Kimley»Horn

March 20, 2020

Firat Akcay
City of Miami Beach
Transportation Department
1688 Meridian Avenue, Suite 801
Miami Beach, Florida 33139

Re: 1910 Alton Road
Miami Beach, Florida
Traffic Assessment

Dear Mr. Akcay:

Kimley-Horn and Associates, Inc. has performed a traffic assessment for the proposed 1910 Alton Road redevelopment in Miami Beach, Florida. Currently, the site is occupied by a vacant 6,364 square-foot office. The proposed redevelopment consists of a 4,000 square-foot of art gallery, one (1) multifamily residential unit, and 8,000 square feet of office space. A project location map and conceptual site plan is provided in Attachment A-1.

The traffic assessment's methodology is consistent with the requirements outlined by the City of Miami Beach. Methodology correspondence detailing the study requirements is provided in Attachment B-1. The following sections summarize the trip generation analysis, valet analysis, and transportation demand management (TDM) strategies. Note that the raised median conceptual plan and driveway sight distance analyzed are contained in a separate document. Please also note that the maneuverability analysis is contained is a separate document. An event period valet analysis was also required by the city. However, after further coordination with the applicant, special events are not proposed at the redevelopment.

TRIP GENERATION

Trip generation calculations for the proposed redevelopment were performed using the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 10th Edition. The trip generation for the existing development was determined using ITE Land Use Code (LUC) 710 (General Office Building). LUC 580 (Museum), 221 (Multifamily Housing [Mid-Rise]), and LUC 710 (General Office Building) were utilized for the proposed redevelopment. Project trips were estimated for the weekday A.M. and P.M. peak hours.

A multimodal (public transit, bicycle, and pedestrian) factor based on US Census *Means of Transportation to Work* data was reviewed for the census tracts in the vicinity of the redevelopment. A multimodal factor of 7.7 percent (7.7%) was calculated using the Census data. It is expected that residents and patrons will choose to walk, bike, or use public transit to and from the proposed redevelopment.

The redevelopment is expected to generate nine (9) vehicular trips during the A.M. peak hour and 11 vehicular trips during the P.M. peak hour. Note that credit for the existing development was not taken as the facility is currently vacant. Detailed trip generation calculations are included in Attachment C-1. Table 1 provides a summary of the trip generation for the proposed redevelopment.

Table 1: Proposed Net New Trip Generation				
A.M. (P.M.) Peak Hour				
Future Land Use (ITE Code)	Scale	Net New External Trips	Entering Trips	Exiting Trips
Proposed Redevelopment				
Museum (580)	4,000 square feet	1 (1)	1 (0)	0 (1)
Multifamily Housing (Mid-Rise) (221)	1 dwelling unit	0 (1)	0 (1)	0 (0)
General Office Building (710)	8,000 square feet	8 (9)	7 (2)	1 (7)
Net New Project Trips		9 (11)	8 (3)	1 (8)

VALET ANALYSIS

The proposed redevelopment will provide valet-only parking operations. Self-parking will not be provided on-site. The redevelopment will be served by one (1) dedicated valet drop-off and one (1) dedicated valet pick-up area. Three (3) drop-off spaces and three (3) pick-up space are provided at the site's porte-cochere area. Valet vehicles accessing the site drop-off and pick-up will be driven by a valet attendant to the on-site valet parking area. The on-site valet parking area consists of seven (7) mechanical lift parking spaces (14 spaces) and one (1) ADA space for a total of 15 parking spaces. Attachment D-1 contains graphics illustrating drop-off and pick-up area stacking and proposed valet routes to and from the site's valet parking area.

The valet analysis was prepared for the highest generator of valet trips, therefore the total weekday A.M. peak hour drop-off trips and the total P.M. peak hour pick-up trips were used for the analysis. The valet trip generation calculations indicate that the development will generate eight (8) A.M. peak hour drop-off trips and eight (8) P.M. peak hour pick-up trips. Note that all vehicles will be valeted internally on-site.

The valet queuing operations analysis was performed based on the methodology outlined in ITE's *Transportation and Land Development*, 1988. The analysis was performed to determine if valet operations could accommodate vehicular queues without blocking travel lanes on Sunset Drive.

Valet Assumptions

The queuing analysis used the multiple-channel waiting line model with Poisson arrivals and exponential service times. The queuing analysis is based on the coefficient of utilization, ρ, which is the ratio of the average vehicle arrival rate over the average service rate multiplied by the number of channels.

Valet attendants for the site will be stationed at the porte-cochere area and will travel to and from the on-site valet parking area. Valet drop-off trip service time was calculated based on the time it would take a valet parking attendant to obtain and park a drop-off vehicle to the valet parking area. Valet pick-up trip service time was calculated based on the time it would take a valet parking attendant to bring a parked vehicle back to a patron at the valet porte-cochere area for pick-up. Note that the average mechanical lift processing time was based on the Klaus Model G61 vehicle lift. The average mechanical

lift processing time was based on the average processing times of parking and retrieving vehicles from all the various positions within the non-tandem mechanical lift system. The detailed mechanical-lift processing time analysis is contained in Attachment D-1. The following summarizes the total valet drop-off and pick-up service times.

The calculated average service time for the site valet vehicle drop-off is 2.4 minutes. The following summarizes the valet drop-off service time:

- Exchange between valet attendant and driver (0.5 minutes)
- Valet attendant drives vehicle from valet drop-off area to on-site valet parking area (0.3 minutes)
- Valet attendant parks vehicle utilizing mechanical lift (1.2 minutes)
- Valet attendant returns to valet station (0.4 minutes)
- Total service rate: **2.4 minutes**

The calculated average service time for the site valet vehicle pick-up is 2.3 minutes. The following summarizes the valet pick-up service time:

- Valet attendant proceeds to the valet parking area to retrieve the vehicle (0.4 minutes)
- Valet attendant retrieves vehicle from mechanical lift (1.1 minutes)
- Valet attendant drives vehicle from valet parking area to valet pick-up area (0.3 minutes)
- Exchange between valet attendant and driver (0.5 minutes)
- Total service rate: **2.3 minutes**

Detailed travel time calculations are included in Attachment D-1.

If the coefficient of utilization (average service rate/valet attendant service capacity) is greater than one (>1), the calculation methodology does not yield a finite queue length. This result indicates overcapacity conditions for the valet area. The valet attendant service capacity is the number of total trips a valet attendant can make in a one-hour period multiplied by the number of valet attendants.

The analysis determined the required queue storage, M, which is exceeded P percent of the time. Since this analysis seeks to examine if the queue length exceeds the storage provided, at a level of confidence of 95 percent (95%). Three (3) drop-off spaces are provided at the site's drop-off area and three (3) pick-up spaces are provided at the site's pick-up area.

Valet Analysis

An iterative approach was used to determine the number of valet attendants required to accommodate the proposed redevelopment demand during the analysis hour and ensure that the 95th percentile valet queue does not extend beyond the designated valet service area. The valet analysis worksheet is provided in Attachment D-1.

It was determined that one (1) valet attendant is needed for the site's valet drop-off area and one (1) valet attendant is needed for the site's pick-up area (two (2) attendants total) during the weekday P.M. peak hour so that the vehicle queues from the drop-off and pick-up area do not extend beyond the designated valet areas or negatively impact circulation.

Valet Conclusion

Based on the valet operations analysis performed, it was determined that the 95th percentile valet queues will not extend beyond the valet service area and into the public right-of-way or negatively impacting circulation. Based upon the conservative assumptions applied to the traffic demand conditions, it was estimated that one (1) valet attendant is needed for the site's valet drop-off area and one (1) valet attendant is needed for the site's pick-up area (two (2) attendants total) during the weekday P.M. peak hour so that the vehicle queues from the drop-off and pick-up areas do not extend beyond the designated valet areas or negatively impact circulation. It should be noted that projected vehicular volumes and estimated valet processing times were conservatively assumed in the analysis.

TRANSPORTATION DEMAND MANAGEMENT STRATEGIES

The applicant is considering providing the following TDM strategies to encourage people to use public transportation, use bicycles and walk, use car/vanpools, and find alternatives to the typical workday hours to reduce the impacts of the project traffic on the surrounding roadway network:

- Providing secure bicycle parking (15 long-term spaces)
- A shower facility bicyclists can use on site
- Providing wide hallways to accommodate bicycles
- Elevators that can accommodate bicycles

CONCLUSION

The analysis results indicate that the proposed redevelopment is expected to generate nine (9) vehicular trips during the A.M. peak hour trips and 11 vehicular trips during the P.M. peak hour.

The valet operations analysis performed determined that the 95th percentile valet queues will not extend beyond the valet drop-off and pick-up areas onto Sunset Drive. Based upon the conservative assumptions applied to the traffic demand conditions, it was estimated that one (1) valet attendant is needed for the site's valet drop-off area and one (1) valet attendant is needed for the site's pick-up area (two (2) attendants total) during the weekday P.M. peak hour so that the vehicle queues from the drop-off and pick-up areas do not extend beyond the designated valet areas or negatively impact circulation. It should be noted that projected vehicular volumes and estimated valet processing times were conservatively assumed in the analysis.

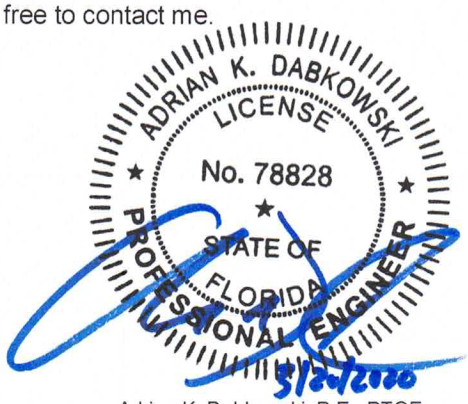
TDM strategies are also proposed as part of the redevelopment to reduce the impacts of the project traffic on the surrounding roadway network. The applicant is considering providing 15 long-term secure bicycle parking spaces, a shower facility for bicyclists to use on site, wide hallways to accommodate bicycles, and large elevators to accommodate bicycles.

If you have any questions regarding this analysis, please feel free to contact me.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.

Adrian K. Dabkowski, P.E., PTOE
Associate



Adrian K. Dabkowski, P.E., PTOE
Florida Registration Number 78828
Kimley-Horn and Associates, Inc.
600 North Pine Island Road, Suite 450
Plantation, Florida 33324
Registry # 00000696

K:\FTL_TPTO\143185000-1910 Alton Road\Correspondence\ltr\1910 Alton Road - Traffic Assessment 03 20 2020.docx

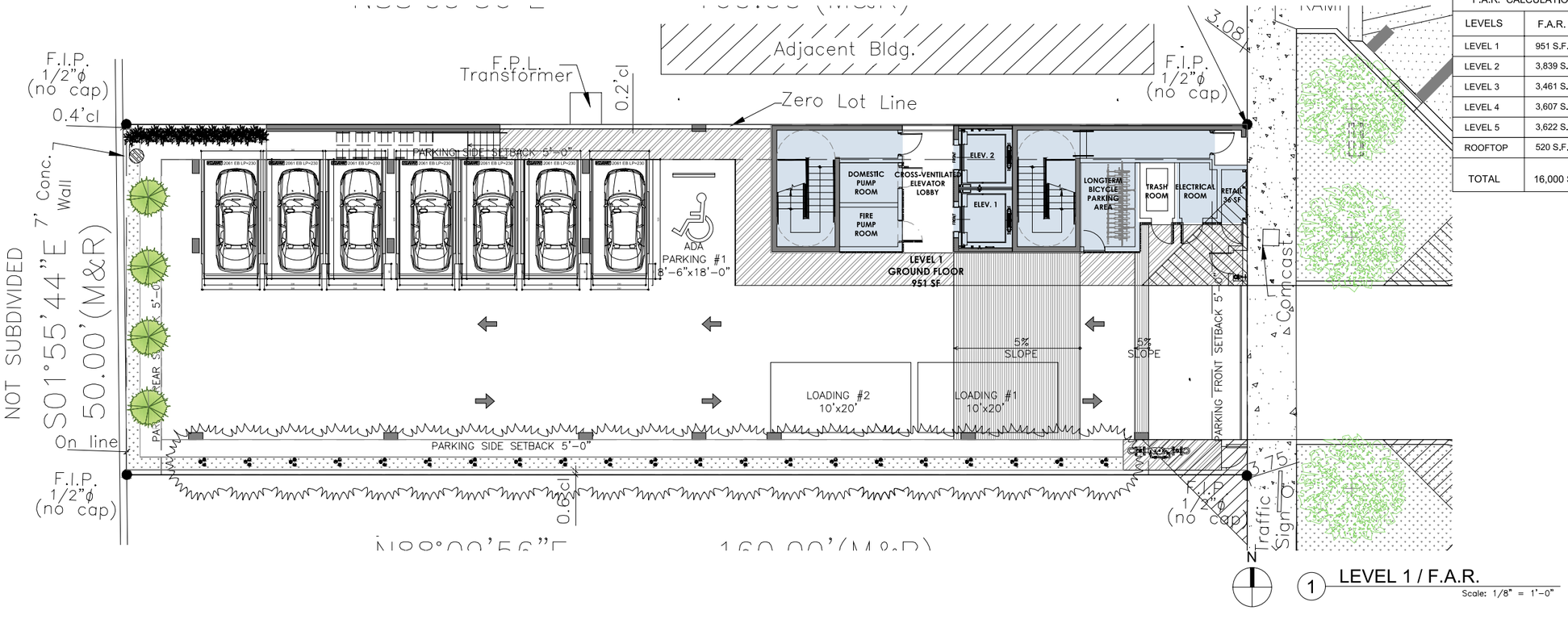
Attachment A-1

Location Map and Conceptual Site Plan

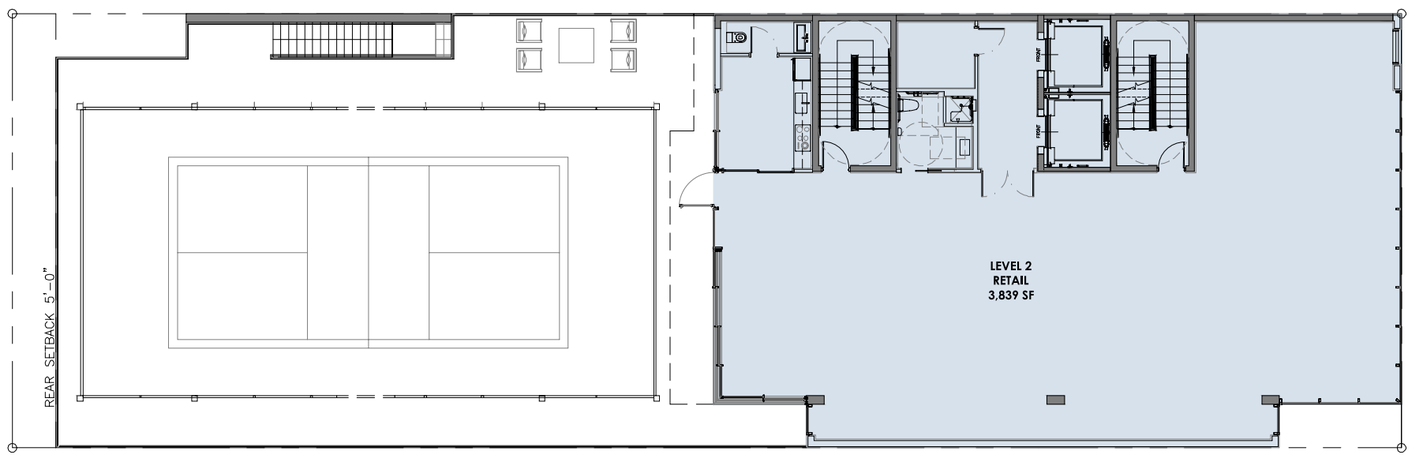
Kimley»Horn

© 2020

Figure 1
Location Map
1910 Alton Road
Miami Beach, Florida



F.A.R. CALCULATIONS	
LEVELS	F.A.R.
LEVEL 1	951 S.F.
LEVEL 2	3,839 S.F.
LEVEL 3	3,461 S.F.
LEVEL 4	3,607 S.F.
LEVEL 5	3,622 S.F.
ROOFTOP	520 S.F.
TOTAL	16,000 S.F.



Rev.	Date	Rev.	Date
DRB FIRST SUBMITTAL	03-16-2020		
DRB FINAL SUBMITTAL	04-06-2020		

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DRB FINAL SUBMITTAL

DRB20-0522

MIXED USE - COMMERCIAL - OFFICE - RESIDENCE

1910 ALTON ROAD
MIAMI BEACH, FLORIDA 33139

Owner:

PRIVATE

Landscape Architect:
Name
Address
Address
Tel:
Email

Consultant:
Name
Address
Address
Tel:
Email

Consultant:
Name
Address
Address
Tel:
Email

Architect of Record:
Kobi Karp Architecture and Interior Design, Inc.
2915 Biscayne Boulevard, Suite #200
Miami, Florida 33137 USA
Tel: +1(305) 573 1818
Fax: +1(305) 573 3766

STATE OF FLORIDA
KOBI KARP
AR0012578
REGISTERED ARCHITECT
Lic. # AR0012578

KOBI KARP

F.A.R. DIAGRAMS

PROPOSED DESIGN

Date 04-06-2020	Sheet No. A0.05
Scale	
Project 2001	

Attachment B-1

Methodology Correspondence

Iliev, Alex

From: Akcay, Firat <FiratAkcay@miamibeachfl.gov>
Sent: Friday, January 31, 2020 5:13 PM
To: Dabkowski, Adrian
Cc: Ferrer, Josiel; Murphy, James
Subject: RE: 1910 Alton Road | Traffic Assessment Methodology

Categories: External

Adrian,

We agree on the below. The event period analysis should consider a demand per the allowed maximum occupancy. We also would like you to analyze the safety and geometric conditions of the roadway at the entrance of the proposed development. Some considerations shall include a conceptual design displaying the highlighted portions of the chevron areas to be raised to prevent drivers from entering directly from Alton Road. The garage entrance should also provide for sight distance clearance, hence the two red dotted parking spaces may need to be removed. The sight distance for the crosswalk and diagonal alignment should be analyzed as well.

Please let me know if you have any questions on the scope of study.
Thank you

Firat Akcay, M.S.C.E. MBA
Transportation Analyst
Transportation and Mobility Department
1688 Meridian Avenue, Suite 801, Miami Beach, FL 33139
Tel: 305-673-7000, ext 26839

We are committed to providing excellent public service and safety to all who live, work and play in our vibrant, tropical, historic community.

Please do not print this e-mail unless necessary.

From: Dabkowski, Adrian <Adrian.Dabkowski@Kimley-horn.com>
Sent: Friday, January 31, 2020 4:13 PM
To: Akcay, Firat <FiratAkcay@miamibeachfl.gov>
Cc: Ferrer, Josiel <JOSIELFERRER@miamibeachfl.gov>; Murphy, James <JamesMurphy@miamibeachfl.gov>
Subject: RE: 1910 Alton Road | Traffic Assessment Methodology

[THIS MESSAGE COMES FROM AN EXTERNAL EMAIL - USE CAUTION WHEN REPLYING AND OPENING LINKS OR ATTACHMENTS]

Good afternoon Firat,

Thank you for calling me back today. As discussed, we will move forward with including the following in the traffic assessment:

- Trip Generation
- TDM
- Valet analysis
- Event period valet analysis
- Maneuverability analysis for the garage

Thank you
Adrian

Adrian K. Dabkowski, P.E., PTOE
Kimley-Horn | 600 North Pine Island Road, Suite 450, Plantation, FL 33324
Direct: 954-535-5144 | Mobile: 303-990-2761

From: Dabkowski, Adrian
Sent: Thursday, January 30, 2020 4:51 PM
To: Akcay, Firat <FiratAkcay@miamibeachfl.gov>
Cc: Ferrer, Josiel <JOSIELFERRER@miamibeachfl.gov>; 'Murphy, James' <JamesMurphy@miamibeachfl.gov>
Subject: 1910 Alton Road | Traffic Assessment Methodology

Good afternoon Firat:

To follow up on my voicemail from earlier today, we are getting started on the 1910 Alton Road project. Currently, a 6,364 sf office building is on the site. The site is proposed to be redeveloped to consist of a 4,000 sf art gallery (ITE LUC 580: Museum), one (1) multi-family unit (ITE LUC 221: Multi-Family Mid-Rise), and 8,000 sf of office (ITE LUC 710: General Office Building). The redevelopment will result in three (3) net new AM peak hour trips and four (4) net new PM peak hour trips.

The project will be valet only, so we propose to prepare a valet analysis, TDM strategies, and maneuverability analysis as part of the traffic assessment. I've attached the trip generation calculations and site plan. Please let us know if we need to meet to finalize the methodology or if email/over the phone will suffice.

I've been told the project is attempting to get on the May DRB agenda so the methodology date was 1/20 and the submittal date is 2/14. We can still meet the 2/14 submittal date if the City gives us the go ahead with methodology early next week.

Thank you
Adrian

Adrian K. Dabkowski, P.E., PTOE
Kimley-Horn | 600 North Pine Island Road, Suite 450, Plantation, FL 33324
Direct: 954-535-5144 | Mobile: 303-990-2761

Attachment C-1

Trip Generation

AM PEAK HOUR TRIP GENERATION COMPARISON

EXISTING WEEKDAY AM PEAK HOUR TRIP GENERATION

		ITE TRIP GENERATION CHARACTERISTICS					DIRECTIONAL DISTRIBUTION		GROSS VOLUMES			MULTIMODAL REDUCTION		EXTERNAL TRIPS			INTERNAL CAPTURE		NET NEW EXTERNAL TRIPS			PASS-BY CAPTURE		NET NEW EXTERNAL TRIPS		
		Land Use	ITE Edition	ITE Code	Scale	ITE Units	Percent In	Percent Out	In	Out	Total	Percent	MR Trips	In	Out	Total	Percent	IC Trips	In	Out	Total	Percent	PB Trips	In	Out	Total
GROUP 1	1	General Office Building	10	710	6.364	ksf	86%	14%	6	1	7	7.7%	1	5	1	6	0.0%	0	5	1	6	0.0%	0	5	1	6
	2																									
	3																									
	4																									
	5																									
	6																									
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	9																									
	10																									
	11																									
	12																									
	13																									
	14																									
	15																									
		ITE Land Use Code		Rate or Equation			**Total:**		6	1	7	7.7%	1	5	1	6	0.0%	0	5	1	6	0.0%	0	5	1	6
		710		Y=1.16(X)																						

PROPOSED WEEKDAY AM PEAK HOUR TRIP GENERATION

		ITE TRIP GENERATION CHARACTERISTICS					DIRECTIONAL DISTRIBUTION		GROSS VOLUMES			MULTIMODAL REDUCTION		EXTERNAL TRIPS			INTERNAL CAPTURE		NET NEW EXTERNAL TRIPS			PASS-BY CAPTURE		NET NEW EXTERNAL TRIPS		
		Land Use	ITE Edition	ITE Code	Scale	ITE Units	Percent In	Percent Out	In	Out	Total	Percent	MR Trips	In	Out	Total	Percent	IC Trips	In	Out	Total	Percent	PB Trips	In	Out	Total
GROUP 2	1	Museum	10	580	4	ksf	86%	14%	1	0	1	7.7%	0	1	0	1	0.0%	0	1	0	1	0.0%	0	1	0	1
	2	Multifamily (Mid-Rise)	10	221	1	du	26%	74%	0	0	0	7.7%	0	0	0	0	0.0%	0	0	0	0	0.0%	0	0	0	0
	3	General Office Building	10	710	8	ksf	86%	14%	8	1	9	7.7%	1	7	1	8	0.0%	0	7	1	8	0.0%	0	7	1	8
	4																									
	5																									
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	10																									
	11																									
	12																									
	13																									
	14																									
	15																									
		ITE Land Use Code		Rate or Equation			**Total:**		9	1	10	7.7%	1	8	1	9	0.0%	0	8	1	9	0.0%	0	8	1	9
		580		Y=0.28(X)																						
		221		LN(Y) = 0.98*LN(X)+-0.98																						
		710		Y=1.16(X)																						

PM PEAK HOUR TRIP GENERATION COMPARISON

EXISTING WEEKDAY PM PEAK HOUR TRIP GENERATION

		ITE TRIP GENERATION CHARACTERISTICS					DIRECTIONAL DISTRIBUTION		GROSS VOLUMES			MULTIMODAL REDUCTION		EXTERNAL TRIPS			INTERNAL CAPTURE		NET NEW EXTERNAL TRIPS			PASS-BY CAPTURE		NET NEW EXTERNAL TRIPS		
		Land Use	ITE Edition	ITE Code	Scale	ITE Units	Percent In	Percent Out	In	Out	Total	Percent	MR Trips	In	Out	Total	Percent	IC Trips	In	Out	Total	Percent	PB Trips	In	Out	Total
GROUP 1	1	General Office Building	10	710	6.364	ksf	16%	84%	1	7	8	7.7%	1	1	6	7	0.0%	0	1	6	7	0.0%	0	1	6	7
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	11																									
	12																									
	13																									
	14																									
	15																									
		ITE Land Use Code		Rate or Equation				**Total:**	1	7	8	7.7%	1	1	6	7	0.0%	0	1	6	7	0.0%	0	1	6	7
		710		LN(Y) = 0.95*LN(X)+0.36																						

PROPOSED WEEKDAY PM PEAK HOUR TRIP GENERATION

		ITE TRIP GENERATION CHARACTERISTICS					DIRECTIONAL DISTRIBUTION		GROSS VOLUMES			MULTIMODAL REDUCTION		EXTERNAL TRIPS			INTERNAL CAPTURE		NET NEW EXTERNAL TRIPS			PASS-BY CAPTURE		NET NEW EXTERNAL TRIPS		
		Land Use	ITE Edition	ITE Code	Scale	ITE Units	Percent In	Percent Out	In	Out	Total	Percent	MR Trips	In	Out	Total	Percent	IC Trips	In	Out	Total	Percent	PB Trips	In	Out	Total
GROUP 2	1	Museum	10	580	4	ksf	16%	84%	0	1	1	7.7%	0	0	1	1	0.0%	0	0	1	1	0.0%	0	0	1	1
	2	Multifamily (Mid-Rise)	10	221	1	du	61%	39%	1	0	1	7.7%	0	1	0	1	0.0%	0	1	0	1	0.0%	0	1	0	1
	3	General Office Building	10	710	8	ksf	16%	84%	2	8	10	7.7%	1	2	7	9	0.0%	0	2	7	9	0.0%	0	2	7	9
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	12																									
	13																									
	14																									
	15																									
		ITE Land Use Code		Rate or Equation				**Total:**	3	9	12	7.7%	1	3	8	11	0.0%	0	3	8	11	0.0%	0	3	8	11
		580		Y=0.18(X)																						
		221		LN(Y) = 0.96*LN(X)+-0.63																						
		710		LN(Y) = 0.95*LN(X)+0.36																						

Attachment D-1

Valet Analysis

Vehicle Routing

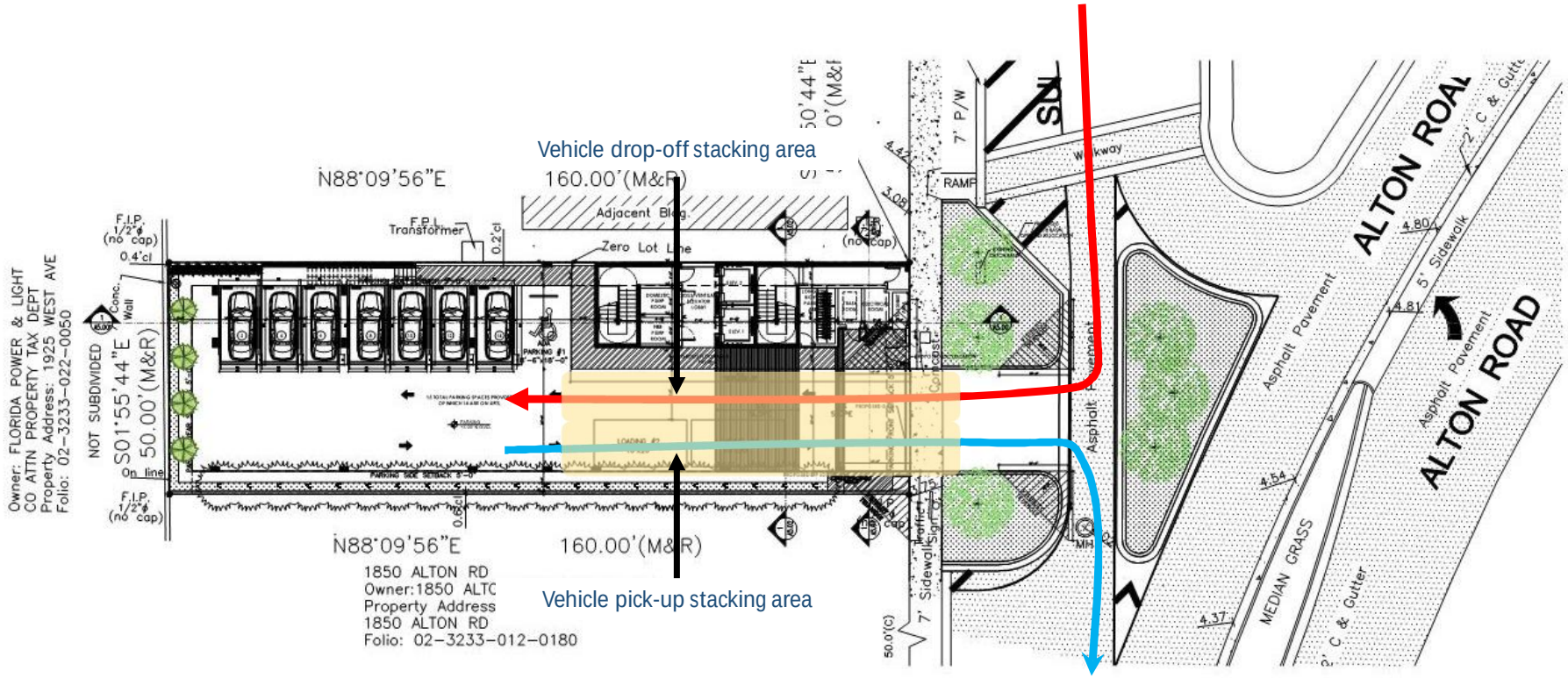
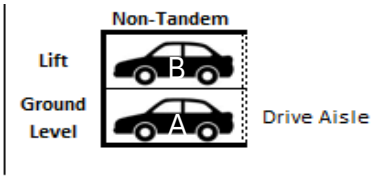


Figure 2
Valet Routing
1910 Alton Road
Miami Beach, Florida

Mechanical Life Processing Scenarios

Vehicle Processing Scenarios

Mechanical Lift Layout



Vehicle A (non-tandem) - Drop-Off		
1.	Attendant drives onto lift	10
		10 sec
Vehicle A (non-tandem) - Pick-Up		
1.	Attendant drives off of lift	10
		10 sec
Vehicle B (non-tandem): No Vehicle A - Drop-Off		
1.	Attendant maneuvers in front of lift	10
2.	Attendant exits vehicle to lower lift	5
3.	Attendant lowers lift	20
4.	Attendant re-enters vehicle and drives onto lift	15
5.	Attendant exits vehicle	5
6.	Attendant raises lift	30
		85 sec
Vehicle B (non-tandem): No Vehicle A - Pick-Up		
1.	Attendant lowers lift	20
2.	Attendant enters vehicle and drives off of lift	15
3.	Attendant exits vehicle to raise lift	5
4.	Attendant raises lift	30
5.	Attendant re-enters vehicle	5
		75 sec
Vehicle B (non-tandem): Vehicle A Parked - Drop-Off		
1.	Attendant exits Vehicle B	5
2.	Attendant enters Vehicle A	5
3.	Attendant moves Vehicle A to drive aisle	10
4.	Attendant exits Vehicle A	5
5.	Attendant lowers lift	20
6.	Attendant re-enters Vehicle B and drives onto lift	15
7.	Attendant exits Vehicle B	5
8.	Attendant raises lift	30
9.	Attendant re-enters Vehicle A and drives into parking space	15
10.	Attendant exits Vehicle A	5
		115 sec
Vehicle B (non-tandem): Vehicle A Parked - Pick-Up		
1.	Attendant moves Vehicle A underneath lift to drive aisle	10
2.	Attendant exits Vehicle A	5
3.	Attendant lowers lift	20
4.	Attendant enters Vehicle B and drives off of lift	15
5.	Attendant exits Vehicle B to raise lift	5
6.	Attendant raises lift	30
7.	Attendant re-enters Vehicle A and drives into parking space	15
8.	Attendant exits Vehicle A	5
9.	Attendant re-enters Vehicle B	5
		110 sec

Average Drop-off Processing Time	70 sec
Average Pick-up Processing Time	65 sec

KLAUS

Parking Systems Atlantic, Inc.

Klaus Model G61 Vehicle lift Processing time:

- 7.5 HP Power Pack
- 12 Liters per Minute Valves
- Raising Lift Platform < 30 seconds
  (With Vehicle)
- Lowering Lift Platform < 30 seconds
  (With Vehicle)

When operating Klaus Model G61 Vehicle Lifts with 7.5 HP Power Pack and 12 Liters per Minute Valves, valet can expect the time required to raise platform (With Vehicle) to be no longer than 30 seconds and the time required to lower platform (With Vehicle) no longer than 30 seconds.

Bruce B. Roden Jr.
KLAUS Parking Systems Atlantic, Inc.
Vice President

655 NW. 128th St, North Miami, Fl 33168
O: (305) 687-5733 | F: (305) 687-5734 | Email: Bruce@klauspark.com
www.klausparking.com | www.multiparking.com

Valet Travel Times

Valet Drop-off/Pick-Up Calculated Travel Time

Valet Parking Area Calculated Travel Time

VALET DROP-OFF	
VEHICLE TRAVEL TIME	VALET ATTENDANT TRAVEL TIME
Travel Times (Assume 5 mph speed)	Travel Times (Assume 5 ft/s speed)
To Valet Parking Area (In vehicle)	Return from Valet Parking Area (Walk/Run) to Porte-cochere
Distance: 0.02 miles	Distance: 0.02 miles
Travel Time: 0.3 minutes	Travel Time: 0.4 minutes
Controlled Delay: 0.5 Minutes	
Average Mechanical Lift Processing Time: 1.2 Minutes	
Total Time: 2.4 Minutes	

Valet Parking Area Calculated Travel Time

VALET PICK-UP	
VALET ATTENDANT TRAVEL TIME	VEHICLE TRAVEL TIME
Travel Times (Assume 5 ft/s speed)	Travel Times (Assume 5 mph speed)
To Valet Parking Area (Walk/Run)	Return from Valet Parking Area (In Vehicle) to Porte-cochere
Distance: 0.02 miles	Distance: 0.02 miles
Travel Time: 0.4 minutes	Travel Time: 0.3 minutes
Controlled Delay: 0.5 Minutes	
Average Mechanical Lift Processing Time: 1.1 Minutes	
Total Time: 2.3 Minutes	

Valet Analysis

Valet Drop-off Analysis

Arrival Rate

IN
8 veh/hr

Service Rate

IN
2.40 mins/veh

Service Time = mins/veh

Number of Valet Attendants (N) =	1	
Level of Confidence =	0.95	
Storage Provided On-Site =	3	vehicles
Total Entering and Exiting Vehicles(q) =	8	veh/hr
Service Capacity per N (60 mins/Service Rate) (Q) =	25.00	veh/hr/pos
Average Service Rate (t) =	2.40	mins/veh
rho (t/Q) =	0.320	

Expected (avg.) number of vehicles in the system	E(m)=	0.15	
Expected (avg.) number of vehicles waiting in queue	E(n)=	0.47	
Mean time in the queue	E(w)=	1.13	mins
Mean time in system	E(t)=	3.53	mins

Proportion of customers who wait (P) (E(w) > 0)=	32.00%	
Probability of a queue exceeding a length (M) P(x > M)=	5.00%	

Queue length which is exceeded 5.00% of the times is equal to 0.4 vehicles

Valet Pick-up Analysis

Arrival Rate

OUT
8

veh/hr

Service Rate

IN
2.30

mins/veh

Service Time = mins/veh

Number of Valet Attendants (N) =	1	
Level of Confidence =	0.95	
Storage Provided On-Site =	3	vehicles
Total Entering and Exiting Vehicles(q) =	8	veh/hr
Service Capacity per N (60 mins/Service Rate) (Q) =	26.09	veh/hr/pos
Average Service Rate (t) =	2.30	mins/veh
rho (t/Q) =	0.307	

Expected (avg.) number of vehicles in the system	E(m)=	0.14	
Expected (avg.) number of vehicles waiting in queue	E(n)=	0.44	
Mean time in the queue	E(w)=	1.02	mins
Mean time in system	E(t)=	3.32	mins

Proportion of customers who wait (P) (E(w) > 0)=	30.67%	
Probability of a queue exceeding a length (M) P(x > M)=	5.00%	

Queue length which is exceeded 5.00% of the times is equal to 0.3 vehicles