SEPI
ENGINEERING &
CONSTRUCTION

TRAFFIC IMPACT ANALYSIS

Emerald Isle Commercial Development

Prepared by
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Prepared for
Ark Consulting Group, PLLC

March 2016

Emerald Isle Commercial Development
Emerald Isle, North Carolina

Traffic Impact Analysis

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I. Executive Summary

A. Site Location

The Emerald Isle Commercial Development is located on the north side of NC 58 (Emerald Drive) between Emerald Landing Drive and the existing Emerald Plantation Shopping Center in Emerald Isle, NC. The proposed development will consist of a 34,200 square foot shopping center and a 2,500 square foot fast food restaurant with drive thru window.

B. Development Description

The proposed development will be constructed in 2016 and will consist of a 34,200 square foot shopping center and a 2,500 square foot fast food restaurant with drive thru window. Access to the development will be provided by one site driveway connection to Emerald Landing Drive. The proposed development parking lot will connect to the existing Emerald Plantation Shopping Center.

This report analyzes and presents the traffic impacts that the proposed development will have on the following intersections:

- Emerald Drive / Coast Guard Road
- Emerald Drive / Islander Drive
- Emerald Drive / Emerald Landing Drive / Mallard Drive
- Emerald Landing Drive / Crew Drive / Site Driveway #1
- Emerald Drive / Emerald Plantation Road / Loon Street

C. Recommendations

The Emerald Isle Commercial Development was analyzed under these conditions: 2015 existing traffic (No Build), 2016 future traffic with the addition of site development (Build) and 2016 future traffic with the addition of site development and NC 58 Corridor Study Improvements (Build with NC 58 Roundabouts). We also studied the impacts of installing a traffic signal (Build with Traffic Signal) and single lane roundabout (Build with NC 58 Roundabouts Improved) at the Emerald Landing Drive/Mallard Drive intersection. Based on the findings of the analyses, the following lane, storage and traffic control measures are recommended in the study area.

Emerald Landing Drive / Crew Drive / Site Driveway #1

- Construct 100 foot northbound right-turn lane
-

Emerald Drive / Emerald Landing Drive / Mallard Drive

- Maintain full movement access
- Install new traffic signal

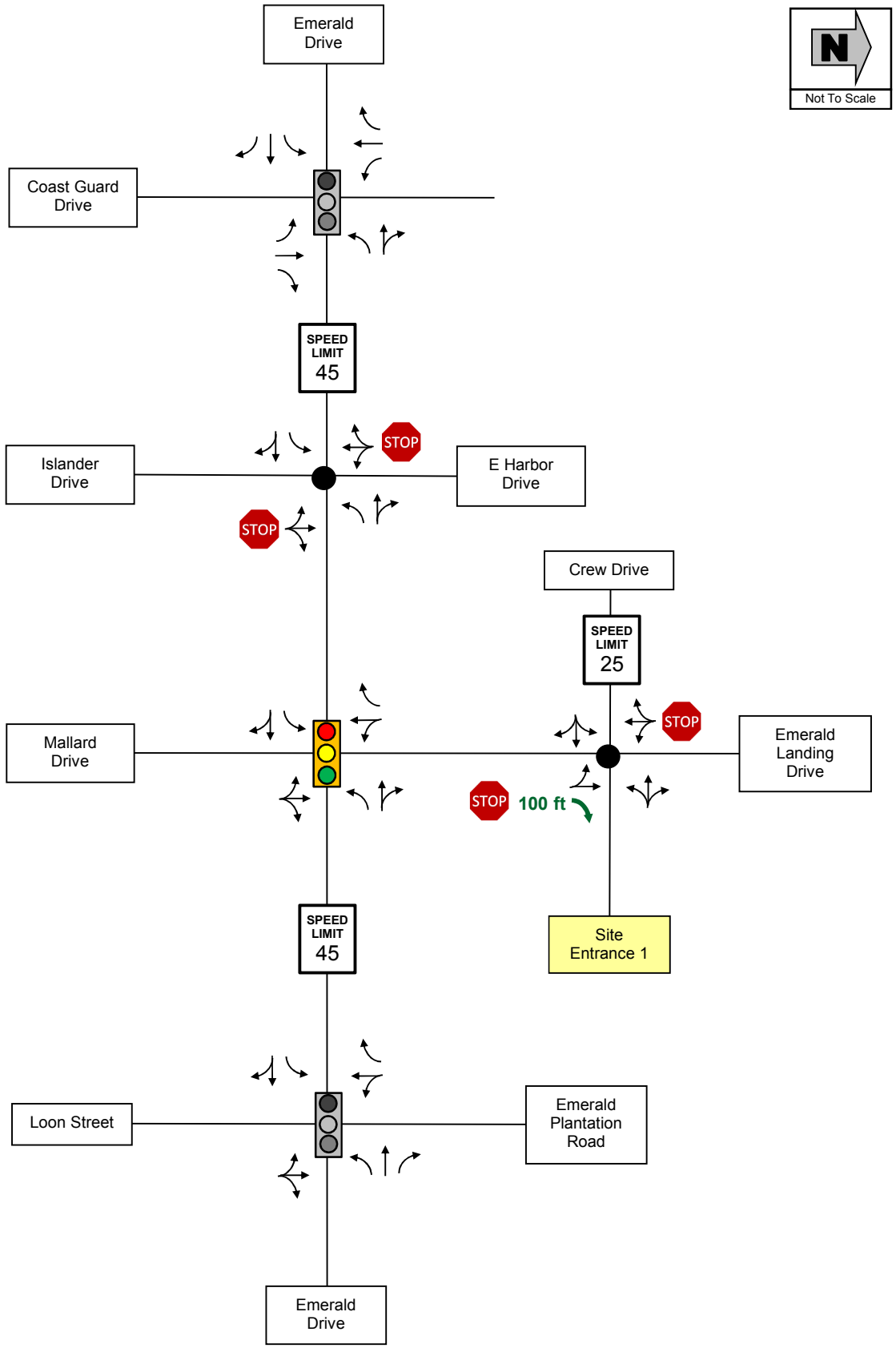
A new northbound right-turn lane (100 feet) is recommended for construction at the intersection of Emerald Landing Drive / Crew Drive and Site Driveway #1 to mitigate site traffic. A new traffic signal is recommended at Emerald Landing Drive/Mallard Drive intersections to mitigate main street left-turn and side street delays. Based on the buildout volumes at this intersection, MUTCD Signal Warrant 3 (Peak Hour) will be met. Minor street right-turn movements were excluded in order to perform a more

conservative warrant analysis. No additional intersections will require improvements due to the construction of the proposed development.

The NC 58 Corridor Study considers the construction of roundabouts at the existing signalized intersections in the study area. Currently all the study intersections operate as full movement. The implementation of the roundabouts will restrict left-turn and thru movement access to/from Islander Drive and Emerald Landing Drive/Mallard Drive, resulting in a significant number of U-turn movements at the adjacent intersections. These U-turning movements will negatively impact the roundabout operations by adding additional volumes and reducing spare capacity.

Therefore, we recommend that full movement access be maintained at the Emerald Landing Drive/Mallard Drive intersection upon the buildout of the proposed site development. We also recommend that NCDOT consider constructing a roundabout at this intersection as part of the NC 58 Corridor study improvements. A traffic signal could serve as an interim traffic control measure until such time as the roundabouts are constructed. It should be noted that no funding or construction schedule has been identified for the corridor improvements. Once the final corridor study recommendations have been completed the project will be scored and prioritized through the Strategic Transportation Initiative process. Therefore, the site development will likely be in place for several years before the roundabout improvements could be constructed.

No additional intersections will require improvements due to the construction of the proposed development. **Figure ES-1** shows the recommended lanes, storage and traffic control at the study area intersections.



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Legend

Existing Lane

New Lane by Developer

Existing Signal

New Signal by Developer

Emerald Isle TIA
Emerald Isle, North Carolina

Recommended Lane Configurations | Figure ES-1

I. Introduction

A. Site Location

The Emerald Isle Commercial Development is located on the north side of NC 58 (Emerald Drive) between Emerald Landing Drive and the existing Emerald Plantation Shopping Center in Emerald Isle, NC. The proposed development will consist of a 34,200 square foot shopping center and a 2,500 square foot fast food restaurant with drive thru window. **Figure 1** shows the general site location of the proposed development.

B. Development Description

The proposed development will be constructed in 2016 and will consist of a 34,200 square foot shopping center and a 2,500 square foot fast food restaurant with drive thru window. Access to the development will be provided by one site driveway connection to Emerald Landing Drive. The proposed development parking lot will connect to the existing Emerald Plantation Shopping Center. **Figure 2** shows a preliminary project site plan and location of the site driveway connections.

C. Type of Studies Undertaken

This report presents trip generation, distribution, traffic analyses, and recommendations for transportation improvements required to meet anticipated traffic demands in conjunction with the development. A scoping meeting was held with the North Carolina Department of Transportation (NCDOT) on November 30, 2015 to discuss the study area intersections, traffic scenarios and pertinent background information to be included in this Traffic Impact Analysis (TIA). This report analyzes impacts of the proposed Emerald Isle Commercial Development under the following conditions: 2015 existing traffic (No Build), 2016 future traffic with the addition of site development (Build) and 2016 future traffic with the addition of site development and NC 58 Corridor Study Improvements (Build with NC 58 Roundabouts). We also studied the impacts of installing a traffic signal (Build with Traffic Signal) and single lane roundabout (Build with NC 58 Roundabouts Improved) at the Emerald Landing Drive/Mallard Drive intersection. The traffic operations optimization and evaluation software Synchro Version 9.0 was used to evaluate the existing signalized and unsignalized intersections. Sidra 4.0 was used to evaluate the operations of roundabouts being proposed along NC 58 Corridor Study.

II. Existing Conditions

A. Study Area Intersections

This report analyzes and presents the traffic impacts that the proposed development will have on the following intersections:

- Emerald Drive / Coast Guard Road
- Emerald Drive / Islander Drive
- Emerald Drive / Emerald Landing Drive / Mallard Drive
- Emerald Landing Drive / Crew Drive / Site Driveway #1
- Emerald Drive / Emerald Plantation Road / Loon Street

Figure 3 shows the existing lane configuration, traffic control, and speed limit at each study area intersection.

B. Description of Roads

NC 58 (Emerald Drive) is a three-lane roadway that runs approximately east-west, south of the project site. The facility stretches from Coast Guard Road to the east past Emerald Plantation Road to the west. Emerald Drive has a posted speed-limit of 45 miles per hour and serves both residential and commercial developments. In the project study area, the facility contains two signalized intersections with Coast Guard Road and Emerald Plantation Drive. There are also two unsignalized intersections with Islander Drive and Emerald Landing Drive / Mallard Drive.

Crew Drive is a two-lane undivided roadway that runs approximately east-west, west of the project site. The facility stretches from Coast Guard Road to the east past Emerald Plantation Road to the west. Crew Drive has a posted speed-limit of 25-mph and serves both residential and commercial developments.

The remaining side streets are Islander Drive, Emerald Landing Drive/Mallard Drive and Emerald Plantation Drive/Loon Street. All are two-lane undivided roadways that run approximately north-south, in the project area. These roadways have a posted speed-limit of 25-mph and primarily serve residential developments.

C. Traffic Count Information

Figure 4 shows the existing AM peak hour (7:00 – 9:00 a.m.) and PM peak hour (4:00 – 6:00 p.m.) traffic volumes for the study area intersections. The counts used to determine these volumes (see **Appendix B)** were conducted by AMT Consulting Engineers and Quality Counts for the following intersections on the respective dates listed in **Table 1** below:

Table 1 – Traffic Count Information

Traffic Count Location	Date of Count
Emerald Drive / Coast Guard Road	7/22/2015
Emerald Drive / Islander Road	12/09/2015
Emerald Drive / Emerald Landing Drive / Mallard Drive	12/09/2015
Emerald Landing Drive / Crew Road / Site Driveway #1	12/09/2015
Emerald Drive / Emerald Plantation Road / Loon Street	7/22/2015

A summer peak factor of 1.5 was applied to the non-summer traffic counts to more accurately reflect the most congested travel times. Traffic volumes throughout the study area were balanced during the AM and PM peak hours to ensure that corridor volumes fell within 5%. Balanced traffic volumes are shown in **Figure 4a**.

D. Land Uses

The land upon which the proposed development is to be constructed currently exists as three separate parcels. Two of the parcels are undeveloped lots, the third is currently occupied by a small commercial business. Residential communities are

located to the north, south and west of the development. The existing Emerald Plantation Shopping Center is located to the east of the proposed development.

E. Existing Signal Phasing / Timing Information

Signal phasing and timing information for the existing signalized intersections (02-0412 and 02-0502) are located in **Appendix C**. The existing signal plans were obtained from the NCDOT Signals and Geometrics Section. Information from the plan related to signal timing offsets and phasing sequences were used for all conditions in this analysis. Minimum green times, yellow and all red times, etc. followed typical NCDOT standards and practices for signalized intersection analysis.

III. Future Conditions

A. Historical Growth Rate

Based on discussions with NCDOT, due to the relatively short build out of the proposed development, it was decided that no future ambient traffic growth would be required for this traffic study.

B. Proposed Public Projects / Private Developments

The NCDOT in conjunction with the Down East Regional Planning Organization is currently completing a corridor study for NC 58 in the project area. The scope of that study includes the entire NC 58 corridor from the NC 24/58 intersection to the US 70 intersection in Morehead City, with a goal to improve traffic flow during peak traffic periods. A preliminary recommendation calls for the installation of roundabouts at four signalized intersections in Emerald Isle: NC 58 / Coast Guard Road, NC 58 / Loon Drive (Emerald Plantation Shopping Center), NC 58 / Mangrove Drive, and NC 58 / Bogue Inlet Drive. It should be noted that no funding or construction schedule has been identified for the corridor improvements. Once the final corridor study recommendations have been completed the project will be scored and prioritized through the Strategic Transportation Initiative process.

According to NCDOT and Town staff, there are no approved private developments in the project study area that generate background traffic for this development.

IV. Proposed Site

A. Development Description

The proposed development will be constructed in 2016 and will consist of a 34,200 square foot shopping center and a 2,500 square foot fast food restaurant with drive thru window. Access to the development will be provided by one site driveway connection to Emerald Landing Drive. The proposed development parking lot will connect to the existing Emerald Plantation Shopping Center. **Figure 2** shows a preliminary project site plan and location of the site driveway connections.

B. Trip Generation

The traffic generation potential of the proposed development was determined using the *ITE Trip Generation Manual* (Institute of Transportation Engineers, 9th Edition, 2012) (**Appendix D**). Land Use Code (LUC) 820 (Shopping Center) and LUC 934 (Fast Food Restaurant with Drive Thru Window) were used to estimate the total peak hour and average daily traffic volumes generated by the existing development. The estimated traffic generation for the development during the AM and PM peak hours as well as during an average workday is summarized in **Table 2**.

No attempt was made to reduce the number of trips by a transit factor or for internal capture (to provide a more conservative vehicle estimate). A pass-by trip reduction of 34% for LUC 820 and 50% for LUC 934 was applied, respectively.

Table 2 – Trip Generation Summary (Vehicles / Hour)

ITE Land Use - LUC	Size	Daily	AM Peak Hour		PM Peak Hour	
			In	Out	In	Out
Shopping Center – 820	34,200 sf	3,381	47	34	141	149
Fast Food Restaurant w/ Drive Thru – 934	2,500 sf	1,240	57	56	41	41
Subtotal		4,621	104	90	184	190
Pass-By Trips		1,770	-42	-42	-70	-70
TOTAL Trips		2,851	62	48	114	120

C. Trip Distribution

The directional traffic patterns, or trip distribution, of the site-generated traffic was determined using the existing AM and PM peak hour traffic characteristics. It was assumed, for purposes of this study, that all site traffic would enter and exit the study area in the same manner as the existing traffic. Distribution percentages into and out of the study area were calculated using projected traffic volumes that enter and exit the study area. The percentages were routed, via shortest path, to and from the proposed development.

D. Proposed Site Access

Access to the development will be provided by one site driveway connection to Emerald Landing Drive. The proposed development parking lot will connect to the existing Emerald Plantation Shopping Center. **Figure 2** shows a location of the existing roadway connections. The internal roadways and parking lots were not examined as part of this study.

E. Build-Out Traffic Volumes

To calculate the 2016 build volumes, site generated trips were applied to the roadway network using the aforementioned distribution methodology. **Figure 5** shows the primary trip distribution percentages and **Figure 6** shows the primary trip volumes. **Figure 7** shows the pass-by trip distribution percentages and **Figure 8** shows the pass-by trip volumes. **Figure 9** shows total site trip volumes. 2016 build-out traffic volumes can be found in **Figure 10**. The impacts of the Emerald Isle Commercial Development's site traffic on the study area intersections was evaluated during the AM and PM peak hours of an average weekday.

V. Capacity Analysis

A. Methodology

Intersection Delay

Intersection levels of service range from "A" to "F," with "A" describing smooth free flow conditions where queues clear through each cycle length, and "F" describing congested, over-saturated conditions, where queues are often forced to wait through multiple cycle lengths prior to traversing an intersection. Other factors, such as a high percentage of trucks or buses within the traffic stream can affect level of service (LOS). The intersection setting, whether it is urban, suburban, or rural, can also affect LOS. For signalized intersections in urban areas, LOS D is generally considered acceptable, while in rural areas, LOS C is considered acceptable.

At unsignalized intersections, a LOS E is generally considered acceptable only if the side street encounters delay. Nevertheless, side streets typically function at a LOS F during peak traffic periods, because the traffic volumes often do not warrant a traffic signal to assist side street traffic. **Table 3** below provides a general description of the various LOS categories and delay ranges:

Table 3 – LOS Descriptions for Intersections

LOS	Description	Signalized Intersections	Unsignalized Intersections
A	Little or no delay	≤ 10 seconds	≤ 10 seconds
B	Short traffic delay	10-20 seconds	10-15 seconds
C	Average traffic delay	20-35 seconds	15-25 seconds
D	Long traffic delay	35-55 seconds	25-35 seconds
E	Very long traffic delay	55-80 seconds	35-50 seconds
F	Unacceptable delay	> 80 seconds	> 50 seconds

As is typical for a traffic impact analysis, each of the study area intersections were first analyzed under existing conditions. The intersections were then analyzed with the addition of site traffic during the build-out year. For this analysis, the following conditions were evaluated:

- No Build: 2015 Existing Traffic
- Build: 2016 Future Traffic with Site Development
- Build with Improvements: 2016 Future Traffic with Site Development and Traffic Signal at Emerald Landing Drive/Mallard Drive Intersection
- Build with NC 58 Roundabouts: 2016 Future Traffic With Site Development and NC 58 Corridor Study Improvements
- Build with NC 58 Roundabouts Improved: 2016 Future Traffic With Site Development and NC 58 Corridor Study Improvements and a Roundabout at Emerald Landing Drive/Mallard Drive Intersection

Synchro Version 9.0 was used to analyze all existing unsignalized intersections. Because overall intersection levels of service are not provided for unsignalized intersections, the results were evaluated on a per-movement basis. Thus, intersection improvements may need to be considered should one or more of the

intersection movements experience a failing LOS. This methodology differs from signalized intersections, where one or more movements at an intersection may be deficient, but no intersection improvements may be necessary as long as the overall intersection LOS does not fall below D.

Synchro Version 9.0 (using HCM delay formulas) was used to analyze all existing signalized intersections. For Existing and Build Conditions, the existing cycle lengths and green splits of each of the signalized intersections were used and LOS and delay values were reported. **Appendix F** contains the Synchro outputs for this analysis.

Sidra 4.0 was used to analyze the proposed roundabout intersections. For Build Conditions with NC 58 Roundabouts, 120-foot diameter single lane roundabouts were assumed. The current corridor study only considers constructing roundabouts at the NC 58 / Coast Guard Road and NC 58 / Loon Drive (Emerald Plantation Shopping Center) intersections. Therefore left-turn and thru movement volumes from the midblock intersections (Islander Drive and Emerald Landing Drive/Mallard Drive) were rerouted to adjacent roundabouts as U-turn movements. For Build Conditions with NC 58 Roundabouts Improved, a 120-foot diameter single lane roundabout was analyzed at the Emerald Landing Drive/Mallard Drive intersection. **Figure 11 & 12** show the rerouted volumes utilized in the roundabout analyses. LOS and delay values were reported based on an 85th percentile saturation rate. **Appendix G** contain the Sidra outputs for all roundabout analyses.

Storage Length Determination
The need for turn-bays was analyzed at each study area intersection. For signalized intersections, Synchro was used to determine the length of turn-bay based upon the projected 95th Percentile queue lengths. For all unsignalized study area intersections, the NCDOT's "Warrant for Left and Right-Turn Lanes" (from the Policy on Street and Driveway Access to North Carolina Highways) nomograph was used for analysis. Because the nomograph does not include turning volumes less than 50 vehicles, only turning movements with volumes greater than 50 vehicles were analyzed. Additionally, when only right-turning volumes exceed 50 vehicles, opposing left-turning volumes or through volumes must exceed 100 vehicles.

B. Capacity Analysis Results
Table 4 shows the results of the intersection analyses. A description of the analysis results follows below. **Appendix F & G** contain the Synchro and Sidra outputs for this analysis.

Emerald Drive / Coast Guard Road
This intersection is currently operating at an overall LOS D during both analyzed peak hours. With the addition of site traffic the intersection is projected to continue to operate at an overall LOS D. With a new traffic signal installed at the Emerald Landing/Mallard Drive intersection, a slight improvement in operations is expected due to optimized signal timings.

The NC 58 Corridor Study considers the construction of roundabouts at the existing signalized intersections in the study area. With the NC 58 Corridor Improvements in

place, the roundabout intersection is projected to operate at LOS D or better on all approaches. The implementation of the roundabouts will restrict left-turn and thru movement access to/from Islander Drive and Emerald Landing Drive/Mallard Drive, resulting in a significant number of U-turn movements at this intersection. These U-turning movements will negatively impact the roundabout operations by adding additional volumes and reducing spare capacity. **Figure 11** shows the rerouted volumes utilized in the roundabout analyses. The Sidra flow scale analysis indicates that a single lane roundabout with north, south and eastbound right turn lanes will provide enough capacity to accommodate 110% of the 2016 buildout condition traffic. Assuming an annual growth rate of 1%, the roundabout would operate well for 10 years before additional lane improvements would be needed. Typically, NCDOT has a desire to construct roundabouts that will have a service life of 20 or more years before improvements are needed.

If a roundabout were constructed at the Emerald Landing/Mallard Drive intersection, the number of U-turn volumes upstream would be greatly reduced. **Figure 12** shows the rerouted volumes utilized in the roundabout analyses. The spare capacity at the Coast Guard Road roundabout would improve to 124% and the roundabout would operate for an additional 22 years before becoming oversaturated.

Emerald Drive / Islander Drive
All movements at this intersection are currently operating at LOS E and F on the minor approaches during the PM peak hour. With the addition of site traffic, all movements are projected to continue to operate poorly on the minor approaches during the PM peak hour. In both scenarios, the poor operations are due to lack of gaps for minor approach traffic. It should be noted that although the LOS and delay reported are poor, the queuing is less than 150 feet. Because of this, no improvements are recommended at this intersection.

The NC 58 Corridor Project will restrict left-turn and thru movement access to/from Islander Drive. The minor street movements expected to improve to LOS C with the corridor project in place.

Emerald Drive / Emerald Landing Drive/ Mallard Drive
All movements at this intersection are currently operating at LOS F on the minor approaches during the PM peak hour. With the addition of site traffic, the minor street approaches will continue to operate at LOS F with considerably more delay. The northbound approach delay is expected to exceed 186 seconds during the peak hour. The southbound approach delay is expected to exceed 921 seconds in the peak hour. The southbound queuing is expected to extend beyond to Site Entrance #1 and prevent vehicles from exiting the development.

The poor approach delay and queuing is based on a lack of gaps due to heavy main street volumes. These delays and queuing can be mitigated by installing a new traffic signal. Based on the buildout volumes at this intersection, the MUTCD Signal Warrant 3 (Peak Hour) will be met. Minor street right-turn movements were excluded in order to perform a more conservative warrant analysis. Because of this, a traffic signal is recommended at this intersection. Appendix E shows the warrant

worksheets for peak hour volumes. With a new traffic signal in place, the intersection is expected to operate at an overall LOS C.

The NC 58 Corridor Project will restrict left-turn and thru movement access to/from Emerald Landing Drive/Mallard Drive, resulting in a significant number of U-turn movements at the adjacent intersections. These U-turning movements will negatively impact the roundabout operations by adding additional volumes and reducing spare capacity. **Figure 11 & 12** show the rerouted volumes utilized in the roundabout analyses.

We recommend full movement access be maintained at this intersection and that NCDOT consider including a roundabout at Emerald Landing Drive/Mallard Drive as part of the NC 58 Corridor study improvements. If a single lane roundabout with single lane approaches were constructed at this intersection, it is expected to operate LOS D or better on all approaches with spare capacity of 112%.

Emerald Landing Drive / Crew Road / Site Driveway #1
All movements at this intersection are currently operating at LOS A during both analyzed peak hours. With the addition of site traffic, the minor street approaches will operate at LOS B and C during both peak hour periods. An exclusive northbound right-turn lane is recommended in order to mitigate delays and queuing associated with the increase in site traffic. The NC 58 Corridor Study Improvements are not anticipated to have a significant impact on the operations of this intersection.

Emerald Drive / Emerald Plantation Road/Loon Street
This intersection is currently operating at LOS C during both analyzed peak hours. With the addition of site traffic the intersection is projected to continue to operate at LOS C. If a new traffic signal is installed at the Emerald Landing/Mallard Drive intersection, a slight improvement in operations is expected due to optimized signal timings.

The NC 58 Corridor Study considers the construction of roundabouts at the existing signalized intersections in the study area. With the NC 58 Corridor Improvements in place, the roundabout intersection is projected to operate at an overall LOS C or better on all approaches. The implementation of the roundabouts will restrict left-turn and thru movement access to/from Islander Drive and Emerald Landing Drive/Mallard Drive, resulting in a significant number of U-turn movements at this intersection. These U-turning movements will negatively impact the roundabout operations by adding additional volumes and reducing spare capacity. **Figure 11** shows the rerouted volumes utilized in the roundabout analyses. The Sidra flow scale analysis indicates that a single lane roundabout with a north and westbound slip lane will only provide enough spare capacity to accommodate 86% of the 2016 buildout condition traffic. This means that a dual lane roundabout may be needed to accommodate the traffic at this intersection. The larger roundabout would require widening of NC 58, which exists as a three lane roadway in the project vicinity.

If a roundabout were constructed at the Emerald Landing/Mallard Drive intersection, the number of U-turn volumes downstream would be greatly reduced. **Figure 12**

shows the rerouted volumes utilized in the roundabout analyses. The spare capacity of the roundabout at Emerald Plantation/Loon Street would improve to 106%.

Table 4 – Level of Service and Delay (sec/veh) Results

Intersection	No Build		Build		Build with Traffic Signal		Build with NC 58 Roundabouts		Build with NC 58 Roundabouts Improved	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Emerald Dr / Coast Guard	D(36.4)	D(42.9)	D(36.3)	D(33.8)	C(34.9)	C(27.4)	D*	C*	C*	C*
Emerald Dr / Islander Dr	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EBL	A(8.4)	A(9.1)	A(8.5)	A(9.3)	A(8.5)	A(9.3)	-	-	-	-
WBL	A(8.5)	A(9.4)	A(8.6)	A(9.6)	A(8.6)	A(9.6)	-	-	-	-
NBLTR	C(22.2)	**F(93.7)**	C(23.7)	**F(134.9)**	C(23.7)	**F(134.9)**	B(12.1)	C(21.4)	B(13.0)	C(17.9)
SBLTR	C(23.5)	**E(39.6)**	D(25.0)	**E(47.6)**	D(25.0)	**E(47.6)**	B(11.7)	C(17.1)	B(12.6)	C(15.7)
Emerald Dr / Mallard Dr	N/A	N/A	N/A	N/A			N/A	N/A		
EBL	A(8.4)	A(9.2)	A(8.7)	B(10.0)			-	-		
WBL	A(8.4)	A(9.3)	A(8.3)	A(9.2)	C(34.2)	C(28.3)	-	-	C*	D*
NBLTR	C(18.2)	**F(59.6)**	C(23.9)	**F(186.7)**			B(13.0)	C(21.2)		
SBLT	C(22.8)	**F(64.7)**	**E(48.8)**	**F(921.5)**			-	-		
SBR	B(11.2)	B(13.3)	B(12.4)	C(15.8)			B(14.5)	E(38.4)		
Site Drive #1 / Crew Rd	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EBLTR	A(7.2)	A(0.0)	A(7.2)	A(9.5)	A(7.2)	A(9.5)	A(7.2)	A(9.5)	A(7.2)	A(9.5)
WBLTR	A(7.2)	A(7.3)	A(7.4)	A(7.7)	A(7.4)	A(7.7)	A(7.4)	A(7.7)	A(7.4)	A(7.7)
NBLTR	A(8.9)	A(9.4)	B(10.8)	C(15.3)	B(10.8)	C(15.3)	B(10.8)	C(15.3)	B(10.8)	C(15.3)
SBLTR	A(9.2)	A(9.7)	B(10.7)	B(14.8)	B(10.7)	B(14.8)	B(10.7)	B(14.8)	B(10.7)	B(14.8)
Emerald Dr / Loon St	B(17.9)	C(33.3)	B(16.4)	C(29.9)	B(14.9)	C(24.6)	C*	C*	C*	C*

**Worst movement LOS reported from SIDRA; represents movement with highest degree of saturation*

Recommendations

A. Recommended Improvements

The Emerald Isle Commercial Development was analyzed under these conditions: 2015 existing traffic (No Build), 2016 future traffic with the addition of site development (Build) and 2016 future traffic with the addition of site development and NC 58 Corridor Study Improvements (Build with NC 58 Roundabouts). We also studied the impacts of installing a traffic signal (Build with Traffic Signal) and single lane roundabout (Build with NC 58 Roundabouts Improved) at the Emerald Landing Drive/Mallard Drive intersection. Based on the findings of the analyses, the following lane, storage and traffic control measures are recommended in the study area.

Emerald Landing Drive / Crew Drive / Site Driveway #1

- Construct 100 foot northbound right-turn lane

Emerald Drive / Emerald Landing Drive / Mallard Drive

- Maintain full movement access
- Install new traffic signal

A new northbound right-turn lane (100 feet) is recommended for construction at the intersection of Emerald Landing Drive / Crew Drive and Site Driveway #1 to mitigate

site traffic. A new traffic signal is recommended at Emerald Landing Drive/Mallard Drive intersections to mitigate main street left-turn and side street delays. Based on the buildout volumes at this intersection, MUTCD Signal Warrant 3 (Peak Hour) will be met. Minor street right-turn movements were excluded in order to perform a more conservative warrant analysis. No additional intersections will require improvements due to the construction of the proposed development.

The NC 58 Corridor Study considers the construction of roundabouts at the existing signalized intersections in the study area. Currently all the study intersections operate as full movement. The implementation of the roundabouts will restrict left-turn and thru movement access to/from Islander Drive and Emerald Landing Drive/Mallard Drive, resulting in a significant number of U-turn movements at the adjacent intersections. These U-turning movements will negatively impact the roundabout operations by adding additional volumes and reducing spare capacity.

Therefore, we recommend that full movement access be maintained at the Emerald Landing Drive/Mallard Drive intersection upon the buildout of the proposed site development. We also recommend that NCDOT consider constructing a roundabout at this intersection as part of the NC 58 Corridor study improvements. A traffic signal could serve as an interim traffic control measure until such time as the roundabouts are constructed. It should be noted that no funding or construction schedule has been identified for the corridor improvements. Once the final corridor study recommendations have been completed the project will be scored and prioritized through the Strategic Transportation Initiative process. Therefore, the site development will likely be in place for several years before the roundabout improvements could be constructed.

No additional intersections will require improvements due to the construction of the proposed development. **Figure 13** shows the recommended lanes, storage and traffic control at the study area intersections.