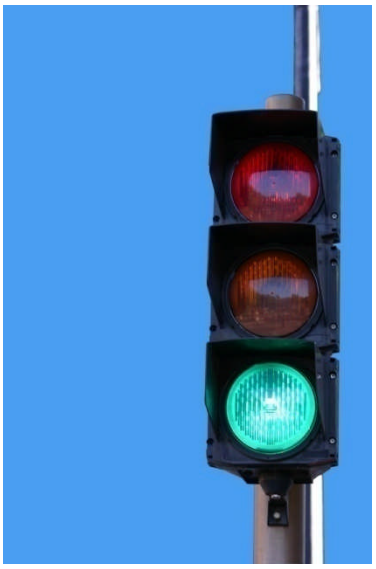
EXECUTIVE SUMMARY

Marina Loft Development

Broward County, Florida
(DRC 51-R-12)



traffic study

prepared for:
Cymbal Development

Traf Tech
ENGINEERING, INC.

July 2013

EXECUTIVE SUMMARY

Marina Loft is a proposed mixed-use development planned to be located on the north side of SW 5th Street both east and west of SW 3rd Avenue in the City of Fort Lauderdale in Broward County, Florida. More specifically, the project site is bounded by the New River on the north, SW 5th Street and SW 4th Court on the south, the FEC railroad on the east, and SW 4th Avenue on the west. Figure 1 on the following page shows the location of the project site as well as the transportation network located in the immediate vicinity of the project site.

Traf Tech Engineering, Inc. was retained by Cymbal Development to conduct a traffic study in connection with the subject project. The study addresses trip generation, access to the site, the traffic impacts on the nearby transportation network, and potential roadway improvement intended to mitigate the new trips generated by the project, if any.

Existing Land Uses

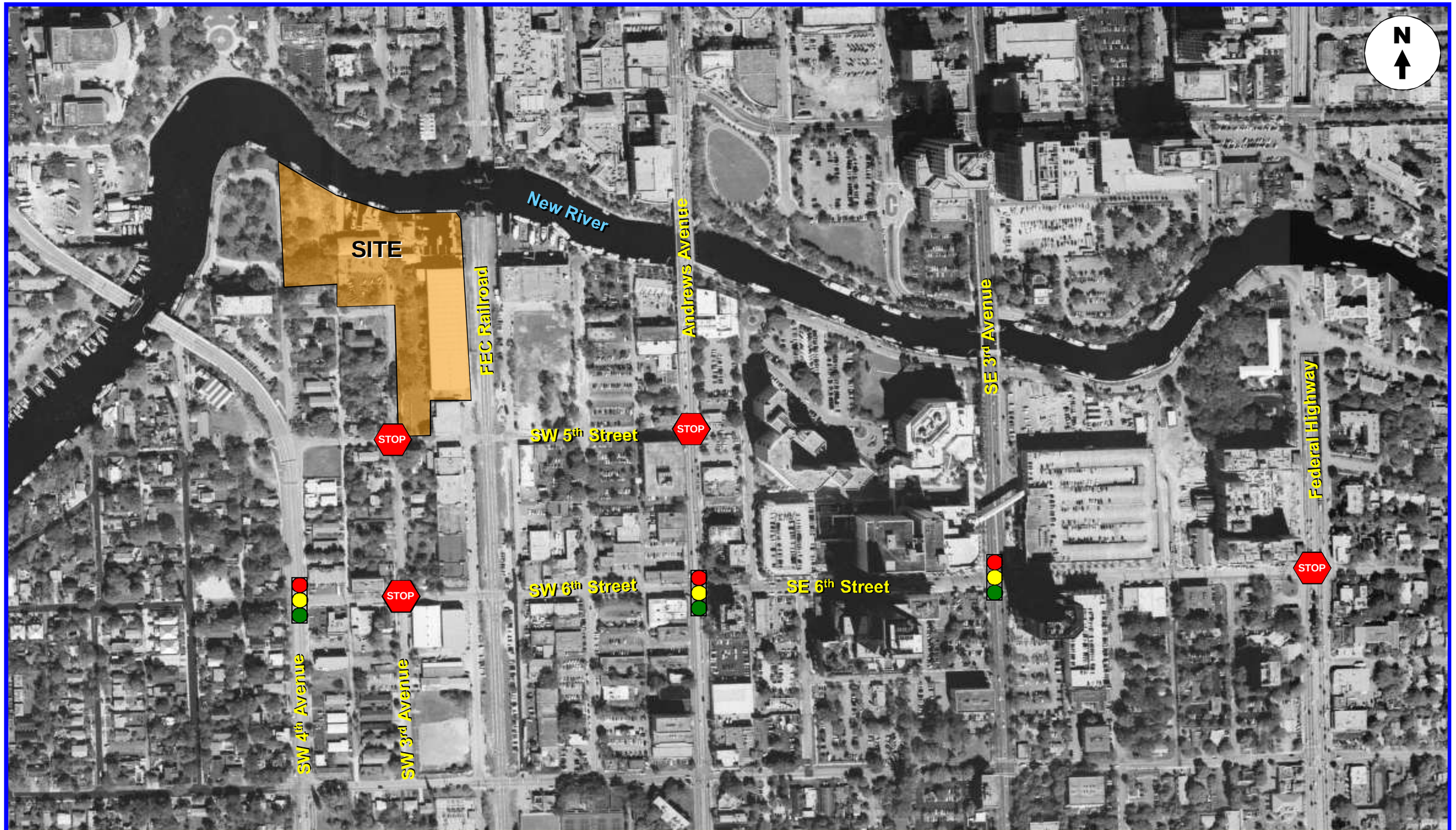
The project site is divided in three parcels (East, Center, and West) and currently contains several marine-related developments currently in operation. This project includes the re-development of all three parcels. On the east parcel, there is an existing development called River Front Marina. On the center parcel, a boat repair facility is currently in place called Mid River Marina and on the west parcel boat storage.

Proposed Land Uses and Access

The existing developments located on the three parcels will be replaced with a mixed-use development consisting of residential use, retail use, restaurants, and a boat storage facility. The project will be developed in three phases. The proposed land uses and intensities associated with each phase are presented below:

PHASE 1 (YEAR 2015)
- 196 boat storage units (existing)
- 255 residential units
- 3,717 square-foot restaurant
- 433 parking spaces in a parking garage on the west parcel

PHASE 2 (YEAR 2017)
- 261 additional residential units
- 5,121 additional square feet of restaurant space
- 6,015 square feet of retail use
- 442 additional parking spaces in a parking garage on the center parcel



TrafTech ENGINEERING, INC.

PROJECT LOCATION MAP

FIGURE 1
Marina Loft
Fort Lauderdale, Florida

PHASE 3 (YEAR 2020)

- 482 additional residential units (including 6 live/work units)
- 3,078 additional square feet of restaurant space
- 11,471 additional square feet of retail use
- 438 additional parking spaces in a parking garage on the east parcel

The proposed access for the mixed-use development is planned to be provided via three access driveways (one for each parking garage). The west parcel parking structure will be served by one access driveway located off of SW 4th Avenue, the center parking garage will be served by an access driveway located off of SW 4th Court, the parking structure located on the east parcel will be served by an inbound-only driveway and an outbound-only driveway both located off of SW 3rd Avenue.

Roadway System

Three major north-south roadways and one east-west collector facility are located in the vicinity of the project site. The three north-south roadways include SW 7th Avenue/SW 4th Avenue, Andrews Avenue, and SE 3rd Avenue. All these facilities provide two through lanes in each direction. The east-west facility located near the project site includes SW 6th Street. This roadway generally provides one through lane in each direction and extends from Federal Highway on the east to west of SW 4th Avenue.

In addition to the above major roadways, SW 3rd Avenue, SW 4th Avenue and SW 4th Court provide direct access to the project site. These roadways provide one through lane in each direction.

Trip Generation

The trip generation for the proposed Marina Loft development was based on information contained in the Institute of Transportation Engineer's (ITE) *Trip Generation* manual (8th Edition). According to the subject ITE manual, the most appropriate "land use" categories for the subject project are ITE's Land Use 232 – High Rise Residential Condominium/Townhouse, ITE's Land Use 814 – Specialty Retail, and ITE's Land Use 931 – Quality Restaurant.

The Phase 1 trips consist of approximately 1,519 daily trips, approximately 106 AM peak hour trips (22 inbound and 84 outbound), and approximately 130 PM peak hour trips (82 inbound and 48 outbound).

The Phase 2 trips consist of approximately 1,936 daily trips, approximately 109 AM peak hour trips (22 inbound and 87 outbound), and approximately 158 PM peak hour trips (96 inbound and 62 outbound).

The Phase 3 trips consist of approximately 2,826 daily trips, approximately 171 AM peak hour trips (33 inbound and 138 outbound), and approximately 233 PM peak hour trips (140 inbound and 93 outbound).

Trip Distribution

The trip distribution and traffic assignment for the proposed project was based on knowledge of the study area, examination of the surrounding roadway network characteristics, review of current traffic volumes, and existing land use patterns. The trip distribution assumed for the Marina Loft mixed-use development is summarized below:

- 15% to and from the north via NW 7th Avenue (north of Broward Boulevard)
- 10% to and from the north via South Andrews Avenue
- 2% to and from the north via SE 3rd Avenue
- 10% to and from the south via SW 4th Avenue (south of Davie Boulevard)
- 5% to and from the south via South Andrews Avenue
- 3% to and from the south via SE 3rd Avenue
- 5% to and from the east via SE 6th Street/SE 7th Street east of SE 3rd Avenue
- 5% to and from the east via Broward Boulevard
- 25% to and from the west via Broward Boulevard
- 5% to and from the east via Davie Boulevard
- 15% to and from the west via Davie Boulevard

Level of Service Analyses

Intersection capacity analyses were performed for the seven study intersections. The analyses were undertaken following the capacity/level of service procedures outlined in the Highway Capacity Manual using SYNCHRO. The results of the intersection analyses are summarized in Tables 1 through 6.

TABLE 1 Intersection Level of Service – Signalized Intersections Marina Loft – Phase 1			
		Future Traffic Conditions	
Intersection	2012 Existing	2015 Without Phase 1	2015 With Phase 1
Broward/SW 7th Avenue	D (D)	E (E)	E (E)
SW 4th Ave/SW 6th St	A (B)	C (E)	C (E)
SW 4th Ave/Davie Blvd	C (C)	D (D)	D (D)
SW 6th St/Andrews	B (B)	B (B)	B (B)
SE 6th St/SE 3rd Ave	A (B)	A (B)	A (B)

Source: Synchro Software. LEGEND: AM Peak (PM Peak)

As indicated in Table 1, all signalized intersections are currently operating adequately. Level of service deficiencies are expected in the year 2015 without the Marina Loft development. The Marina Loft Phase 1 development will not cause any of the signalized intersection to degrade in level of service (the deficient intersections will remain deficient at level of service "E"). However, signal timing fine-tuning is recommended for the intersection of SW 4th Avenue and SW 6th Street in order to improve the side-street operation.

TABLE 2 Intersection Level of Service – Stop Control Intersections Marina Loft – Phase 1			
		Future Traffic Conditions	
Intersection/Movements	2012 Existing	Year 2015 Without Phase 1	Year 2015 With Phase 1
SW 6th Street/SW 3rd Ave	**A (A)**	**B (B)**	**C (C)**
- NB	B (C)	C (E)	C (F)
- SB	B (C)	B (E)	C (F)
- EB Left-Turn	A (A)	A (A)	A (A)
- WB Left-Turn	A (A)	A (A)	A (A)
SW 5th Street/SW 3rd Ave	**A (A)**	**A (A)**	**A (A)**
- NB Left-Turn	A (A)	A (A)	A (A)
- SB Left-Turn	A (A)	A (A)	A (A)
- EB	A (A)	A (A)	A (A)
- WB	A (A)	A (A)	B (A)

Source: Synchro Software. LEGEND: AM Peak (PM Peak)

As indicated in Table 2, the northbound and southbound approaches of the SW 6th Street/SW 3rd Avenue intersection are projected to experience less-than-desirable delay during afternoon peak period.

Therefore, it is recommended that a second northbound and a second southbound lane be added to the intersection in order to operate both approaches with a shared left-turn/through lane and an exclusive right-turn lane.

TABLE 3
Intersection Level of Service – Signalized Intersections
Marina Loft – Phase 2

Intersection	2012 Existing	Future Traffic Conditions	
		2015 With Phase 1	2017 With Phase 2
Broward/SW 7th Avenue	D (D)	E (E)	E (E)
SW 4th Ave/SW 6th St	A (B)	C (E)	C (E)
SW 4th Ave/Davie Blvd	C (C)	D (D)	D (D)
SW 6th St/Andrews	B (B)	B (B)	B (C)
SE 6th St/SE 3rd Ave	A (B)	A (B)	A (B)

Source: Synchro Software. LEGEND: AM Peak (PM Peak)

As indicated in Table 3, at the buildout year of Phase 2 level of service "E" conditions are projected for the Broward/SW 7th Avenue intersection and the SW 4th Avenue/SW 6th Street intersection. Since the Broward/SW 7th Avenue consists of the intersection of a County roadway and an FDOT facilities, transit oriented concurrency will address the projected deficiency at this location. Moreover, signal timing fine-tuning is recommended for the intersection of SW 4th Avenue and SW 6th Street in order to improve the side-street operation.

TABLE 4
Intersection Level of Service – Stop Control Intersections
Marina Loft – Phase 2

Intersection/Movements	2012 Existing	Future Traffic Conditions	
		Year 2015 With Phase 1	Year 2017 With Phase 2
SW 6th Street/SW 3rd Ave	**A (A)**	**C (C)**	D (D)
- NB	B (C)	C (F)	D (F)
- SB	B (C)	C (F)	D (F)
- EB Left-Turn	A (A)	A (A)	A (A)
- WB Left-Turn	A (A)	A (A)	A (A)
SW 5th Street/SW 3rd Ave	**A (A)**	**A (A)**	**A (A)**
- NB Left-Turn	A (A)	A (A)	A (A)
- SB Left-Turn	A (A)	A (A)	A (A)
- EB	A (A)	A (A)	B (A)
- WB	A (A)	B (A)	B (B)

Source: Synchro Software. LEGEND: AM Peak (PM Peak)

As presented in Table 4, the northbound and southbound approaches of the SW 6th Street/SW 3rd Avenue intersection are projected to operate at level of service "F". Therefore, it is recommended that a second northbound lane and a second southbound lane be added to the intersection in order to operate both approaches with a shared left-turn/through lane and an exclusive right-turn lane.

TABLE 5
Intersection Level of Service – Signalized Intersections
Marina Loft – Phase 3

Intersection	2012 Existing	Future Traffic Conditions	
		2017 With Phase 2	2020 With Phase 3
Broward/SW 7th Avenue	D (D)	E (E)	E (F)
SW 4th Ave/SW 6th St	A (B)	C (E)	C (F)
SW 4th Ave/Davie Blvd	C (C)	D (D)	D (D)
SW 6th St/Andrews	B (B)	B (C)	B (C)
SE 6th St/SE 3rd Ave	A (B)	A (B)	A (B)

Source: Synchro Software. LEGEND: AM Peak (PM Peak)

Level of service "F" condition is expected for the Broward/SW 7th Avenue intersection and the SW 4th Avenue/SW 6th Street intersection during the buildout of Phase 3 in 2020. As indicated previously, transit oriented concurrency will address the projected deficiency at this Broward Boulevard location. Moreover, signal timing fine-tuning is recommended for the intersection of SW 4th Avenue and SW 6th Street in order to improve the side-street operation.

The proposed signal timing optimization consists of transferring green time (approximately 14 seconds) from the north-south through phase to the east-west phase. Additionally, the timing for the southbound left-turn protected phase was increased from 12 seconds to 16 seconds. The cycle length remained at 80 seconds in order to maintain Broward County's coordination along SW 7th/4th Avenue.

TABLE 6 Intersection Level of Service – Stop Control Intersections Marina Loft – Phase 3			
		Future Traffic Conditions	
Intersection/Movements	**2012 Existing**	**Year 2017 With Phase 2**	**Year 2020 With Phase 3**
SW 6th Street/SW 3rd Ave	**A (A)**	**D (D)**	**E (E)**
- NB	B (C)	D (F)	D (F)
- SB	B (C)	D (F)	F (F)
- EB Left-Turn	A (A)	A (A)	A (A)
- WB Left-Turn	A (A)	A (A)	A (A)
SW 5th Street/SW 3rd Ave	**A (A)**	**A (A)**	**A (A)**
- NB Left-Turn	A (A)	A (A)	A (A)
- SB Left-Turn	A (A)	A (A)	A (A)
- EB	A (A)	B (A)	B (B)
- WB	A (A)	B (B)	B (B)

Source: Synchro Software. LEGEND: AM Peak (PM Peak)

As indicated in Table 6, the northbound and southbound approaches of the SW 6th Street/SW 3rd Avenue intersection are projected to fail. If right-of-way is available, it is recommended that separate eastbound and westbound left-turn lanes be provided along SW 6th Street and two approach lanes on both the north and south legs of the intersection.

The results of the level of service analyses are divided into two parts: 1) regional impacts and 2) local impacts.

Regional Traffic Impacts

The regional impacts (intersection of Broward Boulevard/SW 7th Avenue and Davie Boulevard/SW 4th Avenue) are addressed by Broward County's Transit Oriented Concurrency. Broward County has a Transit Oriented Concurrency (TOC) system. The TOC System divides Broward County into 10 Concurrency Districts. These districts are designated as Transportation Concurrency Districts. The District boundaries, as well as the transit improvements within the districts, are the result of extensive consultations with the municipalities. Transportation Concurrency assessments are based on a five-year Transit Development Plan (TDP) adopted by the County Commission. The Transportation Concurrency Assessment is calculated as the total peak-hour trip generation of the proposed development, multiplied by a constant dollar figure for each District, that represents the cost per trip of all the TDP enhancements in that District. The revenues from Transportation Concurrency Assessments must be used to fund transit enhancements in the District.

Level of service deficiencies are currently found at the intersection of Broward Boulevard and SW 7th Avenue (the intersection of two trafficways). The Marina Loft mixed-use project will impact this intersection. Moreover, the eastbound left-turn movement of the intersection of Davie Boulevard and SW 4th Avenue is also experiencing some level of service deficiencies and the Marina Loft project will impact the subject movement. However, TOC will address the project's traffic impacts at these two major regional intersections.

Local Traffic Impacts

The local street system that will be negatively impacted by the proposed project include SW 6th Street (from SW 4th Avenue to east of SW 3rd Avenue) and SW 3rd Avenue north and south of SW 6th Street. In order to mitigate the local street system, the improvements documented previously should be considered, for each of the three development phases. Additionally, bicycle racks should be provided on the development associated with each phase as well as public transportation information in order to encourage non-automobile mode of transportation.

Sidewalk connectivity to the future Wave Stations located on SE 6th Street, east of Andrews Avenue, and Andrews Avenue, south of 6th Street, shall be provided as follows:

- "Complete Streets" concept along SW 3rd Avenue (Project site to SW 6th Street)

- "Compete Streets" concept along SW 6th Street (SW 3rd Avenue to Andrews Avenue)

The above "Complete Streets" concept will tie into the existing sidewalk system located on both S. Andrews Avenue and SE 6th Street. The signalized intersection of South Andrews Avenue and 6th Street already has ADA ramps and pedestrian features to safely accommodate pedestrians through the subject intersection in order to access the future Wave stations.

If acceptable to the residents located on the west side of the SW 7th Avenue/SW 4th Avenue Bridge over the new River, and south of the New River, install a traffic calming devices (such as a speed hump) along SW 5th Avenue/SW 5th Street (the segment located west of SW 7th Avenue/SW 4th Avenue). This improvement is intended to slow down speeds along the subject residential neighborhood.

Ingress/Egress Driveways

As documented in the Marina Lofts Traffic Study (Revised April 29, 2013), the existing traffic counts documented in Figure 3a of the traffic study, the project trips summarized in Figures 4a, 5a, and 6a, the background traffic conditions depicted in Figures 7a, 8a, and 9a, as well as the total traffic volumes presented in Figures 10a, 11a, and 12a, almost all of the traffic volume projected at the SW 4th Avenue driveway, the SW 4th Court entrance/exit driveway, and the SW 3rd Avenue ingress/egress driveway is associated with the Marina Loft development. For this reason, minimal to no queuing is projected at the three garage entrance/exit driveways.

Link Evaluation

A roadway link analysis was conducted for the study area. All roadway segments are currently operating at an acceptable level of service and will continue to operate adequately with the proposed project in place (all three phases).

Construction Traffic

All construction related traffic will be encouraged to arrive via SW 7th/4th Avenue and will access the site from SW 3rd Avenue. All construction vehicles will be "stored" on site in order to avoid negative impacts to the surrounding land uses, especially the residential homes. If required by the City of Fort Lauderdale, a construction "staging" plan will be developed as part of this project.

Mitigation Plan

In order to mitigate the traffic impacts created by the project, the following improvements should be considered for the Marina Loft Development:

PHASE 1 (Year 2015) - Mitigation

- After 75% occupancy for Phase 1, the consulting team will conduct AM and PM peak period field observations to determine if signal timing fine tuning is warranted at the intersection of SW 4th Avenue and SW 6th Street. If warranted, the consulting team will contact Broward County Traffic Engineering Division and request signal timing optimization from their computerized signal system based on the consulting team's input.

- Prior to CO for Phase 1, construct bicycle lanes adjacent to the project site along SW 4th Avenue. The typical section of the roadway segment where the bicycle lanes are being added will comply with applicable City of Fort Lauderdale engineering standards.

- Prior to CO for Phase 1, construct a Water Taxi Shelter, as depicted on Sheets C-3 and A-003. Prior to CO for Phase 1, expand the Riverwalk public access route adjacent to the Phase 1 site, as depicted on Sheets A-600 and LA3.06.

- Prior to CO for Phase 1, provide public docking along the project's seawall, as depicted on Sheet C-3 and A-003.

- Prior to CO for Phase 1, provide resident bicycle storage rooms on the ground floor of the parking garage, as depicted on Sheet A-006. The storage room will be lit, secured, and will store approximately 30 bicycles (250 square feet).

- Prior to CO for Phase 1, design and construct a second northbound (150 feet of storage length) and a second southbound (150 feet of storage length) lane to the intersection of SW 3rd Avenue and SW 6th Street to operate both approaches with a shared left-turn/through lane and an exclusive right-turn lane. The turn lanes will comply with applicable City of Fort Lauderdale design standards.

- Prior to CO for Phase 1, provide one (1) bicycle rack within Phase 1, as depicted on Sheet A-003 for public use. After 75% occupancy of Phase 1, the consulting team will evaluate SW 5th Avenue/SW 5th Street across from Esplanade to determine if traffic calming is warranted. If traffic calming is warranted, install speed humps or similar traffic calming devices. This effort will be coordinated with the City of Fort Lauderdale and the affected nearby residents.

- Prior to CO for Phase 1, the consulting team will review and improve safety measures at the merge condition associated with the entrance from SW 5th Avenue/SW 5th Street into the southbound lanes of SW 4th Avenue, safety improvements might include additional signage, markings, trimming landscaping on public rights-of-way or minor geometric configurations, as approved by Broward County Engineering and City of Fort Lauderdale. After 75% occupancy of Phase 1, provide route and schedule information to tenants and patrons for alternative modes of transportation such as mass transit, B-cycle stations, The Wave Streetcar, and Water Taxi. The information shall be posted on a website or at kiosks/information stations in visible and conspicuous areas within the project sites of each phase, as depicted on Sheet A-004.

- Prior to CO for Phase 1, provide advance warning signs advising trucks of the low bridge crossing at SW 4 Avenue and SW 5 Avenue. The signs and devices shall be placed in advance of the intersection of SW 4th Avenue and SW 4th Court.

PHASE 2 (Year 2017) - Mitigation

- After 75% occupancy for Phase 2, the consulting team will conduct AM and PM peak period field observations to determine if signal timing fine tuning is warranted at the intersection of SW 4th Avenue and SW 6th Street. If warranted, the consulting team will contact Broward County Traffic Engineering Division and request signal timing optimization from their computerized signal system based on the consulting team's input.

- Prior to CO for Phase 2, construct bicycle lanes adjacent to the project site along SW 4th Court. The typical section of the roadway segment where the bicycle lanes are being added will comply with applicable City of Fort Lauderdale engineering standards.

- Prior to CO for Phase 2, expand the Riverwalk public access route adjacent to the Phase 2 site, as depicted on Sheets A-600 and LA3.06.

- Prior to CO for Phase 2, provide resident bicycle storage rooms on the ground floor of the parking garage, as depicted on Sheet A-006. The storage room will be lit, secured, and will store approximately 24 bicycles (190 square feet).

- Prior to CO for Phase 2, provide one (1) bicycle rack within Phase 2 (as depicted on Sheet A-003), as well as route and schedule information on alternate modes of transportation at kiosks/information stations in visible and conspicuous areas, as depicted on Sheet A-004.

PHASE 3 (Year 2020) - Mitigation

- After 75% occupancy for Phase 3, the consulting team will conduct AM and PM peak period field observations to determine if signal timing fine tuning is warranted at the intersection of SW 4th Avenue and SW 6th Street. If warranted, the consulting team will contact Broward County Traffic Engineering Division and request signal timing optimization from their computerized signal system based on the consulting team's input.

- Prior to CO and if right-of-way is available, design and construct separate eastbound and westbound left-turn lanes along SW 6th Street and SW 3rd Avenue. These turn lanes will have a storage dimension of 50 feet.

- Prior to CO for Phase 3, expand the Riverwalk public access route adjacent to the Phase 3 site, as depicted on Sheets A-600 and LA3.06.

- Prior to CO for Phase 3, provide one (1) bicycle rack and one (1) B-Cycle station within Phase 3, as depicted on Sheet A-006, as well as route and schedule information on alternate modes of transportation at kiosks/information stations in visible and conspicuous areas, as depicted on Sheet A-004.

- Prior to CO for Phase 3, provide resident bicycle storage rooms on the ground floor of the parking garage, as depicted on Sheet A-006. The storage room will be lit, secured, and will store approximately 20 bicycles (140 square feet).

- Continue to allow transient and day-use of marina dockage.

- Prior to CO for Phase 3, within available right-of-way, implement "Complete Streets" principles on SW 3rd Avenue right-of-way between the New River and SW 6th Street, as can be accommodated without the need to relocate power poles or utilities. The travel way design shall incorporate a balance between pedestrian realm connectivity (sidewalk), bicycle lane facilities with safe pedestrian crossings, enhanced traffic calming, sustainable green streets that allow for appropriate drainage and transit amenities.

- Prior to CO for Phase 3, within available right-of-way, implement "Complete Streets" principles along SW 6th Street between SW 4th Avenue and Andrews Avenue, as can be accommodated without the need to relocate power poles or utilities. Wherever possible, the travel way design shall meet the intent of the New River Master Plan streetscape section, a balance between pedestrian realm connectivity (sidewalk), bicycle lane facilities with safe pedestrian crossings, enhanced traffic calming, sustainable green streets that allow for appropriate drainage and transit amenities that provide connections to planned Wave Streetcar stations.