RESOLUTION NO. 2015-101

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MARINA APPROVING THE CONSTRUCTION OF A ROUNDABOUT IN LIEU OF A TRAFFIC SIGNAL FOR THE DEL MONTE BOULEVARD AND BEACH ROAD INTERSECTION IMPROVEMENT PROJECT

WHEREAS, on October 22, 2012, the City of Marina was awarded by Caltrans a Federal Highway Administration (FHWA) Highway Safety Improvement Program (HSIP) grant of $325,000 to construct a traffic signal at the Del Monte Blvd. and Beach Rd. intersection. On November 6, 2013, the City received Caltrans' authorization to proceed with preliminary engineering for the signalization project, and;

WHEREAS, at the regular meeting of December 18, 2012, the City Council adopted Resolution No. 2012-197, approving an update to the five (5) year City Capital Improvement Program (CIP). Included in the approved CIP project list was the Del Monte Blvd & Beach Rd project (TI 29) for traffic signalization of the intersection, and;

WHEREAS, at the regular meeting of November 10, 2013, the City Council adopted Resolution No. 2013-165, approving an agreement between the City of Marina and RBF Consulting, of Walnut Creek, California, to provide design services for the Del Monte Blvd. and Beach Rd. Traffic Signalization Project, and;

WHEREAS, General Plan section 3.21.1 (New Policy 2010-13) states "Roundabouts improve the safety of intersections for pedestrians, bicyclists and vehicles by eliminating conflict, reducing speed differentials, and forcing drivers to decrease speeds as they proceed through intersections. Roundabouts should be considered when designing roadway intersections. Two options for bicyclist travel should be incorporated, including riding through the roundabout or using on-ramps to sidewalks, and;

WHEREAS, in light of this General Plan section, the City Manager in May of 2015 requested staff to conduct a preliminary investigation as to the application of a roundabout at the intersection of Beach Road and Del Monte Boulevard. With the current and projected traffic counts, staff has concluded that a one-lane roundabout is feasible at the intersection within the current design provided by RBF Consulting, and;

WHEREAS, at the regular meeting of May 19, 2015, the City Council adopted Resolution No. 2015-59, approving Amendment No l to the Agreement between City of Marina and RBF Consulting of Walnut Creek, California, for engineering services for the Del Monte Boulevard and Beach Road Intersection Improvement Project in order to redesign the intersection for a one-lane roundabout, and;

WHEREAS, City staff held a public forum workshop on July 16, 2015 at the City Council chambers to provide a presentation on the conceptual design of the roundabout and receive comments from the public. There were 30 names confirming attendance on the sign-in sheet with the following summary of questions/concerns:

There is a safety concern due to speeding through this intersection: The roundabout design speed through the intersection will reduce speeds to 20 mph. Unlike a traffic signal with the potential for red-light speeding, the roundabout contains channelizing medians that will serve as physical and visual barriers slowing traffic approaching the intersection. Vehicles leaving the intersection will continue to be channelized by medians & striping and therefore have a reduced, safer speed.

There is a safety concern for children crossing this intersection: The roundabout design contains elements to address safety concerns for pedestrian crossings. The crosswalk length within the vehicle travel lane will be greatly reduced from the original 100 foot length (average) of traffic signal design to the roundabout's 37 foot length (average) due to concrete bulb-outs and the median channelizing island that acts as a pedestrian refuge. The shorter distance for pedestrians crossing the roadway decreases the chance that motorists can strike a pedestrian. The roundabout will also include LED flashing beacon signs at all crossings with pedestrian activated push-buttons mounted for easy access. Unlike a traffic signal intersection with the potential for red-light running, approach, transit, and exit speeds for the roundabout will be significantly slower and creates a safer environment for pedestrian crossings.

There is a traffic concern for large trucks navigating the proposed roundabout: The roundabout design accommodates all standard sized trucks as shown on **Exhibit A**. For vehicles longer than 65 feet, the roundabout itself contains a "truck apron" or concrete pad that will allow these very large vehicles to navigate through the intersection. Mayor Bruce Delgado has reached out to Green Waste Recovery, the City's contracted waste hauler company whose trucks would utilize this intersection. Green Waste has stated that their garbage trucks have no issues with navigating the Reservation Road roundabouts. The Del Monte Boulevard roundabout will be slightly larger than the Reservation Road roundabout.

Can there be access to Frontage Road from the Roundabout? The current intersection geometry does not legally allow vehicles from Frontage Road to make a left turn towards Del Monte Boulevard. On August 13, 2015 staff and the project designer met with Michael Tate, majority property owner of lands adjacent with Frontage Road, to discuss various options for exiting Frontage Road into the roundabout. The roundabout design is currently being evaluated to allow a left turn onto Beach Road from Frontage Road.

Will the roundabout prevent access to Michael Drive for vehicles coming from the roundabout? No – the roundabout and its channelizing medians will not impede drivers from entering Michael Drive.

There is a safety concern with the lane drop (two lanes to one) and "bottlenecking" for vehicles approaching the intersection from the south (Del Monte Blvd.): The lane drop striping taper will occur over 300 linear feet, meeting today's Traffic Control standards for lane merging at the current speed on Del Monte Boulevard. The Roundabout Operations Memorandum by Kittelson and Associates, Inc. dated June 23, 2015 shows that in the existing conditions and the future conditions with land use assumptions, the single lane roundabout will operate at an acceptable level of service (LOS) with reasonably free flow in both the AM and PM peak periods through 2040 ("**Exhibit B**").

What is the cost difference between a traffic signal versus a roundabout? The initial construction costs for each option are very close, the roundabout being the less expensive options with cost savings in electrical material and work. The true cost savings of a roundabout in comparison to a traffic signal is evident in the ongoing maintenance costs. The City has a significant financial investment in many expensive components of a traffic signal controlled intersection such as the signal lights, crosswalk signs, signal poles, traffic cameras and the traffic control cabinet, all of which require regular monthly maintenance by specialized consultant contracts. The roundabout will contain minimal landscaping and adequate intersection lighting, reducing the maintenance responsibilities and financial burden on the City's intersection maintenance budget.

There is a concern with the general public's ability to navigate a roundabout: Navigating a roundabout is much like merging onto and off of a freeway: yielding to traffic moving in the roundabout, waiting for an adequate opening, and safely merging into traffic. The City website contains an instructional video for navigating a roundabout. The Engineering Division is coordinating with the Recreation & Cultural Services Department and the Monterey Peninsula Unified School District to conduct on-site field trips to educate students of Olson Elementary on crossing through the Reservation Road roundabouts, and;

WHEREAS, should the City Council deny construction of a roundabout, the traffic signal design will be brought to the City Public Works Commission for final design review and recommendation for a call for bids on the construction, and;

WHEREAS, should the City Council approve construction of a roundabout, the roundabout design will be brought to the Design Review Board for final landscaping and lighting design review along with a review by the Public Works Commission for final design review and recommendation for a call for bids on the construction, and;

WHEREAS, the City has submitted an application for the AB 2766 Emission Reduction Grant Program for 2015-16 administered by the Monterey Bay Unified Air Pollution Control District in the amount of $400,000. Should the City Council deny construction of a roundabout, staff would need to withdraw the Air District application, and;

WHEREAS, in discussions with Caltrans on the status of the HSIP grant, staff received direction on submitting a scope of work revision summary for the design change from a traffic signal to a roundabout. There are potentially additional funds available for a roundabout as an alternative to a new traffic signal.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Marina does hereby:

1. Approve the construction of a Roundabout in lieu of a traffic signal for the Del Monte Boulevard and Beach Road Intersection Improvement Project

PASSED AND ADOPTED by the City Council of the City of Marina at a regular meeting duly held on the 18th day of August 2015, by the following vote:

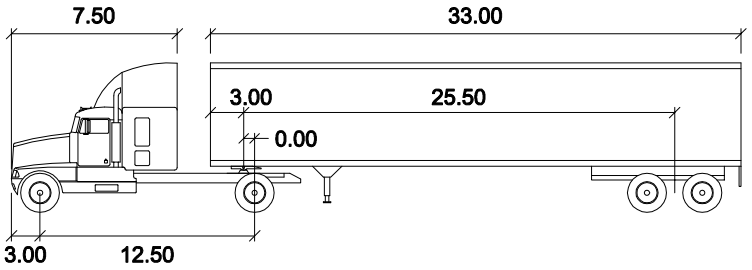
AYES: COUNCIL MEMBERS: Amadeo, Brown, Morton, O'Connell, Delgado
NOES: COUNCIL MEMBERS: None.
ABSTAIN: COUNCIL MEMBERS: None.
ABSENT: COUNCIL MEMBERS: None.

_____
Bruce C. Delgado, Mayor

ATTEST:

_____
Anita Flanagan, Deputy City Clerk

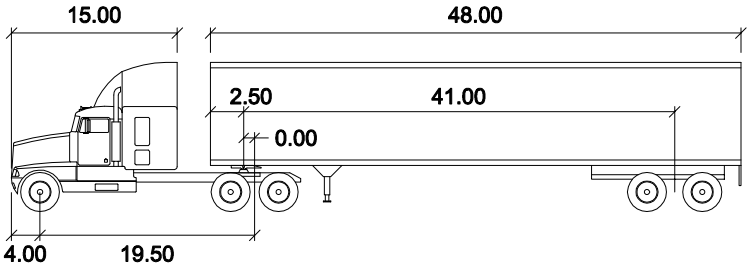
# AASHTO 2011




## WB-40

feet

| | | | |
|---|---|---|---|
| Tractor Width | : 8.00 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 8.00 | Steering Angle | : 20.3 |
| Tractor Track | : 8.00 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.00 | | |




## WB-62

feet

| | | | |
|---|---|---|---|
| Tractor Width | : 8.00 | Lock to Lock Time | : 6.0 |
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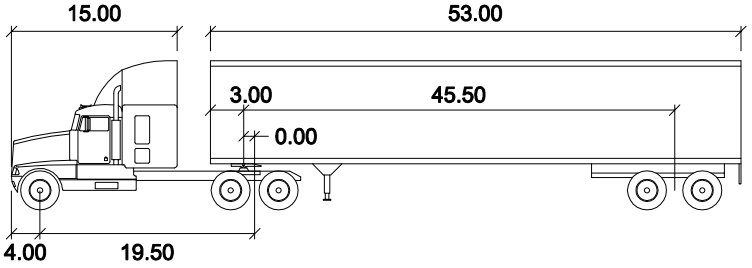
| Tractor Track | : 8.00 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.50 | | |




## WB-67

feet

| | | | |
|---|---|---|---|
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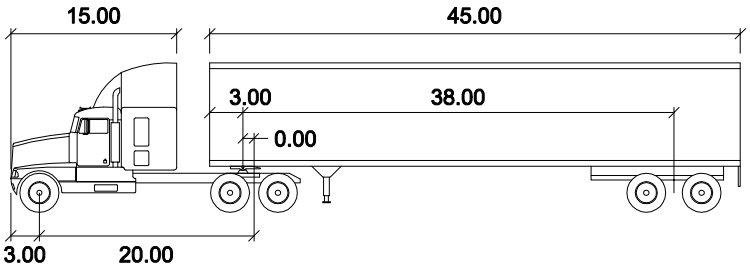
| Trailer Width | : 8.50 | Steering Angle | : 28.4 |
| Tractor Track | : 8.00 | Articulating Angle | : 75.0 |
| Trailer Track | : 8.50 | | |

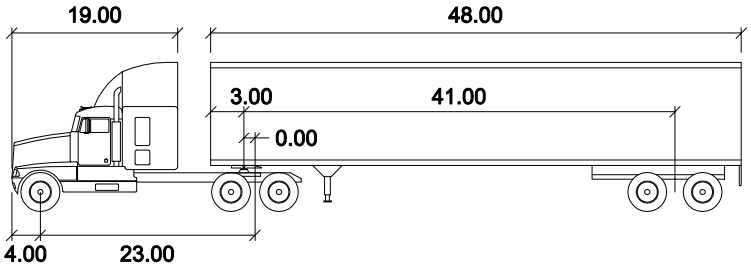
# CALTRANS 2012




## CA LEGAL - 65 FT

feet

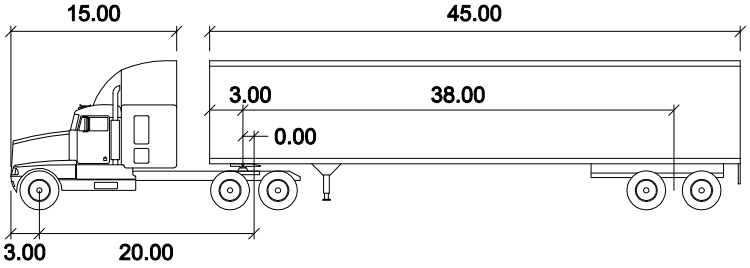
| | | | |
|---|---|---|---|
| Tractor Width | : 8.50 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 8.50 | Steering Angle | : 26.3 |
| Tractor Track | : 8.50 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.50 | | |




## STAA - STANDARD

feet

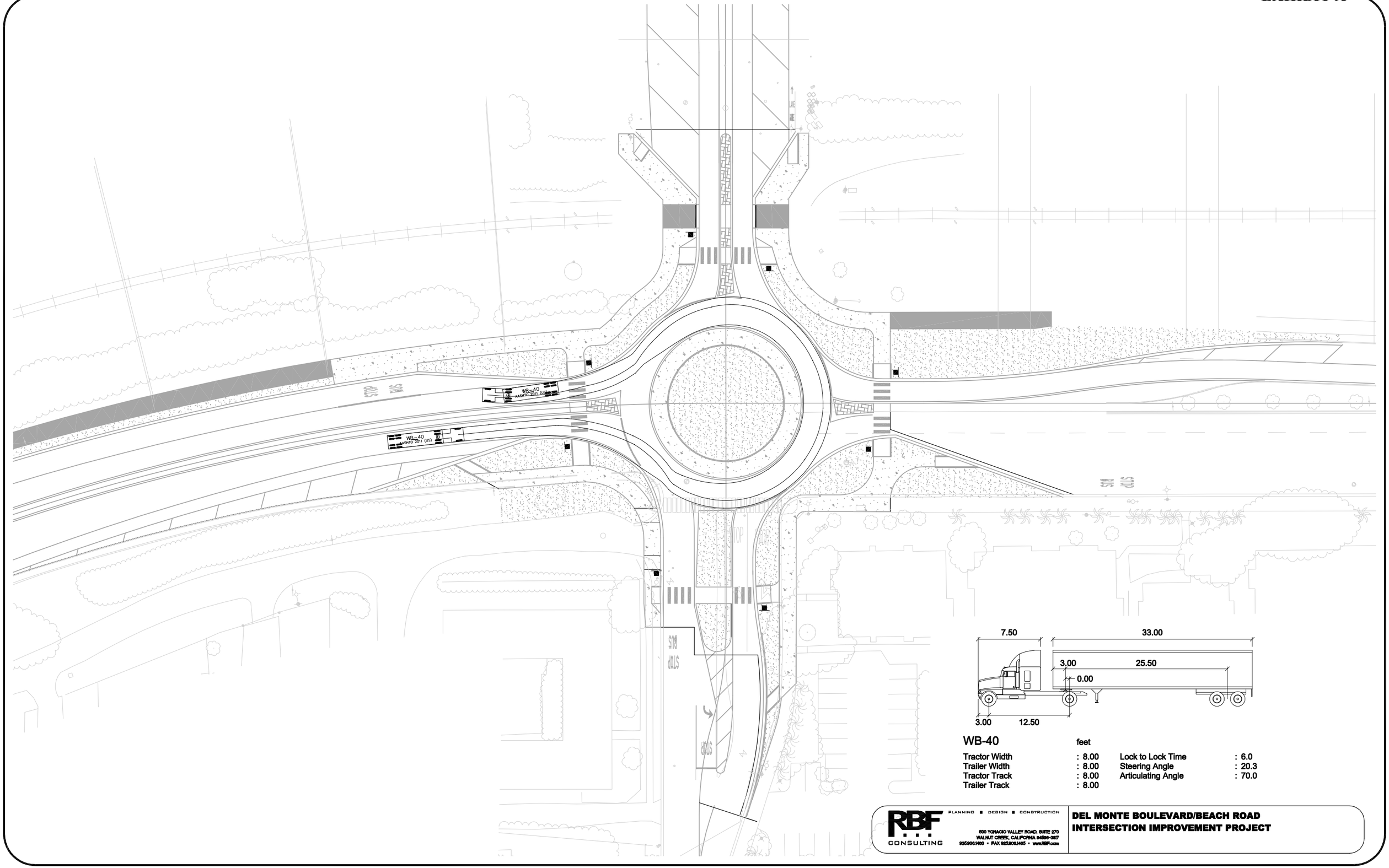
| | | | |
|---|---|---|---|
| Tractor Width | : 8.50 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 8.50 | Steering Angle | : 26.3 |
| Tractor Track | : 8.50 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.50 | | |




## CA LEGAL - 65 FT (60 FT RADIUS)

feet

| | | | |
|---|---|---|---|
| Tractor Width | : 8.50 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 8.50 | Steering Angle | : 20.9 |
| Tractor Track | : 8.50 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.50 | | |







**WB-40** feet

| | | | |
|---|---|---|---|
| Tractor Width | : 8.00 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 8.00 | Steering Angle | : 20.3 |
| Tractor Track | : 8.00 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.00 | | |

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PLANNING ■ DESIGN ■ CONSTRUCTION
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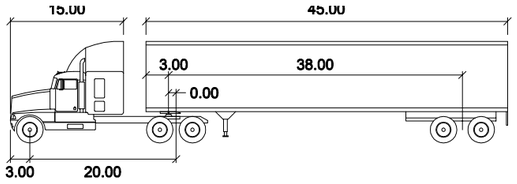
WALNUT CREEK, CALIFORNIA 94598-3807
925.906.1460 • FAX 925.906.1465 • www.RBF.com

**DEL MONTE BOULEVARD/BEACH ROAD INTERSECTION IMPROVEMENT PROJECT**

**EXHIBIT A**




## CA LEGAL - 65 FT

feet

| | | | |
|---|---|---|---|
| Tractor Width | : 8.50 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 8.50 | Steering Angle | : 26.3 |
| Tractor Track | : 8.50 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.50 | | |



RBF CONSULTING

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**DEL MONTE BOULEVARD/BEACH ROAD**
**INTERSECTION IMPROVEMENT PROJECT**

**EXHIBIT B**

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
428 J Street, Suite 500, Sacramento, CA 95814 P 916.266.2190 F 916.266.2195

# TECHNICAL MEMORANDUM

**Del Monte Boulevard at Beach Road Roundabout**

DRAFT - Roundabout Operations - DRAFT

| | | |
|---|---|---|
| Date: | June 23, 2015 | Project #: 19010 |
| To: | Jennifer Harmon, P.E. | |
| From: | Sean Houck | |
| cc: | | |

## INTRODUCTION

Kittelson & Associates, Inc. (KAI) has completed an evaluation of the performance of a proposed roundabout (yield) intersection control at the intersection of Del Monte Boulevard and Beach Road. The purpose of this analysis is to summarize the design year operations at this intersection for opening day, service life, and design life considerations.

## BASELINE AND DESIGN YEAR CONDITIONS

The operations are based upon forecasts provided by the City of Marina in the Marina Station Traffic Impact Analysis, December 5, 2006. In addition, we evaluated operations based upon AM traffic counts conducted by the City on April 3, 2015. In summary, the following design year scenarios were evaluated:

- Baseline Condition
  - Existing (2015) AM peak hour
- Cumulative Condition
  - Cumulative AM/PM Peak Hour
- Design Year + Project (Marina Station) Condition
  - Existing (2006) + Project AM/PM peak hour
  - Cumulative + Project AM/PM peak hour (assume 2040 Design year horizon)

All results assume:

- 10 pedestrians crossing each leg for each peak hour.
- Peak hour factor of 0.92 for all movements

Refer to the attachments for peak hour volumes used in each scenario.

## OPERATIONS METHODOLOGY

Roundabout operations were evaluated using SIDRA Intersection 6 software using the 2010 Highway Capacity Manual (HCM) capacity model. The 2010 HCM capacity model was calibrated to better reflect gap acceptance behavior of California drivers for critical headway and follow-up headway. The calibration factors, or HCM Parameters A and B, used in this analysis are recommended in the Caltrans document "Roundabout Geometric Design Guidance" dated June 2007. The A and B parameters were derived based on field observations to more accurately reflect operational performance of California roundabouts.

## RESULTS SUMMARY

Roundabout operations were evaluated for a single lane roundabout as illustrated in Figure 1. A multilane roundabout was evaluated for scenarios where operations for the single lane roundabout were unacceptable. Refer to Figure 2 for an illustration of the multilane roundabout concept.

Figure 1: Single Lane Roudnabout

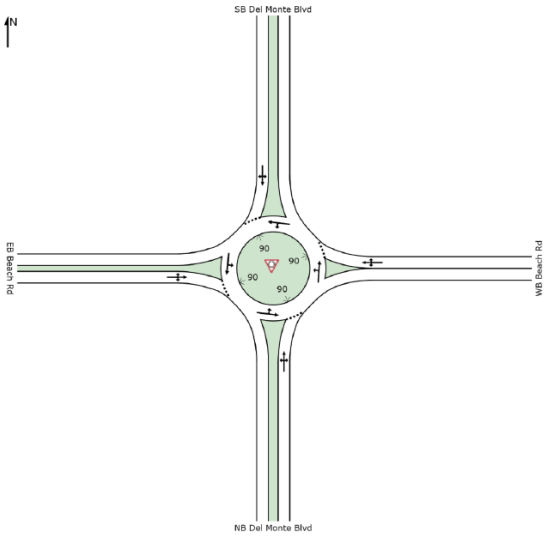
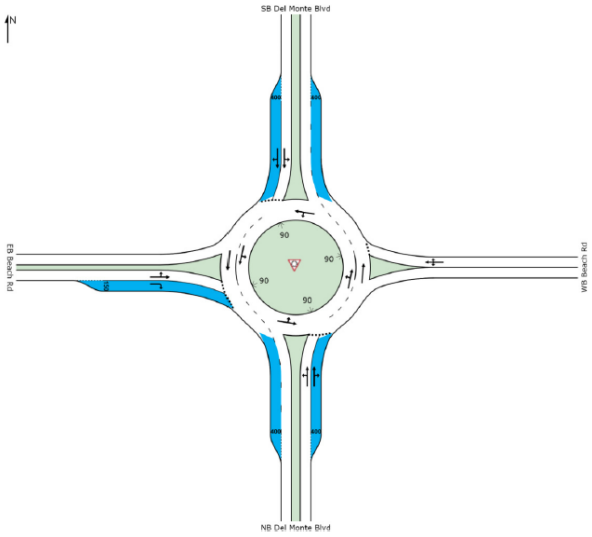



Figure 2: Multi-Lane Roundabout




BLUE: Added Approach/Departure Lanes

### Baseline Conditions

Table 1 provides the results for the Baseline AM Condition. A single lane roundabout will provide acceptable operations for the AM Baseline Condition.

Baseline PM traffic counts were not provided.

**Table 1: Baseline AM Condition - Single Lane Roundabout**

| Lane Use and Performance | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 315 | 2.0 | 1226 | 0.257 | 100 | 5.2 | LOS A | 1.4 | 34.7 | Full | 1600 | 0.0 | 0.0 |
| Approach | 315 | 2.0 | | 0.257 | | 5.2 | LOS A | 1.4 | 34.7 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 225 | 2.0 | 1013 | 0.222 | 100 | 5.7 | LOS A | 1.1 | 26.9 | Full | 1600 | 0.0 | 0.0 |
| Approach | 225 | 2.0 | | 0.222 | | 5.7 | LOS A | 1.1 | 26.9 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 350 | 2.0 | 1054 | 0.332 | 100 | 6.8 | LOS A | 1.8 | 45.1 | Full | 1600 | 0.0 | 0.0 |
| Approach | 350 | 2.0 | | 0.332 | | 6.8 | LOS A | 1.8 | 45.1 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 161 | 2.0 | 1070 | 0.150 | 100 | 4.7 | LOS A | 0.7 | 17.5 | Full | 1600 | 0.0 | 0.0 |
| Approach | 161 | 2.0 | | 0.150 | | 4.7 | LOS A | 0.7 | 17.5 | | | | |
| Intersection | 1051 | 2.0 | | 0.332 | | 5.8 | LOS A | 1.8 | 45.1 | | | | |

## Cumulative No Project Condition

The cumulative no project condition was evaluated to determine future roundabout operations based on land use assumptions without the proposed Marina Station project documented in the 2006 Marina Station Traffic Impact Study.

Tables 2 and 3 summarize the roundabout operations for the AM and PM cumulative condition.

**Table 2: Cumulative AM Condition - Single Lane Roundabout**

| Lane Use and Performance | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 395 | 2.0 | 1181 | 0.334 | 100 | 6.2 | LOS A | 1.9 | 48.2 | Full | 1600 | 0.0 | 0.0 |
| Approach | 395 | 2.0 | | 0.334 | | 6.2 | LOS A | 1.9 | 48.2 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 292 | 2.0 | 978 | 0.299 | 100 | 6.7 | LOS A | 1.5 | 38.1 | Full | 1600 | 0.0 | 0.0 |
| Approach | 292 | 2.0 | | 0.299 | | 6.7 | LOS A | 1.5 | 38.1 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 359 | 2.0 | 920 | 0.390 | 100 | 8.3 | LOS A | 2.1 | 52.3 | Full | 1600 | 0.0 | 0.0 |
| Approach | 359 | 2.0 | | 0.390 | | 8.3 | LOS A | 2.1 | 52.3 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 303 | 2.0 | 983 | 0.308 | 100 | 6.8 | LOS A | 1.6 | 39.7 | Full | 1600 | 0.0 | 0.0 |
| Approach | 303 | 2.0 | | 0.308 | | 6.8 | LOS A | 1.6 | 39.7 | | | | |
| Intersection | 1349 | 2.0 | | 0.390 | | 7.0 | LOS A | 2.1 | 52.3 | | | | |

**Table 3: Cumulative PM Condition - Single Lane Roundabout**

| Lane Use and Performance | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 774 | 2.0 | 1085 | 0.713 | 100 | 14.7 | LOS B | 8.0 | 202.5 | Full | 1600 | 0.0 | 0.0 |
| Approach | 774 | 2.0 | | 0.713 | | 14.7 | LOS B | 8.0 | 202.5 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 189 | 2.0 | 667 | 0.284 | 100 | 8.9 | LOS A | 1.2 | 31.2 | Full | 1600 | 0.0 | 0.0 |
| Approach | 189 | 2.0 | | 0.284 | | 8.9 | LOS A | 1.2 | 31.2 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 308 | 2.0 | 827 | 0.372 | 100 | 8.8 | LOS A | 1.9 | 47.5 | Full | 1600 | 0.0 | 0.0 |
| Approach | 308 | 2.0 | | 0.372 | | 8.8 | LOS A | 1.9 | 47.5 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 551 | 2.0 | 1053 | 0.524 | 100 | 9.7 | LOS A | 3.6 | 91.2 | Full | 1600 | 0.0 | 0.0 |
| Approach | 551 | 2.0 | | 0.524 | | 9.7 | LOS A | 3.6 | 91.2 | | | | |
| Intersection | 1822 | 2.0 | | 0.713 | | 11.6 | LOS B | 8.0 | 202.5 | | | | |

A single lane roundabout will provide acceptable operations for the AM and PM cumulative condition.

### Design Year + Project (Marina Station) Conditions

Design year conditions were evaluated based on potential development of the Marina Station project north of the Del Monte Boulevard at Beach Road intersection. The purpose of this evaluation is to evaluate roundabout operations for estimated travel demand generated by the Marina Station project as well as cumulative land use assumptions documented in the 2006 Marina Station Traffic Impact Analysis.

Tables 4 and 5 summarize the roundabout operations for the AM and PM Existing (2006) + Project condition.

**Table 4: Design Year (2006) + Project AM Condition - Single Lane Roundabout**

| Lane Use and Performance | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 592 | 2.0 | 960 | 0.617 | 100 | 12.7 | LOS B | 5.2 | 130.9 | Full | 1600 | 0.0 | 0.0 |
| Approach | 592 | 2.0 | | 0.617 | | 12.7 | LOS B | 5.2 | 130.9 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 438 | 2.0 | 825 | 0.531 | 100 | 11.8 | LOS B | 3.5 | 89.2 | Full | 1600 | 0.0 | 0.0 |
| Approach | 438 | 2.0 | | 0.531 | | 11.8 | LOS B | 3.5 | 89.2 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 713 | 2.0 | 937 | 0.761 | 100 | 18.7 | LOS C | 8.8 | 224.7 | Full | 1600 | 0.0 | 0.0 |
| Approach | 713 | 2.0 | | 0.761 | | 18.7 | LOS C | 8.8 | 224.7 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 323 | 2.0 | 697 | 0.463 | 100 | 11.8 | LOS B | 2.6 | 65.4 | Full | 1600 | 0.0 | 0.0 |
| Approach | 323 | 2.0 | | 0.463 | | 11.8 | LOS B | 2.6 | 65.4 | | | | |
| Intersection | 2066 | 2.0 | | 0.761 | | 14.5 | LOS B | 8.8 | 224.7 | | | | |

**Table 5: Design Year (2006) + Project PM Condition - Single Lane Roundabout**

| Lane Use and Performance | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 765 | 2.0 | 919 | 0.833 | 100 | 24.2 | LOS C | 11.8 | 300.8 | Full | 1600 | 0.0 | 0.0 |
| Approach | 765 | 2.0 | | 0.833 | | 24.2 | LOS C | 11.8 | 300.8 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 387 | 2.0 | 672 | 0.576 | 100 | 15.3 | LOS C | 3.7 | 94.5 | Full | 1600 | 0.0 | 0.0 |
| Approach | 387 | 2.0 | | 0.576 | | 15.3 | LOS C | 3.7 | 94.5 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 729 | 2.0 | 982 | 0.742 | 100 | 17.1 | LOS C | 8.5 | 216.1 | Full | 1600 | 0.0 | 0.0 |
| Approach | 729 | 2.0 | | 0.742 | | 17.1 | LOS C | 8.5 | 216.1 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 392 | 2.0 | 706 | 0.556 | 100 | 14.1 | LOS B | 3.6 | 90.6 | Full | 1600 | 0.0 | 0.0 |
| Approach | 392 | 2.0 | | 0.556 | | 14.1 | LOS B | 3.6 | 90.6 | | | | |
| Intersection | 2274 | 2.0 | | 0.833 | | 18.7 | LOS C | 11.8 | 300.8 | | | | |

A single lane roundabout will provide acceptable operations for the AM and PM Design Year (2006) + Project condition.

Tables 6 and 7 summarize the roundabout operations for the AM and PM Cumulative + Project condition.

**Table 6: Cumulative + Project AM Condition - Single Lane Roundabout**

| Lane Use and Performance | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 782 | 2.0 | 955 | 0.819 | 100 | 22.3 | LOS C | 11.5 | 292.0 | Full | 1600 | 0.0 | 0.0 |
| Approach | 782 | 2.0 | | 0.819 | | 22.3 | LOS C | 11.5 | 292.0 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 452 | 2.0 | 684 | 0.661 | 100 | 18.2 | LOS C | 5.0 | 125.8 | Full | 1600 | 0.0 | 0.0 |
| Approach | 452 | 2.0 | | 0.661 | | 18.2 | LOS C | 5.0 | 125.8 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 786 | 2.0 | 803 | 0.979 | 100 | 49.4 | LOS E | 22.8 | 580.0 | Full | 1600 | 0.0 | 0.0 |
| Approach | 786 | 2.0 | | 0.979 | | 49.4 | LOS E | 22.8 | 580.0 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 476 | 2.0 | 644 | 0.739 | 100 | 23.4 | LOS C | 6.2 | 156.8 | Full | 1600 | 0.0 | 0.0 |
| Approach | 476 | 2.0 | | 0.739 | | 23.4 | LOS C | 6.2 | 156.8 | | | | |
| Intersection | 2496 | 2.0 | | 0.979 | | 30.3 | LOS D | 22.8 | 580.0 | | | | |

A single lane roundabout for the Cumulative + Project AM Condition will provide a high level of congestion on the north leg approach. The degree of saturation for the north leg is less than 1.0 but is greater than the desirable threshold of 0.85.

**Table 7: Cumulative + Project PM Condition - Single Lane Roundabout**

| Lane Use and Performance | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 1190 | 2.0 | 924 | 1.289 | 100 | 154.3 | LOS F | 104.3 | 2648.4 | Full | 1600 | 0.0 | 22.7 |
| Approach | 1190 | 2.0 | | 1.289 | | 154.3 | LOS F | 104.3 | 2648.4 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 430 | 2.0 | 568 | 0.758 | 100 | 27.3 | LOS D | 6.1 | 155.0 | Full | 1600 | 0.0 | 0.0 |
| Approach | 430 | 2.0 | | 0.758 | | 27.3 | LOS D | 6.1 | 155.0 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 812 | 2.0 | 740 | 1.097 | 100 | 85.4 | LOS F | 40.7 | 1032.5 | Full | 1600 | 0.0 | 0.0 |
| Approach | 812 | 2.0 | | 1.097 | | 85.4 | LOS F | 40.7 | 1032.5 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 708 | 2.0 | 673 | 1.052 | 100 | 73.6 | LOS F | 29.2 | 742.7 | Full | 1600 | 0.0 | 0.0 |
| Approach | 708 | 2.0 | | 1.052 | | 73.6 | LOS F | 29.2 | 742.7 | | | | |
| Intersection | 3140 | 2.0 | | 1.289 | | 100.9 | LOS F | 104.3 | 2648.4 | | | | |

A single lane roundabout for the Cumulative + Project PM Condition will provide unacceptable operations on the north, south and west leg approaches. The degree of saturation for the north, south, and west legs is greater than 1.0.

For the Cumulative + Project conditions, additional analysis was performed to determine the number of lanes needed to provide acceptable operations for the roundabout. As shown in Figure 2, one additional lane is required on Del Monte Boulevard in the northbound and southbound direction. In addition, an eastbound right turn lane on Beach Road is required. These added lanes will require one additional circulatory lane in the northbound and the southbound directions of the roundabout. A single eastbound and westbound circulatory lane can remain, without compromising operations for this movement.

Tables 8 and 9 summarize the roundabout operations for the AM and PM Cumulative + Project condition with the recommended added lanes (i.e., multi-lane roundabout)

The multi-lane roundabout will provide acceptable operations for the AM and PM Cumulative + Project condition.

**Table 8: Cumulative + Project AM Condition – Multi-Lane Roundabout**

| Lane Use and Performance | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 437 | 2.0 | 948 | 0.461 | 100 | 9.3 | LOS A | 2.8 | 69.9 | Full | 1600 | 0.0 | 0.0 |
| Lane 2 | 344 | 2.0 | 948 | 0.363 | 79[6] | 7.8 | LOS A | 1.9 | 48.0 | Short | 400 | 0.0 | 0.0 |
| Approach | 782 | 2.0 | | 0.461 | | 8.6 | LOS A | 2.8 | 69.9 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 452 | 2.0 | 838 | 0.540 | 100 | 11.9 | LOS B | 3.5 | 89.3 | Full | 1600 | 0.0 | 0.0 |
| Approach | 452 | 2.0 | | 0.540 | | 11.9 | LOS B | 3.5 | 89.3 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 440 | 2.0 | 799 | 0.550 | 100 | 12.6 | LOS B | 3.7 | 93.8 | Full | 1600 | 0.0 | 0.0 |
| Lane 2 | 346 | 2.0 | 799 | 0.433 | 79[6] | 10.1 | LOS B | 2.4 | 60.8 | Short | 400 | 0.0 | 0.0 |
| Approach | 786 | 2.0 | | 0.550 | | 11.5 | LOS B | 3.7 | 93.8 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 298 | 2.0 | 794 | 0.375 | 100 | 9.1 | LOS A | 1.9 | 47.5 | Full | 1600 | 0.0 | 0.0 |
| Lane 2 | 178 | 2.0 | 733 | 0.243 | 100 | 7.7 | LOS A | 1.1 | 28.7 | Short | 150 | 0.0 | 0.0 |
| Approach | 476 | 2.0 | | 0.375 | | 8.6 | LOS A | 1.9 | 47.5 | | | | |
| Intersection | 2496 | 2.0 | | 0.550 | | 10.1 | LOS B | 3.7 | 93.8 | | | | |

**Table 9: Cumulative + Project PM Condition – Multi-Lane Roundabout**

| Lane Use and Performance | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 666 | 2.0 | 893 | 0.745 | 100 | 18.5 | LOS C | 8.0 | 202.3 | Full | 1600 | 0.0 | 0.0 |
| Lane 2 | 524 | 2.0 | 893 | 0.587 | 79[6] | 12.5 | LOS B | 4.4 | 112.4 | Short | 400 | 0.0 | 0.0 |
| Approach | 1190 | 2.0 | | 0.745 | | 15.9 | LOS C | 8.0 | 202.3 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 430 | 2.0 | 573 | 0.752 | 100 | 26.6 | LOS D | 5.7 | 144.0 | Full | 1600 | 0.0 | 0.0 |
| Approach | 430 | 2.0 | | 0.752 | | 26.6 | LOS D | 5.7 | 144.0 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 454 | 2.0 | 675 | 0.673 | 100 | 19.0 | LOS C | 5.1 | 129.5 | Full | 1600 | 0.0 | 0.0 |
| Lane 2 | 358 | 2.0 | 675 | 0.530 | 79[6] | 13.8 | LOS B | 3.2 | 81.2 | Short | 400 | 0.0 | 0.0 |
| Approach | 812 | 2.0 | | 0.673 | | 16.7 | LOS C | 5.1 | 129.5 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 372 | 2.0 | 784 | 0.474 | 100 | 11.0 | LOS B | 2.7 | 69.1 | Full | 1600 | 0.0 | 0.0 |
| Lane 2 | 336 | 2.0 | 723 | 0.465 | 100 | 11.5 | LOS B | 2.8 | 70.4 | Short | 150 | 0.0 | 0.0 |
| Approach | 708 | 2.0 | | 0.474 | | 11.3 | LOS B | 2.8 | 70.4 | | | | |
| Intersection | 3140 | 2.0 | | 0.752 | | 16.5 | LOS C | 8.0 | 202.3 | | | | |

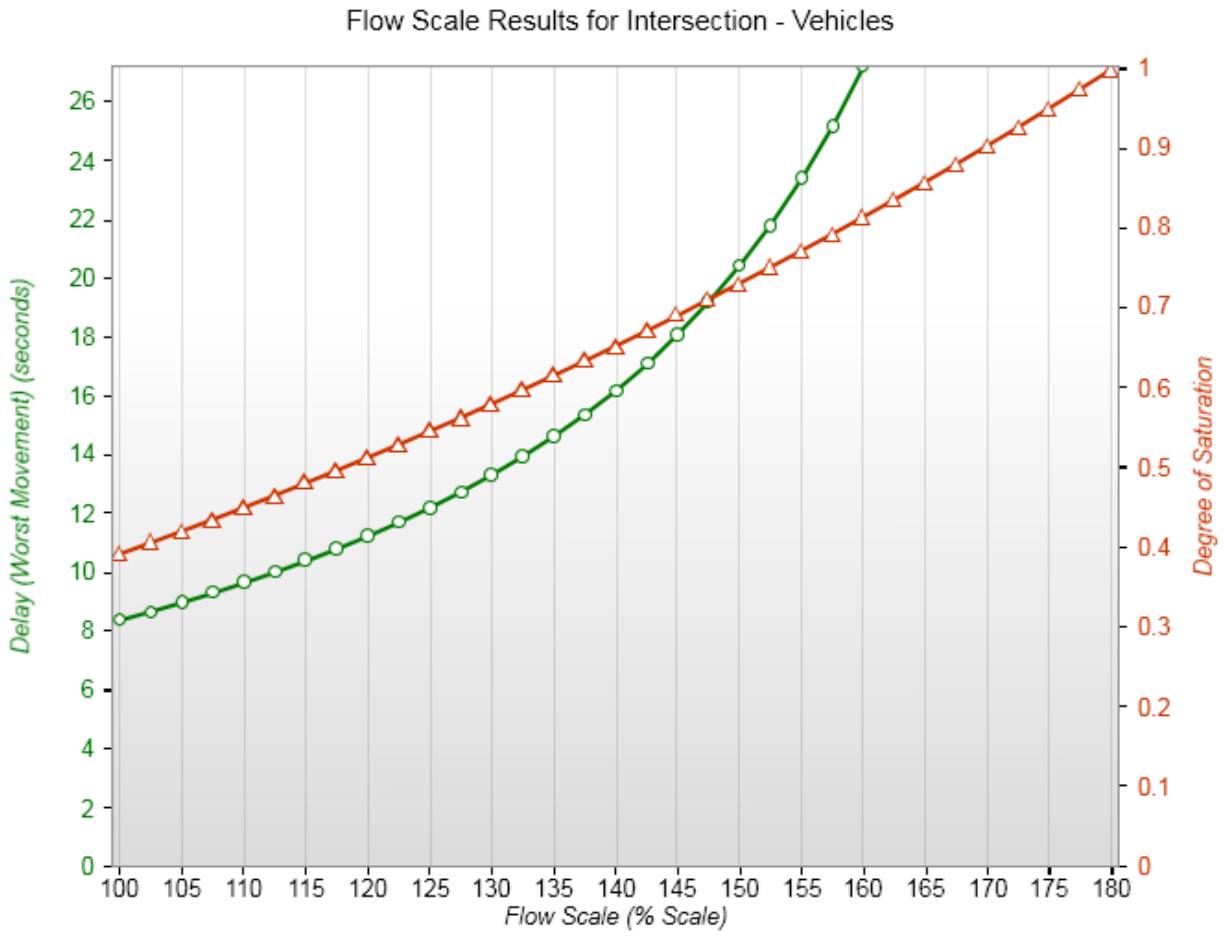
## PROJECT PHASING

The estimated service life of a single lane roundabout is dependent on development of the Marina Station project site. Currently, there are no time lines associated with the Marina Station project. Without the ability to apply a time-scale to roundabout operations, a flow scale analysis was

conducted for the cumulative AM/PM condition. The flow scale analysis uniformly increases traffic volumes across all movements to determine the effect on roundabout operations.

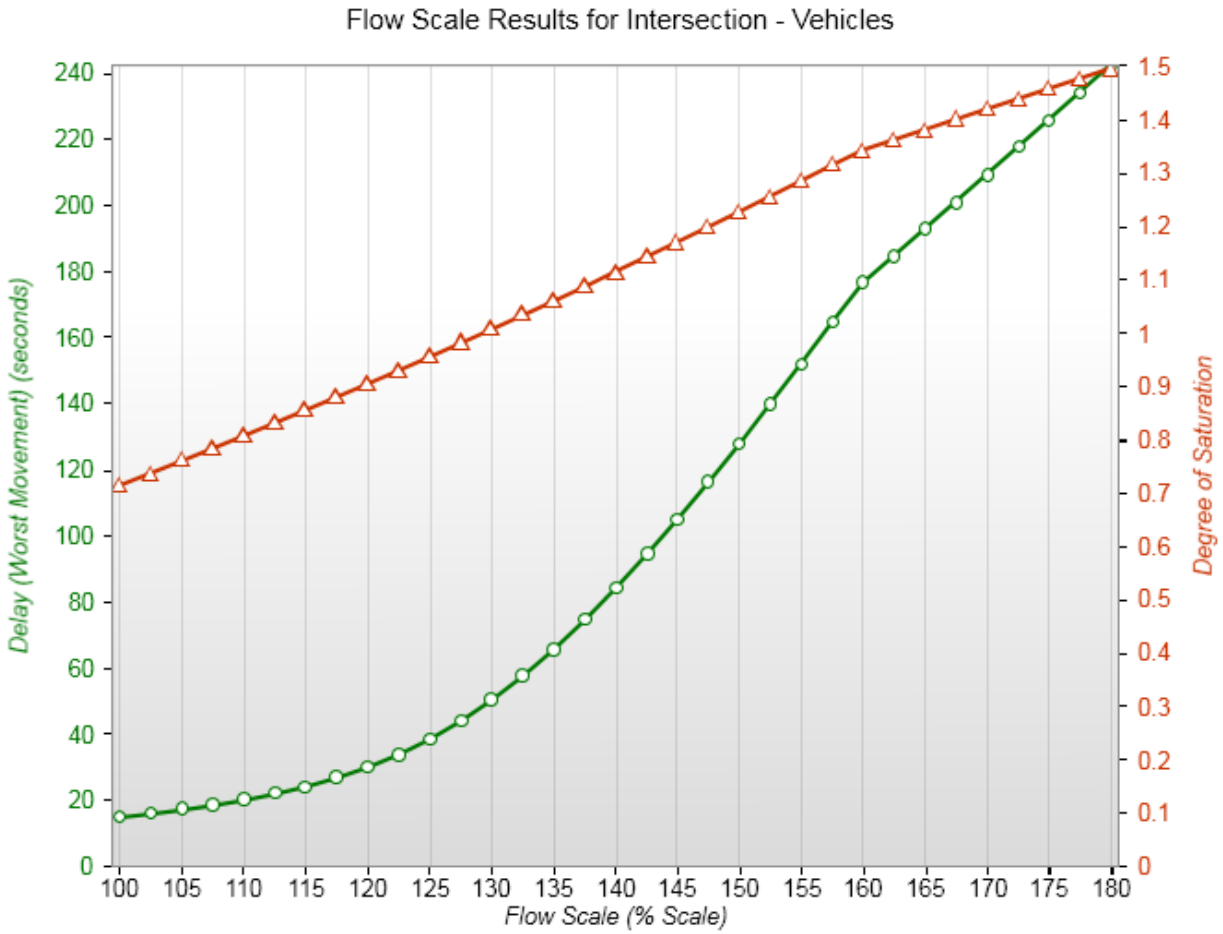
Figures 3 and 4 illustrate the relationship between traffic flows and roundabout operations using average control delay per vehicle for the worst vehicle movement as well as the highest degree of saturation in any lane.

**Chart 1: Flow Scale - Cumulative AM - Single Lane Roundabout**




Based on the flow scale analysis, the single lane roundabout may accommodate an estimated 60% to 75% increase in traffic volume for the cumulative AM condition.

**Chart 2: Flow Scale - Cumulative PM - Single Lane Roundabout**




Based on the flow scale analysis, the single lane roundabout may accommodate an estimated 15% to 25% increase in traffic volume for the cumulative PM condition.

Based on the flow scale analysis for the cumulative no project condition, a single lane roundabout should be considered the preferred alternative for construction. However, the following should be considered to accommodate potential development at the Marina Station project site:

- Minimum 10 year Service Life: Determine likelihood of the Cumulative + Marina Station development being completed to a level that will generate a 15% increase in PM traffic, beyond the cumulative condition, within 10 years of the single lane roundabout being opened. A multi-lane roundabout should be considered if there is a high probability of development being completed within the next 10 years that will generate a 15% increase in traffic in excess of the cumulative PM condition.
- Prepare for a Potential Multi-lane Roundabout – Design Life: Position single lane roundabout to accommodate future expansion to a multi-lane roundabout. Preserve and/or identify right-

of-way needs, approach and departure geometry, central island position, multi-use path, and other geometric elements to minimize cost and impact with future expansion.

## ATTACHMENTS

Peak hour volumes
Intersection layouts (Sidra)
Intersection Summaries

# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: 2015 AM_DelMonte-Beach_Alt 00

Del Monte Boulevard at Beach Road
Roundabout

**Volume Display Method: Total and %**

**Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles**

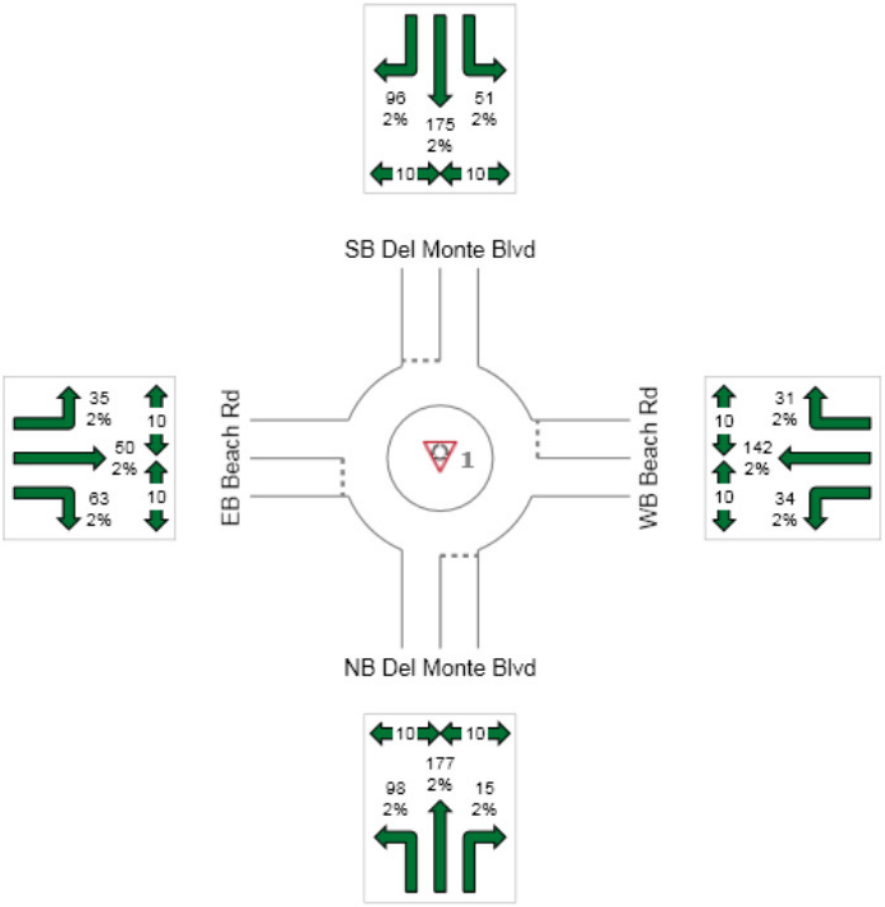
**Total Intersection Volumes (veh)**

**All Movement Classes: 967.0001**

**Light Vehicles (LV): 948**

**Heavy Vehicles (HV): 19**

**Pedestrians: 80**



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: Cumulative AM_DelMonte-Beach_Alt 00

Del Monte Boulevard at Beach Road
Roundabout

**Volume Display Method: Total and %**

**Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles**

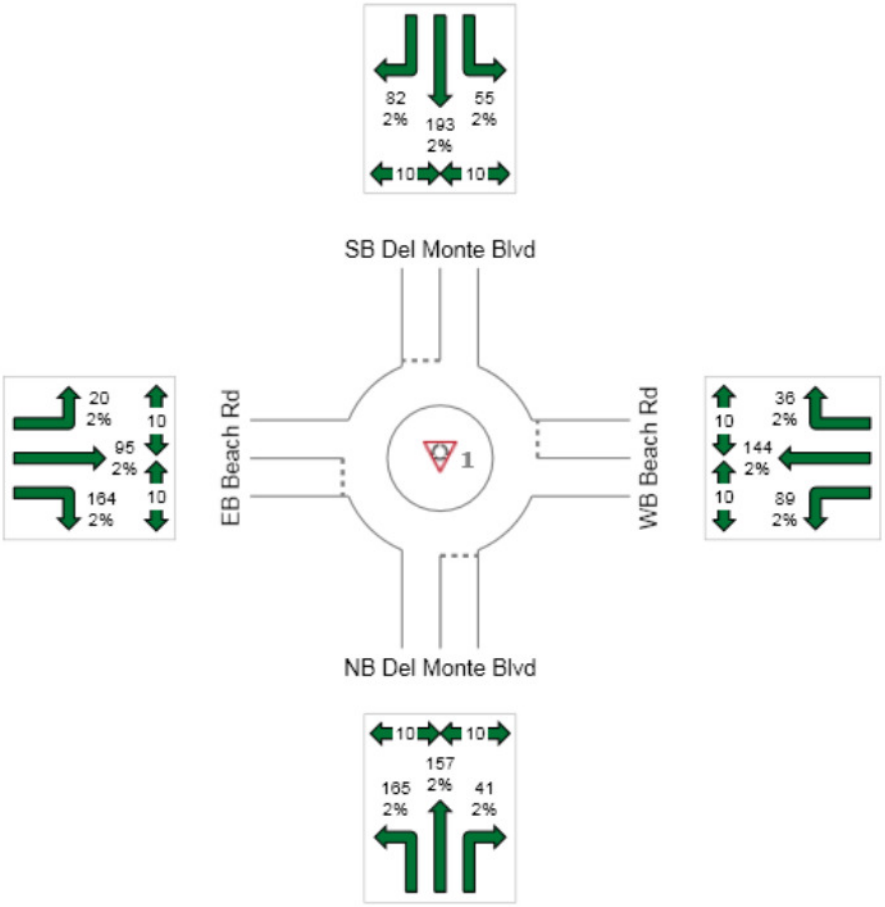
**Total Intersection Volumes (veh)**

**All Movement Classes: 1241**

**Light Vehicles (LV): 1216**

**Heavy Vehicles (HV): 25**

**Pedestrians: 80**



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: Cumulative PM_DelMonte-Beach_Alt 00

Del Monte Boulevard at Beach Road
Roundabout

**Volume Display Method: Total and %**

**Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles**

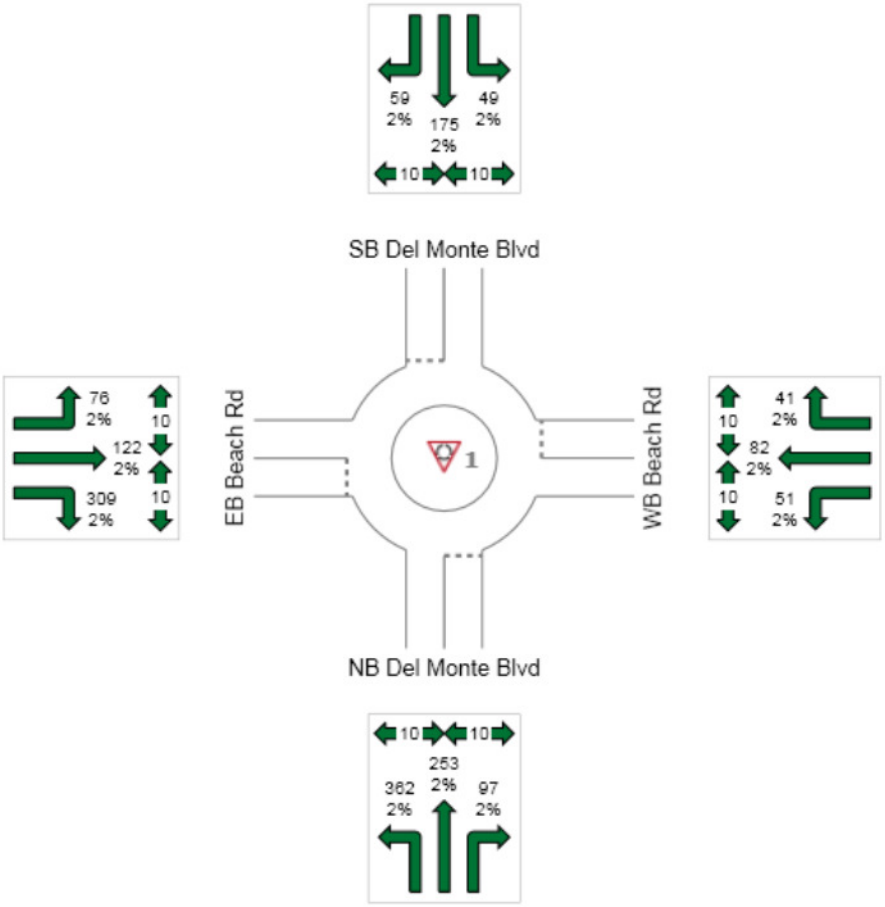
**Total Intersection Volumes (veh)**

**All Movement Classes: 1676**

**Light Vehicles (LV): 1642**

**Heavy Vehicles (HV): 34**

**Pedestrians: 80**



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: Exist (2006)+Project AM_DelMonte-Beach_Alt 00

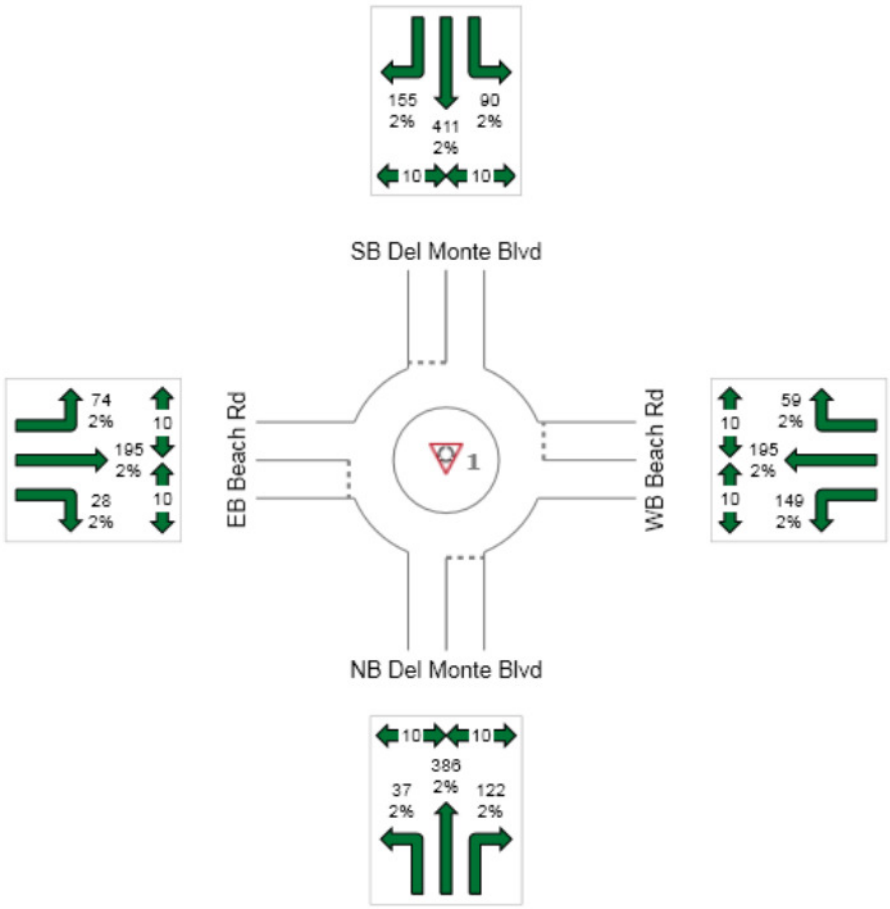
Del Monte Boulevard at Beach Road
Roundabout

**Volume Display Method: Total and %**

**Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles**

**Total Intersection Volumes (veh)**

- **All Movement Classes: 1901**
- **Light Vehicles (LV): 1863**
- **Heavy Vehicles (HV): 38**
- **Pedestrians: 80**



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: Exist (2006)+Project PM_DelMonte-Beach_Alt 00

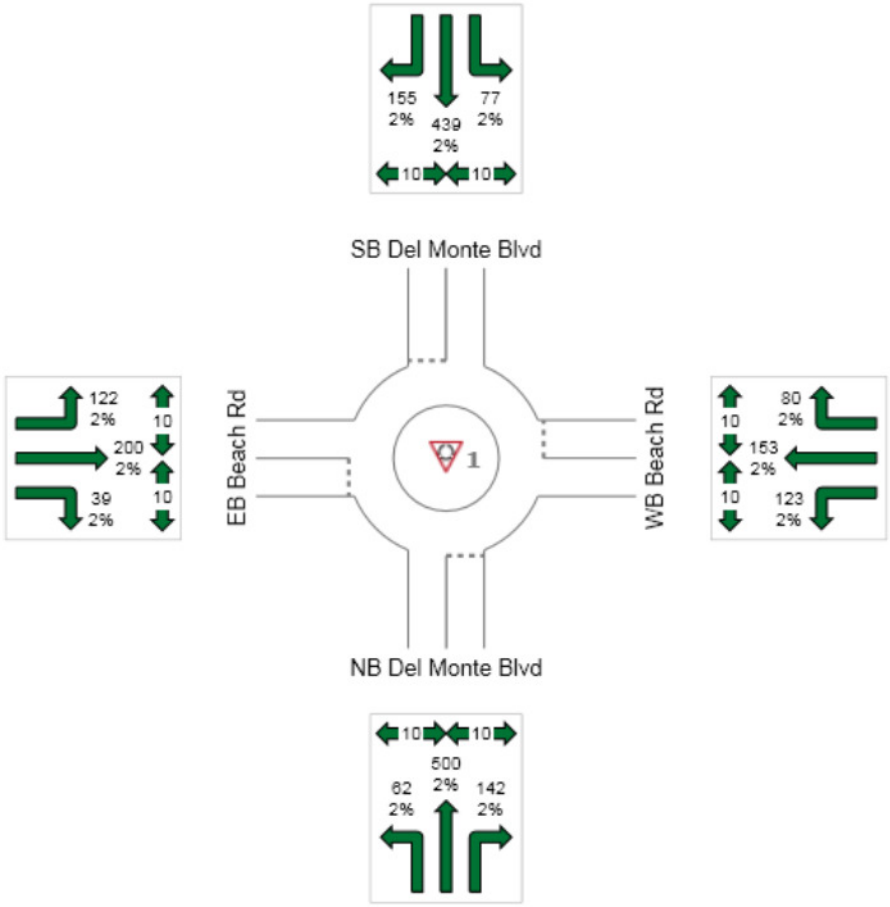
Del Monte Boulevard at Beach Road
Roundabout

**Volume Display Method: Total and %**

**Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles**

**Total Intersection Volumes (veh)**

- **All Movement Classes: 2092**
- **Light Vehicles (LV): 2050**
- **Heavy Vehicles (HV): 42**
- **Pedestrians: 80**



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: Cumulative+Project AM_DelMonte-Beach_Alt 00

Del Monte Boulevard at Beach Road
Roundabout

**Volume Display Method: Total and %**

**Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles**

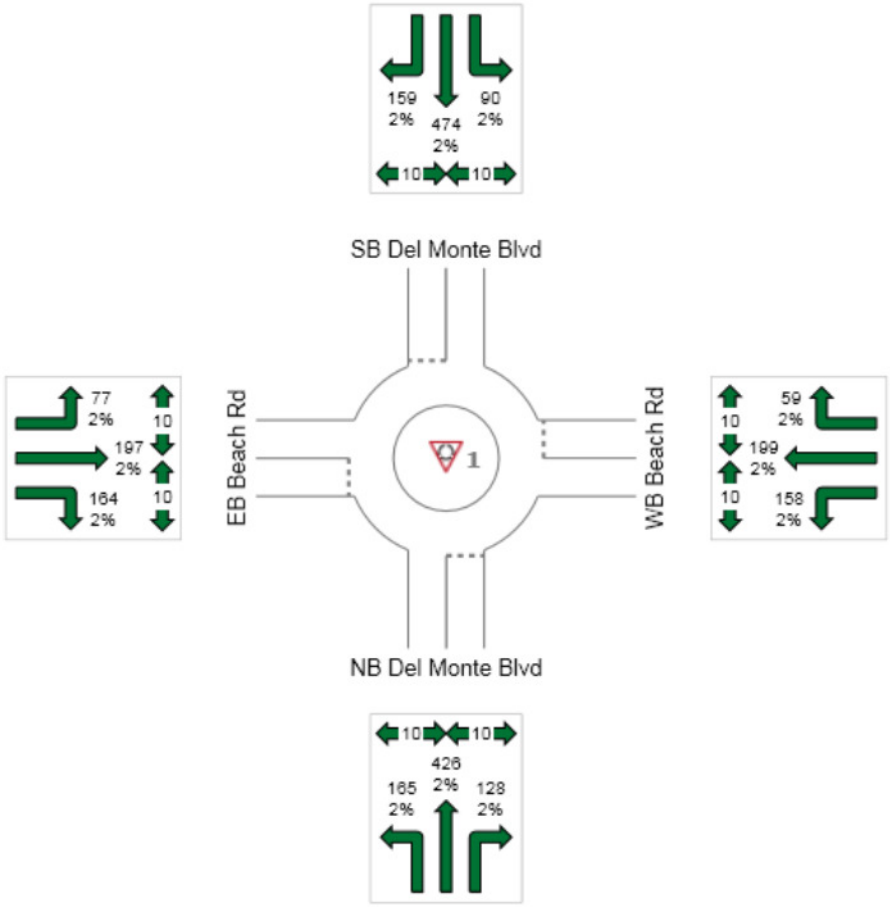
**Total Intersection Volumes (veh)**

**All Movement Classes: 2296**

**Light Vehicles (LV): 2250**

**Heavy Vehicles (HV): 46**

**Pedestrians: 80**



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: Cumulative+Project PM_DelMonte-Beach_Alt 00

Del Monte Boulevard at Beach Road
Roundabout

**Volume Display Method: Total and %**

**Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles**

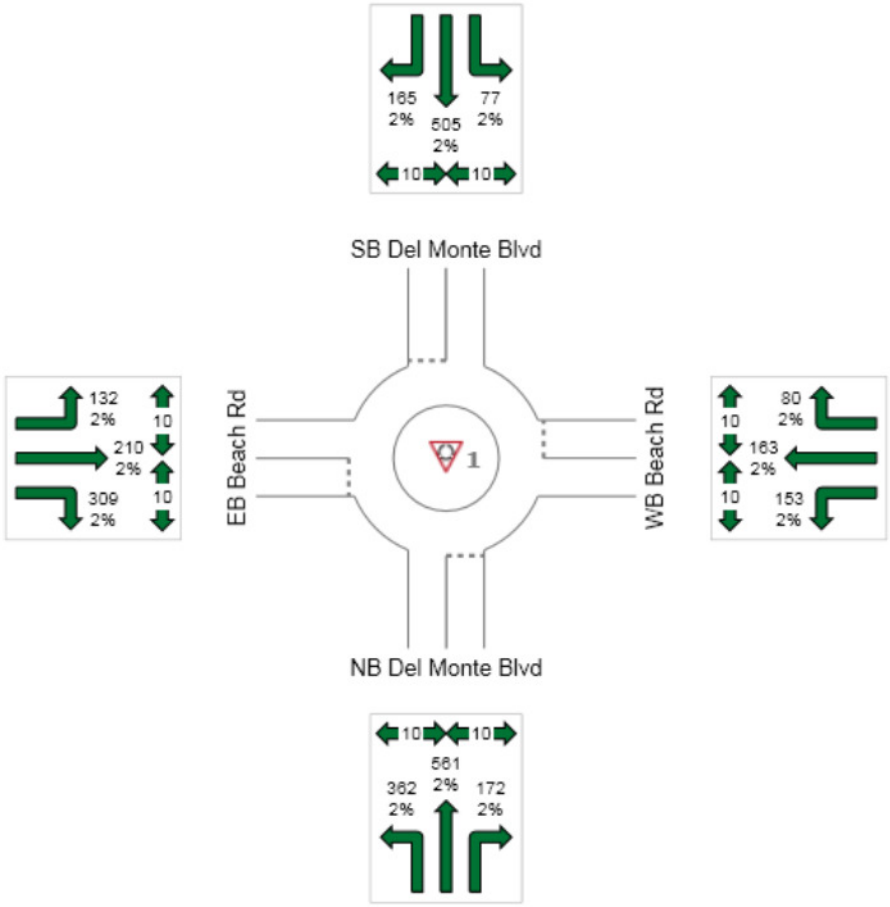
**Total Intersection Volumes (veh)**

**All Movement Classes: 2889**

**Light Vehicles (LV): 2831**

**Heavy Vehicles (HV): 58**

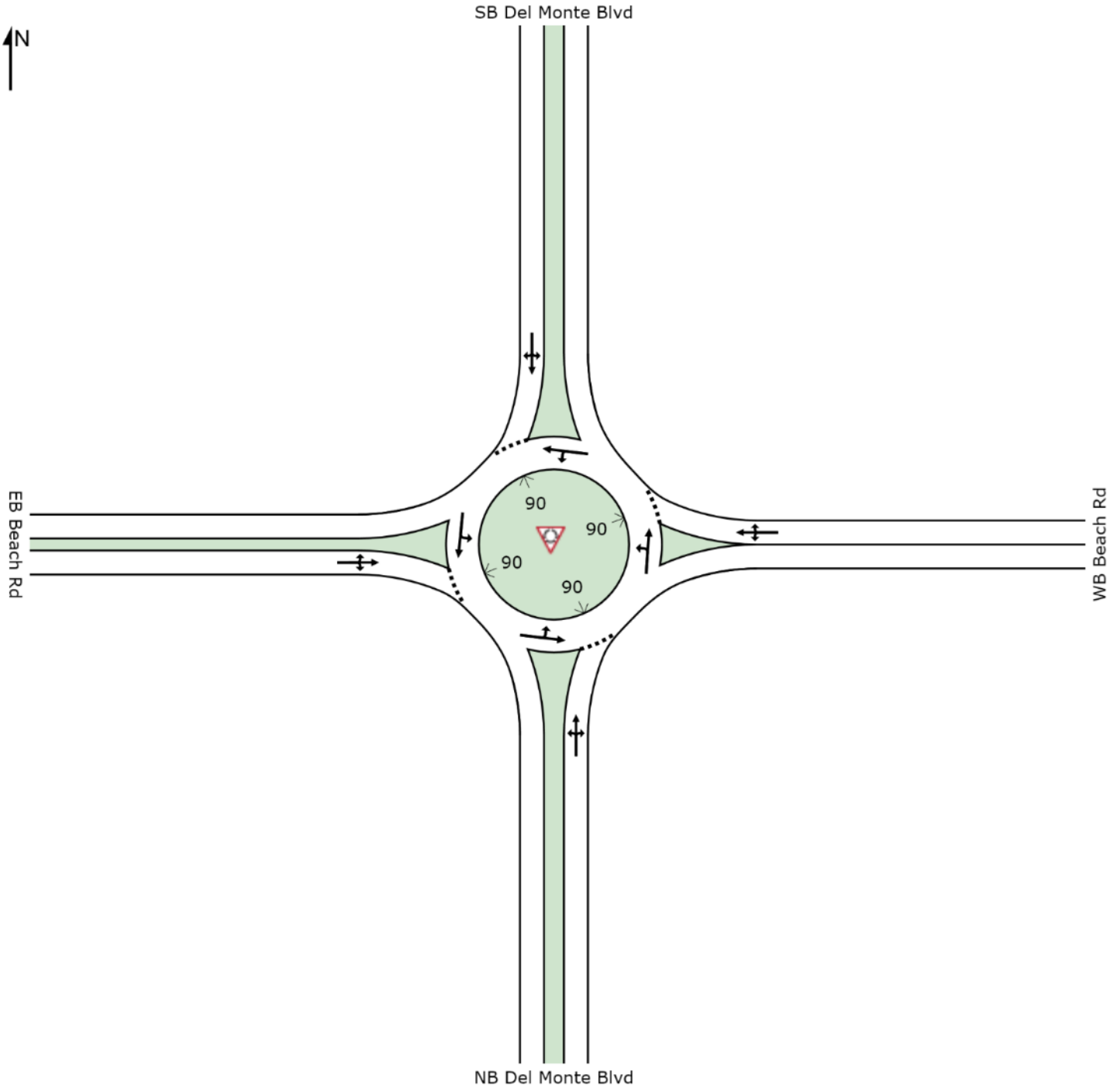
**Pedestrians: 80**



# SITE LAYOUT

## Site: Layout Alt 00

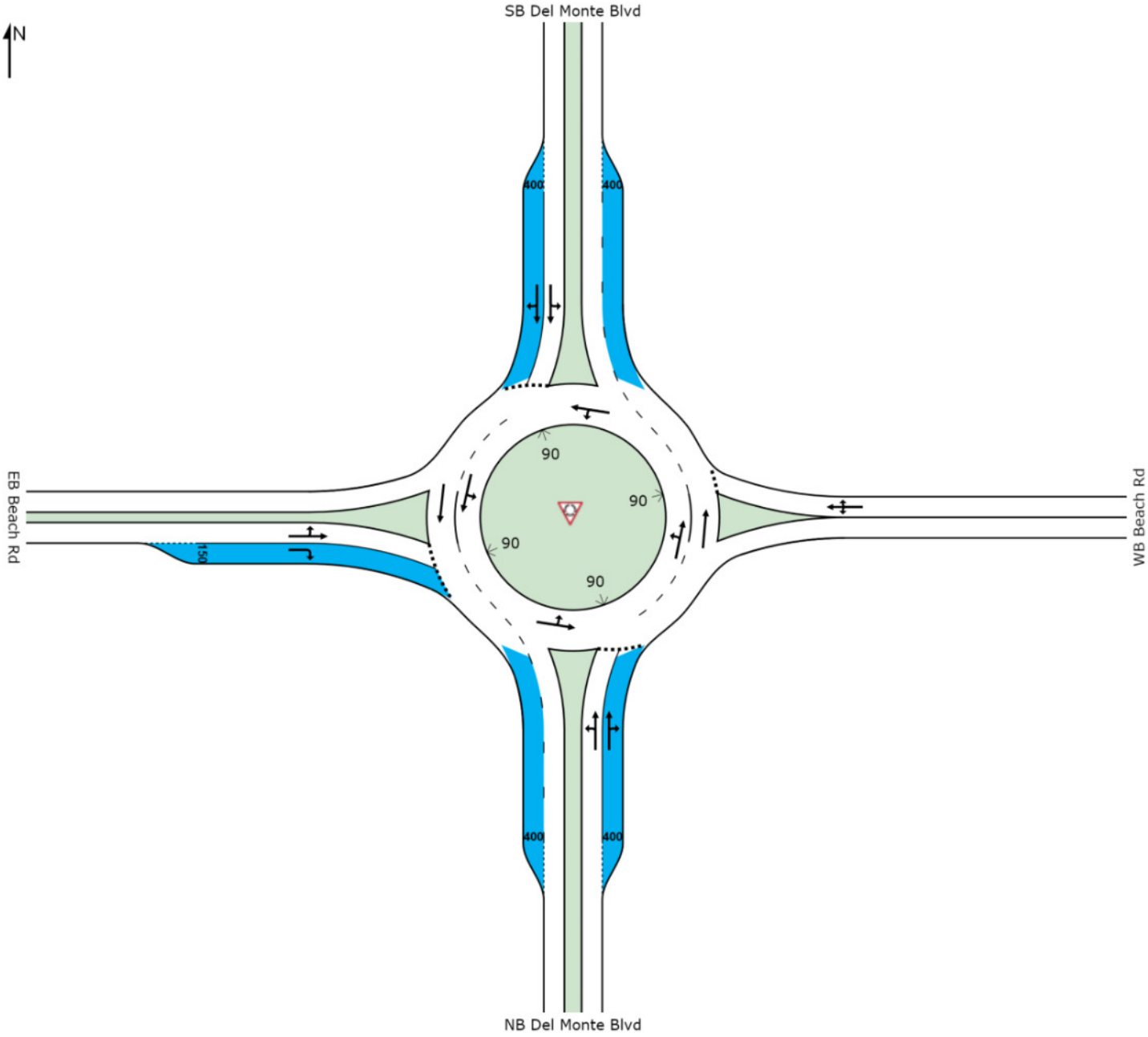
Del Monte Boulevard at Beach Road
Initial Construction
Roundabout



# SITE LAYOUT

## Site: Layout Alt 01

Del Monte Boulevard at Beach Road
Blue = Future Lanes
Roundabout



# LANE SUMMARY

## Site: 2015 AM_DelMonte-Beach_Alt 00

Del Monte Boulevard at Beach Road
Roundabout

**Lane Use and Performance**

| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 315 | 2.0 | 1226 | 0.257 | 100 | 5.2 | LOS A | 1.4 | 34.7 | Full | 1600 | 0.0 | 0.0 |
| Approach | 315 | 2.0 | | 0.257 | | 5.2 | LOS A | 1.4 | 34.7 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 225 | 2.0 | 1013 | 0.222 | 100 | 5.7 | LOS A | 1.1 | 26.9 | Full | 1600 | 0.0 | 0.0 |
| Approach | 225 | 2.0 | | 0.222 | | 5.7 | LOS A | 1.1 | 26.9 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 350 | 2.0 | 1054 | 0.332 | 100 | 6.8 | LOS A | 1.8 | 45.1 | Full | 1600 | 0.0 | 0.0 |
| Approach | 350 | 2.0 | | 0.332 | | 6.8 | LOS A | 1.8 | 45.1 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 161 | 2.0 | 1070 | 0.150 | 100 | 4.7 | LOS A | 0.7 | 17.5 | Full | 1600 | 0.0 | 0.0 |
| Approach | 161 | 2.0 | | 0.150 | | 4.7 | LOS A | 0.7 | 17.5 | | | | |
| Intersection | 1051 | 2.0 | | 0.332 | | 5.8 | LOS A | 1.8 | 45.1 | | | | |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

# LANE SUMMARY

## Site: Cumulative AM_DelMonte-Beach_Alt 00

Del Monte Boulevard at Beach Road
Roundabout

**Lane Use and Performance**

| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 395 | 2.0 | 1181 | 0.334 | 100 | 6.2 | LOS A | 1.9 | 48.2 | Full | 1600 | 0.0 | 0.0 |
| Approach | 395 | 2.0 | | 0.334 | | 6.2 | LOS A | 1.9 | 48.2 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 292 | 2.0 | 978 | 0.299 | 100 | 6.7 | LOS A | 1.5 | 38.1 | Full | 1600 | 0.0 | 0.0 |
| Approach | 292 | 2.0 | | 0.299 | | 6.7 | LOS A | 1.5 | 38.1 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 359 | 2.0 | 920 | 0.390 | 100 | 8.3 | LOS A | 2.1 | 52.3 | Full | 1600 | 0.0 | 0.0 |
| Approach | 359 | 2.0 | | 0.390 | | 8.3 | LOS A | 2.1 | 52.3 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 303 | 2.0 | 983 | 0.308 | 100 | 6.8 | LOS A | 1.6 | 39.7 | Full | 1600 | 0.0 | 0.0 |
| Approach | 303 | 2.0 | | 0.308 | | 6.8 | LOS A | 1.6 | 39.7 | | | | |
| Intersection | 1349 | 2.0 | | 0.390 | | 7.0 | LOS A | 2.1 | 52.3 | | | | |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach





SIDRA INTERSECTION 6

# LANE SUMMARY

## Site: Cumulative PM_DelMonte-Beach_Alt 00

Del Monte Boulevard at Beach Road
Roundabout

**Lane Use and Performance**

| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 774 | 2.0 | 1085 | 0.713 | 100 | 14.7 | LOS B | 8.0 | 202.5 | Full | 1600 | 0.0 | 0.0 |
| Approach | 774 | 2.0 | | 0.713 | | 14.7 | LOS B | 8.0 | 202.5 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 189 | 2.0 | 667 | 0.284 | 100 | 8.9 | LOS A | 1.2 | 31.2 | Full | 1600 | 0.0 | 0.0 |
| Approach | 189 | 2.0 | | 0.284 | | 8.9 | LOS A | 1.2 | 31.2 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 308 | 2.0 | 827 | 0.372 | 100 | 8.8 | LOS A | 1.9 | 47.5 | Full | 1600 | 0.0 | 0.0 |
| Approach | 308 | 2.0 | | 0.372 | | 8.8 | LOS A | 1.9 | 47.5 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 551 | 2.0 | 1053 | 0.524 | 100 | 9.7 | LOS A | 3.6 | 91.2 | Full | 1600 | 0.0 | 0.0 |
| Approach | 551 | 2.0 | | 0.524 | | 9.7 | LOS A | 3.6 | 91.2 | | | | |
| Intersection | 1822 | 2.0 | | 0.713 | | 11.6 | LOS B | 8.0 | 202.5 | | | | |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach





SIDRA INTERSECTION 6

# LANE SUMMARY

## Site: Exist (2006)+Project AM_DelMonte-Beach_Alt 00

Del Monte Boulevard at Beach Road
Roundabout

**Lane Use and Performance**

| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 592 | 2.0 | 960 | 0.617 | 100 | 12.7 | LOS B | 5.2 | 130.9 | Full | 1600 | 0.0 | 0.0 |
| Approach | 592 | 2.0 | | 0.617 | | 12.7 | LOS B | 5.2 | 130.9 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 438 | 2.0 | 825 | 0.531 | 100 | 11.8 | LOS B | 3.5 | 89.2 | Full | 1600 | 0.0 | 0.0 |
| Approach | 438 | 2.0 | | 0.531 | | 11.8 | LOS B | 3.5 | 89.2 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 713 | 2.0 | 937 | 0.761 | 100 | 18.7 | LOS C | 8.8 | 224.7 | Full | 1600 | 0.0 | 0.0 |
| Approach | 713 | 2.0 | | 0.761 | | 18.7 | LOS C | 8.8 | 224.7 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 323 | 2.0 | 697 | 0.463 | 100 | 11.8 | LOS B | 2.6 | 65.4 | Full | 1600 | 0.0 | 0.0 |
| Approach | 323 | 2.0 | | 0.463 | | 11.8 | LOS B | 2.6 | 65.4 | | | | |
| Intersection | 2066 | 2.0 | | 0.761 | | 14.5 | LOS B | 8.8 | 224.7 | | | | |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

# LANE SUMMARY

## Site: Exist (2006)+Project PM_DelMonte-Beach_Alt 00

Del Monte Boulevard at Beach Road
Roundabout

**Lane Use and Performance**

| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 765 | 2.0 | 919 | 0.833 | 100 | 24.2 | LOS C | 11.8 | 300.8 | Full | 1600 | 0.0 | 0.0 |
| Approach | 765 | 2.0 | | 0.833 | | 24.2 | LOS C | 11.8 | 300.8 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 387 | 2.0 | 672 | 0.576 | 100 | 15.3 | LOS C | 3.7 | 94.5 | Full | 1600 | 0.0 | 0.0 |
| Approach | 387 | 2.0 | | 0.576 | | 15.3 | LOS C | 3.7 | 94.5 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 729 | 2.0 | 982 | 0.742 | 100 | 17.1 | LOS C | 8.5 | 216.1 | Full | 1600 | 0.0 | 0.0 |
| Approach | 729 | 2.0 | | 0.742 | | 17.1 | LOS C | 8.5 | 216.1 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 392 | 2.0 | 706 | 0.556 | 100 | 14.1 | LOS B | 3.6 | 90.6 | Full | 1600 | 0.0 | 0.0 |
| Approach | 392 | 2.0 | | 0.556 | | 14.1 | LOS B | 3.6 | 90.6 | | | | |
| Intersection | 2274 | 2.0 | | 0.833 | | 18.7 | LOS C | 11.8 | 300.8 | | | | |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach





SIDRA INTERSECTION 6

# LANE SUMMARY

## Site: Cumulative+Project AM_DelMonte-Beach_Alt 00

Del Monte Boulevard at Beach Road
Roundabout

**Lane Use and Performance**

| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 782 | 2.0 | 955 | 0.819 | 100 | 22.3 | LOS C | 11.5 | 292.0 | Full | 1600 | 0.0 | 0.0 |
| Approach | 782 | 2.0 | | 0.819 | | 22.3 | LOS C | 11.5 | 292.0 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 452 | 2.0 | 684 | 0.661 | 100 | 18.2 | LOS C | 5.0 | 125.8 | Full | 1600 | 0.0 | 0.0 |
| Approach | 452 | 2.0 | | 0.661 | | 18.2 | LOS C | 5.0 | 125.8 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 786 | 2.0 | 803 | 0.979 | 100 | 49.4 | LOS E | 22.8 | 580.0 | Full | 1600 | 0.0 | 0.0 |
| Approach | 786 | 2.0 | | 0.979 | | 49.4 | LOS E | 22.8 | 580.0 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 476 | 2.0 | 644 | 0.739 | 100 | 23.4 | LOS C | 6.2 | 156.8 | Full | 1600 | 0.0 | 0.0 |
| Approach | 476 | 2.0 | | 0.739 | | 23.4 | LOS C | 6.2 | 156.8 | | | | |
| Intersection | 2496 | 2.0 | | 0.979 | | 30.3 | LOS D | 22.8 | 580.0 | | | | |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach





SIDRA INTERSECTION 6

# LANE SUMMARY

## Site: Cumulative+Project PM_DelMonte-Beach_Alt 00

Del Monte Boulevard at Beach Road
Roundabout

**Lane Use and Performance**

| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 1190 | 2.0 | 924 | 1.289 | 100 | 154.3 | LOS F | 104.3 | 2648.4 | Full | 1600 | 0.0 | 22.7 |
| Approach | 1190 | 2.0 | | 1.289 | | 154.3 | LOS F | 104.3 | 2648.4 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 430 | 2.0 | 568 | 0.758 | 100 | 27.3 | LOS D | 6.1 | 155.0 | Full | 1600 | 0.0 | 0.0 |
| Approach | 430 | 2.0 | | 0.758 | | 27.3 | LOS D | 6.1 | 155.0 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 812 | 2.0 | 740 | 1.097 | 100 | 85.4 | LOS F | 40.7 | 1032.5 | Full | 1600 | 0.0 | 0.0 |
| Approach | 812 | 2.0 | | 1.097 | | 85.4 | LOS F | 40.7 | 1032.5 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 708 | 2.0 | 673 | 1.052 | 100 | 73.6 | LOS F | 29.2 | 742.7 | Full | 1600 | 0.0 | 0.0 |
| Approach | 708 | 2.0 | | 1.052 | | 73.6 | LOS F | 29.2 | 742.7 | | | | |
| Intersection | 3140 | 2.0 | | 1.289 | | 100.9 | LOS F | 104.3 | 2648.4 | | | | |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

# LANE SUMMARY

## Site: Cumulative+Project AM_DelMonte-Beach_Alt 01

Del Monte Boulevard at Beach Road
Roundabout

**Lane Use and Performance**

| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 437 | 2.0 | 948 | 0.461 | 100 | 9.3 | LOS A | 2.8 | 69.9 | Full | 1600 | 0.0 | 0.0 |
| Lane 2 | 344 | 2.0 | 948 | 0.363 | 79[6] | 7.8 | LOS A | 1.9 | 48.0 | Short | 400 | 0.0 | 0.0 |
| Approach | 782 | 2.0 | | 0.461 | | 8.6 | LOS A | 2.8 | 69.9 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 452 | 2.0 | 838 | 0.540 | 100 | 11.9 | LOS B | 3.5 | 89.3 | Full | 1600 | 0.0 | 0.0 |
| Approach | 452 | 2.0 | | 0.540 | | 11.9 | LOS B | 3.5 | 89.3 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 440 | 2.0 | 799 | 0.550 | 100 | 12.6 | LOS B | 3.7 | 93.8 | Full | 1600 | 0.0 | 0.0 |
| Lane 2 | 346 | 2.0 | 799 | 0.433 | 79[6] | 10.1 | LOS B | 2.4 | 60.8 | Short | 400 | 0.0 | 0.0 |
| Approach | 786 | 2.0 | | 0.550 | | 11.5 | LOS B | 3.7 | 93.8 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 298 | 2.0 | 794 | 0.375 | 100 | 9.1 | LOS A | 1.9 | 47.5 | Full | 1600 | 0.0 | 0.0 |
| Lane 2 | 178 | 2.0 | 733 | 0.243 | 100 | 7.7 | LOS A | 1.1 | 28.7 | Short | 150 | 0.0 | 0.0 |
| Approach | 476 | 2.0 | | 0.375 | | 8.6 | LOS A | 1.9 | 47.5 | | | | |
| Intersection | 2496 | 2.0 | | 0.550 | | 10.1 | LOS B | 3.7 | 93.8 | | | | |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

6 Lane under-utilisation due to downstream effects
d Dominant lane on roundabout approach

# LANE SUMMARY

## Site: Cumulative+Project PM_DelMonte-Beach_Alt 01

Del Monte Boulevard at Beach Road
Roundabout

**Lane Use and Performance**

| | Demand Flows Total veh/h | HV % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Average Delay sec | Level of Service | 95% Back of Queue Veh | Dist ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 666 | 2.0 | 893 | 0.745 | 100 | 18.5 | LOS C | 8.0 | 202.3 | Full | 1600 | 0.0 | 0.0 |
| Lane 2 | 524 | 2.0 | 893 | 0.587 | 79[6] | 12.5 | LOS B | 4.4 | 112.4 | Short | 400 | 0.0 | 0.0 |
| Approach | 1190 | 2.0 | | 0.745 | | 15.9 | LOS C | 8.0 | 202.3 | | | | |
| East: WB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 430 | 2.0 | 573 | 0.752 | 100 | 26.6 | LOS D | 5.7 | 144.0 | Full | 1600 | 0.0 | 0.0 |
| Approach | 430 | 2.0 | | 0.752 | | 26.6 | LOS D | 5.7 | 144.0 | | | | |
| North: SB Del Monte Blvd | | | | | | | | | | | | | |
| Lane 1[d] | 454 | 2.0 | 675 | 0.673 | 100 | 19.0 | LOS C | 5.1 | 129.5 | Full | 1600 | 0.0 | 0.0 |
| Lane 2 | 358 | 2.0 | 675 | 0.530 | 79[6] | 13.8 | LOS B | 3.2 | 81.2 | Short | 400 | 0.0 | 0.0 |
| Approach | 812 | 2.0 | | 0.673 | | 16.7 | LOS C | 5.1 | 129.5 | | | | |
| West: EB Beach Rd | | | | | | | | | | | | | |
| Lane 1[d] | 372 | 2.0 | 784 | 0.474 | 100 | 11.0 | LOS B | 2.7 | 69.1 | Full | 1600 | 0.0 | 0.0 |
| Lane 2 | 336 | 2.0 | 723 | 0.465 | 100 | 11.5 | LOS B | 2.8 | 70.4 | Short | 150 | 0.0 | 0.0 |
| Approach | 708 | 2.0 | | 0.474 | | 11.3 | LOS B | 2.8 | 70.4 | | | | |
| Intersection | 3140 | 2.0 | | 0.752 | | 16.5 | LOS C | 8.0 | 202.3 | | | | |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

6 Lane under-utilisation due to downstream effects
d Dominant lane on roundabout approach

August 13, 2015 Item No. **11a**

Honorable Mayor and Members
of the Marina City Council

City Council Meeting
of August 18, 2015

**CITY COUNCIL CONSIDER ADOPTING RESOLUTION NO. 2015-, APPROVING THE CONSTRUCTION OF A ROUNDABOUT IN LIEU OF A TRAFFIC SIGNAL FOR THE DEL MONTE BOULEVARD AND BEACH ROAD INTERSECTION IMPROVEMENT PROJECT**

**REQUEST:**
It is requested that the City Council consider:

1. Approving the construction of a Roundabout in lieu of a traffic signal for the Del Monte Boulevard and Beach Road Intersection Improvement Project

**BACKGROUND:**
On October 22, 2012, the City of Marina was awarded by Caltrans a Federal Highway Administration (FHWA) Highway Safety Improvement Program (HSIP) grant of $325,000 to construct a traffic signal at the Del Monte Blvd. and Beach Rd. intersection. On November 6, 2013, the City received Caltrans' authorization to proceed with preliminary engineering for the signalization project.

At the regular meeting of December 18, 2012, the City Council adopted Resolution No. 2012-197, approving an update to the five (5) year City Capital Improvement Program (CIP). Included in the approved CIP project list was the Del Monte Blvd & Beach Rd project (TI 29) for traffic signalization of the intersection.

At the regular meeting of November 10, 2013, the City Council adopted Resolution No. 2013-165, approving an agreement between the City of Marina and RBF Consulting, of Walnut Creek, California, to provide design services for the Del Monte Blvd. and Beach Rd. Traffic Signalization Project.

General Plan section 3.21.1 (New Policy 2010-13) states "Roundabouts improve the safety of intersections for pedestrians, bicyclists and vehicles by eliminating conflict, reducing speed differentials, and forcing drivers to decrease speeds as they proceed through intersections. Roundabouts should be considered when designing roadway intersections. Two options for bicyclist travel should be incorporated, including riding through the roundabout or using on-ramps to sidewalks.

In light of this General Plan section, the City Manager in May of 2015 requested staff to conduct a preliminary investigation as to the application of a roundabout at the intersection of Beach Road and Del Monte Boulevard. With the current and projected traffic counts, staff has concluded that a one-lane roundabout is feasible at the intersection within the current design provided by RBF Consulting.

At the regular meeting of May 19, 2015, the City Council adopted Resolution No. 2015-59, approving Amendment No l to the Agreement between City of Marina and RBF Consulting of Walnut Creek, California, for engineering services for the Del Monte Boulevard and Beach Road Intersection Improvement Project in order to redesign the intersection for a one-lane roundabout.

**ANALYSIS:**
City staff held a public forum workshop on July 16, 2015 at the City Council chambers to provide a presentation on the conceptual design of the roundabout and receive comments from the public.

There were 30 names confirming attendance on the sign-in sheet with the following summary of questions/concerns:

- **There is a safety concern due to speeding through this intersection.**
  The roundabout design speed through the intersection will reduce speeds to 20 mph. Unlike a traffic signal with the potential for red-light speeding, the roundabout contains channelizing medians that will serve as physical and visual barriers slowing traffic approaching the intersection. Vehicles leaving the intersection will continue to be channelized by medians & striping and therefore have a reduced, safer speed.

- **There is a safety concern for children crossing this intersection.**
  The roundabout design contains elements to address safety concerns for pedestrian crossings. The crosswalk length within the vehicle travel lane will be greatly reduced from the original 100 foot length (average) of traffic signal design to the roundabout's 37 foot length (average) due to concrete bulb-outs and the median channelizing island that acts as a pedestrian refuge. The shorter distance for pedestrians crossing the roadway decreases the chance that motorists can strike a pedestrian. The roundabout will also include LED flashing beacon signs at all crossings with pedestrian activated push-buttons mounted for easy access. Unlike a traffic signal intersection with the potential for red-light running, approach, transit, and exit speeds for the roundabout will be significantly slower and creates a safer environment for pedestrian crossings.

- **There is a traffic concern for large trucks navigating the proposed roundabout.**
  The roundabout design accommodates all standard sized trucks as shown on "**EXHIBIT A"**. For vehicles longer than 65 feet, the roundabout itself contains a "truck apron" or concrete pad that will allow these very large vehicles to navigate through the intersection. Mayor Bruce Delgado has reached out to Green Waste Recovery, the City's contracted waste hauler company whose trucks would utilize this intersection. Green Waste has stated that their garbage trucks have no issues with navigating the Reservation Road roundabouts. The Del Monte Boulevard roundabout will be slightly larger than the Reservation Road roundabout.

- **Can there be access to Frontage Road from the Roundabout?**
  The current intersection geometry does not legally allow vehicles from Frontage Road to make a left turn towards Del Monte Boulevard. On August 13, 2015 staff and the project designer met with Michael Tate, majority property owner of lands adjacent with Frontage Road, to discuss various options for exiting Frontage Road into the roundabout. The roundabout design is currently being evaluated to allow a left turn onto Beach Road from Frontage Road.

- **Will the roundabout prevent access to Michael Drive for vehicles coming from the roundabout?**
  No – the roundabout and its channelizing medians will not impede drivers from entering Michael Drive.

- **There is a safety concern with the lane drop (two lanes to one) and "bottlenecking" for vehicles approaching the intersection from the south (Del Monte Blvd.).**
  The lane drop striping taper will occur over 300 linear feet, meeting today's Traffic Control standards for lane merging at the current speed on Del Monte Boulevard. The Roundabout Operations Memorandum by Kittelson and Associates, Inc. dated June 23, 2015 shows that in the existing conditions and the future conditions with land use assumptions, the single lane roundabout will operate at an acceptable level of service (LOS) with reasonably free flow in both the AM and PM peak periods through 2040 ("**EXHIBIT B**").

- **What is the cost difference between a traffic signal versus a roundabout?**
  The initial construction costs for each option are very close, the roundabout being the less expensive options with cost savings in electrical material and work. The true cost savings of a roundabout in comparison to a traffic signal is evident in the ongoing maintenance costs. The City has a significant financial investment in many expensive components of a traffic signal controlled intersection such as the signal lights, crosswalk signs, signal poles, traffic cameras and the traffic control cabinet, all of which require regular monthly maintenance by specialized consultant contracts. The roundabout will contain minimal landscaping and adequate intersection lighting, reducing the maintenance responsibilities and financial burden on the City's intersection maintenance budget.

- **There is a concern with the general public's ability to navigate a roundabout.**
  Navigating a roundabout is much like merging onto and off of a freeway: yielding to traffic moving in the roundabout, waiting for an adequate opening, and safely merging into traffic. The City website contains an instructional video for navigating a roundabout. The Engineering Division is coordinating with the Recreation & Cultural Services Department and the Monterey Peninsula Unified School District to conduct on-site field trips to educate students of Olson Elementary on crossing through the Reservation Road roundabouts.

**NEXT STEPS:**

Should the City Council deny construction of a roundabout, the traffic signal design will be brought to the City Public Works Commission for final design review and recommendation for a call for bids on the construction.

Should the City Council approve construction of a roundabout, the roundabout design will be brought to the Design Review Board for final landscaping and lighting design review along with a review by the Public Works Commission for final design review and recommendation for a call for bids on the construction.

**FISCAL IMPACT:**

The City has submitted an application for the AB 2766 Emission Reduction Grant Program for 2015-16 administered by the Monterey Bay Unified Air Pollution Control District in the amount of $400,000. Should the City Council deny construction of a roundabout, staff would need to withdraw the Air District application.

In discussions with Caltrans on the status of the HSIP grant, staff received direction on submitting a scope of work revision summary for the design change from a traffic signal to a roundabout. There are potentially additional funds available for a roundabout as an alternative to a new traffic signal.

**CONCLUSION:**

The request is submitted for City Council consideration and possible action.

Respectfully submitted,

_____

Edrie Delos Santos, P.E.
Senior Engineer, Engineering Division
Community Development Department
City of Marina

**REVIEWED/CONCUR:**

_____
Nourdin Khayata, P.E.
Acting City Engineer
Community Development Department
City of Marina

_____
Theresa Szymanis, AICP CTP
Acting Director
Community Development Department
City of Marina

_____
Layne P. Long
City Manager
City of Marina