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TECHNICAL MEMORANDUM

Oyster Bay Regional Park TIA Update

Findings from Existing Conditions Analysis

Date: October 7, 2019 Project #: 24250
To: Sandra Hamlat
From: Aaron Elias, P.E.
cc:

In March 2012, Dowling Associates (now Kittelson & Associates, Inc. (Kittelson)) completed a traffic study for expanding the Oyster Bay Regional Shoreline (the Park) and moving the primary access to Davis Street. Access to the Park today is primarily via Neptune Drive where vehicles park on the street and walk into the park. In Fall 2013, the East Bay Regional Parks District requested KAI perform an additional study to supplement the March 2012 study. This additional study assumed the expansion of the park occurs and the access remains on Neptune Drive instead of moving to Davis Street. In June 2019, the East Bay Regional Parks District requested the Existing and Existing + Project conditions analysis for the Park expansion with Neptune Drive as the primary access point be reevaluated for conditions in 2019. This technical memorandum documents the findings of this 2019 study.

METHODOLOGY

To determine the impact on existing conditions (2019) of expanding Oyster Bay Regional Shoreline and keeping primary access via Neptune Drive, Kittelson analyzed the following peak hours and scenarios:

- Existing No Project (weekday AM, weekday PM, Saturday (SAT))
- Existing + Project (weekday AM, weekday PM, Typical SAT, Busy SAT, and Special Event SAT)

Each scenario and peak hour were analyzed at four study intersections:

- Davis Street & Doolittle Drive
- Williams Street & Doolittle Drive
- Marina Boulevard & Doolittle Drive
- Williams Street & Neptune Drive

Vehicle volumes for 2019 at these four study intersections were collected during a midweek AM Peak (7:00 – 9:00 AM), a PM peak period (4:00 – 6:00 PM), and a Saturday peak period (10:00 AM – 2:00 PM). The midweek AM and PM peak period volumes were collected on Thursday, July 25, 2019. The Saturday peak period traffic volumes were collected on July 27, 2019.

Intersection vehicle volumes are traditionally not performed during the summer months because schools are not in session which can lead to lower traffic volumes than normal during data collection. However, Kittelson believed summer data collection was appropriate for this analysis for the following reasons:

1. Saturday traffic over the summer months is generally higher than other times of the year because the weather is better and more people are out of the house shopping or accessing outdoor recreational areas such as Oyster Bay Regional Park. Therefore, collecting traffic volumes in the summer on a Saturday should result in a more conservative weekend analysis.

2. Saturday trip generation for a regional park is significantly higher than the trip generation during a weekday AM or PM peak hour. Therefore, expanding Oyster Bay Regional Park is likely to cause more impacts on a Saturday rather than a midweek day.

3. The 2014 traffic study found that the four study intersections operated well in the weekday AM and PM peak hours. Therefore, significant traffic growth would be needed at these study locations for the expansion of the Oyster Bay Regional Park to cause a significant impact. There has not been much development in this area in the last few years making it unlikely the volumes would be significantly different on a weekday.

Trip Generation

Kittelson used the same trip generation as the previous studies completed in March 2012 and Fall 2013. The scenarios included typical AM, PM, and Saturday peak hours. There were also two additional scenarios that were based on the land use amendment for the park that were analyzed. These two scenarios were a worst-case Saturday (Busy Saturday) and the potential result of a special event releasing all its traffic during a Saturday peak hour. The final trip generation numbers from these scenarios is shown in Exhibit 1.

Exhibit 1 – Estimated Vehicle Trip Generation for the Proposed Expansion of the Park

Scenario	Inbound Vehicle Trips	Outbound Vehicle Trips
Weekday AM	39	22
Weekday PM	26	16
Typical Saturday	233	233
Busy Saturday	467	467
Special Saturday	0	700

Trip Distribution

Trip distribution used the same methodology as the Fall 2013 study. All vehicles entering and leaving the park in each scenario were assumed to use the intersection of Neptune Drive/Williams Street.

Outbound vehicles all made a southbound left turn from Neptune Drive onto Williams Street while inbound vehicles made a westbound right turn from Williams Street onto Neptune Drive at this intersection. Vehicles were then distributed at the remaining intersections proportionally to the vehicle turning movements from the no project conditions. For example, if the eastbound movement at Davis Street and Doolittle Drive had 25 left, 50 through, and 25 right turns in the no project condition, then 25% of project traffic was assigned to make a left, 50% to go through the intersection, and 25% were assigned to make a right turn. Lane configuration and intersection turn movement figures are documented in the appendix to this technical memorandum.

TRAFFIC IMPACTS

This section presents the findings of the level of service (LOS) analysis performed at the four study intersections.

Thresholds of Significance

San Leandro's General Plan contains LOS standards for signalized and unsignalized intersection operations. According to Policy 16.02, the minimum acceptable LOS is D. Exceptions are detailed on page 4-20 of the General Plan, which states:

> *LOS D may only be exceeded where the following circumstances exist:*
>
> - *Road improvements are not possible because the necessary right-of-way does not exist and cannot be acquired without significant impacts on adjacent buildings and properties.*
> - *The intersection or road segment is in a pedestrian district, such as Downtown, where the priority is on pedestrian, bicycle, and public transit access rather than vehicle traffic*.

The above exceptions are not applicable to the study intersections. Therefore, for the purposes of this study, Kittelson identified significant traffic impacts at the study intersections if the Project causes:

- An intersection to operate at LOS E or F; or
- An increase in the volume-to-capacity (v/c) ratio of 0.05 or more for signalized intersections that operate at LOS E or F under No Project conditions; or
- An increase in average delay of more than five (5) seconds on the worst approach for unsignalized intersections that operate at LOS E or F under No Project conditions.

LOS was analyzed using the methodologies described in the 6th Edition of the Highway Capacity Manual (HCM 6) as implemented in the analysis software program Vistro. The LOS criteria for signalized and unsignalized intersections are shown in Exhibit 2 and Exhibit 3, respectively.

Exhibit 2 - HCM 6 LOS Criteria for Signalized Intersections

Level of Service (LOS)	Average Delay (seconds/vehicle)	Description
A	≤ 10	Very Low Delay: This level of service occurs when progression is extremely favorable and most vehicles arrive during a green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	> 10 and ≤ 20	Minimal Delays: This level of service generally occurs with good progression, short cycle lengths, or both. More vehicles stop than at LOS A, causing higher levels of average delay.
C	> 20 and ≤ 35	Acceptable Delay: Delay increases due to fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level of service. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	> 35 and ≤ 55	Approaching Unstable Operation/Significant Delays: The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume / capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	> 55 and ≤ 80	Unstable Operation/Substantial Delays: These high delay values generally indicate poor progression, long cycle lengths, and high volume / capacity ratios. Individual cycle failures are frequent occurrences.
F	> 80	Excessive Delays: This level, considered unacceptable to most drivers, often occurs with oversaturation (that is, when arrival traffic volumes exceed the capacity of the intersection). It may also occur at high volume / capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.
Source: *Highway Capacity Manual 6th Edition* (HCM 6)		

Exhibit 3 - HCM 6 LOS Criteria for Unsignalized Intersections

Level of Service (LOS)	Average Delay (seconds/vehicle)	Description
A	≤ 10	Very Low Delay
B	> 10 and ≤ 15	Minimal Delays
C	> 15 and ≤ 25	Acceptable Delay
D	> 25 and ≤ 35	Approaching Unstable Operation and/or Significant Delays
E	> 35 and ≤ 50	Unstable Operation and/or Substantial Delays
F	> 50	Excessive Delays
Source: *Highway Capacity Manual 6th Edition* (HCM 6)		

Existing Conditions

The LOS analysis for the existing and existing plus project conditions in 2019 during the AM peak hour are shown in Exhibit 4. Intersection LOS for the weekday PM and typical Saturday peak hours for the existing and existing plus project scenarios are shown in Exhibit 5 and Exhibit 6, respectively. As these exhibits show, each of the four study intersections continue to operate within the acceptable LOS standards set forth in the City of San Leandro's General Plan. Additionally, the project does not result in any change to the existing LOS except for the intersection of Williams Street and Neptune Drive which operated at LOS A without the Project and LOS B with the Project.

Exhibit 4 – LOS for the AM Peak Hour in the Existing and Existing + Project Scenarios

#	Intersection	Existing AM			Existing AM + Project			Change in V/C
		V/C	Delay	LOS	V/C	Delay	LOS	
1	Davis Street & Doolittle Drive	0.63	48.5	D	0.63	48.7	D	0.00
2	Williams Street & Doolittle Drive	0.67	16.3	B	0.70	17.2	B	0.03
3	Marina Boulevard & Doolittle Drive	0.75	31.7	C	0.75	32.5	C	0.01
4	Williams Street & Neptune Drive	0.06	7.2	A	0.11	7.4	A	0.05
Source: Kittelson & Associates, Inc. 2019 Level of Service Methodology based on HCM 6th Edition								

Exhibit 5 – LOS for the PM Peak Hour in the Existing and Existing + Project Scenarios

#	Intersection	Existing PM			Existing PM + Project			Change in V/C
		V/C	Delay	LOS	V/C	Delay	LOS	
1	Davis Street & Doolittle Drive	0.76	23.0	C	0.76	23.1	C	0.00
2	Williams Street & Doolittle Drive	0.67	16.9	B	0.69	18.3	B	0.02
3	Marina Boulevard & Doolittle Drive	0.67	27.0	C	0.67	27.1	C	0.00
4	Williams Street & Neptune Drive	0.08	7.4	A	0.11	7.6	A	0.02

Source: Kittelson & Associates, Inc. 2019
Level of Service Methodology based on HCM 6th Edition

Exhibit 6 – LOS for the Saturday Peak Hour in the Existing and Existing + Project Scenarios

#	Intersection	Existing Sat			Existing Sat + Project			Change in V/C
		V/C	Delay	LOS	V/C	Delay	LOS	
1	Davis Street & Doolittle Drive	0.36	16.6	B	0.38	17.9	B	0.03
2	Williams Street & Doolittle Drive	0.49	10.4	B	0.65	15.3	B	0.16
3	Marina Boulevard & Doolittle Drive	0.63	22.8	C	0.64	23.3	C	0.01
4	Williams Street & Neptune Drive	0.06	7.2	A	0.44	11.1	B	0.38

Source: Kittelson & Associates, Inc. 2019
Level of Service Methodology based on HCM 6th Edition

Busy and Special Event Saturdays

In addition to analyzing the typical Saturday traffic conditions as shown in Exhibit 6, Kittelson also evaluated two additional Saturday scenarios for 2019 conditions. These scenarios were based on the Park's land use amendment and included an analysis of what would happen on a busy Saturday and a Saturday where a special event occurred at the Park and released all its traffic during the Saturday peak hour. Findings for the busy Saturday, Exhibit 7, indicate that traffic operations at the Williams Street/Doolittle Drive intersection is potentially significantly impacted as a result of the project with the LOS deteriorating from LOS B in the no project condition to LOS F with the Park expansion. Additionally, the intersection of Williams Street and Neptune Drive deteriorates from LOS A to LOS E with the Park expansion.

These two study intersections are also estimated to have potentially significant impacts to their traffic operations due to the project during the special event Saturday scenario as detailed in Exhibit 8. The Williams Street/Doolittle Drive intersection deteriorates from LOS B without the park expansion to LOS F with the Park expansion. The Williams Street/Neptune Drive intersection, which is the primary entrance intersection, is also significantly impacted deteriorating from LOS A to LOS F. The next section

includes recommendations for how these traffic operation impacts can be mitigated to less than significant.

Exhibit 7 – LOS for a Busy Saturday Peak Hour in the Existing and Existing + Project Scenarios

#	Intersection	Existing SAT			Existing SAT + Busy Project			Change in V/C
		V/C	Delay	LOS	V/C	Delay	LOS	
1	Davis Street & Doolittle Drive	0.36	16.6	B	0.41	19.0	B	0.05
2	Williams Street & Doolittle Drive	0.49	10.4	B	2.16	166.5	F	1.67
3	Marina Boulevard & Doolittle Drive	0.63	22.8	C	0.65	23.7	C	0.01
4	Williams Street & Neptune Drive	0.06	7.2	A	0.99	47.4	E	0.93

Source: Kittelson & Associates, Inc. 2019
Level of Service Methodology based on HCM 6th Edition

Exhibit 8 – LOS for a Special Event Saturday Peak Hour in the Existing and Existing + Project Scenarios

#	Intersection	Existing SAT			Existing SAT + Special Event			Change in V/C
		V/C	Delay	LOS	V/C	Delay	LOS	
1	Davis Street & Doolittle Drive	0.36	16.6	B	0.43	19.8	B	0.07
2	Williams Street & Doolittle Drive	0.49	10.4	B	1.26	122.7	F	0.77
3	Marina Boulevard & Doolittle Drive	0.63	22.8	C	0.66	24.0	C	0.02
4	Williams Street & Neptune Drive	0.06	7.2	A	1.07	67.4	F	1.01

Source: Kittelson & Associates, Inc. 2019
Level of Service Methodology based on HCM 6th Edition

Traffic Impact Mitigations

While Project conditions at the Park for AM, PM, and typical Saturday peak hours were not found to cause significant impacts, busy Saturday's could potentially result in significant traffic operation impacts at the Williams Street/Doolittle Drive and the Williams Street/Neptune Drive intersections. Kittelson found the following mitigations would improve the operations of these intersections on busy Saturdays:

- Williams Street & Doolittle Drive
    - Change signal to operate in isolation at a 90 second cycle length during the Saturday peak period.
    - Modify the phase splits for individual movements based on traffic demand estimates
    - Restripe the eastbound approach from a single shared left/through/right lane to an exclusive left turn lane and a shared through/right turn lane.
    - Implementing these recommendations would reduce the impact to less than significant.

- Williams Street & Neptune Drive
    - Convert the existing all-way stop control to a two-way stop-controlled intersection where Williams Street is stop controlled. The volumes at this intersection are currently low enough that the all-way stop is not warranted according to the California Manual on Uniform Traffic Control Devices.
    - Implementing this recommendation would reduce the delay but the impact would remain with the westbound left turn still operating at LOS E. However, the overall approach would operate at LOS C.

The resulting traffic operations for existing plus busy Saturday conditions with the mitigations are shown in Exhibit 9.

Existing plus project conditions during a special event Saturday could also potentially result in significant impacts at these two intersections. Kittelson recommends traffic control officers be placed at both the William Street/Neptune Drive intersection and the Williams Street/Doolittle Drive intersections. Exhibit 10 shows an estimate of traffic operations at Williams Street/Doolittle Drive assuming the traffic control officers operate the intersection by allowing eastbound Williams Street to have a protected movement for all eastbound traffic (a split phase signal).

Exhibit 9 – Mitigation Findings for a Busy Saturday

Intersection	Existing Sat		Existing + Project Busy Saturday		Change in V/C	Existing + Project Busy Saturday Mitigated		Change in V/C
	Delay	LOS	Delay	LOS		Delay	LOS	
Davis Street/Doolittle Drive	16.6	B	19.0	B	0.05	19.0	B	0.05
Williams Street/Doolittle Drive	10.4	B	166.5	F	1.67	33.3	C	0.30
Marina Boulevard/Doolittle Drive	22.8	C	23.7	C	0.01	23.7	C	0.01
Williams Street/Neptune Drive	7.2	A	47.4	E	0.93	39.6	E	0.07

Source: Kittelson & Associates, Inc. 2019
Level of Service Methodology based on HCM 6th Edition

Exhibit 10 – Mitigation Findings for a Special Event Saturday

Intersection	Existing Sat		Existing + Project Special Event SAT		Change in V/C	Existing + Project Special Event SAT Mitigated		Change in V/C
	Delay	LOS	Delay	LOS		Delay	LOS	
Davis Street/Doolittle Drive	16.6	B	19.8	B	0.07	19.8	B	0.07
Williams Street/Doolittle Drive	10.4	B	122.7	F	0.77	33.3	C	0.21
Marina Boulevard/Doolittle Drive	22.8	C	24.0	C	0.02	24.0	C	0.02
Williams Street/Neptune Drive	7.2	A	67.4	F	1.01	Controlled by Officer		

Source: Kittelson & Associates, Inc. 2019
Level of Service Methodology based on HCM 6th Edition

SUMMARY

A March 2012 and Fall 2013 traffic study performed for the East Bay Regional Parks District investigated the traffic operations impacts of expanding the Oyster Bay Regional Shoreline and keeping the primary access point on Neptune Drive. As a follow-up to this study, this technical memorandum documented an updated analysis of 2019 existing conditions with and without the Project. Project scenarios analyzed included:

- Existing No Project (weekday AM, weekday PM, SAT)
- Existing + Project (weekday AM, weekday PM, SAT)
- Existing + Project Busy Saturday (SAT)
- Existing + Project Special Event Saturday (SAT)

The findings of this analysis indicate that the project is not anticipated to cause a significant transportation impact during the AM, PM, and typical Saturday peak hours. However, potentially significant impacts to traffic operation could occur at two study intersections during a busy Saturday or a Saturday where a special event is held.

- The Williams Street/Doolittle Drive intersection under the Busy Saturday and Special Event Saturday scenarios is estimated to experience a potentially significant traffic operation impact. This impact can be mitigated for busy Saturdays by restriping the eastbound approach to provide an exclusive left turn lane and optimizing the signal operations. During a special event Saturday, having a traffic control officer operate the signal under split phase operations (allowing an exclusive signal phase for the eastbound approach) would reduce the impact to less than significant.
- The Neptune Drive/Williams Street intersection also had potentially significant impacts under the Busy Saturday and Special Event Saturday scenarios. Kittelson recommends this four-way stop sign be converted into a two-way stop-controlled intersection with the Williams Street approach controlled. The worst movement would operate at LOS E (below the LOS standard) with this change but the overall intersection delay would decrease compared to the existing all-way stop control. For special events, Kittelson recommends this intersection be controlled by a traffic officer.