Oregon
Theodore R. Kulongoski, Governor

Department of Land Conservation and Development
635 Capitol Street, Suite 150
Salem, OR 97301-2540
(503) 373-0050
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NOTICE OF ADOPTED AMENDMENT

11/13/2012

TO: Subscribers to Notice of Adopted Plan or Land Use Regulation Amendments

FROM: Plan Amendment Program Specialist

SUBJECT: City of Newport Plan Amendment
DLCD File Number 003-12

The Department of Land Conservation and Development (DLCD) received the attached notice of adoption. Due to the size of amended material submitted, a complete copy has not been attached. A Copy of the adopted plan amendment is available for review at the DLCD office in Salem and the local government office.

Appeal Procedures*

DLCD ACKNOWLEDGMENT or DEADLINE TO APPEAL: Thursday, November 29, 2012

This amendment was submitted to DLCD for review prior to adoption pursuant to ORS 197.830(2)(b) only persons who participated in the local government proceedings leading to adoption of the amendment are eligible to appeal this decision to the Land Use Board of Appeals (LUBA).

If you wish to appeal, you must file a notice of intent to appeal with the Land Use Board of Appeals (LUBA) no later than 21 days from the date the decision was mailed to you by the local government. If you have questions, check with the local government to determine the appeal deadline. Copies of the notice of intent to appeal must be served upon the local government and others who received written notice of the final decision from the local government. The notice of intent to appeal must be served and filed in the form and manner prescribed by LUBA, (OAR Chapter 661, Division 10). Please call LUBA at 503-373-1265, if you have questions about appeal procedures.

*NOTE: The Acknowledgment or Appeal Deadline is based upon the date the decision was mailed by local government. A decision may have been mailed to you on a different date than it was mailed to DLCD. As a result, your appeal deadline may be earlier than the above date specified. NO LUBA Notification to the jurisdiction of an appeal by the deadline, this Plan Amendment is acknowledged.

Cc: Derrick Tokos, City of Newport
Gordon Howard, DLCD Urban Planning Specialist
Patrick Wingard, DLCD Regional Representative
Gary Fish, DLCD Transportation Planner

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FORM 2 **DLCD**

Notice of Adoption

This Form 2 must be mailed to DLCD within **5-Working Days after the Final Ordinance is signed** by the public Official Designated by the jurisdiction and all other requirements of ORS 197.615 and OAR 660-018-000

DATE STAMP
☐ In person ☐ electronic ☐ mailed
DEPT OF
NOV 09 2012
LAND CONSERVATION AND DEVELOPMENT
For Office Use Only

Jurisdiction: **City of Newport** Local file number: **2-CP-11**

Date of Adoption: **11/5/2012** Date Mailed: **11/9/2012**

Was a Notice of Proposed Amendment (Form 1) mailed to DLCD? ☒ Yes ☐ No Date:

☒ Comprehensive Plan Text Amendment ☐ Comprehensive Plan Map Amendment

☒ Land Use Regulation Amendment ☒ Zoning Map Amendment

☒ New Land Use Regulation ☐ Other:

Summarize the adopted amendment. Do not use technical terms. Do not write "See Attached".

Update to the Transportation System Plan element of the Newport Comprehensive Plan to setout a policy framework in support of an alternate mobility standard for US 101 south of the Yaquina Bay Bridge. Includes zoning ordinance amendments establishing a trip budget program for South Beach, citywide traffic impact analysis requirements, and citywide transportation improvement requirements for infill development. Functional classification maps and project/priorities/estimates were also updated.

Does the Adoption differ from proposal? Yes, Please explain below:

Trip budget overlay boundary clarified, language added to address when trips "vest" out of budget, TSP text better explains basline system analysis, expenditure of new "payment-in-lieu" fees more closely tied to type of development that generated the fee, and stronger policy language added regarding need to plan for new bridge.

Plan Map Changed from: to:

Zone Map Changed from: to:

Location: Acres Involved:

Specify Density: Previous: New:

Applicable statewide planning goals:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐

Was an Exception Adopted? ☐ YES ☒ NO

Did DLCD receive a Notice of Proposed Amendment...

35-days prior to first evidentiary hearing? ☒ **Yes** ☐ **No**

DLCD File No. 003-12 (19415) [17235]

If no, do the statewide planning goals apply? ☐ Yes ☐ No

If no, did Emergency Circumstances require immediate adoption? ☐ Yes ☐ No

DLCD file No. ______________________

Please list all affected State or Federal Agencies, Local Governments or Special Districts:

ODOT (contact; John DeTar, ODOT Region 2, Senior Planner, (541) 757-4159)

Local Contact: **Derrick I. Tokos, AICP** Phone: **(541) 574-0626** Extension:

Address: **169 SW Coast Hwy** Fax Number: **541-574-644**

City: **Newport** Zip: **97365-** E-mail Address: **d.tokos@newportoregon.gov**

ADOPTION SUBMITTAL REQUIREMENTS

This Form 2 must be received by DLCD no later than 5 working days after the ordinance has been signed by the public official designated by the jurisdiction to sign the approved ordinance(s)

per ORS 197.615 and OAR Chapter 660, Division 18

1. This Form 2 must be submitted by local jurisdictions only (not by applicant).
2. When submitting the adopted amendment, please print a completed copy of Form 2 on light **green paper if available**.
3. Send this Form 2 and **one complete paper copy** (documents and maps) of the adopted amendment to the address below.
4. Submittal of this Notice of Adoption must include the final signed ordinance(s), all supporting finding(s), exhibit(s) and any other supplementary information (ORS 197.615).
5. Deadline to appeals to LUBA is calculated **twenty-one (21) days** from the receipt (postmark date) by DLCD of the adoption (ORS 197.830 to 197.845).
6. In addition to sending the Form 2 - Notice of Adoption to DLCD, please also remember to notify persons who participated in the local hearing and requested notice of the final decision. (ORS 197.615).
7. Submit **one complete paper copy** via United States Postal Service, Common Carrier or Hand Carried to the DLCD Salem Office and stamped with the incoming date stamp.
8. Please mail the adopted amendment packet to:

ATTENTION: PLAN AMENDMENT SPECIALIST
DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT
635 CAPITOL STREET NE, SUITE 150
SALEM, OREGON 97301-2540

9. **Need More Copies?** Please print forms on **8½ -1/2x11 green paper only if available**. If you have any questions or would like assistance, please contact your DLCD regional representative or contact the DLCD Salem Office at (503) 373-0050 x238 or e-mail **plan.amendments@state.or.us**.

CITY OF NEWPORT

ORDINANCE NO. 2045

AN ORDINANCE TO REPEAL AND REPLACE THE TRANSPORTATION SYSTEM PLAN ELEMENT OF THE NEWPORT COMPREHENSIVE PLAN, AND TO AMEND RELATED PROVISIONS OF THE NEWPORT ZONING AND SUBDIVISION CODES
(Newport File No. 2-CP-11)

Summary of Findings:

1. Since 2006 the City of Newport, Lincoln County, and Oregon Department of Transportation (ODOT) have worked collaboratively to update the Transportation System Plan (TSP) element of the Newport Comprehensive Plan, Newport Zoning Ordinance, and Newport Subdivision Ordinance to put in place policies and implementation strategies for establishing a coordinated, multi-modal transportation network that meets Newport's current and future needs. The last comprehensive update to the Newport TSP occurred in 1997.

2. This collaboration led to the adoption of a local street plan for areas north of the Yaquina Bay Bridge and resulted in a comprehensive update to the City of Newport's Bike and Pedestrian Plan. Both of these plans were completed in 2008.

3. As these plans were prepared, it became evident that much of the future growth in Newport will occur in its South Beach neighborhood. The parties further recognized that capacity limits of the Yaquina Bay Bridge and ODOT's existing mobility standard for US 101 severely restrict long term growth opportunities in this portion of the City.

4. An alternate mobility standard is a tool that ODOT can use to allow more vehicle trips to be generated onto US 101 than is permissible under current state law. ODOT indicated a willingness to develop such a standard as part of a coordinated effort with the City, County and stakeholders in South Beach to identify future transportation system enhancements needed to improve the flow of traffic on the highway. This effort was undertaken considering a 20 year planning period, in accordance with Statewide Planning Goal 12 and the Transportation Planning Rule contained in Chapter 660, Division 12 of the Oregon Administrative Rules (OARs).

5. The proposal assumes that the Yaquina Bay Bridge will not be replaced within 20 years, and, further, that this constraint to traffic flow justifies establishing the alternate mobility standard. At some point; however, the bridge will need to be replaced and the City of Newport will continue to engage with ODOT to develop

10. The finalized proposal includes the repeal and replacement of the TSP element of Chapter 5 of the Newport Comprehensive Plan (Ordinance No. 1621 (as amended)) with a new plan that sets out policies in support of an alternate mobility standard for US 101 to allow higher levels of congestion on the highway. In turn, this will provide increased opportunities for economic development and reduce the costs of transportation system improvements associated with development. New policies and related revisions include:

a. Direction to establish a trip budget program for lands within the Newport Urban Growth Boundary (UGB) located between the Yaquina Bay Bridge and SE 62nd street to more effectively track where growth is occurring to ensure that it is progressing in line with projections and to allow for adjustments if it is not.

b. Updates to Functional Classification Maps that illustrate the City's existing and future transportation system.

c. Identification of enhancements that should be made to the transportation system in South Beach to improve traffic flow along US 101. This includes likely funding sources, and constitutes the maximum level of improvement that can be made short of replacing or expanding the Yaquina Bay Bridge.

d. Support for the establishment of traffic impact analysis standards that apply to new development anywhere in the City so that decision makers will have information they need to fully understand the impacts and effectiveness of proposed mitigation on the transportation system.

e. Street frontage improvement requirements for new development to the extent that such requirements are proportional to the impact of the project.

f. Adoption by reference of transportation refinement plans that have been completed since the TSP was last amended, including the South Beach Peninsula Transportation Refinement Plan (2010), the Agate Beach Wayside Improvements Concept Plan (2011), and the Coho/Brant Infrastructure Refinement Plan (2012).

g. Updates to project tables to reflect 2012 cost estimates, align priorities with current policy direction and likely funding sources, and to eliminate completed or redundant projects.

h. A commitment from the City of Newport to find long term solutions that sufficiently address the existing capacity and structural limitations of the Yaquina Bay Bridge, particularly in light of the Oregon Department of Transportation's decision to place the bridge on the "Weight-Restricted Bridges on Major State Routes" list.

11. The proposed new Chapter 14.43 to the Zoning Ordinance element of the Newport Municipal Code (Ordinance No. 1308 (as amended)) describes the mechanics of how the trip budget program will work. It creates a zoning overlay district for lands inside the Newport UGB between the Yaquina Bay Bridge and SE 62nd Street. The overlay is divided into Transportation Analysis Zones (TAZs). Each TAZ is allocated a total number of trips that is based upon the amount of growth projected within a 20 year timeframe. City will be responsible for deducting trips from the budget as new development occurs. The new code anticipates variations in growth and holds back 10% of the trips across all TAZs as a reserve that can be allocated where needed. Further, the code requires that a comprehensive review be performed by the City and State in 10 years or upon allocation of 65% of the trips in any TAZ. A developer may also mitigate a project's impact on the transportation system or enhance the system such that additional vehicle trips would be permitted.

12. The proposed new Chapter 14.44 to the Zoning Ordinance element of the Newport Municipal Code (Ordinance No. 1308 (as amended)) authorizes the City to require frontage improvements for new development or redevelopment that require a building permit and places demands on transportation facilities or city utilities. It includes standards for determining the types of needed improvements, authorizes the City to charge a fee in lieu of requiring the installation of frontage improvements in certain circumstances, identifies processes by which public right-of-way can be created, and sets out requirements for creating access easements. The provisions of this chapter would apply citywide.

13. The proposed new Chapter 14.45 to the Zoning Ordinance element of the Newport Municipal Code (Ordinance No. 1308 (as amended)) requires that developers conduct traffic impact analysis for projects that significantly impact the transportation system. It identifies how the analysis is to be performed and the process the City is to use to evaluate requests. Further, this new chapter sets out criteria for evaluating the analysis to ensure that transportation facilities are adequate to handle the additional traffic; requires that improvements be made by a developer proportional to the project's impacts if the transportation system is not adequate; and provides developers the option of paying a fee in lieu of constructing needed transportation system improvements, in certain circumstances. The provisions of this chapter would apply citywide.

14. Targeted revisions are proposed to the Subdivision Ordinance element of the Newport Municipal Code (Ordinance No. 1990 (as amended)). They include clarifications for when public improvements are required in association with a subdivision plat and how the improvements can be guaranteed; an allowance for payment in lieu of constructing a required improvement as outlined in the new Chapter 45; and a requirement that traffic impact analysis be conducted and trips allocated to new subdivision lots consistent with the provisions of new Chapters 43 and 45.

15. When considered as a whole, analysis performed by Parametrix demonstrates that the City of Newport can anticipate significant increases in vehicle traffic and other transportation modes over the next 20 years. The resulting recommendations identify a range of transportation system improvements that can reasonably be made to accommodate this demand and facilitate traffic flow along US 101 and US 20 to the extent possible recognizing the bridge's capacity limitations.

16. The proposed amendments to the zoning and subdivision ordinances are a public necessity which furthers the general welfare of the citizens of Newport. The proposed measures establish a method for the City to more accurately assess where growth is occurring and how it is impacting the transportation system. The revisions ensure that new development offsets impacts to the transportation system in an equitable manner and put in place a trip budget program that quantifies available capacity on US 101, while providing persons interested in developing in South Beach with a clear, predictable path for doing so. This promotes economic development and increases opportunities for commercial and industrial uses to locate in South Beach. In turn, this may decrease local users' reliance on the bridge for needed services and employment over the long term.

17. Detailed findings have been prepared showing how the proposed amendments satisfy procedural and substantive requirements for amendments to the City's Transportation System Plan and related implementing ordinances, as well as applicable Statewide Planning Goals and the Transportation Planning Rule. The findings are contained in a document titled "*Newport South Beach Findings to Support Comprehensive Plan and Code Amendments*," prepared by Angelo Planning Group on August 24, 2012 and adopted herein to supplement these findings.

18. In August of 2007, a settlement agreement was signed by the State of Oregon, City of Newport, Emery Investments, Inc., Landwaves, Inc., GVR Investments, and the Oregon Coast Community College District (Settlement Agreement). The Settlement Agreement authorized a specific number of vehicle trips to be generated onto US 101 at SE 40th Street from South Beach properties annexed with Ordinance No. 1922. In performance of its obligations under the Settlement Agreement, the City will reserve trips out of the TAZ trip budget for this area for the exclusive use of these properties. Since the Settlement Agreement does not have an explicit expiration date, it is appropriate that the trips be reserved for a period of ten years from the date that final plats for the properties were recorded, or preliminary plat approval in the case where no final plat has been recorded. This approach is consistent with limitations contained in ORS 92.040 regarding vesting of prior land use regulations with land division approvals. Any unused trips would be returned to the TAZ trip budget once the ten year period has lapsed.

19. On August 27, 2012, the Newport Planning Commission held a public hearing on the proposed amendments and voted to recommend adoption of the amendments.

20. On July 9, 2012, the Department of Land Conservation & Development (DLCD) was properly provided notice of the proposed legislative amendments. Notice of the City Council hearing was provided to stakeholders and interested parties in the South Beach area; public/private utilities and agencies; and affected city departments on October 4, 2012. Notice of the hearing was published in the Newport News-Times on October 10, 2012.

21. The City Council held a work session on September 17, 2012 and public hearing on October 15, 2012, regarding the question of the proposed amendments. The Council voted in favor of its adoption after considering the recommendation of the Planning Commission and all evidence and argument in the record.

22. In adopting these amendments, the Council recognizes that successful implementation of the trip budget program set forth in the proposed Chapter 14.43 requires close coordination with Lincoln County and the Oregon Department of Transportation. Both organizations will need to adopt rule changes. For Lincoln County, this involves amendments to its land use plans and regulations to put in place the trip budget for unincorporated areas that fall within the boundaries of the South Beach Transportation Overlay Zone and to authorize the City to track consumption of trips associated with new development on these lands. With regards to ODOT, the Oregon Transportation Commission must amend the Oregon Highway Plan to put in place the alternate mobility standard for US 101 that provides the additional trip capacity built into the trip budget program. The City cannot reasonably implement a trip budget until these organizations have acted.

23. Information in the record, including affidavits of mailing and publication, demonstrate that appropriate public notification was provided for both the Planning Commission and City Council public hearings.

THE CITY OF NEWPORT ORDAINS AS FOLLOWS:

Section 1. The above findings, those contained in the document titled "*Newport South Beach Findings to Support Comprehensive Plan and Code Amendments*," prepared by Angelo Planning Group on August 24, 2012, as set forth in Exhibit A, and technical memorandums prepared by Parametrix, listed as Exhibits B1 through B5, attached and incorporated herein, are hereby adopted as support for this Ordinance and the Council's following amendments.

Section 2. The Transportation System Plan Element (§5; pps 152a - 152ab) of Chapter 5 "Public Facilities" of the City's Comprehensive Plan, Ordinance No. 1621 (as amended) is hereby repealed and replaced with the text entitled "Newport

Transportation System Plan", as set forth in Exhibit C, attached and incorporated herein by this reference.

Section 3. Title XIV, Chapters 14.43, "Procedural Requirements," through 14.51, "Fees" of the Zoning Ordinance element of the Newport Municipal Code (Ordinance No. 1308 (as amended)) are hereby renumbered as Chapters14.46 through 14.54, respectively.

Section 4. Title XIV, the Zoning Ordinance element of the Newport Municipal Code (Ordinance No. 1308 (as amended)), is hereby amended to include a new Chapter 14.43 entitled "South Beach Transportation Overlay Zone (SBTOZ)" as set forth in Exhibit D. The overlay zone is as described on the map and legal description prepared by John Thatcher, PLS, dated October 30, 2012, attached and incorporated herein as Exhibit E.

Section 5. Title XIV, the Zoning Ordinance element of the Newport Municipal Code (Ordinance No. 1308 (as amended)), is hereby amended to include a new Chapter 14.44 entitled "Transportation Standards", as set forth in Exhibit F, attached and incorporated herein by this reference.

Section 6. Title XIV, the Zoning Ordinance element of the Newport Municipal Code (Ordinance No. 1308 (as amended)), is hereby amended to include a new Chapter 14.45 entitled "Traffic Impact Analysis," as set forth in Exhibit G, attached and incorporated herein by this reference.

Section 7. The introductory language of Subsection 13.05.040(A) and Subsection 13.05.040(A)(5), of Title XIII, Land Division, the Subdivision Ordinance element of the Newport Municipal Code (Ordinance No. 1990 (as amended)), are hereby amended as follows:

> "A. The following public improvements are required for all land divisions, except where a subdivision plat is reconfiguring or establishing rights-of-way for future public streets:"
>
> "5. Sidewalks. Required sidewalks shall be constructed in conjunction with the street improvements except as specified below:
>
> a. Delayed Sidewalk Construction. If sidewalks are designed contiguous with the curb, the subdivider may delay the placement of concrete for the sidewalks by depositing with the city a cash bond equal to 115 percent of the estimated cost of the sidewalk. In such areas, sections of sidewalk shall be constructed by the owner of each lot as building permits are issued. Upon installation and acceptance by the city engineer, the land owner shall be reimbursed for the construction of the sidewalk from the bond. The amount of the reimbursement shall be in proportion to the footage

of sidewalk installed compared with the cash bond deposited and any interested earned on the deposit.

b. Commencing three (3) years after filing of the final plat, or a date otherwise specified by the city, the city engineer shall cause all remaining sections of sidewalk to be constructed, using the remaining funds from the aforementioned cash bond. Any surplus funds shall be deposited in the city's general fund to cover administrative costs. Any shortfall will be paid from the general fund.

c. Notwithstanding the above, a developer may guarantee installation of required sidewalks in an Improvement Agreement as provided in Section 13.05.090(C)."

Subsections 13.05.040(A)(1) - (4) remain unamended and in full force and effect.

Section 8. Subsection 13.05.070(A) of Title XIII, Land Division, the Subdivision Ordinance element of the Newport Municipal Code (Ordinance No. 1990 (as amended)), is hereby amended, to insert new Subsections A(13) and (14), and to renumber existing Subsection A(13) as A(15), as follows:

"13. A Trip Assessment Letter, if required by Chapter 14.43.

14. A Traffic Impact Analysis, if required by Chapter 14.45.

15. Other materials that the applicant believes relevant or that may be required by the city."

All other subsections of 13.05.070(A) and Subsections (B) - (E) of that section remain unamended and in full force and effect.

Section 9. Subsection 13.05.090(B) of Title XIII, Land Division, the Subdivision Ordinance element of the Newport Municipal Code (Ordinance No. 1990 (as amended)) is hereby amended as follows:

"B. Provision of Improvements. It shall be the responsibility of the developer to install all required improvements and to repair any existing improvements damaged in the development of the property. The installation of improvements and repair of damage shall be completed prior to final plat approval. Except as provided in Subsection C., or where payment in lieu of constructing a required improvement is allowed by City and has been paid by developer per Chapter 14.45, the final plat will not be approved until improvements are installed to the specifications of the city and "as constructed" drawings are given to the city and approved by the city engineer. The developer shall warrant the materials and workmanship of all required public improvements for a period of one year from the date the city accepts the public improvements."

Section 10. City shall reserve trips out of the TAZ budget for properties annexed with Ordinance No. 1922, per the Settlement Agreement, as follows: For properties owned by Emery Investments, Inc. and/or Landwaves, Inc. 130 weekday PM peak hour trips, plus an additional 127 trips at such time as Ash Street is improved between Ferry Slip Road and SE 40th Street. With respect to properties owned by GVR Investments, 47 trips will be reserved, plus an additional 43 trips once Ash Street is improved. The City will reserve 20 trips for the Oregon Coast Community College property, once the Ash Street improvements are constructed. These trips will be reserved for a period of ten years from the date that final plats for the properties were recorded, or preliminary plat approval in the case where no final plat has been recorded. Any unused trips will accrue back to the TAZ trip budget once this ten year period has lapsed.

Section 11. Section 4, adopting Chapter 14.43, of this ordinance shall take effect at such time as both Lincoln County adopts corresponding implementation measures for unincorporated lands with the boundary of the zoning overlay and the Oregon Transportation Commission amends the Oregon Highway Plan to put in place the alternate mobility standard for US 101.

Section 12. Except as provided in Section 11, this ordinance shall take effect 30 days after passage.

Date adopted and read by title only: November 5, 2012

Signed by the Mayor on November 6, 2012.

Mark McConnell

Mark McConnell, Mayor

ATTEST:

Margaret M. Hawker

Margaret M. Hawker, City Recorder

Exhibit A
Newport TSP Amendments
File No. 2-CP-11

Staff Report

Newport South Beach

Findings to Support Comprehensive Plan and Code Amendments

Prepared for
City of Newport

November 1, 2012

CH2MHILL®

Angelo planning group

Requested Action

The City is considering amending the Comprehensive Plan to update the Transportation System Plan section to include the findings, recommendations, and policies supporting the multi-modal transportation system in South Beach. To fully implement the TSP, the City is also considering making specific amendments to the Zoning Ordinance. A summary of the proposed plan and code amendments are listed in the following section.

Summary of Proposed Plan and Code Amendments

The following actions are requested:

- Amend Chapter 5 Transportation of the Comprehensive Plan, including:
  - New background language describing the South Beach transportation system planning process.
  - New Table 1: Roadway Improvement Projects (replaces Tables 1, 2 and 2A) to include South Beach improvements and implement the Coho / Brant Refinement Plan.
  - New Table 2: Transportation Management System (TSM) Improvement Projects (replaces Tables 3 and 3A) to include South Beach improvements.
  - New text supporting signals at the intersections of US 101 at SE 35th Street, SW 40th Street, and South Beach State Park/New SW 50th Street and the removal of the signal at SE 32nd Street (stop sign, right in/right out) once 35th Street intersection widening is complete/signal installed.
  - New Table 3: Functional Classification of Roadways Modifications, including amendments to functional classifications of specific roadways and new Road Functional Classification maps (Map 1: North; Map 2: Downtown; Map 3: South)
  - Description of issues specific to South Beach and the implementation of the Trip Budget Program (including New Table 4: South Beach Overlay Zone Trip Budget Totals).
  - Updated Pedestrian Facility Improvements and Bicycle Facility Improvements text and new Table 5: Recommended Pedestrian and Bicycle Improvements (Replaces Tables 5, 6, and 6A) to include South Beach improvements.
  - Updated Table 6: Recommended Transit Improvements and new description of Lincoln County Transit service.
  - Revised Goals and Policies section to include updated policies related to South Beach specifically, as well as general system planning and development-related guidance.
- Amend the Zoning Ordinance to include:
  - New Chapter 43, South Beach Transportation Overlay Zone (SBTOZ)
  - New Chapter 44, Transportation Standards
  - New Chapter 45, Traffic Impact Analysis (TIA)

Staff Recommendation

Staff recommends amending the Comprehensive Plan and the Zoning Ordinance, consistent with the list of actions noted in the Summary of Proposed Plan and Code Amendments. Findings of support for these actions are found in the Findings section of this report.

Transportation System Plan Documentation

Overview

Planning Process

The City of Newport, Lincoln County, and ODOT have been working on an update of the Newport Transportation System Plan (TSP) for the South Beach area between the Yaquina Bay Bridge and SW 62nd Street. Traffic growth associated with the anticipated development in this area over the next twenty years will contribute to very high traffic volumes on the Yaquina Bay Bridge and along US 101. Transportation analysis has shown that these volumes would significantly exceed existing highway and bridge capacity, resulting in long traffic queues extending away from the bridge. The South Beach Urban Renewal District's plan includes street improvements that will provide critical components of the new system, but transportation funding from the State or other sources is not likely to provide a solution to bridge capacity constraints within the next twenty years. Additional transportation system network and capacity are needed in South Beach if the existing transportation performance targets are to be met as development occurs.

The first step in developing a plan for South Beach was to identify the transportation-related problems and the constraints, and at the same time set goals and objectives to ensure that the preferred solution sufficiently addressed the identified issues. Applicable State and local plans and policies were reviewed to determine the appropriate guidelines for the South Beach planning process, and past planning efforts to address alternative mobility targets in Newport, as well as examples from elsewhere in the state, were reviewed. The elements of alternative mobility targets specific to South Beach were then identified, and a range of potential solutions was developed, including both infrastructure and policy solutions for US 101 and the local transportation system. The details of the process can be found in technical memoranda referenced in the TSP amendments; a summary is included in the following sections of this report.

A separate infrastructure refinement plan has been prepared for the Coho / Brant neighborhood concurrent with the preparation of the TSP. That plan identifies specific needed improvements to local and collector streets in the neighborhood. The plan is consistent with the transportation network identified in the TSP update for the South Beach area.

US 101 Alternative Mobility Target

Through the transportation planning process it has been determined that developing a transportation system sufficient to handle complete development of the South Beach area is not feasible within the next 20-years. The system is limited by the capacity of the Yaquina Bay Bridge, South Beach wetlands, and the cost of the system infrastructure. Newport's planned community development in South Beach cannot be accommodated with the mobility targets in the Oregon Highway Plan. The transportation planning process resulted in a recommendation to adopt of alternative mobility standards for three intersections on US 101 (South 35th Street, Southeast 40th Street, and Southeast 50th Street/South Beach State Park). The proposed alternative standards will allow more traffic congestion on US101 if authorized by the Oregon Transportation Commission (OTC). The OTC will consider adopting alternative standards after the City adopts supporting local policy and transportation improvements through this plan amendment process.

South Beach Local Transportation System

A set of projects creating a preferred road network has been developed from a series of open houses and meetings between Newport, Lincoln County, ODOT and other concerned state agencies. The Planning Commission considered these projects as part of a July 9, 2012 work session. The alternative mobility targets developed for US 101 assume the improvement projects proposed for inclusion in the TSP, as described in the project tables and illustrated on the functional classification maps.

The local and state actions and improvements that are identified for South Beach are the reasonable limits of what can be done to address congestion on US 101, short of building more capacity into the Yaquina Bay Bridge. The City is committed to finding long-term solutions of the existing structure that affect the bridge's ability to carry vehicles and pedestrians. To this end, the City will continue to engage ODOT in conversations regarding future project planning and funding that would lead to improvements to, and possibly replacement of, the Yaquina Bay Bridge.

Policy and Code Language

The City and ODOT worked together to identify a transportation system and management strategy that will support future growth in South Beach, one that includes alternative mobility targets for US 101, strategic improvements to the state highway, and improvements to the local road system and the pedestrian and bicycle system. The City is proposing to update the Comprehensive Plan, Transportation System Plan, and the Newport Development Code to reflect the outcomes of this planning process. The update proposes policies that will guide management of development in South Beach by using an overlay zone and a trip budget program. The update also supports adoption of alternative mobility targets by the OTC. The following is an overview of the proposed amendments to the Comprehensive Plan and the Zoning Ordinance.

Transportation System Plan

Proposed Comprehensive Plan amendments that update the Newport Transportation System Plan (Comprehensive Plan Chapter 5) are in Exhibit C of Newport Ordinance No. 2045. Proposed amendments provide planning context, a policy framework, and a list of transportation projects needed over a 20-year planning period for the future transportation system in South Beach. Proposed amendments include:

- Background sections documenting the development of the proposed South Beach transportation system;
- New text providing a policy framework for the implementation of a Trip Budget Program;
- Policy statements supporting the planned transportation system in South Beach; and
- Updated transportation project lists include needed projects south of the bridge. Updated tables include a description of the roadway, bicycle and/or pedestrian project, along with cost estimates, and the priority in which the projects should be built.

Proposed background sections explain the context of transportation planning in South Beach and new policies reflect the findings and recommendations of that planning process.

New text and policies highlight the following:

- A significant amount of the City's new development is anticipated in South Beach area (south of the Yaquina Bay Bridge).
- A combination of anticipated 2030 levels of land development in South Beach and increasing through traffic volumes on US 101 will result in greater congestion levels.
- The capacity of the Yaquina Bay Bridge will continue to be the major constraint and will strongly influence the operation of the transportation system south of the bridge.
- Due to limited State transportation funding, bridge expansion or replacement is not expected in the next 20 years.
- The City and ODOT worked together to identify a transportation system and management plan to support future growth in South Beach. The plan includes alternative mobility targets for US 101, strategic improvements to the state highway, and improvements to both the local roadway system and the pedestrian and bicycle system.
- The local and state actions and improvements that are identified for South Beach represent the limits of what can be done to address traffic congestion within reasonable funding expectations.

- The City desires to find long-term solutions to address existing capacity deficiencies on the Yaquina Bay Bridge and to continue to engage ODOT in conversations regarding future project planning and funding that would lead to improving, and possibly replacing, the existing bridge.

South Beach Transportation Overlay Zone

The South Beach Transportation Overlay Zone, or SBTOZ, is applicable to developable property between the Yaquina Bay Bridge and SE 62nd Street. The SBTOZ, as described in Exhibits D and E of Newport Ordinance No. 2045, is being proposed as an overlay on the City of Newport Zoning Map. The SBTOZ is needed to manage future development so that the planned transportation system will be able to serve future land use needs. The SBTOZ will allow the City to track trip generation from future development and to assess new growth and compare it to the assumptions upon which the transportation system and improvements are based.

As proposed, anyone who is planning an expansion of an existing use, a change in use, or an improvement on a parcel or parcels within the SBTOZ that requires City land use or development approval will need to comply with requirements specific to the overlay. Proposed development on parcels within the SBTOZ will to be limited to the number of PM peak hour trips that are budgeted for the Traffic Analysis Zone (TAZ) in which the parcel is located, except when a development proposes to use the Trip Reserve Fund (see following *Trip Budget Program* section). A development that results in a change in the number of vehicle trips being generated to or from a property must submit a Trip Assessment Letter. If certain threshold conditions are met, a more detailed Traffic Impact Analysis (TIA) would need to be submitted to the City for review and approval.

Land use applications in the SBTOZ will be reviewed and approved consistent with existing requirements, according to the type of proposal. Approval of the trip allocation is a ministerial, or administrative, action and can be approved by staff when sufficient trips are available to be allocated from the TAZ Trip Budget in which the development is proposed. If sufficient trips cannot be allocated from the TAZ Trip Budget, the proposal can include a request to use the Trip Reserve Fund. Such a request will involve a Planning Commission decision.

Trip Budget Program

As documented through the South Beach transportation planning process, developing a transportation system sufficient to handle complete development of the area is not feasible within the next 20-years due to physical constraints and system infrastructure costs related to the Yaquina Bay Bridge. The South Beach Trip Budget Program provides the City with a way to track and manage the number of trips generated by new development to make sure that the planned transportation system can operate at an acceptable level with the new growth in South Beach. The Trip Budget Program is a tool to track the pace at which at which highway capacity is consumed.

The benefit of a trip budget program is a high level of predictability for development. By tracking trips, and making decisions based on the status of the availability of trips within a TAZ, the City can ensure that transportation facilities are available to accommodate new trips and can continue to approve development in South Beach. This certainty, however, entails monitoring and enforcement and adds a level of administrative work to the City's existing responsibilities. Coordination with Lincoln County will also be necessary for development proposals in South Beach that are within the urban growth boundary, but outside city limits. The County will be undergoing Comprehensive Plan policy amendments that support the Trip Budget Program and coordination with the City (ref: June 20, 2012 Memorandum, Transportation Planning in South Beach: Proposed Lincoln County Comprehensive Plan Amendments (attached)).

Additional Code Amendments

A transportation impact analysis would apply when a proposed development or use includes one or more "triggers," such as generating more than 50 PM peak hour trips on US 101. Requiring a TIA for proposed development that meets thresholds related to expected transportation impacts is another way to ensure that the planned transportation system in the City can accommodate future development. The new Zoning Code Chapter

45 (Exhibit G of Newport Ordinance No. 2045) proposed for adoption clarifies the City's process for assessing the impacts of proposed development on the transportation system and providing needed infrastructure. New code provisions enhance predictability in the development approval process, while at the same time ensure that that the transportation system can meet the needs of existing and future users.

Other proposed development requirements related to proposed transportation standards are found in a new Chapter 44 (Exhibit F of Newport Ordinance No. 2045). New development standards relate to access easements, street curves and grades, and acceptance of future improvement guarantees in lieu of street improvements. Proposed standards are intended to compliment similar subdivision requirements. The proposed standards give the City the ability to address impacts from development when land divisions are not involved.

Findings

Statewide Planning Goals

Goal 1: Citizen Involvement

Goal 1 requires the development of a citizen involvement program that is widespread, allows two-way communication, provides for citizen involvement through all planning phases, and is understandable, responsive, and funded.

Response: Opportunities for public involvement were provided through information sessions and public open houses. The first information session was held February 28, 2011 at a joint meeting of the Newport and Lincoln County Planning Commissions. A second information session occurred June 27, 2011 at a Newport Planning Commission meeting. A third session was a joint meeting of the Newport and Lincoln County Planning Commissions held June 25, 2012. Information sessions with the Newport Planning Commission also occurred on July 9, 2012 and July 23, 2012. Citizens also were invited to three open houses during the project, all of which were held at Newport City Hall. The first, held on May 5, 2011, presented information describing the future transportation issues and gave the public an opportunity to provide feedback and to prioritize concerns. Open House #2 was held on July 27, 2011. Information about future transportation projects considered to be feasible for improving the local street system and the operation of US 101 was presented. A technique to coordinate land development and transportation projects using trip budgets also was presented at the conceptual level. Open House #3 was held on May 24, 2012 and gave the public an opportunity to review and comment on proposed changes to Newport's Transportation Systems Plan, Comprehensive Plan, and Municipal Code, as well as proposed changes to the Oregon Highway Plan.

Citizens were also afforded the opportunity to participate in the public adoption process. Public notice of the first evidentiary hearing for the proposed amendments to the Newport Comprehensive Plan, Transportation Systems Plan and Development Code was provided to the Department of Land Conservation and Development on July 9, 2012. Parties who attended the open houses or otherwise advised the City that they would like to receive notice of upcoming hearings received such notice by mail on August 10, 2012. Newspaper notice of the Planning Commission hearing was published on August 17, 2012.

Goal 2: Land Use Planning

This goal requires that a land use planning process and policy framework be established as a basis for all decisions and actions relating to the use of land. All local governments and state agencies involved in the land use action must coordinate with each other. City, county, state and federal agency and special districts plans and actions related to land use must be consistent with the comprehensive plans of cities and counties and regional plans adopted under Oregon Revised Statues (ORS) Chapter 268.

Response: At the onset of the project there was a review and analysis of the applicable state, regional, and local transportation and land use plans, policies, regulations and local ordinances. The City of Newport, Lincoln County, and ODOT policies and requirements that influence the development, adoption, and implementation of transportation standards and projects within South Beach were reviewed. Findings in this report document how the proposed Comprehensive Plan and code amendments are consistent with other adopted documents. [ref: Technical Memos #1 through #13, prepared by Parametrix from 2006 to 2012]

Because of the interrelatedness of the jurisdictional authority over the transportation system in South Beach, the recommendations considered for adoption are the result of a high level of state and local coordination. The City, Lincoln County, Department of Land Conservation and Development and ODOT representatives met formally three times as part of a project and technical advisory group and have been providing feedback at critical decision points during the process. An initial briefing on the project was provided to the Lincoln County Planning Commission at a joint meeting with the Newport Planning Commission on February 28, 2011; a second joint meeting was held June 25, 2012 to discuss the project outcomes and adoption process.

Goal 9: Economic Development

This goal requires that local comprehensive plans and policies contribute to a stable and healthy economy in all regions of the state.

Response: The proposed multi-modal transportation system for South Beach, including necessary local transportation improvement projects paired with proposed changes related to US 101, has been developed and designed to reasonably accommodate the expected growth in the 20-year planning horizon. The proposed change to mobility targets on US 101 as a result of planning done in 2011-12 is part of the transportation solution within the given planning horizon. The new targets will allow more traffic from development and from through travel, thereby accommodating more development in South Beach than the existing targets would allow. By adopting the recommended transportation improvements in South Beach and language that is supportive of the US 101 alternative mobility targets, the City considers a higher level of congestion on US 101 as an acceptable trade-off for accommodating economic development and reduced costs of total transportation system improvements associated with development.

Goal 10: Housing

This goal requires the City to plan and provide for the appropriate type, location and phasing of public facilities and services sufficient to support housing development in areas presently developed or undergoing development or redevelopment.

Response:

The analysis of the transportation system's capability to support existing and future growth accounted for background traffic growth (e.g., through traffic) and anticipated development within the South Beach area. Determining future transportation demand included determining the amount of growth in future residential trips. Access to residential areas in South Beach is dependent upon US 101 and area roads. Improvements to mobility or safety on these facilities benefit existing and future residents. The proposed roadway, bicycle, and pedestrian system and associated improvement projects will provide essential access to new and developing residential areas.

Goal 11: Public Facilities and Services

Goal 11 requires cities and counties to plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development. The goal requires that urban and rural development be "guided and supported by types and levels of urban and rural public facilities and services appropriate for, but limited to, the needs and requirements of the urban, urbanizable and rural areas to be served."

Response: Transportation facilities are considered a primary type of public facility. The TSP documentation includes existing conditions and future needs for the transportation system (ref: Parametrix Tech Memos); improvements and implementation measures are proposed to meet the future needs in South Beach. Proposed new transportation policies in the Comprehensive Plan formalize the City's intent to develop transportation facilities in an efficient and timely manner, consistent with the planned system in the TSP.

Goal 12: Transportation

Goal 12 requires cities, counties, and ODOT to provide and encourage a "safe, convenient and economic transportation system." This is accomplished through development of Transportation System Plans based on inventories of state, regional and local transportation needs. Goal 12 is implemented through OAR 660, Division 12, also known as the Transportation Planning Rule ("TPR").

Response: This Goal has been met; see the "Oregon Administrative Rule 660-012: the Transportation Planning Rule" section of this document for findings of compliance with the TPR.

Oregon Highway Plan

The Oregon Highway Plan (OHP) establishes policies and investment strategies for Oregon's state highway system over a 20-year period and refines the goals and policies found in the Oregon Transportation Plan. Policies in the OHP emphasize the efficient management of the highway system to increase safety and to extend highway capacity, partnerships with other agencies and local governments, and the use of new techniques to improve road safety and capacity. These policies also link land use and transportation, set standards for highway performance and access management, and emphasize the relationship between state highways and local road, bicycle, pedestrian, transit, rail, and air systems. The OHP provides the policy level guidance for improvements on US 101 and developing alternative mobility targets. Alternative mobility targets must be adopted by the Oregon Transportation Commission as an amendment to the OHP before they can be used for future decision-making. The goals and policies applicable to the Newport TSP amendments are addressed below.

Goal 1: System Definition

Policy 1A (Highway Classification) develops a state highway classification system to guide ODOT priorities for system investment and management.

Response: US 101 is classified as a Statewide Highway and a National Scenic Byway and part of the National Highway System (NHS). Inside Newport city limits, US 101 is functionally classified as a Principal Arterial. Statewide Highways are intended to provide inter-urban and inter-regional mobility and connections to larger urban areas, ports, and major recreation areas not directly served by Interstate Highways. The management objective for Statewide Highways is to provide safe and efficient, high-speed, continuous-flow operation along the corridor, with minimal interruptions to flow in constrained or urban areas. The amendments to the TSP achieve a balance between Newport's growth and development needs and objectives in South Beach and the state's mobility and safety objectives for US 101.

Policy 1B (Land Use and Transportation) recognizes the need for coordination between state and local jurisdictions.

Response: To assist in the development of the transportation system plan for South Beach, a Project Advisory Committee was established that included the City of Newport, Lincoln County, Department of Land Conservation and Development, and ODOT.

In accordance with this policy, an analysis of planned future land uses has been performed and was an integral part of determining the preferred alternative mobility target for US 101 to balance mobility and local development needs. Recommended implementation measures, such as the adoption of the Trip Budget Program and TIA requirements, provide the city with information regarding the impacts of land use actions on the transportation system and a formalized process by which to coordinate with ODOT.

Policy 1F (Highway Mobility Standards) sets mobility targets for ensuring a reliable and acceptable level of mobility on the highway system by identifying necessary improvements that would allow the interchange to function in a manner consistent with OHP mobility standards.

Response: The South Beach transportation planning process determined that OHP mobility targets for US 101 cannot be met by the end of the planning period (2030). Policy 1F allows ODOT and local jurisdictions to consider different target levels and methodologies for measuring mobility where it is "infeasible or impractical" to meet the OHP mobility targets. The City supports alternative mobility targets for US 101 as a way to balance land development and traffic congestion on the highway. Local support includes adopting the TSP policy amendments, the South Beach Overlay Zone and Trip Budget, and the identified local transportation improvements in South Beach. Alternative mobility targets acknowledge that congestion on the highway, especially in the summertime peak tourist season, is expected and inevitable for in Newport. Adoption of the alternative targets for US 101 by the Oregon Transportation Commission will provide the City with more flexibility to approve future development, while continuing to coordinate future improvements in the corridor with ODOT based on an expectation of higher congestion levels.

Policy 1G (Major Improvements) requires maintaining performance and improving safety by improving efficiency and management before adding capacity. ODOT works with regional and local governments to address highway performance and safety.

Response: The recommended US 101 improvements, as well as the local roadway, pedestrian and bicycle improvements, are intended to help the state improve efficiency and safety on US 101. Transportation system management improvement projects (new TSP Table 2) are prioritized with the intent of maximizing system efficiency before more costly capacity improvements, such as highway widening, are needed.

Goal 2: System Management

The focus of the System Management policies is on creating an increasingly seamless transportation system by maintaining highway functionality and integrity, meeting local mobility and accessibility needs and enhancing system efficiency and safety. Such a system can be developed by establishing cooperative partnerships to effectively and efficiently use available resources, provide state assistance to local jurisdictions when such assistance is a cost-effective way of improving highway operations, address appropriate management responsibilities for roads, by ensuring that opportunities to provide input into transportation decisions are provided to everyone, improving safety of highway users and improving rail-highway compatibility.

Response: Through the South Beach TSP update, the City has coordinated with the State and Lincoln County to ensure that recommended transportation improvements will be implemented in a most effective and efficient manner. Local, off-system improvements in South Beach, including the proposed local street system and access modifications at highway intersections, will improve mobility and safety along US 101.

Goal 3: Access Management

Policy 3A (Classification and Spacing Standards) seeks to balance access to developed land while ensuring movement of traffic in a safe and efficient manner. This policy addresses the location, spacing, and type of road and street intersections and approach roads on state highways.

Response:

Improvements recommended for South Beach, including closing the US 101/Ferry Slip Road intersection and modifying the US 101/32nd Street to right-in/right-out traffic movements, are consistent with this OHP goal.

Goal 4: Travel Alternatives

Policy 4B (Alternative Passenger Modes) articulates the State's intent to advance and support alternative passenger transportation systems where travel demand, land use, and other factors indicate the potential for successful and effective development of alternative passenger modes.

Response: The bicycle and pedestrian improvements recommended for adoption (see new TSP Table 5), as well as the proposed transit-related policies, support alternative modes of transportation in South Beach and have the potential to relieve automobile trips on US 101.

Oregon Administrative Rule 660-012: the Transportation Planning Rule

The Transportation Planning Rule ("TPR") implements Oregon's Statewide Planning Goal 12 (Transportation) and promotes the development of safe, convenient, and economic transportation systems that reduce reliance on automobile travel. The TPR requires local jurisdictions to prepare TSPs to plan for the transportation system needed in twenty years and to create performance standards for that system. In Newport, the City's TSP provides the standards for city streets and the Oregon Highway Plan (OHP) governs state highways. Local standards and State performance targets are then used to determine what, if any, additional system improvements should be provided within that twenty-year period. Public investments in the system can then be developed to meet those standards and targets. The TPR guides the development of a TSP and lists required elements (Sections 660-12-0020 through -0040) and details how local jurisdictions are required to implement the TSP (660-012-0045).

Recommended changes to the TSP and the related zoning ordinance amendments and are consistent with the TPR, as demonstrated by the following findings.

Section 660-012-0020 through 660-012-0040: Elements of Transportation System Plans; Determination of Transportation Needs; Evaluation and Selection of Transportation System Alternatives; Transportation Financing Program

Response: The transportation system plan update focused on the needs of South Beach; the proposed action is to update the TSP to include policies and projects that provide for the expected future growth in this area of Newport. The analysis on which the proposed TSP amendments are based is consistent with the requirements of the TPR and can be found in [ref: Parametrix Tech Memos]. System alternatives were evaluated to meet future transportation needs and the recommended approach – improvements on the US 101 corridor in tandem with an alternative mobility target for this facility plus local street, pedestrian and bicycle system improvements - was devised to improve mobility and safety within the limits of available technology and funding. The City is proposing updated improvement project tables for all modes; each project listed includes a cost estimate. Note that new projects recommended for inclusion are supported by the transportation system planning in South Beach, as well as the Coho/Brant Refinement Plan. In addition, new functional classification maps incorporated into the TSP amendments and corresponding updated tables are being recommended for adoption.

660-012-0045: Implementation of the Transportation System Plan

Response: The City is proposing to update the Zoning Ordinance to implement the recommended transportation system in South Beach. The proposed requirements for the SBTOZ (Chapter 43), new development (Chapter 44) and the transportation impact analysis requirements (Chapter 45) all provide the City with information to determine the development-related impacts on transportation facilities. These code amendments also provide the regulatory tool that allows the City to require that development-related transportation impacts are mitigated consistent with the identified design and function of the impacted facility in the TSP. Consistent with this TPR requirement, the SBTOZ and TIA requirements ensure coordination with ODOT when development occurs in South Beach, or when a proposed development impacts US 101.

The proposed South Beach sidewalk and bike lane projects identified in TSP Table 5 will implement a transportation system that will facilitate non-motorized modes of transportation. The Zoning Ordinance has existing requirements for providing bike and pedestrian connections where roadways are not required or feasible and no additional code requirements are being proposed to implement the bicycle and pedestrian circulation and plans for South Beach.

The City adopted street standards as part of the 1997 TSP update. While no changes to these standards are recommended as part of this action, proposed policy amendments acknowledge that the City will implement street cross-section designs that deviate from adopted street classification system standards through a Refinement Planning process (see proposed TSP Policy 2.A.3).

Comprehensive Plan Policies (Administration of the Plan)

Text Amendments

Changes to the text of the plan shall be considered legislative acts and processed accordingly. These include conclusions, data, goals and policies, or any other portion of the plan that involves the written word.

Response: The proposed action will update the text of the Transportation Chapter of the City's adopted Comprehensive Plan.

Map Amendments

There are three official maps within this plan. They are (1) the General Land Use Plan Map (commonly called the "Comp Plan Map"), (2) the Yaquina Bay Estuary and Shorelands Map (page 272), and (3) the Ocean Shorelands Map (page 50).

The first involves wide areas of the map and many different properties, and these are considered major, legislative changes [...].

[...]

Major, minor, and error amendments to any of the three maps shall be processed consistent with the procedure established in 2-6- 1/"Procedural Requirements" of the Zoning Ordinance (No. 1308, as amended). Major, minor, and error amendments to the maps shall be accompanied by findings addressing the following:

A. Major Amendments:

1.) A significant change in one or more goal or policy; and

2.) A demonstrated need for the change to accommodate unpredicted population trends, to satisfy urban housing needs, or to assure adequate employment opportunities; and

3.) The orderly and economic provision of key public facilities; and

4.) Environmental, energy, economic, and social consequences; and

5.) The compatibility of the proposed change with the community; and

6.) All applicable Statewide Planning Goals.

Response: The proposed adoption of the SBTOZ includes an amendment to the Comprehensive Plan Map that identifies the geographic extent of the overlay. Because the SBTOZ involves a wide area and many different properties and the action of adopting the overlay is considered a major amendment.

Local Ordinance (Chapter 43 Procedural Requirements)

CHAPTER 14.36 AMENDMENTS TO THE ZONING ORDINANCE

14.36.010 General. Whenever the public necessity and the general welfare require, the City Council of the City of

Newport may, on its own motion, or on petition, or on recommendation of the City Planning Commission, (after said Planning Commission and City Council gives public notice and holds public hearings), amend, supplement, or change the regulations or the districts of this ordinance herein established.

14.36.020 Initiation of Amendment. An amendment, supplement, or change in this ordinance may be initiated by:

A. A motion of the City Council.

B. A motion by the City Planning Commission.

C. A petition of the property owner or authorized representative to either the Planning Commission or the City Council.

D. Referral to the Planning Commission. All requests for amendments, supplements, or changes in this ordinance shall, whether initiated with the City Council or otherwise, first be referred to the City Planning Commission.

Response: The proposed addition of new chapters to the City's Zoning Ordinance (Chapter 43, South Beach Transportation Overlay Zone; Chapter 44, Transportation Standards, and; Chapter 45, Traffic Impact Analysis (TIA) is being initiated by the Community Development Department and referred to the Planning Commission for this body's consideration and recommendation. In making a recommendation to the City Council, the Commission should consider whether or not the proposed changes, on balance, constitute a public necessity and promote the general welfare of the community.

Memorandum

Date: June 20, 2012

To: Onno Husing, Planning and Development Director, Lincoln County

From: Darci Rudzinski, AICP
Frank Angelo

cc: John deTar, ODOT Region 2
Derrick Tokos, City of Newport
Sumi Malik, CH2M HILL

Re: Transportation Planning in South Beach: Proposed Lincoln County Comprehensive Plan Amendments

Introduction

This memorandum provides information to County staff in anticipation of a County Board of Commissioners action regarding transportation system planning in the South Beach Area, between the Yaquina Bay Bridge and Southeast 62nd Street. The following provides information to support adoption of new County Comprehensive Plan policies (attached) that are consistent with the City of Newport's draft Transportation System Plan (TSP) and the proposed modification of mobility standards on US 101.

Background

The City of Newport, Lincoln County, and ODOT have been working on an update of the Newport Transportation System Plan (TSP) for the South Beach area between the Yaquina Bay Bridge and SW 62nd Street. Traffic growth associated with the anticipated development in this area over the next twenty years will contribute to very high traffic volumes on the Yaquina Bay Bridge and along US 101. Transportation analysis has shown that these volumes would significantly exceed existing highway and bridge capacity, resulting in long traffic queues extending away from the bridge. Transportation funding from the State or other sources is not likely to provide a solution to bridge capacity constraints within the next twenty years. Additional transportation system network and capacity are needed in South Beach to make the system functional as development occurs; it is not possible to meet the existing Oregon Highway Plan (OHP) performance targets until additional travel lanes can be provided on the bridge.

Oregon's Transportation Planning Rule (Oregon Administrative Rule 660-012) requires the Oregon Department of Transportation to prepare a transportation plan for the State, and requires cities and counties to prepare TSPs to plan for the transportation system needed in twenty years. Measuring performance of the system is one of the elements of the plan. The OHP provides performance targets for state highways. Within Newport and the UGB, the

Newport TSP provides the performance standards for other roads. State targets and local performance standards are then used to determine what, if any, additional system improvements should be provided within that twenty-year period. Future public and private investments in the system can then be developed to meet those standards.

The OHP allows modifications to performance targets under certain conditions. OHP Action 1F.3 establishes that different target levels, methods, and measures for assessing mobility may be considered, in particular where state targets do not match local expectations for a specific facility or may not reflect the surrounding land use, environmental, or financial conditions. Analysis of likely future development in South Beach in combination with the high seasonal traffic and the costs of providing additional bridge capacity led to the conclusion that the OHP mobility targets could not be met within the twenty year planning period. Alternative targets have been developed to provide for future community development and maintain a level of performance on US 101 that, while not desirable, is a more realistic expectation given the funding limitations and environmental consequences. Alternative highway mobility targets are proposed to be measured at three locations on US-101: 35th Street, 40th Street, and a realigned 50th Street, located opposite the connection to South Beach State Park. If adopted by the Oregon Transportation Commission (OTC), these targets will change how transportation conditions are evaluated in South Beach. The changes will:

1. adjust the period during which transportation conditions are measured to the annual average weekday PM peak hour instead of summertime traffic conditions, and

2. increase the mobility targets used to evaluate traffic congestion.

The new targets will allow more traffic from development and from through travel, thereby accommodating more development in South Beach than the existing targets would allow.

The City of Newport supports of the alternative mobility targets and is proposing amendments to both the Newport Comprehensive Plan (the Transportation System Plan – "TSP" - element), as well as to the Zoning Ordinance, consistent with this approach. TSP amendments include adopting roadway and bicycle/pedestrian projects that will enhance local mobility and connectivity and policy statements in support of a package of transportation improvements in South Beach. Central to the balance of future land development and planned transportation improvements is a Trip Budget Program, described in the TSP and codified in a South Beach Overlay Zone (SBOZ). The Trip Budget Program provides a method for the City to track and manage the number of vehicle trips generated by new development to ensure that development is progressing in line with TSP assumptions and that planned improvements continue to be adequate to serve growth and meet the new mobility targets in South Beach. Information pertaining to the SBOZ and the Trip Budget Program were presented at a Public Open House on May 24, 2012. Handout #2 and #3 from the Open House are included in Attachment A.

Lincoln County Coordination

Lincoln County Planning staff has been participating in the City of Newport's TSP update process, both on a Technical Advisory Committee and at public events associated with the project. An initial briefing on the project was provided to the Lincoln County Planning Commission at a joint meeting with the Newport Planning Commission on February 28, 2011. Plans for the transportation system south of the Yaquina Bay Bridge involve the county in the following ways:

- Adoption of the proposed alternative mobility targets on US 101 will have implications for County residents and landowners, particularly those who may benefit from future growth in South Beach and those who will be impacted by the level of congestion on US 101.
- Proposed changes to the transportation system in South Beach are not confined to land within the city limits. Some proposed improvements within the UGB are in unincorporated Lincoln County.
- The City proposes to track and manage the number of vehicle trips generated by new development through the SBOZ and Trip Budget Program. There are a limited number of parcels in the SBOZ that are currently outside of city limits where redevelopment or development could be permitted through the County development approval process.

A map of the proposed SBOZ is included as Attachment B.

Lincoln County Acknowledgement/Adoption Approach

The Lincoln County Comprehensive Plan calls for coordination between the County and other jurisdictions to provide coordinated planning.[1] The following items need to need to be addressed by the County in order to be consistent with the City of Newport's transportation planning in South Beach:

- Consistency between County policy and the proposed alternative mobility standards.
- Consistency between the County's TSP and the proposed local street system and bicycle/pedestrian improvements in South Beach.
- Land use permitting within the South Beach Overlay Zone (SBOZ): ensuring that growth within the designated SBOZ, but currently outside city limits, is accounted for through the Trip Budget Program.

[1] County participation is consistent with the County's Intergovernmental Coordination Policies, which state that the " County shall work with all local, state and federal agencies districts owning and managing property within Lincoln County to assure coordinated comprehensive planning" (Comprehensive Plan Section 1.0020).

Updating policies in the County's Comprehensive Plan will ensure that City and County local planning processes in South Beach are consistent and that future growth and development is consistent with long-range transportation plans.

Proposed amendments to the Comprehensive Plan (Chapter 1 of the Lincoln County Code) are found in Attachment C of this memorandum. Proposed language is underlined. New language is proposed in Section 1.0005, Introduction, and Section 1.0145, Transportation Policies. The new language can be characterized in the following ways:

- A description of the County's participation.
- An overview of the County's interests and where the County's jurisdiction and responsibilities overlap with the City's (e.g., land use permitting, local street system outside City limits/inside UGB).
- A confirmation that the County accepts the identified implementation measures (the local policies, procedures, and local improvements) that support the alternative mobility standard on US 101. Specifically:
    - Lincoln County development approval for areas within the SBOZ but outside city limits will require documentation of compliance with the City's adopted Trip Budget Program.
    - Lincoln County will rely on the City of Newport's adopted TSP for future alignments and locations of planned transportation improvements in South Beach, including local roadway, bicycle, and pedestrian facility improvements.

Recommendation

The City of Newport's TSP update has resulted in a creative solution to monitor future impacts to the transportation system in South Beach. The two key components to ensure that the land use and transportation system in South Beach are in balance are the alternative mobility standards, to be adopted by the Oregon Transportation Committee, and the Trip Budget Program, which is to be implemented locally by Newport. Since Lincoln County has land use permitting authority within the boundaries of the SBOZ, County participation will be necessary to help track the pace at which highway capacity is consumed by future trips associated with development in South Beach. The successful implementation of the South Beach TSP is reliant on the Trip Budget Program, coordinated and implemented by both the City and County. It is recommended that the Board of County Commissioners adopt supportive Comprehensive Plan policies through a legislative amendment to Chapter 1 of the Lincoln County Code. These amendments will provide the necessary local commitment to the proposed alternative mobility targets and the local transportation system improvements and implementation steps. Lack of local support could jeopardize the adoption of the alternative mobility targets at the state level.

ATTACHMENT A

Handout #2: South Beach Overlay Zone ("SBOZ")

Purpose: To promote development in the South Beach area of Newport in a way that maintains an efficient, safe, and functional transportation system.

Where is it applied? Generally to developable property between the Yaquina Bay Bridge and SE 62nd Street, in an area identified as the South Beach Overlay Zone, or SBOZ. The area will be adopted as an overlay on the City of Newport Zoning Map. The attached map shows the proposed area.

Why is it needed? The SBOZ is needed to manage future development so that the planned transportation system will be able to serve future land use needs. The SBOZ will track the consumption of trips from future development. It is a tool to assess new growth and compare it to the assumptions upon which the transportation system and improvements are based.

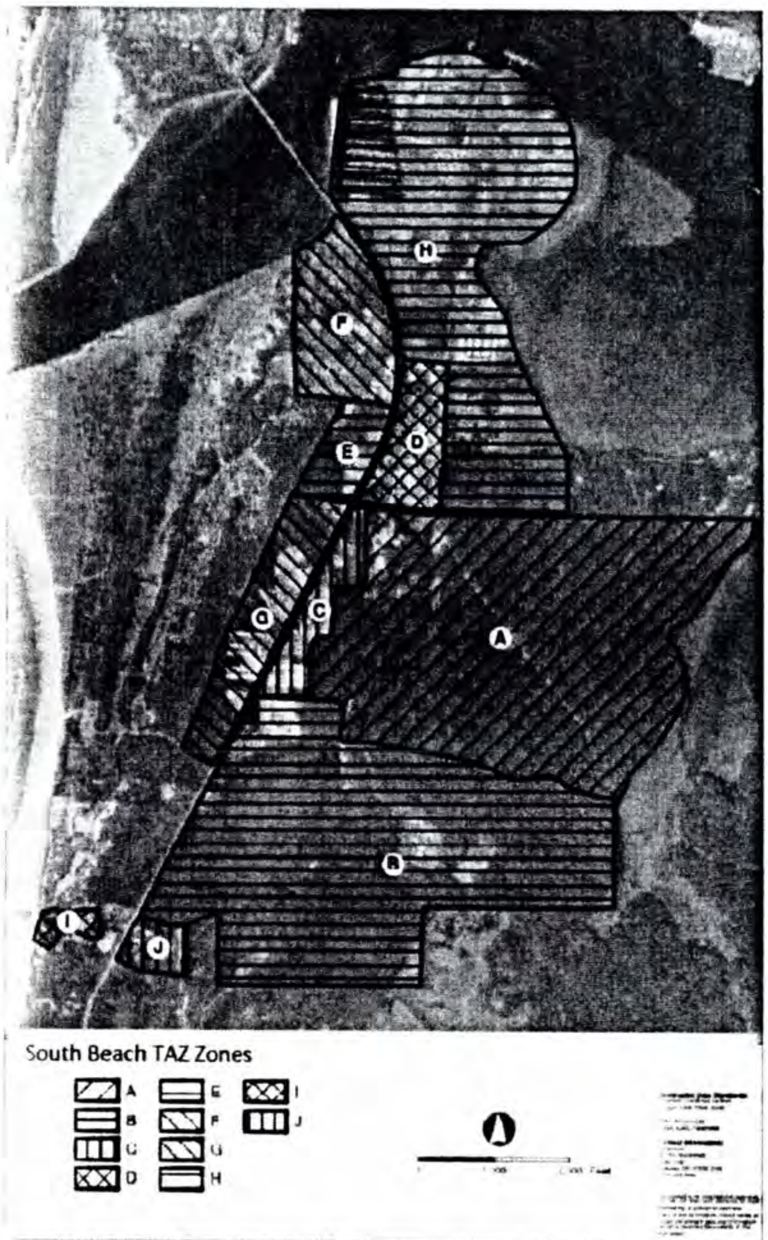
Who does it affect? Anyone who is planning an expansion of an existing use, a change in use, or an improvement on a parcel or parcels within the SBOZ that requires City land use or development approval. Proposed code provisions would apply to any land use application for a parcel within the SBOZ.

What are the development requirements? Proposed development on parcels within the SBOZ are to be limited to the number of PM peak hour trips than are budgeted for the Traffic Analysis Zone (TAZ) in which the parcel is located, except when a development proposes to use the Trip Reserve Fund (see Handout #3). A development that results in a change in the number of vehicle trips being generated to or from a property must submit a Trip Assessment Letter. If certain threshold conditions are met, a more detailed Traffic Impact Analysis (TIA) would need to be submitted to the City for review and approval through a Type III process.

What is the approval process? Land use applications in the SBOZ will be reviewed and approved consistent with existing requirements, according to the type of proposal. Approval of the trip allocation is a ministerial, or administrative, action and can be granted when sufficient trips can be allocated from the TAZ Trip Budget in which the development is proposed. If sufficient trips cannot be allocated from the TAZ Trip Budget, the proposal can include a request to use the Trip Reserve Fund (see Handout #3). Such a request will involve a Planning Commission decision.

Handout #2: South Beach Overlay Zone ("SBOZ")

Figure 1: South Beach Overlay Zone[1]



[1] Figure 2-2 from *Newport Transportation System Plan Update - Alternate Mobility Standards Final Technical Memorandum #12.*

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Handout #3: South Beach Trip Budget Program

Purpose: To provide a method for the City to track and manage the number of vehicle trips generated by new development to ensure that it is progressing in line with TSP assumptions and that planned improvements continue to be adequate to serve growth in South Beach.

Where is it applied? To the area identified as the South Beach Overlay Zone, or SBOZ (see Handout #2).

Why is it needed? Developing a transportation system sufficient to handle complete development of the area is not feasible within the next 20-years. The system is limited by the capacity of the Yaquina Bay Bridge, given its physical constraints as well as system infrastructure costs. The South Beach Trip Budget Program provides the City with a way to track and manage the number of trips generated by new development to make sure that the planned transportation system can operate at an acceptable level with the new growth in South Beach. The Trip Budget Program is a tool to track the pace at which highway capacity is consumed.

What does it affect? Any development that requires City land use review or development approval.

How will the city track new trips on the transportation system? New submittal requirements are being proposed that would apply to development proposals and requests for land use changes. All such applications would need to document expected future trips through a Trip Assessment Letter; large developments would need to provide a more detailed Traffic Impact Analysis (TIA).

How does it work? The program is based on the future number of PM peak hour trips projected to be generated from new development in South Beach at the 20-year time horizon. Transportation Analysis Zones (TAZs) have been identified in South Beach to forecast future trips. The number of new trips expected to be generated by new development in each TAZ then was identified as a "trip budget" for each TAZ. The expected future PM peak hour trips created by the new development are subtracted from the total trips that have been "budgeted" in the individual TAZ in which the development is located.

What happens when the trip budget for a TAZ is exhausted? In the future, if there aren't enough trips available to accommodate a proposed development in any given TAZ, an applicant can apply to use trips from the "Trip Reserve Fund." The number of trips held in reserve is 10% of the total PM peak hour trips available within the South Beach Overlay Zone (SBOZ). The Newport Planning Commission would make decisions about using the Trip Reserve Fund. Trip Reserve Fund trips may be allocated to any development that is permitted by the underlying zoning as long as there are sufficient trips available in the Trip Reserve Fund and the decision is supported by the findings of a transportation impact analysis. The proposed program includes required re-evaluation to recalibrate the system, if needed, whenever development within a TAZ reaches 65% of the trip budget for that TAZ. A separate, automatic review of the program also will occur in 10 years.

Newport South Beach Public Open House – May 24, 2012

ATTACHMENT B

ATTACHMENT C

The following amendments to the Lincoln County Comprehensive Plan (Lincoln County Code, Chapter 1) are recommended to support transportation system planning in the South Beach Area. Proposed new language is underlined.

CHAPTER 1

Land Use Planning

COMPREHENSIVE PLAN

...

COMPREHENSIVE PLAN

1.0001 Title and Purpose

Chapter One shall be known and may be cited or pleaded as the Lincoln County Comprehensive Plan and Zoning Regulations. This chapter applies to all that area of Lincoln County subject to county jurisdiction under the provisions of ORS 215.130 and subsequent amendments to the Oregon Revised Statutes. The purpose of this chapter is to promote the public health, safety and general welfare and to implement the goals and policies of the Lincoln County Comprehensive Plan, LCC 1.0005 to 1.0190.

1.0005 Introduction

The comprehensive plan is a statement of Lincoln County's overall policies regarding the nature of future growth and development in the County. This policy reflects a consideration of the County's problems and needs as well as its social, environmental and economic values. The purpose of comprehensive planning is to allow the public to make decisions in advance about the development of the County and the use and conservation of its resources. The resulting plan is a document upon which public agencies and private firms and individuals can rely so their decisions and investments can be made with confidence. People buying homes can do so, assured that their community will grow and develop in an orderly fashion. Businesses can invest in new sites, confident that they can be used for their intended purpose and that needed services will be provided. Public investments in water systems, sewer systems, schools, roads, etc., can be made in an orderly and cost effective manner. At the same time, the comprehensive plan is not intended to be a static document; rather it is intended to be dynamic in nature. Periodic review and revision is a necessary part of the planning process in order to respond to changing social and economic needs and circumstances. The Lincoln County Comprehensive Plan consists of four primary elements: The Comprehensive Plan Inventory; the Comprehensive Plan Policies; the Comprehensive Plan Maps; and the Lincoln County Transportation System Plan adopted pursuant to LCC 1.0138. The Comprehensive Plan Inventory provides the background information, data and other factual base material concerning the social, economic and environmental resources of the County. The Comprehensive Plan Policies are the formal binding policy statements which direct future growth and development and which are derived from the problems and needs identified in the Comprehensive Plan Inventory. The Comprehensive Plan Maps assign land use designations to all areas of the County in accordance with the requirements of the Comprehensive Plan Policies. It should be emphasized that these three elements of the County Comprehensive Plan must be considered together in analyzing a specific application of the plan. For example, the policy provisions for Forest Lands are in response to resources and conflicts identified in the inventory, and are in turn applicable to those resources defined in the inventory and delineated on the plan maps. In order to provide a better understanding of this linkage between the inventory and policy elements of the Comprehensive Plan, the relevant conclusions of the various inventory sections have been summarized below:

[...]

(20) **Transportation**:

Transportation in Lincoln County centers primarily on the use of the private automobile. It is anticipated that this reliance will continue, and the focus of transportation planning for the planning period will be on design, improvement and maintenance of public roads and highways. Mass transit opportunities in Lincoln County appear to be extremely limited during the planning period. The small number of potential users and their low concentration combine to make any such project economically unsound. It is likely that the importance of air travel will increase during the planning period, commensurate with projected population increases. The probability of commercial air service to the Newport area is anticipated and plans for significant improvements at the airport are being formulated. Rail service and commercial shipping activities are both confined to serving industrial wood products operations in the Newport-Toledo area.

In 2011-12, Lincoln County participated in a planning process that addressed transportation and land use issues in South Beach, an area south of the Yaquina Bay Bridge that includes land both within the City of Newport and outside city limits, within Lincoln County. A significant amount of new development in the Newport area is expected in this area. Forecasted traffic volumes along US 101 are anticipated to result in greater congestion levels, particularly during the summertime peak. However, traffic growth is likely to be high enough that significant congestion also will be experienced at other times of the year. The limited state funding available for bridge improvement and replacement causes the Yaquina Bay Bridge to become the major constraint in the operation of the transportation system south of the bridge.

Newport and ODOT, in consultation with Lincoln County, have worked together to identify a transportation system and management strategy that will support future community development in South Beach. The strategy includes alternative mobility standards for US 101, strategic improvements to the state highway and to the local street system and a variety of improvements to the pedestrian and bicycle system. A South Beach Overlay Zone (SBOZ) has been created that creates a Trip Budget Program to track vehicle trips generated by future development. The City has adopted the SBOZ and Trip Budget Program to track the trips from future development so that the planned transportation system will be able to serve future land use needs. The County will rely upon the City's adopted TSP to identify the necessary and appropriate improvements to the transportation system. The County will participate in the SBOZ and Trip Budget Program by continuing to use the conditional use permit process for all development proposed on land designated Industrial within the SBOZ. This process provides the City of Newport with an opportunity to comment on any land use proposal. This process will provide the City of Newport with the means to ensure that trips are available in the City's Trip Budget Program to support developments in South Beach.

[...]

1.0138 Adoption of Lincoln County Transportation System Plan

(1) The Lincoln County Transportation System Plan, consisting of Volume 1 (Plan) and Volume 2 (Appendixes, Tables and Figures), is hereby adopted and made a part of the Lincoln County Comprehensive Plan. The Plan, Volumes 1 and 2, are incorporated herein as if fully set forth. Copies of the Plan, Volumes 1 and 2, shall be placed in the Lincoln County Clerk's Office and kept in the Department of Planning and Development's offices.

(2) To the extent that provisions in the Lincoln County Transportation System Plan diverge from this Chapter or subsequent amendments to the Comprehensive Plan, this Chapter or subsequent amendments to the Comprehensive Plan shall supersede those inconsistent provisions. [2008 o.456 §3]

1.0140 Transportation Goals

Transportation goals:

(1) To plan for a safe, convenient and economic transportation system.

(2) To provide an efficient and aesthetically pleasing system of public roads.

(3) To develop a transportation system which enhances the County's economy.

(4) To encourage energy conserving transportation modes.

(5) To conserve energy in transportation.

1.0145 Transportation Policies

(1) Lincoln County shall coordinate its transportation plans with state transportation plans and the city comprehensive plans.

(2) The Lincoln County Road Committee shall recommend capital improvement plans for road construction, major road improvements and maintenance. Priorities shall be established on the basis of road condition, road capacity, traffic volume and effectiveness toward reducing accidents.

(3) Lincoln County shall review improvements to the state highway system within the county for consistency with this plan.

(4) Lincoln County shall classify roads as major and minor arterials, collectors and residential streets and designate county and public roads.

(5) Major arterials shall provide regional access between communities and areas of the county and state.

(6) Access to major arterials shall be via fully improved streets except where no alternative exists. Developments adjacent to arterials shall provide through access via collector or residential streets to adjacent developable lands.

(7) In response to applications for highway access permits for abutting properties from the State of Oregon, Lincoln County shall respond with the following condition: "This highway access permit shall be valid only as long as alternative access from a collector or local street is not available. Upon development or improvement of a collector or local street, this permit shall be terminated and the driveway shall be abandoned."

(8) Adequate setbacks from arterial and collector roads shall be required in order to provide for future purchase of additional right-of-way.

(9) Existing rights-of-way shall be used where appropriate and future needed rights-of-way shall be designated to improve the safety of vehicular circulation within the county.

(10) Lincoln County shall work to preserve existing rights-of-way that have been identified as having future potential as transportation corridors.

(11) Lincoln County shall adopt minimum standards for road construction, improvements and maintenance for county and public roads.

(12) Lincoln County shall work with road districts through inter-governmental agreements to provide programs for improvement and continual maintenance.

(13) Lincoln County shall work with existing road districts to ensure improvement of public roads to minimum county standards.

(14) Lincoln County may share in public road maintenance and improvement with abutting property owners. The County share shall be based upon benefit, road use, classification and priority of the County road capital improvement plan.

(15) A condition of final development approval shall be that public roads providing access to proposed development be improved to minimum County standards.

(16) Lincoln County shall initiate vacation or closure of county or public roads which are no longer necessary for access or which cannot be maintained as determined by the County Engineer except where such roads abut the ocean.

(17) Lincoln County may reduce county roads to public road status.

(18) Set-backs for development shall provide for the planned right-of-way width.

(19) The establishment of private road rights-of-way to accommodate land partitioning shall be to minimum county road standards except when no further partitioning or subdividing is possible.

(20) Lincoln County shall encourage the improvement of existing airports.

(21) Lincoln County shall work with citizens, the Department of Transportation Aeronautics Division, and cities to develop zones which designate surrounding land uses compatible with airports.

(22) Development of heliports, except for emergency use, shall be restricted to commercial, industrial, forest, and agricultural areas and residential areas where the approach and departure occur over areas where there is no potential for residential use.

(23) The Lincoln County Airport Advisory Committee shall advise the County on all land use matters pertinent to airport and aircraft safety.

(24) Lincoln County shall encourage:

(a) Improved transportation choices including opportunities for those who are aged or incapable due to physical or mental disorder;

(b) Establishment of a commuter airline service;

(c) Improvement and maintenance of marine facilities, where appropriate, such as docks, jetties and channels; and

(d) Designation and improvement of pedestrian and bicycle routes.

(25) Lincoln County shall promote the expansion of the railway system capability.

(26) Lincoln County shall review proposals to locate high voltage electrical transmission lines and high volume natural gas or oil pipelines. The review shall take into consideration land uses along and adjacent to these transmission corridors, weighing public benefit, environmental safety and the economics of alternative proposals.

(27) Transmission lines and pipelines serving and linking residential, commercial, and industrial users shall be located along common corridors where feasible

(28) Lincoln County shall encourage the licensing of bicycles by State of Oregon to increase revenues for bike way facilities.

(29) Lincoln County shall encourage the Oregon Department of Transportation to widen and improve valley access highways.

(30) Lincoln County shall require designation of car pool parking areas as part of access management plan for intersections near major collectors.

(31) Permanent access to that portion of NE Harney Street between NE 32nd Street and NE 36th Street shall be limited to lands within the City of Newport Urban Growth Boundary. Access to lands outside the Urban Growth Boundary shall be limited to temporary access for forest management purposes.

(32) Lincoln County shall support programs providing transportation choices and reduction of single-occupancy vehicle trips.

(33) Lincoln County shall work to improve mass transit and inter-city transit links. [1998 o.379 § 2; 2008 o.456 §5]

(34) Lincoln County supports optimizing the transportation system in Newport's South Beach area between the Yaquina Bay Bridge and SE 62nd Street through improvements to US 101 and the local transportation system as identified in the City of Newport's TSP. The capacity of the Yaquina Bay Bridge is expected to continue to be the major constraint in the operation of the transportation system south of the bridge, and funding for a new or expanded facility is not likely in the foreseeable future.

(35) Lincoln Count supports adoption of alternative mobility standards by the Oregon Transportation Commission on US 101 at the future signalized intersections of South 35th Street, Southeast 40th Street and Southeast 50th Street/South Beach State Park to accommodate planned community development in Newport's South Beach area. These standards will allow a higher level of congestion than would be acceptable without the alternative standards. The alternative standards will support economic development and reduce the costs of total transportation system improvements associated with development in South Beach.

(36) Lincoln County shall participate in monitoring the transportation impacts of development in South Beach by noticing the City of development proposals outside City limits,

within the City of Newport's adopted South Beach Overlay Zone (SBOZ). The county shall coordinate with the City of Newport through the development approval process to ensure that County-approved trips are recorded in the City's SBOZ Trip Budget Program. Documentation of compliance with the SBOZ Trip Budget program, as adopted in the City of Newport TSP, will be required prior to County development approval.

(37) Lincoln County will use the City of Newport's adopted TSP to identify necessary and appropriate improvements to the transportation system in Newport's South Beach area.

(38) Lincoln County, in coordination with the City of Newport, shall continue to engage ODOT in conversations regarding future project planning and funding that would lead to improvements to, and possibly replacement of, the Yaquina Bay Bridge. The county is supportive of finding long-term solutions sufficient to address existing capacity and structural limitations that affect the bridge's ability to carry vehicles and pedestrians

Exhibit B1
Newport TSP Amendments
File No. 2-CP-11

Newport Transportation System Plan Technical Memorandum #5 – South Beach Existing Conditions

Prepared for

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December 2006 | 274-2395-051 (04/04)

CITATION

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and State of Oregon funds.

Parametrix. 2006. Newport Transportation System Plan Technical Memorandum #5 – South Beach Existing Conditions. Prepared by Parametrix, Portland, Oregon. November 2006.

CERTIFICATION

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.

Prepared by John Evans and Shelley Oylear, E.I.T.

Checked by Anne Sylvester, P.T.E.

Approved by Anne Sylvester, P.T.E.

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APPENDICES

ACRONYMS

ADA	Americans with Disabilities Act
ADT	Average Daily Traffic (volumes)
DLCD	Department of Land Conservation and Development
HDM	Highway Design Manual
LOS	Level of Service
MEV	Million Entering Vehicles
MVMT	Million Vehicle Miles of Travel
OAR	Oregon Administrative Rules
OBPP	Oregon Bicycle and Pedestrian Plan
ODOT	Oregon Department of Transportation
OHP	Oregon Highway Plan
ORS	Oregon Revised Statues
OTC	Oregon Transportation Commission
OTP	Oregon Transportation Plan
PDO	Property Damage Only
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
STIP	State Transportation Improvement Program
Synchro	HCM compatible traffic analysis software for intersections
TPAU	Transportation Planning and Analysis Unit
TPR	Transportation Planning Rule
TSP	Transportation System Plan
UGB	Urban Growth Boundary
V/C	Volume-to-Capacity (ratio)

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1. INTRODUCTION

This report provides analysis of existing transportation conditions for the South Beach study area as part of the update process for the City of Newport Transportation System Plan (TSP), known as the South Beach TSP Refinement Plan. This report is divided into three sections. Chapter 1 is this introduction. Chapter 2 provides a review of the existing street system, traffic operations, crash history, Yaquina Bridge, roadway access, and public transportation. Chapter 3 provides a summary of all applicable plans, policies and programs relevant to this portion of the TSP update. A separate analysis of existing bicycle and pedestrian transportation conditions is provided in Technical Memorandum #3.

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2. INVENTORY OF EXISTING CONDITIONS

2.1 OVERVIEW

The analysis of existing traffic conditions in the South Beach study area included an inventory of current transportation system conditions. Infrastructure characteristics reviewed include intersection geometry, bridge conditions, and access features. Analyses were made of existing traffic operations and crash histories at key intersections. Assessments of other transportation-related area functions include a review of truck traffic volumes, available transit and location of pedestrian attractions in the South Beach area.

The South Beach system inventory in this memo serves as a basic framework for evaluation of future transportation facilities needs.

2.2 STUDY AREA

For purposes of this project, the South Beach study area is bisected by the US 101 corridor and largely lies south of the Yaquina Bay Bridge. The boundaries of the study area include the Pacific Ocean to the west, Yaquina Bay to the east, Abbey Street to the north and South 65th Street to the south. This study will incorporate work currently being conducted on the urban growth boundary (UGB) expansion in this area and other plans for further economic development.

2.3 EXISTING STREET SYSTEM

This section describes the physical characteristics of state highways in the Newport transportation system, and discusses the features of study area streets. The inventory includes functional classification, number of lanes, posted speeds, destinations served, and surrounding land uses. An inventory of bicycle and pedestrian facilities on and near study area streets is included in Technical Memorandum #3.

US 101

US 101 is the main transportation facility in South Beach area and along the Oregon Coast. This highway is classified by the Newport Transportation System Plan (TSP) as a Principal Arterial and by the Oregon Department of Transportation (ODOT) as a Statewide Highway. The Oregon Highway Plan (OHP) also classifies US 101 as a scenic byway. The highway carries the highest volume of traffic of any facility in the South Beach area. The pavement condition in the study area is rated as fair in the 2004 Oregon State Highway System Pavement Conditions report. US 101 has one through traffic lane in each direction, with left-turn lanes at some intersections. A summary of the lane widths along US 101 are included in Table 2-1 below.

One of the proposed projects in the Newport TSP is the widening of US 101 from two to four through lanes from the Yaquina Bay Bridge south to 123rd Street.

Local Streets

Abalone Street and Pacific Way lie at the south end of the Yaquina Bay Bridge and function as both northbound and southbound entrance and exit ramps to US 101. Abalone Street and Pacific Way are classified as minor arterial roadways. They provide connections to Marine Science Drive, the Port of Newport, and the South Jetty recreation area. Both roadways consist of one travel lane in each direction and have posted speeds of 25 mph.

Table 2-1. 2003-2005 South Beach Area Lane Widths

Segment of US 101	Southbound Bike Lane (feet)	Southbound Travel Lane (feet)	Center Lane Median (feet)	Northbound Travel Lane (feet)	Northbound Bike Lane (feet)
South End of Bridge to Pacific Way/ Abalone Street	0	12 & 12	1	12 & 12	0
Pacific Way to 32nd Street	6	12	14	12	6
32nd Street to Ferry Slip Road	6 to 10	12	14	12	6
Ferry Slip Road to 50th Street	6	12	0	12	6

Source: ODOT 2004. US 101: Yaquina Bay Bridge-SE 123rd & US 20: US 101-John Moore Rd. Grading, Drainage, Paving Signing & Signal Project.

SE 32nd Avenue is a signalized intersection about 0.25 miles south of the Yaquina Bridge. From US 101 to Ferry Slip Road, 32nd Avenue is classified as a collector street. The two-lane roadway is posted at 25 mph and serves residential, industrial, and commercial land uses. A new street is proposed to connect 32nd Street from Anchor Way to Abalone Street, offering a local route parallel to US 101.

Ferry Slip Road is classified as a minor arterial with a posted speed of 30 mph. The two-lane roadway connects US 101 to residential, shopping, employment, and recreational activity areas. The intersection of Ferry Slip Road with US 101 has a sharp angle and irregular geometric configuration.

SE 50th Street is currently classified as a local street that provides access to the City's wastewater treatment plant and Mike Miller Park. The posted speed is 25 mph. The street does not have centerline striping, but accommodates two-way traffic. There has been a proposal to re-align and combine the 50th Street and South Beach State Park access points into a single intersection with US 101.

2.4 EXISTING (2006) TRAFFIC OPERATIONS

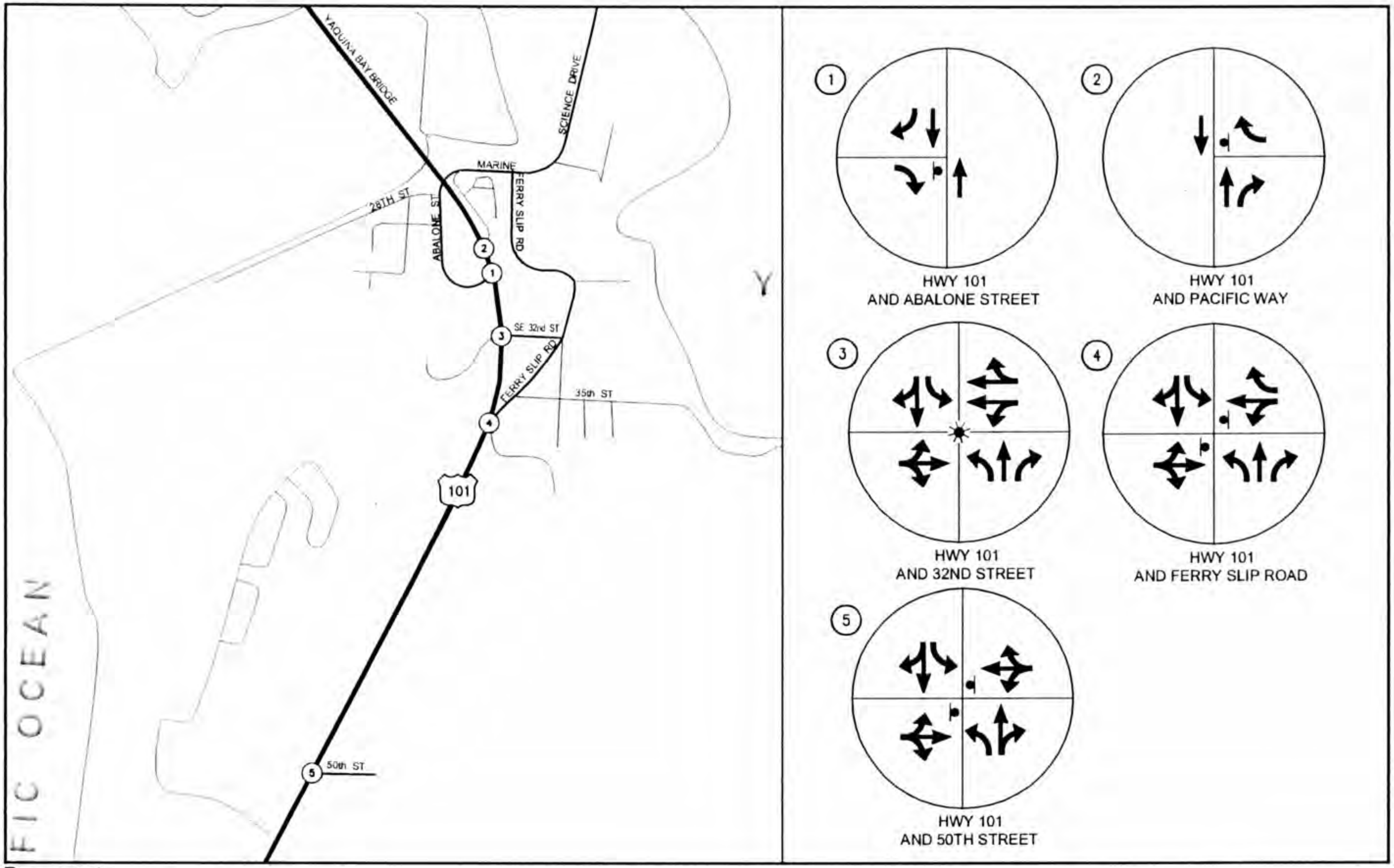
This section addresses existing transportation system volumes and operations on US 101 at key study area intersections in the South Beach area. The inventory and analysis described in this section will serve as a basic framework for evaluation of future transportation facilities needs.

Intersection Traffic Control and Geometrics

Five intersections were evaluated as part of the analysis of the existing conditions:

- US 101 at Abalone Street (unsignalized)
- US 101 at Pacific Way (unsignalized)
- US 101 at SE 32nd Street (signalized)
- US 101 at Ferry Slip Road (unsignalized)
- US 101 at SE 50th Street (unsignalized)

Each of the unsignalized intersections is stop-controlled on the minor street approach. Only the US 101/SE 32nd Street intersection operates with traffic signals. Existing lane configurations and traffic control for the five study area intersections are shown in Figure 2-1.



Parametrix DATE: Nov 02, 2006 FILE: P2395051P02TF-11

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Figure 2-1
South Beach Existing Lane Characteristics

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Intersections Operational Standards

Within the state of Oregon traffic operations are evaluated based on two sets of criteria or standards. The operative standard used by ODOT for state highways is the volume-to-capacity (V/C) ratio, and is expressed in terms of a ratio between traffic volumes and the roadway or intersection's capacity. Many local communities assess the quality of traffic performance in terms of intersection or roadway levels of service (LOS). These two operational standards are described below.

Volume-to-Capacity Standard

As adopted in the 1999 Oregon Highway Plan (OHP), ODOT uses V/C ratios to measure state highway performance rather than intersection or roadway levels of service. A V/C ratio expresses the relationship between traffic volumes and the roadway or intersection's theoretical capacity. Various V/C thresholds are applied to all state highways based on functional classification of these facilities.

US 101 in the South Beach area is classified as a Statewide Highway. The peak hour, maximum V/C standards for US 101 inside the Urban Growth Boundary (UGB) boundary with speeds less than or equal to 35 mph is 0.85.

Intersection Levels of Service

Another measure of intersection operating performance during peak travel periods is based on average control delay per vehicle entering the intersection. This delay is calculated using equations that take into account turning movement volumes, intersection lane geometry and traffic signal features, as well as characteristics of the traffic stream passing through the intersection, including time required to slow, stop, wait, and accelerate to move through the intersection. Various levels of delay are then expressed in terms of level of service (LOS) for either signalized or unsignalized intersections. The various LOS range from LOS A (free-flow conditions) through LOS F (operational breakdown). Between LOS A and LOS F, progressively higher LOS grades reflect increasingly worse intersection performance, with higher levels of control delay and increased congestion and traffic queues. Characteristics of each LOS are briefly described below in Table 2-2.

Table 2-2. Level of Service Definitions

	Average Delay/Vehicle (sec.)		
Level of Service	**Signalized**	**Unsignalized**	**Description**
A (Desirable)	<10 seconds	<10 seconds	Very low delay; most vehicles do not stop.
B (Desirable)	>10 and <20 seconds	>10 and <15 seconds	Low delay resulting from good progression, short cycle lengths, or both.
C (Desirable)	>20 and <35 seconds	>15 and <25 seconds	Higher delays with fair progression, longer cycle lengths, or both.
D (Acceptable)	>35 and <55 seconds	>25 and <35 seconds	Noticeable congestion with many vehicles stopping. Individual cycle failures occur.
E (Unsatisfactory)	>55 and <80 seconds	>35 and <50 seconds	High delay with poor progression, long cycle lengths, high V/C ratios, and frequent cycle failures.
F (Unsatisfactory)	>80 seconds	>50 seconds	Very long delays, considered unacceptable by most drivers. Often results from over-saturated conditions or poor signal timing.

Source: 2000 Highway Capacity Manual, Transportation Research Board.

Traffic Volumes

ODOT provided PM peak hour turning movement counts for the South Beach study intersections, based on data that had been collected between February 2004 and April 2006. An adjustment to the count data was required to translate data from previous years so that they all represented 2006 volumes. Additionally, as traffic volumes vary with the seasons, further adjustments were required for counts taken outside of the peak season to ensure that they reflect "typical" conditions for use in assessing design and improvement options. The traffic count data is summarized in Figure 2-2 and reflects seasonally adjusted PM peak traffic volumes. The methodology for the adjustments is summarized in Appendix A.

Adjusted 2006 average daily traffic volumes (ADT) that have been balanced between intersections are illustrated in Figure 2-3. Heavy truck volumes for the study intersections were extracted from the 14 and 16 hour classification counts provided by ODOT. Figure 2-4 illustrates the PM peak and daily heavy truck volumes along US 101 at the study intersections.

Pedestrian-Oriented Areas

Figures 2-5 and 2-6 illustrate the pedestrian-oriented attractions in the South Beach area. These attractions include the following locations:

- Oregon Coast Aquarium
- Hatfield Marine Science Center
- Rogue Brewery
- South Beach State Park
- Fishing Pier

Traffic Operations

The analysis of existing PM peak hour traffic operations was conducted using a Synchro traffic simulation model developed specifically for the study area intersections. This model includes field-verified geometrics and other relevant physical data for each intersection. Analysis procedures follow guidelines in the ODOT Transportation Planning and Analysis Unit (TPAU).

Table 2-3 summarizes existing (2006) traffic operations for the PM peak hour at the five intersections in the South Beach study area. Data in these tables includes the overall intersection V/C ratios, average intersection delay, and intersection levels of service (LOS). V/C ratios above 1.0 are useful indicators of potential concerns such as sub-optimal signal timing or inadequate turn lane storage. Intersection analysis worksheets are included in Appendix B. Currently, the intersections generally experience minimal delays and operate within acceptable LOS standards. None of the intersections studied exceeded the state V/C threshold. However the minor street approaches at Ferry Slip Road showed substantial delay.

Table 2-3. 2006 PM Peak Traffic Operations

Signalized Intersection	V/C Ratio	Critical Delay (sec/vehicles)	Critical LOS
US 101 @ 32nd Street	0.75	13.6	B
Unsignalized Intersection/ *Critical Movement*			
US 101 @ Pacific Way			
Westbound Right	0.73	40.2	E
US 101 @ Abalone Street			
Eastbound Right	0.17	18.7	C
US 101 @ Ferry Slip Road			
Eastbound	0.38	71.3	F
Westbound Left	0.32	56.7	F
US 101 @ 50th Street			
Eastbound	0.11	31.7	D
Westbound	0.09	27.2	D

Note 1: V/C ratio is a ratio between traffic volumes and the roadway or intersection's capacity.
Note 2: LOS means intersection level of service.
Note 3: "Critical Delay" and "Critical LOS" refers to the delay or LOS experienced for the specific intersection traffic movement listed.

2.5 CRASH HISTORY

Crash data for the study area intersections were provided by the ODOT for 4-year period from January 1, 2002, through December 31, 2005. Analysis of this data was conducted for both roadway segments through the study area and the key intersections.

Roadway Segment Crash Analysis

Roadway segment crash data is analyzed on the basis of accidents per million vehicle miles of travel (MVMT), which considers both the number of crashes and the level of exposure to crashes expressed in terms of the total traffic volume carried along the roadway segment.

Table 2-4 identifies crash data and calculates crash rates for three segments along US 101 in the study area: Fall Street to Pacific Way (1.25 miles), Pacific Way to Ferry Slip Road (0.30 miles), and Ferry Slip Road to SE 50 Street (0.75 miles). Using 4-year crash data, analysis indicates that each segment experienced crash rates less than 1.0/MVMT. This compares with the 2005 crash rate of 2.05 for all urban principal arterial highways in Oregon. A review of the roadway segment crash data indicates that many of the collisions are rear end or turning movement crashes at public and private access points.

Table 2-4. 2002-2005 South Beach Area Segment Crash History

	Crash Type					Crash Severity			Total	
Intersection	Rear-end	Turn	Angle	Side-swipe	Other	PDO	Injury	Fatal	Reported Crashes	Crash Rate/ MVMT
Along US 101										
Fall Street to Pacific Way	9	3	0	3	6	13	8	0	21	0.88
Pacific Way to Ferry Slip Road	3	0	0	0	1	3	1	0	4	0.47
Ferry Slip Road to 50th Street	2	1	0	1	2	4	2	0	6	0.47

Source: ODOT 2006.
Note 1: PDO means Property Damage Only. "Other" crashes include backing, pedestrian collisions, and hitting fixed objects.
Note 2: MVMT means million vehicle miles of travel.

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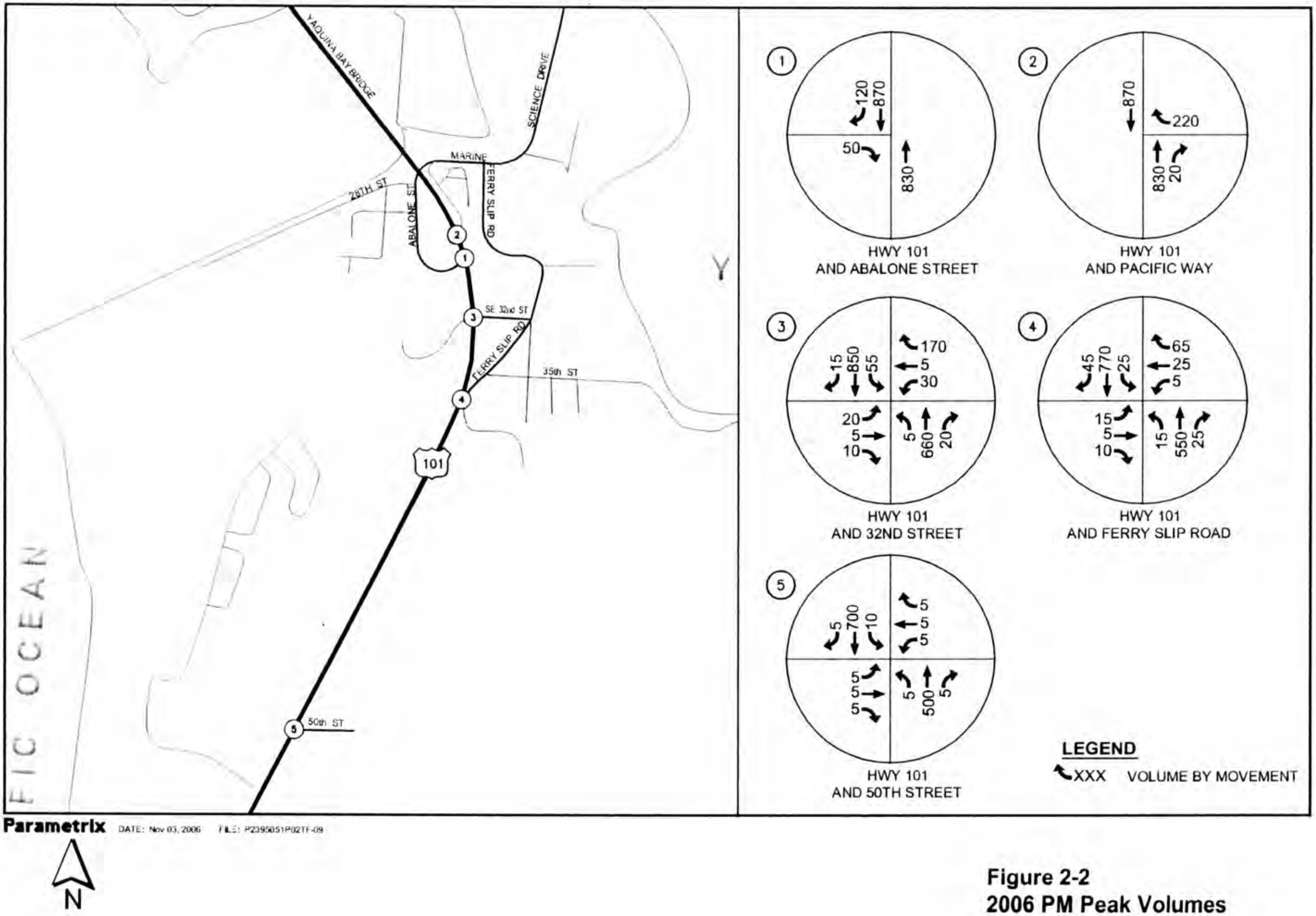

Figure 2-2
2006 PM Peak Volumes

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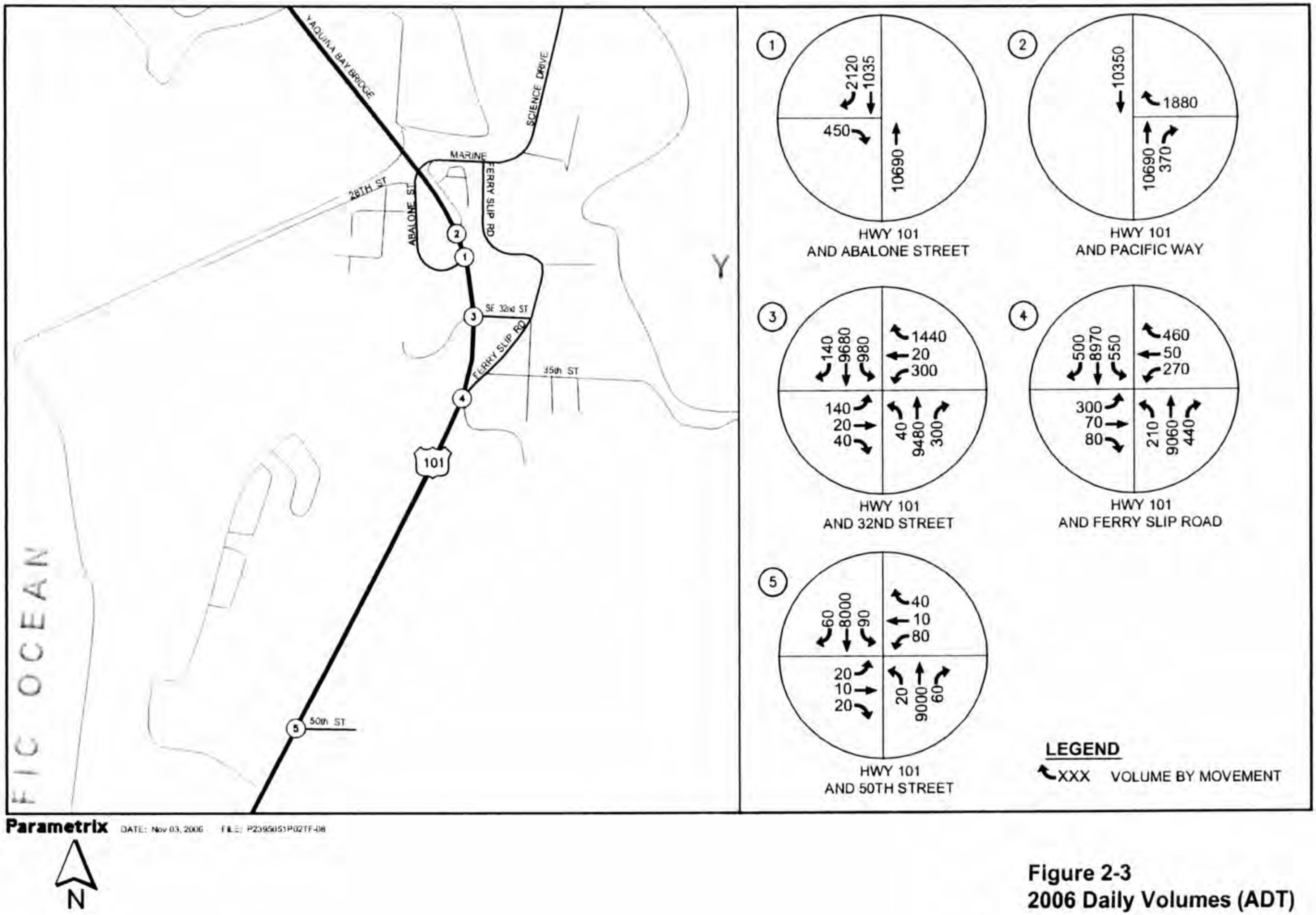

Figure 2-3
2006 Daily Volumes (ADT)

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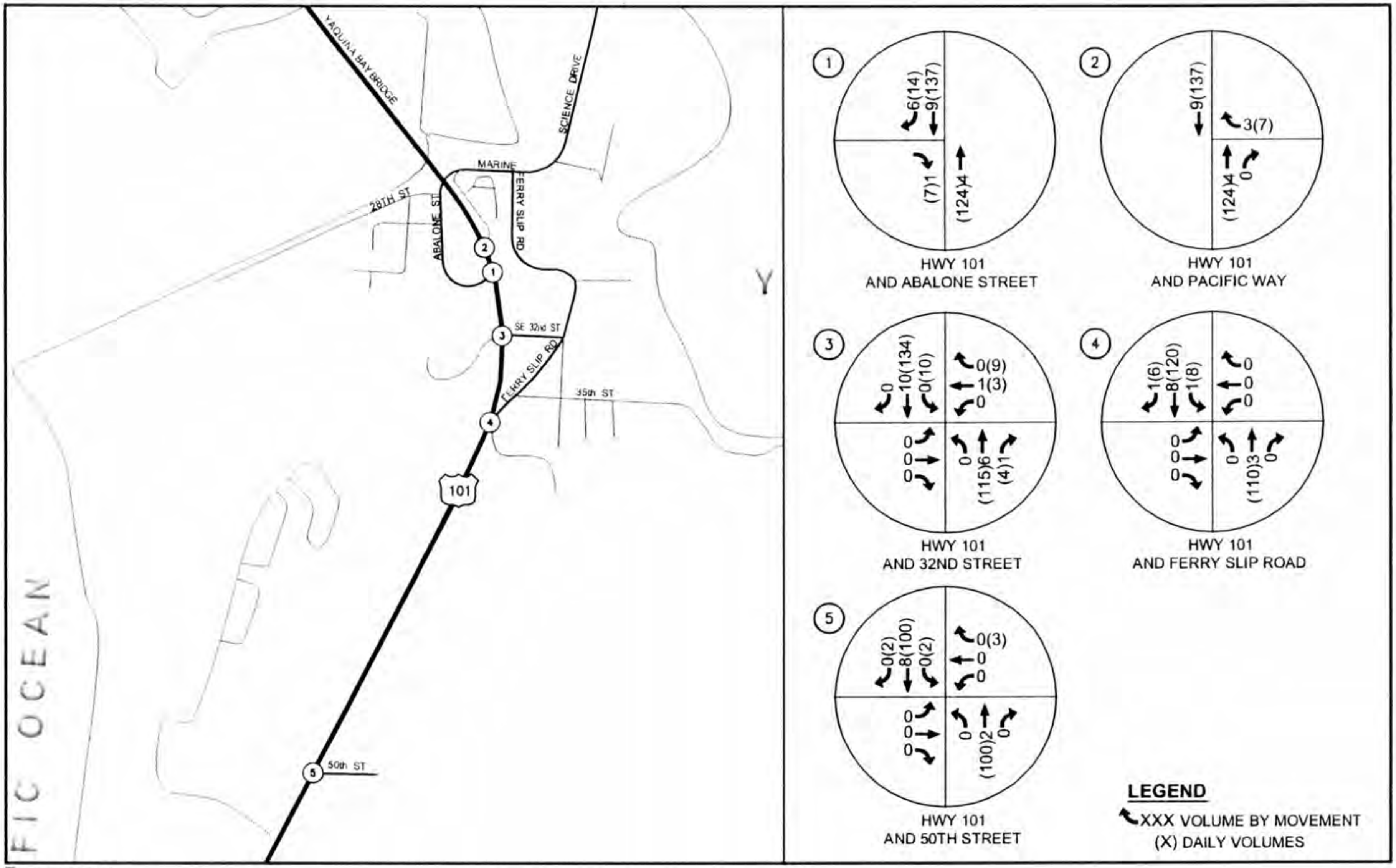

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Figure 2-4
PM Peak And Daily Heavy Truck Traffic Volumes

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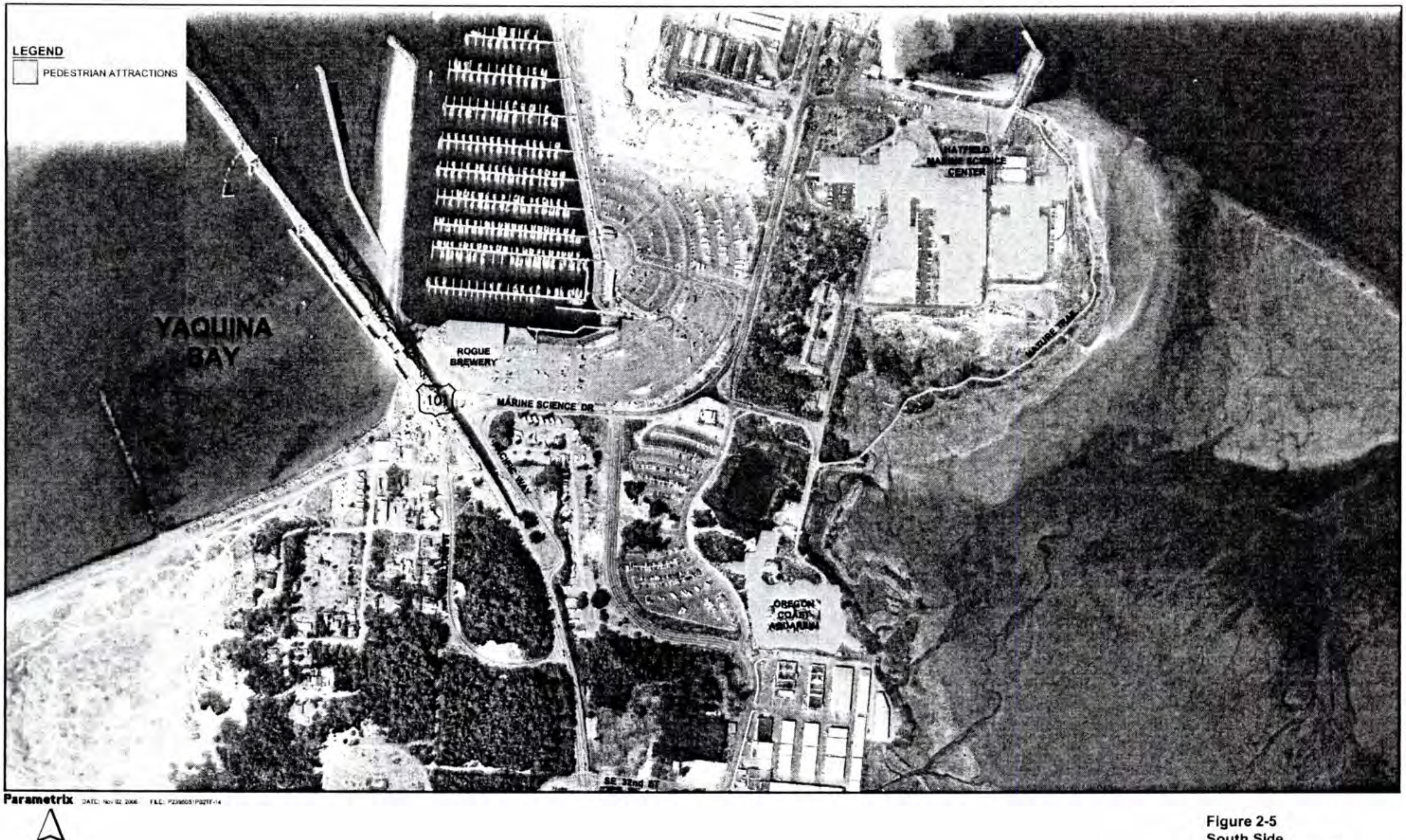

Figure 2-5
South Side
Pedestrian Attractions

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PEDESTRIAN ATTRACTIONS

Figure 2-6
South Beach
Pedestrian Attractions

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Intersection Crash Analysis

The number of crashes per million entering vehicles is used to calculate an intersection's "crash rate." A rate greater than 1.0 crashes per million entering vehicles (MEV) is commonly used as a threshold to identify locations that warrant further analysis, potentially leading to implementation of measures to improve safety. Table 2-5 identifies crash rates and types and severity at study area intersections. None of the study intersections exceed the 1.0 MEV rate and only one intersection recorded any crashes at all during the 2002 to 2005 period.

A review of the data in Table 2-5 indicates that about 67 percent of the collisions at the intersection of US 101 with 32nd Street are rear end, and 33 percent involve turning movements at or in the immediate vicinity of the intersection. These crashes may be related to the lone traffic signal along this highway segment. With respect to crash severity, 33 percent of the intersection collisions involved only property damage while 67 percent experienced an injury. The injury percentile at intersections is lower than for roadway segments as a whole, indicating that most of the injury collisions are occurring at roadway access points between the intersections. As also indicated in the table, there were no fatal collisions at study area intersections during the 2002 to 2005 time period.

Table 2-5. 2002-2005 South Beach Study Area Intersection Crash History

	Crash Type					Crash Severity			Total	
Intersection	Rear-end	Turning	Angle	Side-swipe	Other	PDO	Injury	Fatal	Reported Crashes	Crash Rate/ MEV
US 101 @ Pacific Way	0	0	0	0	0	0	0	0	0	0.00
US 101 @ Abalone Street	0	0	0	0	0	0	0	0	0	0.00
US 101 @ 32nd Street	2	1	0	0	0	1	2	0	3	0.12
US 101 @ Ferry Slip Road	0	0	0	0	0	0	0	0	0	0.00
US 101 @ 50th Street	0	0	0	0	0	0	0	0	0	0.00

Source: ODOT 2006.
Note: PDO means Property Damage Only and MEV means Million Entering Vehicles. "Other" crashes include sideswipes and head-on collisions.

2.6 YAQUINA BAY BRIDGE CONDITION

The Yaquina Bay Bridge is an historically significant, iconic steel bridge spanning Yaquina Bay. ODOT bridge inspection report assessment identifies the bridge as functionally obsolete. The bridge roadway width is 27 feet, accommodating one lane in each direction. The bridge has a sufficiency rating of 46.2 out of 100 points and, accordingly, is eligible for federal funding for bridge rehabilitation. Currently there are no load restrictions on the bridge. The National Bridge Inventory rates the deck and superstructure as satisfactory. Currently, there are no major structural issues with the bridge; however, it continues to receive extensive ongoing maintenance for corrosion prevention.

2.7 ACCESS MANAGEMENT AND CONDITIONS

The term access management refers to the process of balancing the need for vehicle access to parcels of land adjacent to roadways with the need for safe and efficient through movement of vehicular traffic on the roadway. Access management can be implemented by a variety of means. These include median controls (e.g., raised concrete medians); driveway spacing and/or driveway consolidation (so that there are fewer driveways serving one parcel or multiple parcels), requiring that driveways be placed on lower order streets where a parcel abuts both higher and lower order streets; and intersection spacing to reduce the number of conflict points or signal-controlled locations along a street, as the frequency of these locations can reduce the benefits of effective signal timing progression.

Access management is closely related to street functional classification. Typically, when access controls are in place, the frequency of driveways and intersecting streets is more restrictive along state highways and major arterials where the movement of traffic takes a higher priority. Access controls are less restrictive along collector streets where there is greater balance between access and mobility. Access controls are restricted only by safety considerations along local streets where property access is the primary function of the street.

Frequent driveway and cross-street access can significantly degrade traffic operations along major streets as motorists must contend with people slowing to turn into adjacent property or attempting to get back onto the major street from a side access location. Not only do frequent driveways adversely affect the operational capacity of a road, they also affect safety since each driveway or intersecting street represents a potential conflict point for through-moving vehicles. The strip development that often occurs as a result of the lack of access control is often inhospitable to pedestrians and bicyclists, and its dispersed uses make efficient transit service difficult.

Access management can be most effectively implemented during the land development process when access locations and localized street improvements can be adapted to ensure that adjacent street traffic-carrying functions are not degraded. Access management controls are more difficult to implement along streets with developed property due to possible right-of-way limitations and/or the concerns of property owners about business or on-site circulation impacts. In these cases, access controls can be incorporated into a roadway improvement project.

Along state highways, access is commonly controlled by ODOT through the purchase of access rights. New access to/from a state highway is provided consistent with the standards adopted in the OHP for each highway classification, its location within an urban or rural area, and its posted speed. Access management guidelines for state highways are published in OAR 734-051. Access management standards along US 101 within the Newport area are shown in Table 2-6.

Figure 2-7 illustrates the number of private and public access points along US 101 in the South Beach study area. No driveways are present from the south end of the bridge to 32nd Street. On the approximate 1-mile segment of US 101 from 32nd Street to 50th Street, there are 35 access points.

Table 2-6. Access Management Spacing Standards for Approaches on US 101

Posted Speed (mph)	Public and Private Approach Spacing[a]
≥ 55	1,320 feet
50	1,100 feet
40 & 45	990 feet
30 & 35	720 feet
≤ 25	520 feet

Source: OAR 734-051-00115 Table 2.

[a] Measurement of the approach road spacing is from center to center on the same side of road.

2.8 EXISTING TRANSIT OPERATIONS

Currently, two public transit systems operate in the South Beach area. The City of Newport provides a free shuttle and Lincoln County runs a bus service linking Newport with Yachats (Figure 2-8).

The Free Bay & Beach Shuttle currently operates year round, linking major business areas and tourist attractions in the city. During the summer months (July, August and September), the Shuttle operates between 9 am to 9 pm. The rest of the year the Shuttle runs on weekends (Saturday and Sunday) only, from 10 am to 5 pm. The Shuttle began operating in 2006 and is widely used by both local residents and visitors. The Shuttle currently makes five stops in the South Beach study area. Crossing the Yaquina Bay Bridge from the north, the Shuttle stops at the following locations before returning north across the Bridge:

- Aquarium Village
- Aquarium
- Marine Science Center
- Port RV Park
- Rogue Ales Lot

Lincoln County's bus service operates year round, Monday through Saturday. All services originate at the Newport City Hall. The cost of this service is based on the number of zones traveled. The county bus routes through South Beach include the following:

- The Newport-to-Yachats service makes various stops between Newport and Yachats. The only stops within the South Beach study area are South Beach Marina, South Beach Market, and Espresso-South Beach. This route continues south to Yachats.

This route runs on an individual schedule (see Appendix C for routing and schedule information).

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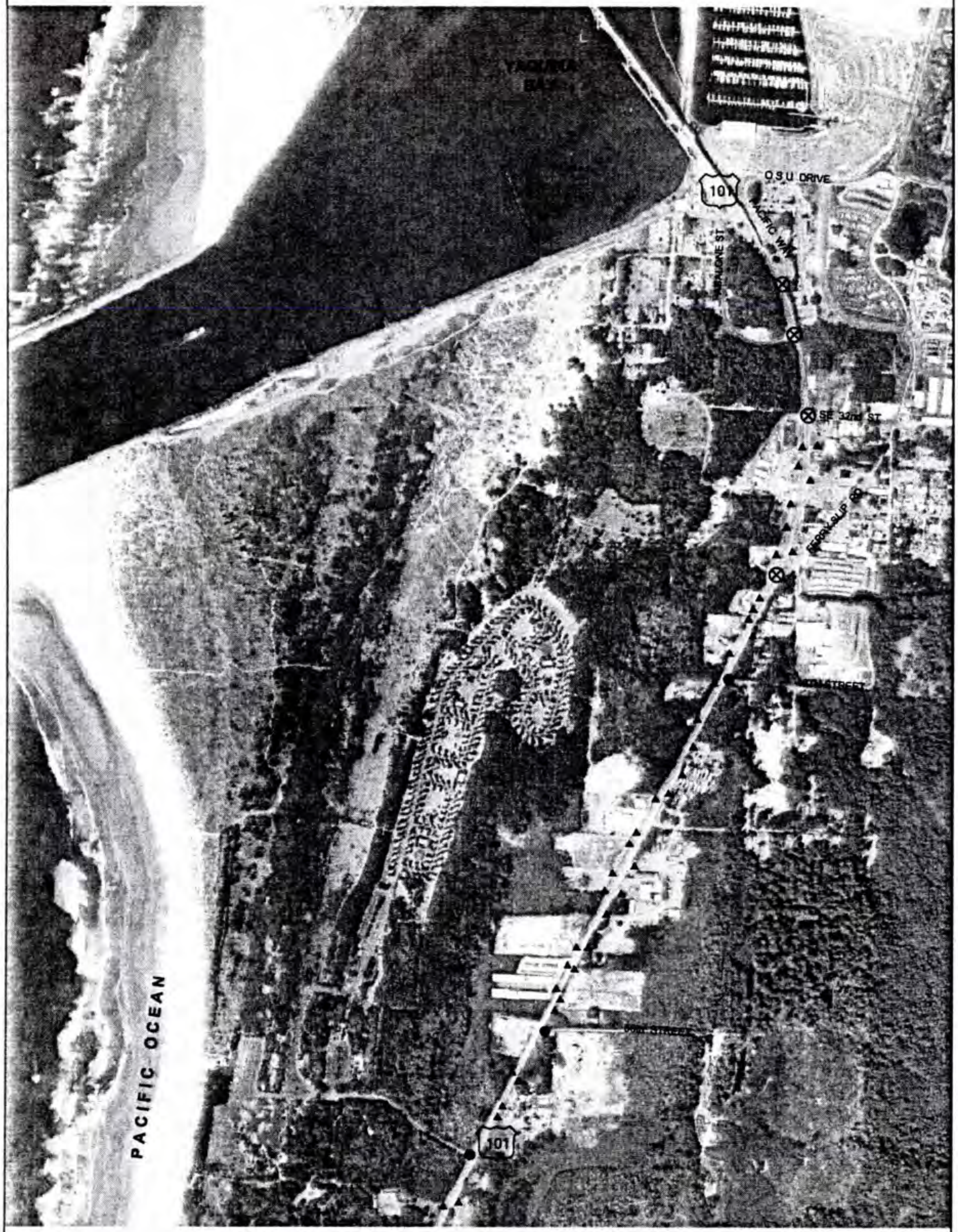

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⊗ STUDIED INTERSECTIONS

● PUBLIC STREETS

▲ DRIVEWAYS

Figure 2-7
South Beach Newport
Driveway Inventory

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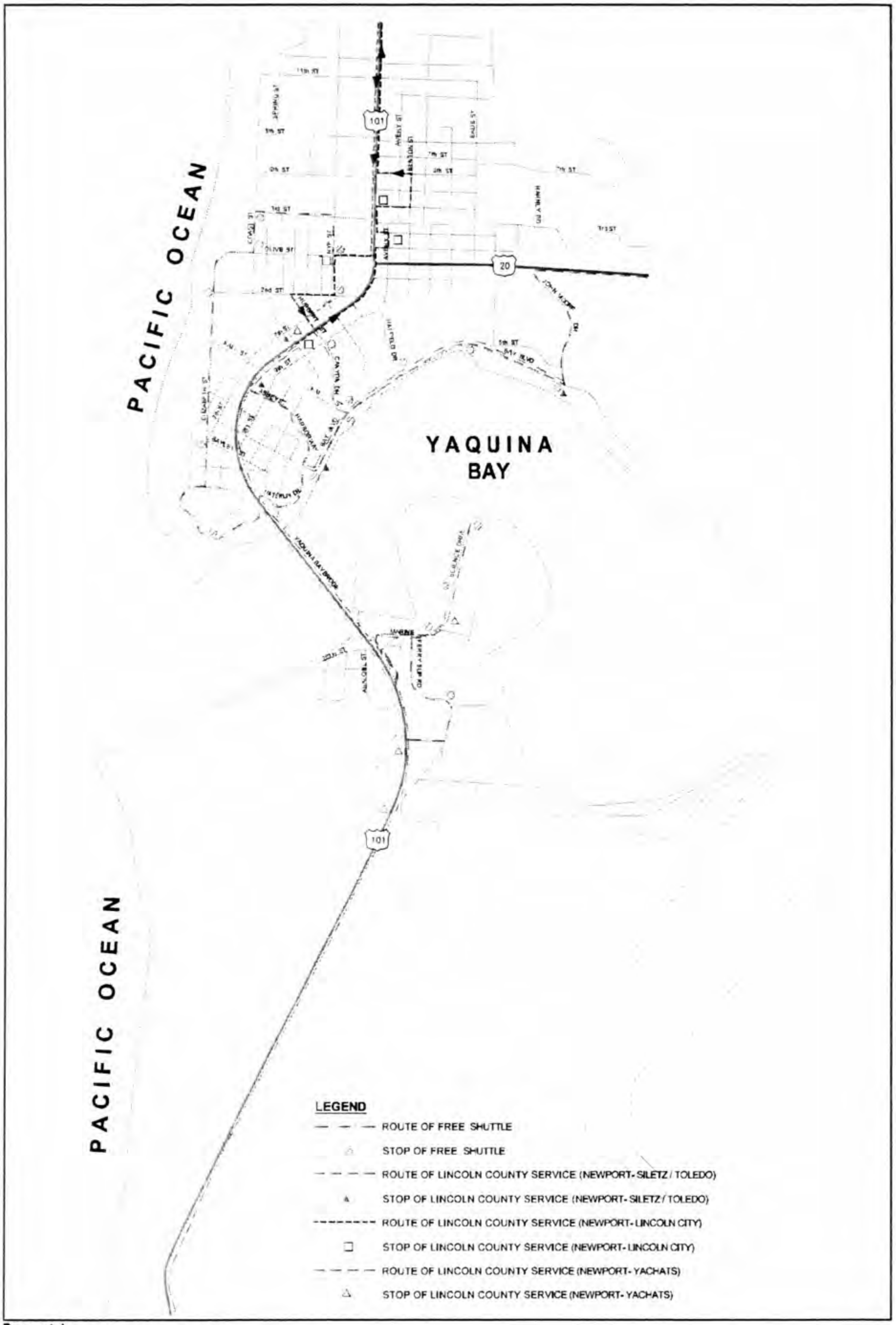

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Figure 2-8
Existing Transit Systems
North and South Newport

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3. PLANS, POLICIES AND PROGRAMS

3.1 OVERVIEW

The purpose of this section is to identify and review existing plans, policies and programs that need to be considered in the development of the TSP Refinement Plan for the South Beach area. Several new major development projects are planned for South Beach, with a variety of project specific plans, policies and accompanying analysis. The guiding planning document for the study area is the South Beach Neighborhood Land Use Plan adopted in 2005.

Additionally, all local transportation improvements are subject to numerous state and federal requirements, transportation studies, transportation plans, and other transportation-related documents and standards. The relevance of each of the many planning documents to the South Beach TSP Refinement Plan varies widely. This chapter will provide a synopsis of the following:

- Federal Americans with Disabilities Act (ADA)
- Oregon Transportation Planning Rule
- Oregon Transportation Plan (2006)
- All state modal plans
- Freight Moves the Oregon Economy report (1999)
- Oregon Administrative Rules regarding access management
- Statewide Transportation Improvement Program (STIP) 2006-2009
- Draft Lincoln County TSP (1997)
- City of Newport Comprehensive Plan (1991)
- City of Newport TSP; US 101 Corridor Plan (2002 – not adopted), and
- South Beach Neighborhood Land Use Plan (2005)

3.2 SUMMARY OF PLANS, POLICIES AND PROGRAMS

Federal Americans with Disabilities Act

The federal ADA and its implementing regulations lay out guidance for the development of pedestrian facilities within public rights-of-way that are *"readily accessible to and usable by people who have disabilities."* These regulations apply to all facilities constructed or altered after January 26, 1992, and include sidewalks, street crossings, and other elements of the public rights-of-way. The technical provisions of the regulations describe the characteristics of an accessible element, such as the slope of a curb ramp, the turning space required at a landing, mounting heights for operating hardware (such as pedestrian push buttons for a signal), and other features.

In November 2005, the federal Access Board issued new draft guidelines for public rights-of-way that will address accessibility issues in greater detail than previous guidance. Included are such issues as access for blind pedestrians at street crossings, wheelchair access to on-street parking, and various constraints posed by space limitations, roadway design practices, slope, and terrain. The new guidelines will cover pedestrian access to sidewalks and streets, including crosswalks, curb ramps, street furnishings, and pedestrian signals (including provision for disabled pedestrian crossings at roundabouts, parking, and other components of public rights-of-way). The Access Board developed these draft guidelines based on recommendations from an advisory committee it had chartered. The Public Rights-of-Way Access Advisory Committee was composed of representatives from disability organizations, public works departments, transportation and traffic engineering groups, the design and civil engineering professions, government agencies, and standards-setting bodies. The draft guidelines were revised in January 2006 and are currently undergoing additional review and comment.

Oregon Transportation Plan (2006)

ODOT utilizes several planning documents to guide transportation planning efforts and transportation system improvements in the state. The OTP is ODOT's overall policy guiding document. The OTP and its modal elements represent a statewide TSP and drive all transportation planning in Oregon. The plans provide a framework for cooperation between the ODOT and local jurisdictions and offer guidance to cities and counties for developing local modal plans. Table 3-1 lists established modal plans and the year each plan was adopted by the Oregon Transportation Commission (OTC).

Table 3-1. Adopted Elements of the Oregon Transportation Plan

Oregon Transportation Plan or Plan Element	Year Adopted
Aviation System Plan	2000
Bicycle and Pedestrian Plan	1995
Transportation Safety Action Plan	1995
Public Transportation Plan	1997
Highway Plan	1999 with subsequent amendments
Rail Freight and Passenger Plan	2001

First adopted in September 1992, the OTP has three elements: (1) Goals and Policies; (2) Transportation System; and (3) Implementation. The OTP meets a legal requirement that the OTC develop and maintain a plan for a multimodal transportation system for Oregon. Further, the OTP implements the Federal Safe Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, 2005) requirements for the state transportation plan. The OTP also meets land use and transportation planning requirements for state agency coordination, and serves as the implementing policy element of Statewide Goal 12, "Transportation". Goal 12 requires Oregon jurisdictions to cooperatively plan and develop balanced transportation systems.

Oregon Transportation Planning Rule (1991)

The Oregon Transportation Planning Rule (TPR) interprets the OTP policies. As applicable to the City of Newport, it requires local jurisdictions to develop a TSP to accommodate future travel demand resulting from adopted land use. The TPR requires the plan to accommodate all travel modes in use within the City, be consistent with the larger programs contained in the OTP, and be coordinated with federal, state and local agencies, as well as various transportation providers.

In brief, TPR requires every local TSP to assess existing facilities for their adequacy and deficiencies; develop and evaluate system alternatives needed to accommodate land uses in the acknowledged comprehensive plan; and adopt local land use regulations to support implementation of the preferred alternative. The City TSP must also ensure that its functional classification system is consistent or compatible with those applying to facilities maintained by adjacent jurisdictions.

Oregon Aviation System Plan (2000)

The Aviation System Plan provides forecasts and inventories for public access airports in the state. Given expected population growth along the Coast, the Plan identifies a need to protect and invest in the existing air transportation network. Some of the Plan's Policies and Actions relevant to the Newport TSP include:

- 2.1. Guide local jurisdictions in implementing the land use and zoning requirements regarding airports contained in ORS 836.600 to 836.630 and in OAR Chapter 660 Division 13.
- 2.2. Revise, adopt, and implement the state-level Oregon Airport Land Use Compatibility Guidelines, November 1994, to help local jurisdictions establish zoning and land use regulations that preserve airports and avoid future land use conflicts.
- 2.3. Guide local jurisdictions to develop appropriate zoning as required by Department of Land Conservation and Development (DLCD) rules to keep runway protection zones free of all structures.
- 5.2. Develop a comprehensive approach to airport ground access as part of local and regional transportation system plans, of corridor planning, and of modal planning.
- 5.3. Provide information to airport owners on highway and other surface mode planning and programming efforts affecting airports.
- 5.4. Encourage and support the integration of airports into local corridor and regional planning.
- 6.3. Coordinate with local jurisdictions to ensure that compatible land use is implemented within appropriate distances from airports.

The Plan also includes a matrix of airport deficiencies. The matrix includes nine deficiencies for the Newport State Airport, including a deficient length and width for the primary runway.

Oregon Bicycle and Pedestrian Plan (1995)

The Oregon Bicycle and Pedestrian Plan (OBPP) provides guidance for planning, design and operation of facilities for bicycle and pedestrian travel. This Plan is divided into two sections. Section One: Policy & Action provides background information and addresses the goals, actions, and implementation strategies ODOT proposes to improve bicycle and pedestrian transportation. Section Two: Bikeway & Walkway Planning, Design, Maintenance & Safety, provides guidelines to ODOT, cities and counties in designing, constructing and maintaining pedestrian and bicycle facilities. The OBPP is often used by local governments as a guide for the planning and design of facilities for these travel modes. The 2003 Highway Design Manual (HDM) also contains sidewalk and bicycle lane standards that are inconsistent with, and in some cases more stringent than, those found in the 1995 OBPP. An update of the OBPP is currently under way and is expected to be completed in 2007. This update will modify the standards in the OBPP to bring them into consistency with the HDM.

Oregon Transportation Safety Action Plan (1995)

This plan established the safety priorities for Oregon by identifying 70 actions relating to all modes of transportation, the roadway, drivers and vehicles. This plan includes specific actions regarding the way safety issues should be considered in local transportation planning including the following:

- Involvement in the planning process of engineering, enforcement, and emergency service personnel, as well as local transportation safety groups.
- Development of Safety objectives.
- Resolution of goal conflicts between safety and other issues.

Oregon Public Transportation Plan (1997)

The plan is primarily focused on public transportation in metropolitan and urban areas. The minimum public transportation level of service standards (for communities with a population of at least 2,500 located within 20 miles of an urban central city) that will apply to Newport by 2015 are as follows:

- Coordinate intercity senior and disabled services with intercity bus and van services open to the general public.
- Coordinate local public transportation and senior and disabled services to intercity bus services.
- Provide an accessible ride to anyone requesting services.
- Provide at least 1.7 annual hours of public transportation service per capita with fixed-route, dial-a-ride or other service types.
- Provide at least one accessible vehicle for every 40 hours of service.
- Provide backup vehicle for every 3.5 miles.
- Provide daily peak hour commuter service to the core areas of the central city.
- Provide a guaranteed ride home program to all users of the public transportation system and publicize it well.
- Provide park and ride facilities along transit route corridors to meet reasonable peak and off-peak demand for such facilities.
- Maintain vehicles and corresponding facilities in a cost-effective manner and replace vehicles when they reach suggested retirement age.
- Establish ridematching and demand management programs in communities of 5,000 where there are employers with 500 or more workers who are not already covered by a regional ridematching/demand management program.
- Establish ridematching and demand management programs in communities of 10,000.

In addition to intra-city public transportation, the plan also describes minimum level of service standards for intercity bus and passenger rail.

Oregon Highway Plan (1999 – with subsequent amendments)

This plan defines policies and investment strategies for Oregon's state highways for the next 20 years. It further refines the goals and policies of the Oregon Transportation Plan and is a key component of the OTP. The Highway Plan has three main elements:

1. The Vision presents a vision for the future of the state highway system; describes economic and demographic trends in Oregon and future transportation technologies; summarizes the policy and legal context of the Highway Plan; and contains information on the current highway system.

2. The Policy Element contains goals, policies, and actions in five policy areas: system definition, system management, access management, travel alternatives, and environmental and scenic resources.

3. The System Element contains an analysis of state highway needs, revenue forecasts, a description of investment strategies, an implementation strategy, and performance measures.

The Highway Plan gives policy and investment direction to corridor plans and transportation system plans that are being prepared around the state, but leaves the responsibility for identifying specific projects and modal alternatives to these plans.

Specifically relevant to the Newport area are the level of service and access management standards for US 101 and US 20.

Oregon Rail Freight and Passenger Plan (2001)

This plan presents an overview of the rail system in Oregon. It outlines the state rail planning process and examines in detail specific rail lines that may be eligible for state or federal financial assistance. The plan assesses the trend of service on low-density rail lines increasingly provided by the short haul (Class III) railroads. In addition, the plan describes minimum level of service standards for freight and passenger rail systems in Oregon. The previously adopted Passenger Policy and Plan (1994) is now a component of the Oregon Rail Freight and Passenger Plan.

Relative to the Newport area, this plan describes use patterns of the Portland and Western Railroad that runs through nearby Toledo. Passenger rail service is not presently available in the area.

In 1994, the Oregon Transportation Commission adopted policies relating to rail service that are especially relevant to the Newport TSP project and are described below.

Policy 3: Protect abandoned rights-of-way for alternative or future use.

1. Ensure that political jurisdictions and private groups are familiar with how to preserve and convert abandoned rail rights-of-way for Public Use and Interim Trail Use, as allowed under federal law.

2. Use federal, state and local funds to preserve rail rights-of-way for future transportation purposes.

Policy 4: Integrate rail freight considerations into the state's land use planning process.

1. Work with communities to minimize conflicts between railroad operations and other urban activities.

2. Assist in removing constraints to improved railroad operating efficiency within urbanized areas. Work with communities to consolidate or close existing grade crossings and prevent the establishment of unjustifiable new grade crossings.

Oregon Administrative Rules Regarding Access Management (OAR 734-051)

The Oregon Department of Transportation (ODOT) manages access to the highway facilities of the state to the degree necessary to maintain functional use, highway safety, and the preservation of public investment consistent with the 1999 OHP and adopted local comprehensive plans. The purpose of Oregon's Access Management Rules is to govern the issuing of construction, operation, maintenance and use permits for approaches onto state highways, state highway rights-of-way and properties under the state's jurisdiction. These rules also govern closure of existing approaches, spacing standards, medians, variances to the standards, appeal processes, and grants of access.

Through these rules, the state indicates its policy to manage the location, spacing and type of road and street intersections and approaches on state highways to assure the safe and efficient operation consistent with their classification, and the designation of the particular highway segment. OAR 734-051 contains policies and standards regulating access, and generally holds that access control should be considered where beneficial, such as when:

- Protecting resource lands,
- Preserving highway capacity on land adjacent to an urban growth boundary, or
- Ensuring safety on segments with sharp curves, steep grades or restricted sight distance or those with a history of accidents.

Legal and policy guidelines for access are also covered in the Oregon Revised Statues (ORS 374), the OHP, and the OTP. Oregon's access management rules and standards apply to US 101 and US 20 in Newport.

Freight Moves the Oregon Economy (1999)

This publication succinctly states that *"freight plays a major role in moving the Oregon economy. Most freight moves by truck, rail, waterway, air, and pipeline with trucks accounting for the greatest volume."* It indicates common problems on highways on the State Highway Freight System, including congestion, access, pavement in poor condition, and inadequate bridges. Related to congestion, the publication also notes those problems experienced by freight haulers between local roads and highways, especially with turning movements.

Statewide Transportation Improvement Program 2006-2009

Oregon's STIP is the state's transportation capital improvement program, which fulfills the requirements of the federal Safe, Accountable, Flexible, Efficient, and Transportation Equity Act: a Legacy for Users (SAFETEA-LU, 2005). The STIP lists the schedule of transportation projects for the four-year period from 2006 to 2009. It is a compilation of projects utilizing various federal and state funding programs, and includes projects on the state, county and city transportation systems as well as projects in the National Parks, National Forests, and Indian Reservations.

The STIP is not a planning document; it is a project prioritization and scheduling document developed through various planning processes involving local and regional governments, transportation agencies, and the interested public. Through the STIP, ODOT allocates resources to those projects that have been given the highest priority in these plans.

Lincoln County TSP (Draft, expected adoption in spring 2007)

The Lincoln County TSP will be adopted by the Lincoln County Board of Commissioners in early 2007. Currently the Lincoln County TSP is under revision by the Lincoln County Planning Commission and Board of Commissioners. The Lincoln County TSP is a multimodal transportation plan that includes automobile, walking, bicycle, transit, air, rail, water and pipeline. The following goals and objectives from the draft TSP are relevant to the Newport TSP update.

Goal 1

"To provide a safe, convenient and economic multimodal transportation system that serves the needs of residents, businesses, visitors and freight transport.

- *Objective 1-1. Provide a network of arterials and collectors that are interconnected, appropriately spaced and reasonable direct.*
- *Objective 1-2. Maintain functional classification standards and criteria.*
- *Objective 1-3. Balance the simultaneous needs to accommodate local traffic and through-travel.*
- *Objective 1-4. Minimize travel distances and vehicle-miles traveled.*
- *Objective 1-5. Move motor vehicles, pedestrians, bicyclists, transit, trucks, and trains to and through the County safely, efficiently and economically.*
- *Objective 1-6. Develop and adopt design standards for major collectors, minor collectors and arterials describing minimum right-of-way width, pavement pedestrian service, bicycle travel and other design elements.*
- *Objective 1-7. Recognize and balance freight needs for local circulation, safety and access.*
- *Objective 1-8. Promote rail freight transportation between Toledo and the Willamette Valley.*
- *Objective 1-9. Balance the need for truck access to industrial and waterfront areas with the desire for minimization of disruptions to urban areas.*
- *Objective 1-10. Improve signage for streets, bicycle and pedestrian ways, and trails as well directional signs to points of interest.*
- *Objective 1-11. Promote through-movement on US 101.*
- *Objective 1-12. Require developers to bear the entire cost of new development infrastructure for roads, bicycle and pedestrian facilities associated with their development, or impacted by their development.*
- *Objective 1-13. Investigates high accident locations and locations involving traffic fatalities to determine if road improvements might benefit the safety of travel."*

Goal 2

"To provide a transportation system that balances transportation system needs with the community desire to maintain a pleasant, economically viable county.

- *Objective 1-1. Minimize adverse social, economic and environmental impacts created by the transportation system, including balancing the need for road capacity improvements and the need to minimize impacts to existing neighborhoods.*
- *Objective 1-3. Work to develop alternate transportation facilities natural features and historic sites.*
- *Objective 1-4. Minimize congestion for travelers and goods movements.*
- *Objective 1-5. Ensure the tourist based businesses are allowed sufficient access to the county arterials network to promote tourist spending in Lincoln County.*
- *Objective 1-6. Require developers to provide landscaping along roads and within parking lots."*

Goal 3

"To maintain a TSP that is consistent with the goals and objectives of Lincoln County, Lincoln County jurisdictions and the state.

- *Objective 1-1. Provide a transportation system that is consistent with other elements and objectives of the Lincoln County Comprehensive Plan.*
- *Objective 1-2. Coordinate land use and transportation decisions to efficiently use public infrastructure investment to maintain the mobility and safety of the roadway system, foster compact development patterns, encourage the availability and use of transportation alternatives, and enhance livability and economic competitiveness.*
- *Objective 1-4. Establish and maintain zoning standards that will prevent the development of incompatible or hazardous uses around airports.*
- *Objective 1-5. Work to protect airspace corridors and airport approaches.*
- *Objective 1-6. Support the maintenance and expansion of port and harbor facilities to keep them a viable part of Lincoln County's economy.*
- *Objective 1-7. Support expansion of local boating and shipping activities in the County's cities and ports.*
- *Objective 1-8. Work with the Director of Newport Municipal Airport to develop grant applications to improve airport infrastructure and support establishment of scheduled air service into the area, consistent with the facility's master plan.*
- *Objective 1-9. Coordinate with utility service providers when planning new roadway or expanding or upgrading existing roadway to explore efficient location of utilities that can be located in the public right-of-way."*

Goal 4

"To provide cost-effective and safe public transportation options and access to alternative transportation modes to county residents.

- *Objective 1-1. Ensure an appropriate level of county support for public transportation.*
- *Objective 1-2. Support Lincoln County Transit's efforts to work with ODOT to secure Federal funding for the County Transit System in a regular and on-going basis.*

- *Objective 1-3. Ensure appropriate lock-up and storage facilities for bicycles at destinations within Lincoln County.*
- *Objective 1-4. Work to improve the signage and amenities at transit stops and stations.*
- *Objective 1-5. Work with Lincoln County Transit to expand transit service as necessary during summer months of peak travel.*
- *Objective 1-6. Support Lincoln County Transit's coordination efforts with local jurisdiction to meet the transit needs in Lincoln County communities."*

Goal 5

"To provide for an interconnected system of pedestrian and bicycle facilities in Lincoln County to serve residents and recreational users.

- *Objective 1-1. Continue to implement the County Bicycle Plan to provide needed shoulder width for cycling and pedestrian use in rural areas.*
- *Objective 1-2. Ensure consistency between county and city plans for bicycle and pedestrian improvements.*
- *Objective 1-3. Ensure consistency between county standards and city standards for bicycle and pedestrian facilities within urban growth boundaries.*
- *Objective 1-4. Develop bicycle lanes or shoulder bikeways on all arterial streets, major collectors and minor collectors.*
- *Objective 1-5. Adopt, implement and maintain appropriate design and construction standards for pedestrian access in new subdivisions, office parks, shopping centers and public building developments.*
- *Objective 1-6. Ensure adequate pedestrian access on all streets in commercial zones.*
- *Objective 1-7. Use unused rights-of-way for greenbelts, walking trails along the waterfront.*
- *Objective 1-8. Improve public access to the waterfront and trails along the waterfront.*
- *Objective 1-9. Establish signage to indicate trail access points and rules.*
- *Objective 1-10. Promote multimodal connections where appropriate.*
- *Objective 1-11. Promote increased bicycle awareness and support safety education and enforcement programs.*
- *Objective 1-12. Support and encourage increased levels of bicycling and walking.*
- *Objective 1-13. Develop safe and convenient pedestrian and bicycle systems that link all land uses provide connections to transit facilities and provide access to publicly-owned land intended for general public use, such as the beach or park facilities.*
- *Objective 1-14. Adopt and maintain development standards that support pedestrian and bicycle access to commercial and industrial development, including (but not limited to) direct pathway connections, bicycle parking facilities and signage where appropriate."*

Goal 6

"To provide a transportation system that serves that needs of all members of the community.

- *Objective 1-1. Coordinate with Lincoln County Transit to encourage programs that serve the needs of the transportation disadvantaged.*
- *Objective 1-2. Provide for the transportation disadvantaged by complying with state and federal regulations and cooperating with Lincoln County Transit and other agencies to provide transportation services for the disadvantaged.*
- *Objective 1-3. Upgrade existing transportation facilities and work with public transportation providers to provide services that improve access for all users."*

Goal 7

"To provide a transportation system that balances transportation services with the need to protect the environment and significant natural features.

- *Objective 1-1. Promote a transportation system that encourages energy conservation, in terms of efficiency of the roadway network and the standards developed for road improvements.*
- *Objective 1-2. Encourage use of alternative modes of transportation and encourage development that minimizes reliance on the automobiles.*
- *Objective 1-3. Work to balance transportation needs with the preservation of significant natural features.*
- *Objectives 1-4. Minimize transportation impacts on wetlands and wildlife habitat and promote the protection of rare and endangered plant and animal species.*
- *Objective 1-5. Help promote the Lincoln County Public Transit system to increase its ridership."*

Goal 8

"To work to ensure that development does not preclude the construction of identified future transportation improvements and the development mitigates the transportation impacts it generates when appropriate.

- *Objective 1-1. Require developers to aid in the development of the transportation system by dedicating or reserving needed rights-of-way, by constructing half or full street improvements needed to serve new development and by constructing off-street pedestrian, bicycle and transit facilities when appropriate.*
- *Objective 1-2. Consider transportation impacts when land use decisions, and consider land use impacts (in terms of land use patterns, densities and designated uses) when making transportation-related decision.*
- *Objective 1-3. Ensure that development does not preclude the construction of identified future transportation improvements.*
- *Objective 1-4. Discourage through-traffic and high speeds in residential areas.*
- *Objective 1-5. Maintain bridges as a priority that provides community lifelines, specifically connectivity for commerce and access to hospitals by emergency vehicles."*

Goal 9

"To provide a transportation system that has sufficient capacity to serve the needs of all users.

- *Objective 1-1. Protect capacity on existing and improved roads to provide acceptable service levels to accommodate anticipated demand.*
- *Objectives 1-2. Limit access points on highways and major arterials, and use techniques such as alternative access points when possible to protect existing capacity.*
- *Objective 1-3. Minimize direct access points onto arterial rights-of-way by encouraging common driveways or frontage roads.*
- *Objective 1-4. Update and maintain County access management standards to preserve the safe and efficient operation of roadways, consistent with functional classification.*
- *Objective 1-5. Establish and maintain access spacing standards to protect capacity.*
- *Objective 1-6. Consider acceleration/deceleration lanes and other special turning lanes for capacity maintenance where appropriate."*

Goal 10

"To provide reasonable and effective funding mechanisms for County transportation improvements identified in the TSP.

- *Objective 1-1. Develop a financing program that establishes transportation priorities and identifies funding mechanism for implementation.*
- *Objective 1-2. Develop and implement a transportation impact fee program to collect funds from new developments to be used for off-site and on-site transportation improvements.*
- *Objective 1-3. Identify funding opportunities for a range of projects and coordinate with county, state and federal agencies."*

Goal 11

"To provide a transportation system that maintains adequate levels of safety for all users.

- *Objective 1-1. Undertake, as needed, special traffic studies in problem areas, especially around tourist destination sites, to determine appropriate traffic controls too effectively and safety manage vehicle and pedestrian traffic.*
- *Objective 1-2. Work to improve the safety of rail, bicycles and pedestrians routes and crossings.*
- *Objective 1-3. Identify safe connections for vehicles, bicycles and pedestrians across US 101.*
- *Objective 1-4. Coordinate lifeline and tsunami/evacuation routes with local, state and private entities."*

City of Newport Comprehensive Plan 1990-2010 (1991)

The City of Newport Comprehensive Plan was adopted in 1991. The purpose of the Comprehensive Plan is to guide growth and land development in the City of Newport. The Comprehensive Plan is the City's highest tier policy document, and establishes the policy framework for future growth decisions. It establishes the goals and policies by which the City will grow over a 20-year period.

The Comprehensive Plan Goals relevant to the Newport TSP are listed below.

Goal: Physical Description

"To protect and, where appropriate, enhance the natural and scenic beauty of the Newport area."

Policies include encouraging neighborhood commercial areas to reduce trip-making and, thus, conserve energy, and encouraging the development of high density residential areas near high capacity transit corridors to achieve the same objectives.

Goal: Economics

"To maintain an adequate supple of land within the Newport city limits and urban growth boundary to accommodate the anticipated need."

Relevant policies speak to the need to address commercial property development within the City's UGB.

Goal: Airport Facilities

Airport facility goals include maintaining Approach and Clear Zone areas through acquisition of adjacent property at the north and south ends of Runway 16-34 and the northeast end of Runway 2-20. A further goal would involve initiation of commuter air carrier service to the Newport area.

Goal: Transportation

"To provide for safe and efficient transportation facilities for the Newport urbanizable area."

Key policies address street design standards, street classification, service to transportation disadvantaged persons, development of bicycle and pedestrian routes, coordination with ODOT to develop and implement the State Transportation Improvement Program (STIP), and additional coordination with ODOT to formulate and implement access management programs along US 101 and US 20.

Goal: Public Facilities

"To assure adequate planning for public facilities to meet the changing needs of the City of Newport urbanizable area."

Relevant policies speak to the development of public facility master plans and the use of these plans in capital improvement planning, the orderly and cost efficient extension of public facilities and services, and the siting of public services (including streets) with sufficient capacity before development approvals are granted.

City of Newport TSP (1997)

The City of Newport TSP was adopted in 1997. It is a multi-modal transportation system plan that addresses automobile, bicycle, pedestrian, transit, air, water, rail and pipeline transportation. This document will serve as an update to the 1997 TSP. The following TSP goals and policies are of significance to the current Newport TSP revision.

Goal 1

"To provide a safe and efficient multi-modal transportation system consistent with the TSP.

- *Policy 2. To develop implementing ordinances and funding options consistent with the following:"*

Street System Plan

> - *"New roadway projects, transportation management system improvements and improvements to existing roadways shall be consistent with the TSP subject to available funding.*
> - *The City does hereby adopt the classification system contained in the TSP as guidelines and shall develop implementing ordinances consistent with the classifications. However, the topography of the City of Newport limits the ability to develop streets that are totally consistent with the classification system at all times. It is therefore imperative that the classification system be flexible in its application to account for specific circumstances.*
> - *The City shall require that any change to the acknowledged Comprehensive Plan land use designations must make a finding that the chance will not reduce the function of streets, especially Highway 101 and Highway 20, as identified in the TSP.*
> - *Because the cost of a new bridge the capability of the City of Newport, the City shall, within two years, prepare a refinement plan to develop a strategy for dealing with increased traffic across the Yaquina Bay Bridge."*

Pedestrian System Plan

> - *"The City shall provide a continuous pedestrian network consistent with the TSP, to the greatest extent possible considering funding limitations, topographic constraints and existing development patterns.*
> - *The City shall provide a safe walking environment.*
> - *The City shall provide a pedestrian-oriented urban design especially on the Bay Front, in the City Center and in Nye Beach."*

Bicycle System Plan

> - *"The City shall provide a safe and efficient bicycle network consistent with the TSP, considering funding limitations, topographic constraints and existing development patterns."*

Transit System Plan

> - *"The City shall support the Lincoln County Transit Service consistent with the TSP considering funding limitations, topographic constraints and existing development patterns.*

- *The City shall explore the possibility of providing a shuttle service during the busy tourist season to help reduce traffic congestion, i.e. on the Yaquina Bay Bridge subject to the availability of funding."*

Access Management Plan

- *"The City shall implement an access management strategy for the established and developing areas of the City of Newport along Highway 101, Highway 20 and other arterials that supports the City's Transportation Goal and ensures that those streets can accommodate traffic in a safe and efficient manner as traffic increases.*
- *In established areas of the City of Newport as identifies in the TSP, the City shall encourage consolidation or reduction of accesses as possible during property redevelopment and/or frontage improvements. Spacing goals for the established areas are 500 feet for driveways, ¼ mile for public roads and ½ mile for signals. As redevelopment occurs, these spacing standards and access management tools should be evaluated and applied as appropriate to the specific needs of the project.*
- *In developing areas of the City of Newport as identified in the TSP, as sites develop or redevelop, accesses shall be planned, consolidated and/or reduced to meet the spacing standards to the greatest extent possible. Spacing standards for primary arterials in developing areas are 800 feet for driveways, ½ mile to one mile for public roads, and ½ mile to one mile for signals.*
- *The City shall develop specific ordinance provisions to further this access management plan."*

Funding Plan

- *"The City shall increase system development charges to a more comparable rate with surrounding communities.*
- *The City shall seek one or more of the local funding options discussed in the TSP (i.e., local gas tax, street utility fee, general obligation bonds, local improvement districts, developer exactions)*
- *The City shall carefully prioritize capital improvement projects through the development, maintenance and implementation of the TSP and Capital Improvement Program.*
- *The City shall aggressively pursue federal and state funding options for capital improvement projects, especially for Highways 101 and 20."*

Highway 101 Corridor Plan (2002 – not adopted)

The US 101 Corridor Plan, drafted in 2002, was not taken through the adoption process. However, it contains guidance that will be useful in developing the South Beach study. The Plan found that while the corridor was mostly developed, a case could be made for additional development and/or redevelopment activity in the area. The Plan's purpose was to outline the process for managing development along the Corridor. It primarily focused on land use issues, but also considered the importance of economic development.

Employment Lands and Conceptual Land Use Planning Project, and South Beach Neighborhood Plan (2005)

This project includes several planning and analysis products to guide the growth of Newport's economy in general. Specifically, it provides land use, transportation and utility plans for the South Beach Neighborhood.

The report provides a vision for Newport's economy, with specific goals intended to enhance economic development while also improving community livability. A Strategic Action Plan is included which establishes both short- and long-term objectives and strategies. An analysis of existing national, state, county and city economic conditions is compiled and analyzed as the basis for the economic development program. The resulting document was incorporated into the City's Comprehensive Plan and served as an update to the Economic section of the Plan.

The report identifies the South Beach neighborhood as directly linked to the City's new economic development program because of its intended role in accommodating a considerable portion of the forecasted commercial and industrial land needs. The South Beach Neighborhood Plan is included in the report to guide the development of this part of the City. The plan is supported by proposed transportation and utility improvements.

The South Beach Neighborhood Plan is intended to significantly change the land use character of the South Beach area from that currently called for in the Comprehensive Plan. The new plan focuses on commercial, residential and institutional uses that are more consistent with existing uses in South Beach rather than the industrial development identified in the existing Comprehensive Plan. The Plan indicates that South Beach has not been developed with industrial uses as planned in the 1980s because of natural constraints such as steep slopes, wetlands, and a lack of infrastructure to serve industrial users.

The following are the key transportation issues, policies, and recommendations from the South Beach Neighborhood Plan.

Roadway Configuration

The recommended roadway configuration includes the following improvements:

- Construction of a new loop roadway through Area A(this is the area east of US 101 between 50th Street at the south, and Stocker Road at the north)
- Widening of US 101 to four through lanes from the Yaquina Bridge through the 50th Street intersection
- Realignment of Ferry Slip Road and Ash Street to provide a continuous street
- Elimination of the intersection of Ferry Slip Road and US 101
- Turn restrictions at the intersection of US 101 and 35th Street
- Installation of a traffic signal on US 101 at 40th Street
- Installation of a traffic signal on US 101 at 50th Street

Roadway Improvement Priorities

The Plan acknowledges that the order in which roadway improvements should be constructed will depend to a large extent on the sequencing of land development, and indicates that future development will depend on market conditions and financing availability. To assure an orderly development process and to facilitate implementation of the land-use plan, the Plan provides the following recommendations for roadway improvement priorities:

- Begin to procure right-of-way based on preliminary design.
- Construct the north portion of the loop roadway through Area A, from US 101 at 40th Street to a point within Area A. It may be constructed initially as two lanes, but should be designed for ultimate expansion to a four-lane parkway. This will allow development of Area A to begin.
- Widen US 101 from Yaquina Bridge to a point south of 40th to four lanes with a center median. This will accommodate the increased traffic volumes between downtown Newport and Area A.
- Realign and reconstruct Ferry Slip Road and Ash Street to provide a continuous street parallel to and east of US 101 from 32nd Street to the loop roadway.
- Construct the remaining portion of the loop roadway to an intersection with US 101 at 50th Street.
- Widen US 101 to four lanes with a center median from 40th to a point south of 50th. The transition from four lanes to two lanes should be south of 50th so that four lanes of capacity are provided through the intersection.

Traffic signals on US 101 at 40th and at 50th should be installed when traffic volumes meet the traffic signal warrants. Turn lanes at the intersections, as specified in this report, should be constructed when needed if they are not built as part of the initial roadway construction.

Area B Access

The Plan identifies that the development of about 14 acres of commercially-zoned land is proposed for Area B an area in the southeast quadrant of the intersection of US 101 and 50th Street. To avoid safety and congestion issues on US 101, it recommends that primary access to Area B be from 50th Street rather than US 101. Depending on the layout of future development, the Plan states that it may be possible to include a right-in right-out access to US 101 near the south end of Area B.

The plan further states that locating the primary access on 50th Street will allow development traffic to use the future signal at the 50th/101 intersection. To assure that all trips within Area B will have access to the 50th Street signal, it will be necessary to have a master plan for the area so that all parcels within Area B will have access to 50th Street.

Other Issues Identified

The report summarizes the existing South Beach transportation network, identifies the existing poor condition of South Beach area residential streets, accessibility problems with existing industrial land parcels, and an area need for a 25% increase in local and regional roadways by 2025 to serve commercial and industrial uses.

APPENDIX A

Methodologies for Adjustment and Analysis of Traffic Volumes

ADT Raw Counts

INTNAME	DATE	INTID	SBL	SBT	SBR	WBR	WBL	WBT	NBT	NBR	NBL	EBL	EBT	EBR
32nd St. & Hwy 101	4/5/2005	1	762	7491	103	1113	234	11	7335	235	30	110	11	32
Hwy 101 & Ferry Slip Rd	3/23/2006	2	404	5881	383	312	208	39	6012	348	164	166	54	63
Abalone St. & Hwy 101	4/5/2006	5		8016	1669	0	0	0	8295		0	0		353
Hwy 101 & Pacific Way	4/5/2006	6	0	8016	0	1478	0		8295	287		0		0
50th Street & Hwy 101	2/26/2004	8	63	5066	41	26	55	3	5443	44	15	15	2	10

Adjusted ADT 2006

INTNAME	DATE	INTID	SBL	SBT	SBR	WBR	WBL	WBT	NBT	NBR	NBL	EBL	EBT	EBR	Adj. Factor
32nd St. & Hwy 101	4/5/2005	1	985	9680	135	1440	300	15	9475	305	40	140	15	40	1.2920
Hwy 101 & Ferry Slip Rd	3/23/2006	2	510	7425	485	395	265	50	7590	440	205	210	70	80	1.2626
Abalone St. & Hwy 101	4/5/2006	5	0	10165	2115	0	0	0	10515	0	0	0	0	450	1.2678
Hwy 101 & Pacific Way	4/5/2006	6	0	10165	0	1875	0	0	10515	365	0	0	0	0	1.2678
50th Street & Hwy 101	2/26/2004	8	85	6905	55	35	75	5	7420	60	20	20	5	15	1.3635

Balanced 2006 ADT

INTNAME	DATE	INTID	SBL	SBT	SBR	WBR	WBL	WBT	NBT	NBR	NBL	EBL	EBT	EBR
32nd St. & Hwy 101	4/5/2005	1	980	9680	140	1440	300	20	9480	300	40	140	20	40
Hwy 101 & Ferry Slip Rd	3/23/2006	2	510	8970	550	460	270	50	9060	440	210	300	70	80
Abalone St. & Hwy 101	4/5/2006	5	0	10350	2120	0	0	0	10690	0	0	0	0	450
Hwy 101 & Pacific Way	4/5/2006	6	0	10350	0	1880	0	0	10690	370	0	0	0	0
50th Street & Hwy 101	2/26/2004	8	90	8000	60	40	80	10	9000	60	20	20	10	20

Raw Counts

Intersection Name	DATE	INTID	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
32nd St. & Hwy 101	4/5/2005	1	17	1	6	23	1	132	4	527	14	41	691	10
Hwy 101 & Ferry Slip Rd	3/23/2006	2	5	5	7	5	20	21	12	375	19	20	515	35
Abalone St. & Hwy 101	4/5/2006	5	0	0	38	0	0	0	0	654	0	0	688	93
Hwy 101 & Pacific Way	4/5/2006	6	0	0	0	0	0	174	0	654	17	0	688	0
50th Street & Hwy 101	2/26/2004	8	2	0	1	5	0	2	0	310	3	6	512	3

Adjusted Counts

Intersection Name	DATE	INTID	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Adjustment
32nd St. & Hwy 101	4/5/2005	1	22	1	8	30	1	171	5	681	18	53	893	13	1.2920
Hwy 101 & Ferry Slip Rd	3/23/2006	2	6	6	9	6	25	27	15	473	24	25	650	44	1.2626
Abalone St. & Hwy 101	4/5/2006	5	0	0	48	0	0	0	0	829	0	0	872	118	1.2678
Hwy 101 & Pacific Way	4/5/2006	6	0	0	0	0	0	221	0	829	22	0	872	0	1.2678
50th Street & Hwy 101	2/26/2004	8	3	0	1	7	0	3	0	423	4	8	698	4	1.3635

Balanced Counts

Intersection Name	DATE	INTID	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
32nd St. & Hwy 101	4/5/2005	1	5	660	20	55	850	15	20		10	30	5	170
Hwy 101 & Ferry Slip Rd	3/23/2006	2	15	550	25	25	770	45	15	5	10	5	25	65
Abalone St. & Hwy 101	4/5/2006	5		830			870	120			50			
Hwy 101 & Pacific Way	4/5/2006	6		830	20		870							220
50th Street & Hwy 101	2/26/2004	8	5	500	5	10	700	5	5	5	5	5	5	5

Traffic Analysis Methodology

Traffic Counts
14 and 16 hour traffic counts were provided by ODOT. The peak period was selected based on the highest volume hour. This was from 4-5 PM for all but one of the intersections.

PHF and Truck Percentages
For existing conditions analysis a default values of 0.92 was used since 15 minute counts were not available. Truck percentages were calculated from count data and applied to the approaches.

Saturation Flow Rate
A saturation flow rate of 1800 pcphgl was used.

Signal Timing
ODOT provided signal timing for study area intersections was utilized in modeling for the 2006 condition.

Seasonal Adjustment
The ODOT traffic counts were seasonally adjusted for both the peak and ADT cases.

ATR table was reviewed for the nearest ATR locations.

2005 ATR Characteristics

SEASONAL TRAFFIC TREND	AREA TYPE	# OF LANES	WEEKLY TRAFFIC TREND	2005 AADT	OHP CLASSIFICATION	ATR	COUNTY	HIGHWAY ROUTE, NAME, & LOCATION	MP	STATE HIGHWAY NUMBER
COASTAL DESTINATION	SMALL URBAN	5	WEEKDAY	19200	STATEWIDE HIGHWAY - SCENIC BYWAY	21-009	LINCOLN	US 101, OREGON COAST HWY, NORTH OF NEWPORT	139.11	9

Conclusion: Newport –Small urban–Coastal Destination–weekday

From the Seasonal Trend Table

Peak Period Seasonal Factor	0.8472	
Count Date Factor		Adjustment Factor
April 1	1.0741	1.2678
April 1-March 15	(1.0653+1.0741)/2	1.2626
March 1-February 15	(1.1013+1.0855)/2	1.2906

Seasonal Adjustment Factor =Count Date Factor/ Peak Period Seasonal Factor

Annual Growth Adjustment
The traffic count data from 2004 and 2005 required growth adjustment to yield 2006 volumes. The ODOT Future Volume Table for Hwy 101 was reviewed to calculate annual growth rate.

Hwy	MP	Description	2003	2025	Annual Growth Rate
9	142.22	0.11mile south of SE Pacific Way	15500	22000	0.0191

9	142.40	0.06 mile north of Ferry Slip Road	13800	22400	0.0283
9	142.51	0.05 mile south of Ferry Slip Road	13200	21400	0.0282

ADT Volumes

The traffic count data provided 24 hour volumes by applying a multiplier to the 16 hour count data. The volumes were seasonally and annually adjusted, balanced. These

Crash Analysis

Crash data was supplied by ODOT for the years of 2002-2005. The ADT volume data was used in the calculations.

Intersection	Intersection Name	Intx Control	Count Source	Count Date	MP	FVT MP	Volume 2003	2025	Annual Growth Rate	Total Adjustment
1	32nd St. & Hwy 101	Signalized	ODOT	4/5/2005	142.22	142.22	15500	22000	0.0191	1.2920
2	Hwy 101 & Ferry Slip Rd	Stop Controlled	ODOT	3/23/2006	142.4		13800	22400	0.0283	1.2626
5	Abalone St. & Hwy 101	Stop Controlled	ODOT	4/5/2006	142.15		15500	22000	0.0191	1.2678
6	Hwy 101 & Pacific Way	Stop Controlled	ODOT	4/5/2006	142.11		15500	22000	0.0191	1.2678
8	50th Street & Hwy 101	Stop Controlled	ODOT	2/26/2004	143.16	142.51	13200	21400	0.0282	1.3635
US Hwy 101	**Oregon Coast**	Hwy 9								
ATR 21-009	Coastal Destination	Weekday								
Seasonal Factor Peak Period		0.8472								
Count Date Factor			Adjustment Factor =Count Date Factor/ Seasonal Peak Period Factor							
1-Apr	1.0741	1.0741	1.2678							
March 15/April1	(1.0653+1.0741)/2	1.0697	1.2626							
Feb 15/March 1	(1.1013+1.0855)/2	1.0934	1.2906							

Trucks Volumes Data:consists of heavy trucks, single, double, and triple trailer

Truck Volumes (PM, ADT)	DATE	N-E	N-S	N-W	E-N	E-S	E-W	S-N	S-E	S-W	W-N	W-E	W-S	Seasonal Adj. Factor	24 hr Factor
32nd St. & Hwy 101	4/5/2005	0	8	0	0	1	0	5	1	0	0	0	0	1.292	
ADT		7	97	0	6	2	0	113	3	0	0	0	0	1.292	1.1
Hwy 101 & Ferry Slip Rd	3/23/2006	1	6	0	0	0	2	2	0	0	0	0	0	1.263	
ADT	4/5/2006	6	89	1	80	3	81	79	0	0	0	0	0	1.263	1.1
Abalone St. & Hwy 101	4/5/2006	0	7	5	0	0	0	3	0	0	0	0	1	1.268	
ADT		0	98	10	0	0	0	90	0	0	0	0	5	1.268	1.1
Hwy 101 & Pacific Way	4/5/2006	0	7	0	2	0	0	3	0	0	0	0	0	1.268	
ADT		0	98	0	5	0	0	90	0	0	0	0	0	1.268	1.1
50th Street & Hwy 101	2/26/2004	0	2	0	0	0	0	1	0	0	0	0	0	1.363	
ADT		1	49	1	2	0	0	56	0	0	0	0	0	1.363	1.25

Adjusted Heavy Truck Volumes		N-E	N-S	N-W	E-N	E-S	E-W	S-N	S-E	S-W	W-N	W-E	W-S
32nd St. & Hwy 101	DATE	0	10	0	0	1	0	6	1	0	0	0	0
ADT		10	138	0	9	3	0	161	4	0	0	0	0
Hwy 101 & Ferry Slip Rd	3/23/2006	1	8	0	0	0	3	3	0	0	0	0	0
ADT	4/5/2006	8	124	1	111	4	113	110	0	0	0	0	0
Abalone St. & Hwy 101	4/5/2006	0	9	6	0	0	0	4	0	0	0	0	1
ADT		0	137	14	0	0	0	126	0	0	0	0	7
Hwy 101 & Pacific Way	4/5/2006	0	9	0	3	0	0	4	0	0	0	0	0
ADT		0	137	0	7	0	0	126	0	0	0	0	0
50th Street & Hwy 101	2/26/2004	0	3	0	0	0	0	1	0	0	0	0	0
ADT		2	84	2	3	0	0	95	0	0	0	0	0

Balanced Heavy Truck Volumes		N-E	N-S	N-W	E-N	E-S	E-W	S-N	S-E	S-W	W-N	W-E	W-S
32nd St. & Hwy 101		0	10	0	0	1	0	6	1	0	0	0	0
ADT		10	134	0	9	3	0	161	4	0	0	0	0
Hwy 101 & Ferry Slip Rd		1	8	0	0	0	3	3	0	0	0	0	0
ADT		8	120	1	111	4	113	110	0	0	0	0	0
Abalone St. & Hwy 101		0	9	6	0	0	0	4	0	0	0	0	1
ADT		0	137	14	0	0	0	126	0	0	0	0	7
Hwy 101 & Pacific Way		0	9	0	3	0	0	4	0	0	0	0	0
ADT		0	137	0	7	0	0	126	0	0	0	0	0
50th Street & Hwy 101		0	8	0	0	0	0	2	0	0	0	0	0
ADT		2	100	2	3	0	0	100	0	0	0	0	0

APPENDIX B

2006 Intersection Analysis Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			↰	↱	↰	↑	↱	↰	↱	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	15	5	10	5	25	65	15	550	25	25	770	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	5	11	5	27	71	16	598	27	27	837	49
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											951	
pX, platoon unblocked												
vC, conflicting volume	1630	1573	861	1535	1571	598	886			625		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1630	1573	861	1535	1571	598	886			625		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	70	95	97	94	74	86	98			97		
cM capacity (veh/h)	54	105	356	85	105	502	760			952		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	33	33	71	16	598	27	27	886
Volume Left	16	5	0	16	0	0	27	0
Volume Right	11	0	71	0	0	27	0	49
cSH	85	101	502	760	1700	1700	952	1700
Volume to Capacity	0.38	0.32	0.14	0.02	0.35	0.02	0.03	0.52
Queue Length (ft)	38	31	12	2	0	0	2	0
Control Delay (s)	71.3	56.7	13.3	9.8	0.0	0.0	8.9	0.0
Lane LOS	F	F	B	A			A	
Approach Delay (s)	71.3	27.0		0.3			0.3	
Approach LOS	F	D						

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

	↗	↘	↖	↑	↓	↙
Movement	**EBL**	**EBR**	**NBL**	**NBT**	**SBT**	**SBR**
Lane Configurations		↱		↑	↑	↱
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	50	0	830	870	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	0	902	946	130
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				392		
pX, platoon unblocked						
vC, conflicting volume	1848	946	1076			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1848	946	1076			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	83	100			
cM capacity (veh/h)	81	316	644			

Direction, Lane #	**EB 1**	**NB 1**	**SB 1**	**SB 2**
Volume Total	54	902	946	130
Volume Left	0	0	0	0
Volume Right	54	0	0	130
cSH	316	1700	1700	1700
Volume to Capacity	0.17	0.53	0.56	0.08
Queue Length (ft)	15	0	0	0
Control Delay (s)	18.7	0.0	0.0	0.0
Lane LOS	C			
Approach Delay (s)	18.7	0.0	0.0	
Approach LOS	C			

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑	↱		↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	220	830	20	0	870
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	239	902	22	0	946
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			762			
pX, platoon unblocked						
vC, conflicting volume	1848	902			924	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1848	902			924	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	27			100	
cM capacity (veh/h)	80	329			735	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	239	902	22	946
Volume Left	0	0	0	0
Volume Right	239	0	22	0
cSH	329	1700	1700	1700
Volume to Capacity	0.73	0.53	0.01	0.56
Queue Length (ft)	135	0	0	0
Control Delay (s)	40.2	0.0	0.0	0.0
Lane LOS	E			
Approach Delay (s)	40.2	0.0		0.0
Approach LOS	E			

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↱		↰	↱	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	5	5	5	5	5	5	500	5	10	700	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	5	5	5	5	5	543	5	11	761	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								869				
pX, platoon unblocked												
vC, conflicting volume	1348	1345	764	1348	1345	546	766			549		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1348	1345	764	1348	1345	546	766			549		
tC, single (s)	7.4	6.8	6.5	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.3	3.6	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	96	98	96	96	99	99			99		
cM capacity (veh/h)	106	131	362	121	150	539	843			1016		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	16	16	5	549	11	766
Volume Left	5	5	5	0	11	0
Volume Right	5	5	0	5	0	5
cSH	151	179	843	1700	1016	1700
Volume to Capacity	0.11	0.09	0.01	0.32	0.01	0.45
Queue Length (ft)	9	7	0	0	1	0
Control Delay (s)	31.7	27.2	9.3	0.0	8.6	0.0
Lane LOS	D	D	A		A	
Approach Delay (s)	31.7	27.2	0.1		0.1	
Approach LOS	D	D				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations		✥			↰↑↱		↰	↑	↱	↰	↱	
Ideal Flow (vphpl)	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		**1.00**			**0.95**		**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	
Frt		0.95			0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected		**0.97**			**0.99**		**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	
Satd. Flow (prot)		1647			2914		1660	1748	1485	1660	1743	
Flt Permitted		**0.56**			**0.90**		**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	
Satd. Flow (perm)		958			2656		1660	1748	1485	1660	1743	
Volume (vph)	**20**	**0**	**10**	**30**	**5**	**170**	**5**	**660**	**20**	**55**	**850**	**15**
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	**22**	**0**	**11**	**33**	**5**	**185**	**5**	**717**	**22**	**60**	**924**	**16**
RTOR Reduction (vph)	0	10	0	0	169	0	0	0	6	0	0	0
Lane Group Flow (vph)	**0**	**23**	**0**	**0**	**54**	**0**	**5**	**717**	**16**	**60**	**940**	**0**
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type	**Perm**			**Perm**			**Prot**		**Perm**	**Prot**		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	**4**			**8**					**2**			
Actuated Green, G (s)		7.4			7.4		0.8	60.8	60.8	4.7	64.7	
Effective Green, g (s)		**7.4**			**7.4**		**0.8**	**60.8**	**60.8**	**4.7**	**64.7**	
Actuated g/C Ratio		0.09			0.09		0.01	0.72	0.72	0.06	0.76	
Clearance Time (s)		**4.0**			**4.0**		**4.0**	**4.0**	**4.0**	**4.0**	**4.0**	
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		**84**			**232**		**16**	**1252**	**1063**	**92**	**1328**	
v/s Ratio Prot							0.00	0.41		c0.04	c0.54	
v/s Ratio Perm		**0.03**			**c0.08**				**0.01**			
v/c Ratio		0.27			0.23		0.31	0.57	0.01	0.65	0.71	
Uniform Delay, d1		**36.2**			**36.1**		**41.8**	**5.8**	**3.5**	**39.3**	**5.2**	
Progression Factor		1.00			1.10		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		**1.8**			**0.5**		**10.9**	**1.9**	**0.0**	**15.4**	**3.2**	
Delay (s)		38.0			40.1		52.6	7.7	3.5	54.7	8.4	
Level of Service		**D**			**D**		**D**	**A**	**A**	**D**	**A**	
Approach Delay (s)		38.0			40.1			7.9			11.2	
Approach LOS		**D**			**D**			**A**			**B**	

Intersection Summary			
HCM Average Control Delay	**13.6**	**HCM Level of Service**	**B**
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	**84.9**	**Sum of lost time (s)**	**12.0**
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	**15**		

c Critical Lane Group

APPENDIX C

Transit Systems Data

FREE SHUTTLE

NEWPORT, OREGON

BAY & BEACH

Saturdays and Sundays
10AM to 5PM
Through June 30, 2007

Stops at Beaches, Major Attractions, Museums, Galleries, Shops, Hotels, Restaurants, and so much more!

NYE BEACH
BAY FRONT
SOUTH BEACH
CITY CENTER
All in Newport, Oregon

SAT-SUN 10-5 • BAY & BEACH

Stop		AM	AM	AM	PM	PM	PM	PM	PM	PM	PM	PM
1 9th & Canyon Way RV	CC	10:20	11:01	11:42	1:02	1:43	2:24	3:29	4:10			
2 Post Office 2nd & Nye	CC	10:23	11:04	11:45	1:05	1:46	2:27	3:32	4:13			
3 Library - JC Market	CC	10:24	11:05	11:46	1:06	1:47	2:28	3:33	4:14			
4 3rd & Coast - Nye Beach	NB	10:26	11:07	11:48	1:08	1:49	2:30	3:35	4:16			
5 Don Davis Pk/PAC P	OF	10:27	11:08	11:49	1:09	1:50	2:31	3:36	4:17			
6 Eliz. St. Inn/Shilo Inn	OF	10:28	11:09	11:50	1:10	1:51	2:32	3:37	4:18			
7 Hallmark/Georgies RV	OF	10:29	11:10	11:51	1:11	1:52	2:33	3:38	4:19			
8 Yaquina Bay State Pk	OF	10:31	11:12	11:53	1:13	1:54	2:35	3:40	4:21			
9 Aquarium Village	SB	10:35	11:16	11:57	1:17	1:58	2:39	3:44	4:25			
10 Aquarium	SB	10:37	11:18	11:59	1:19	2:00	2:41	3:46	4:27			
11 Marine Science Ctr	SB	10:39	11:20	12:01	1:21	2:02	2:43	3:48	4:29			
12 Port RV Park	SB	10:42	11:23	12:04	1:24	2:05	2:46	3:51	4:32			
13 Rogue Ales Lot RV	SB	10:43	11:24	12:05	1:25	2:06	2:47	3:52	4:33			
14 Bay Street Pier	BF	10:47	11:28	12:09	1:29	2:10	2:51	3:56	4:36			
15 Abbey Street Pier	BF	10:49	11:30	12:11	1:31	2:12	2:53	3:58	4:38			
16 Undersea Gardens	BF	10:51	11:32	12:13	1:33	2:14	2:55	4:00	4:40			
17 Port Dock 5	BF	10:52	11:33	12:14	1:34	2:15	2:56	4:01	4:41			
18 Yaquina Yacht Club	BF	10:54	11:35	*12:16	1:36	2:17	*2:58	4:03	4:42			
19 Bay Blvd. & Fall St.	BF	10:58	11:39	12:59	1:40	2:21	3:26	4:07				

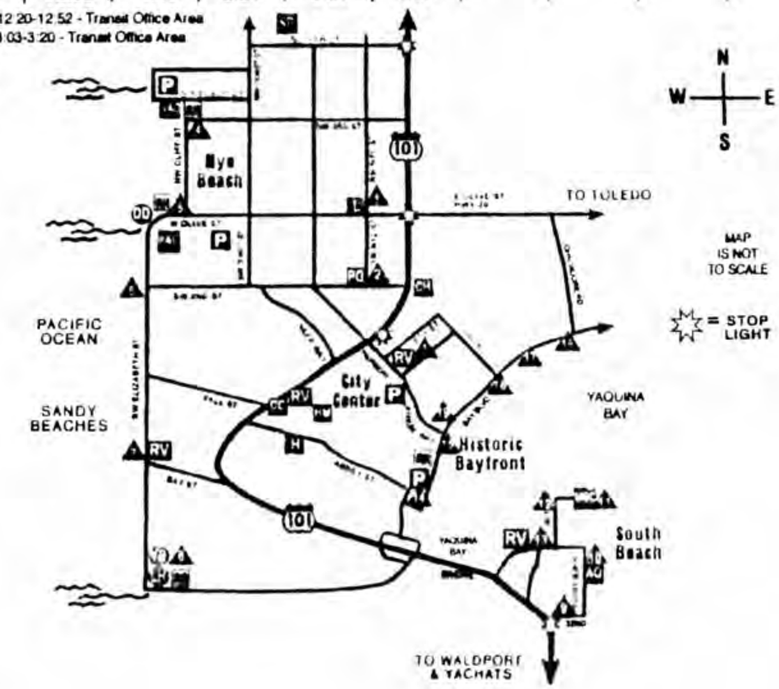
Bay Front = BF
City Center = CC
Nye Beach = NB
Ocean Front = OF
South Beach = SB

*Mandatory break. Riders are not permitted to stay on the bus during break period.

Lunch 12:20-12:52 - Transit Office Area
Break 3:03-3:20 - Transit Office Area

LEGEND & KEY

- **SHUTTLE STOPS**
- AQ **Aquarium**
- BL **Bay Lighthouse**
- **Beach Access**
- CC **Chamber of Commerce**
- CH **City Hall**
- DD **Don Davis Park**
- HM **Historical Museum**
- H **Hospital**
- L **Library**
- MSC **Marine Science Ctr**
- P **Park & Ride - vehicles**
- PAC **Performing Arts Center**
- PO **Post Office**
- RR **Restrooms**
- RV **RV and Vehicle Park & Ride**
- SP **Skate Park**
- VAC **Visual Arts Center**
- YB **Yaquina Bay Park**



Riding the bus is as easy as 1 • 2 • 3

1. If you have questions, call Lincoln County Transit at 265-4900 to schedule your trip. We will identify the most convenient bus stop for you.

2. Carry your coupons or the correct change. Drivers cannot make change for you. Fares are low and you can save even more by purchasing ride coupon booklets at the Lincoln County Transit Office or through the bus driver.

3. Remember to get to the bus stop in plenty of time and to allow for minor variations in the schedule. From Newport, you may connect with another route or carrier to continue your trip.

FARE SCHEDULE

Each zone you travel in is $1.00. *For example: Yachats to Wal-Mart is $4.00. Newport to the Tanger Outlet Center is $3.00. Yachats to Rose Lodge is $7.00.*

North-South	
Zone 1	Yachats to Bayshore Drive
Zone 2	Bayshore Drive to Ona Beach
Zone 3	Ona Beach to Newport City Hall
Zone 4	Newport City Hall to Otter Rock
Zone 5	Otter Rock to 101 & Willow (Lincoln Beach)
Zone 6	101 & Willow to Price & Pride
Zone 7	Price & Pride to Rose Lodge

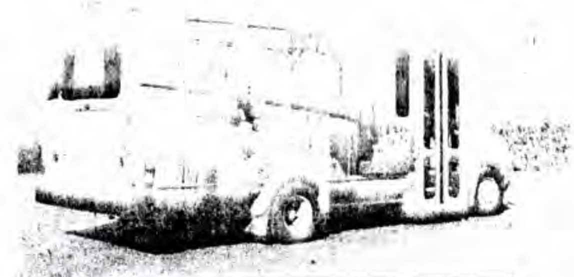
East-West	
Zone 8	Newport City Hall to Toledo
Zone 9	Toledo to Siletz

Ride coupons may be purchased at the Lincoln County Transit Office, 410 NE Harney in Newport or through the Driver.

Design: Diana Martin, Coast Graphics Media

LINCOLN COUNTY TRANSIT

BUS SCHEDULE



CENTRAL COAST CONNECTIONS

410 NE Harney
Newport, OR 97365
(541) 265-4900

A Coordinated Transportation Service for Lincoln County

Effective Date March 1, 2006

Newport – Lincoln City

Northbound	*Express* A.M.	A.M.	P.M.	P.M.
Newport City Hall	5:50	9:00	2:00	6:25
Avery Building	5:51	9:02	2:01	6:26
State Offices-NE 4th		9:05	2:03	6:28
Fred Meyer		9:10	2:11	6:31
Safeway		9:12	2:14	6:33
Wal★Mart		9:15	2:16	6:35
NE 36th & 101		9:18	2:20	6:38
Agate Beach RV Pk		9:20	2:22	6:40
Beverly Beach Store***		9:25	2:27	6:45
Otter Rock Fire Dept***		9:28	2:30	6:48
D. Bay Whistle Stop	6:10	9:35	2:38	6:53
D. Bay Union 76		9:38	2:40	6:55
Lincoln Beach Sentry		9:42	2:45	7:00
Gleneden Beach P.O.		9:46	2:48	7:05
Salishan & 101		9:48	2:51	7:07
Street Car Village		9:53	2:55	7:10
Ace Hardware-Taft	6:23	9:55	3:02	7:14
SE Fleet & Spyglass		9:59	3:05	***
Fast Cash		10:01	3:06	7:17
Tanger Outlet Center		10:05	3:11	7:21
Price & Pride		10:10	3:15	7:24
L. C. Community Ctr		10:15	3:21	7:30
N Lincoln Hospital		10:20	3:26	7:34
Starbuck's & 101		10:25	3:30	7:37
BiMart		10:28	3:34	7:40
Chinook Winds Casino		10:30	3:36	7:43
Safeway		10:33	3:37	7:45
DMV ***		10:35	3:41	
Neotsu P.O.***		10:36	3:42	
Otis P.O.	6:40	10:40	3:45	
Panther Creek/Hillside	6:45	10:45	3:52	
Rose Lodge	6:50	10:50	4:05	

***on call or as needed

[redacted]

[redacted]

Monday through Saturday Service Only

No Sunday Service

There will be bus service on all holidays *except*:

- Thanksgiving Day
- Christmas Day

AIRPORT CONNECTION

We provide connecting service with the Caravan Airport Transportation shuttle service to the Portland Airport.

Schedule Subject to Change Without Notice

Dial-A-Ride Service is available in some areas.

We will take passengers to and from the Valley Retriever bus station on request.

Lincoln City – Newport

Southbound	A.M.	A.M.	P.M.	*Express* P.M.
Rose Lodge	6:55	10:51	4:12	
Rose Lodge Park Store	6:57	10:53	4:15	
Salmon River Mobile Pk	6:59	10:55	4:17	
Otis Post Office***	7:01	10:57	4:20	
Neotsu Post Office***	7:05	11:01	4:22	
DMV***	7:06	11:02	4:24	
BiMart	7:08	11:04	4:27	
Chinook Winds Casino	7:10	11:44	4:29	8:00
Safeway	7:12	11:46	4:31	8:02
Circle K North	7:16	11:49	4:34	
N Lincoln Hospital	7:21	11:54	4:40	
		P.M.		
L. C. Community Center	7:24	12:00	4:44	
NW 17th & 101	7:26	12:02	4:46	
Price & Pride	7:29	12:06	4:49	
Tanger Outlet Center	7:33	12:11	4:53	8:15
Nelscott Strip	7:37	12:17	4:56	
Taft IGA on Hwy 101	7:39	12:20	5:03	
SW 62nd & 101	7:41	12:23	5:05	
Salishan & 101	7:44	12:26	5:08	
Gleneden Beach P.O.	7:46	12:28	5:10	
Willow & 101 ***	7:49	12:33	5:11	
Depoe Bay/Mall 101	7:54	12:37	5:18	8:35
Depoe Bay Fire Dept	7:56	12:39	5:19	
Otter Rock Fire Dept	8:04	12:47	***	
Beverly Beach Store***	8:08	12:51	5:28	
Pacific Shores RV Pk	8:14	12:57	5:30	
Wal★Mart	8:19	1:02	5:33	
Fred Meyer	8:24	1:06	5:37	
Courthouse	8:28	1:10	5:43	
Newport City Hall	8:31	1:14	5:47	9:00
Avery Building	8:34	1:16	***	

***on call or as needed

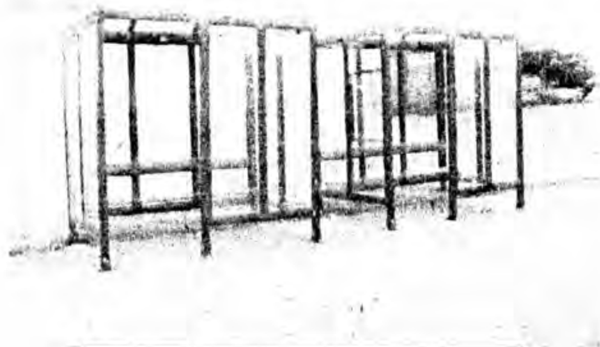
Yachats - Newport

Northbound	A.M.	A.M.	P.M.	P.M.
Yachats Post Office	7:00	9:35	1:00	4.00
Holiday Market	7:04	9.39	1:04	4.04
Wakeetum Street & 101	7:07	9.42	1.07	4.07
Range Drive & 101	7.09	9:44	1.09	4:09
Crestline Golf Course	7:11	9:46	1:11	4:11
Espresso 101	7.12	9.47	1:12	4.12
Waldport Post Office	7:15	9.50	1:15	4:15
Lakeside Market ***	7:20	9:55	1.20	4.20
Ray's Market	7:24	9.59	1:24	4.24
Waldport Library	7:26	10:01	1:26	4.26
Bayshore Drive & 101***	7:28	10:03	1:28	4:28
Driftwood Mobile & 101	7:29	10:04	1:29	4:29
Seal Rock Store	7:34	10.09	1:34	4:34
SE 123rd & 101	7:39	10.14	1.39	4.39
Espresso-South Beach	7:45	10:20	1:45	4.45
South Beach Marina***	7:47	10:22	1:47	4.47
Newport City Hall	7:49	10:24	1.49	4:49

Newport - Yachats

Southbound	A.M.	A.M.	P.M.	P.M.
Newport City Hall	8:40	10.45	2:30	5:50
South Beach Marina***	8:43	10:48	2:33	5:53
South Beach Mkt	8:45	10:50	2:35	5:55
Seal Rock Park & 101	8:53	10:58	2:43	6:03
Bayshore Drive & 101***	9:05	11:10	2:55	6:15
Waldport Post Office	9:09	11:14	2:59	6:19
Lakeside Market ***	9:13	11:18	3:03	6:23
Ray's Market	9:17	11:22	3:07	6:27
Waldport Library	9:18	11:23	3:08	6:28
Waldport Clark's Mkt & 101	9:19	11:24	3:09	6:29
Crestline Golf Course***	9:21	11:26	3:11	6:31
Holiday Market	9:25	11:30	3:15	6:35
Yachats Post Office	9:30	11:35	3:20	6:40

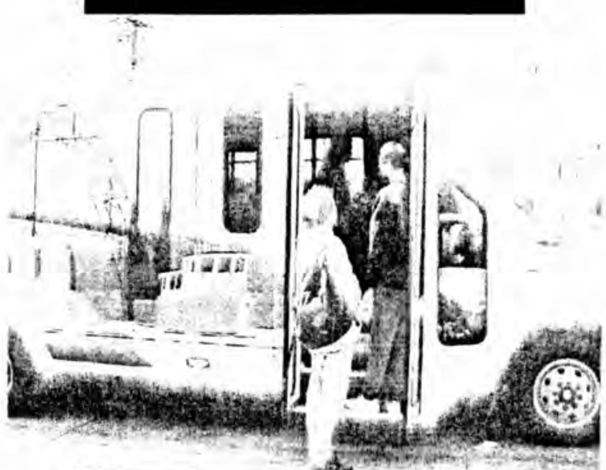
***on call or as needed



Stay dry and comfortable in our covered shelters.

Bike racks are on a first come, first served basis.

Look for our colorful busses with scenic murals depicting our communities!



Siletz/Toledo - Newport

Westbound	A.M.	A.M.	P.M.	P.M.
Tribal Housing***	7.00	9:35	1:00	4:00
Tribal Administration	7:04	9:39	1:04	4:04
Siletz Post Office	7:06	9:41	1:06	4:06
Hwy 20 at East Exit***	7.17	9:52	1:17	4.17
Olalla Store	7:21	9:56	1:21	4:21
Toledo JC Thriftway	7:25	10.00	1:25	4:25
SE 2nd & Main Street	7:27	10:02	1:27	4:27
Yaquina Bay Hotel	7:28	10:03	1:28	4:28
Food Fair	7:30	10:05	1:30	4:30
Oregon Coast Bank***	7:38	10:13	1:38	4:38
Abbey Street Pier	7:42	10:17	1:42	4:42
Pacific Comm Hospital	7:45	10.20	1:45	4:45
Newport City Hall	7:49	10:24	1:49	4.49
Fred Meyer	***	10:30		***
Wal*Mart	***	10:33		***

*** on call or as needed

Newport - Siletz/Toledo

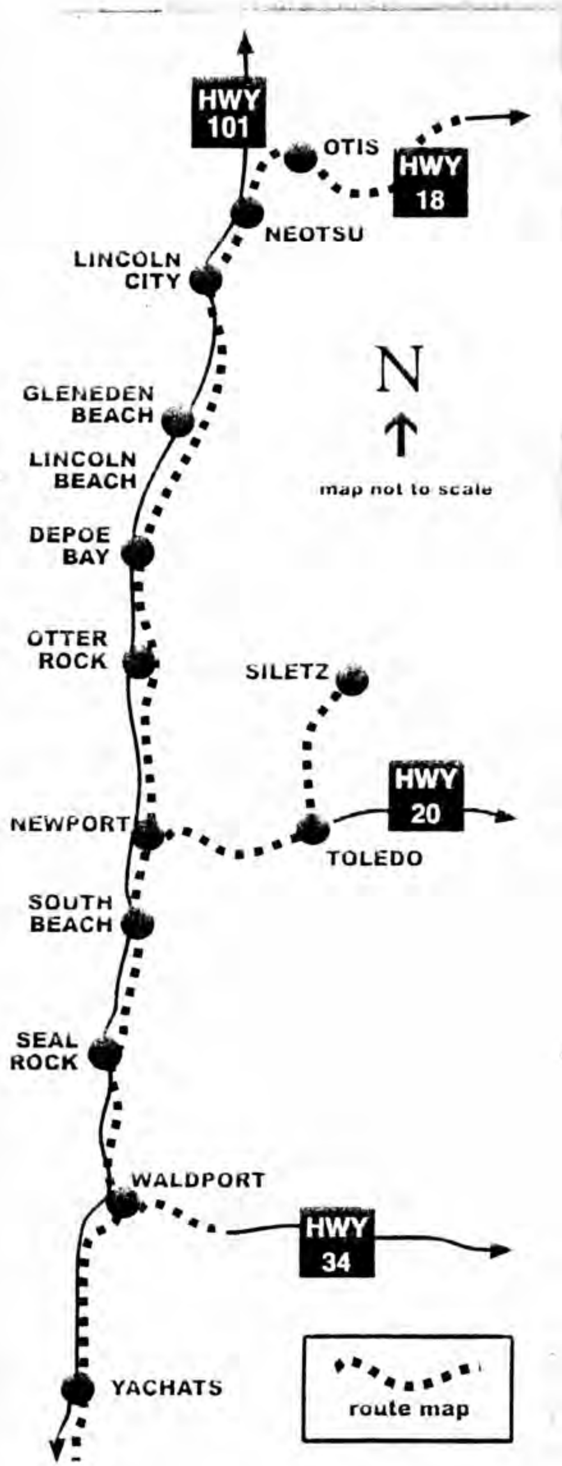
Eastbound	A.M.	A.M.	P.M.	P.M.
Newport City Hall	8:40	10:45	2:30	5:50
Pacific Comm Hospital	8:44	10 49	2.34	5:54
Abbey Street Pier	8:45	10:50	2:35	5:55
Oregon Coast Bank***	8:50	10:55	2:40	6:00
Food Fair	8:59	11:04	2:49	6:09
Yaquina Bay Hotel	9.00	11:05	2:50	6:10
Toledo JC Thriftway	9.02	11:07	2:52	6 12
Olalla Store	9:07	11:12	2:57	***
Hwy 20 at East Exit***	9 11	11:16	3:01	***
Siletz Post Office	9:22	11:27	3:12	6:27
Tribal Administration***	9:23	11.28	3:13	***
Tribal Housing***	9:29	11:34	3:19	***

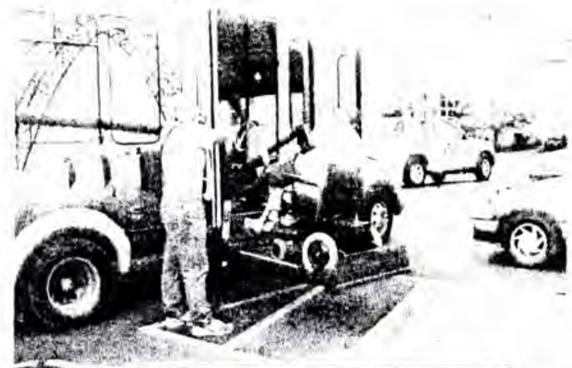
*** on call or as needed

BUS ETIQUETTE Please...

- Extinguish cigarettes well before boarding the bus.
- Practice good personal hygiene.
- Remember, hazardous objects or weapons of any kind are prohibited.
- For safety reasons, we cannot transport flammable, caustic or poisonous materials.
- Finish food and beverage before boarding or keep them in a closed container.
- Limit radio or tape player use to headphones that cannot be heard by the driver or other passengers.
- As a courtesy, turn off cell phones or turn down ringer and talk quietly.
- Acknowledge "front of the bus" courtesy seating for the elderly and disabled.
- Remember that fighting, boisterous or other behavior that disturbs passengers can result in removal from the bus.
- Be courteous to the driver and other passengers; verbal abuse or physically threatening behavior will not be tolerated.
- Do not bring open containers of alcohol or possess any illegal or controlled substance.
- Do not interfere in the movement of any transit vehicle.
- No unnecessary conversation with the driver while the bus is moving.
- Use designated crosswalks *after* the bus pulls away.
- Always remain seated while the bus is in motion, if possible.
- Shoes and shirts must be worn; please keep your feet on the floor.
- Remember, litter and vandalism are not allowed on the bus.
- We allow a maximum of four grocery size bags per person on the bus at one time.

Thank you for your assistance!





Passenger Assistance:
Drivers may leave the bus to provide minimal passenger assistance in boarding and deboarding.

Off Route Stops:
All off route stops must be scheduled through the dispatcher. Drivers can refuse a stop if they feel the stop is unsafe or could cause damage to the bus.

ALL PASSENGERS MUST PAY A FARE OR PRESENT A COUPON UPON BOARDING.

Children five and under and seniors 90 plus ride for *FREE*.

Ride coupons may be purchased at the Lincoln County Transit Office, 410 NE Harney in Newport or through the Driver.

Newport Transportation System Plan Final Technical Memorandum #10 - Biological/Wetland Review

Prepared for

City of Newport
169 SW Coast Highway

Prepared by

Parametrix
700 NE Multnomah, Suite 1000
Portland, OR 97232-4110
503-233-2400
www.parametrix.com

November, 2007 | 274-2395-051 (04)

CITATION

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and State of Oregon funds.

Parametrix. 2007. Newport Transportation System Plan Final Technical Memorandum #10 - Biological/Wetland Review. Prepared by Parametrix, Portland, Oregon. November, 2007.

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APPENDICES

1. INTRODUCTION

The Oregon Department of Transportation (ODOT) has retained Parametrix to conduct data research and analysis, field verification and preliminary road siting to determine whether local access roads in the South Beach area of Newport could be constructed to provide access to land within the UGB that is zoned for development and adjacent to US 101.

As part of the alternatives analysis process, Parametrix performed wetland determinations within the footprint of a variety of proposed routes. These included the following:

- One through route alignment on the west side of US 101 between SE 35th Street and SE 50th Street (see Figure 1).
- One through route alignment on the east side of US 101 also between SE 35th Street and SE 50th Street, incorporating access to the proposed SE 40th Street access road to serve South Shore Village.
- A variety of smaller access routes to provide for localized circulation in the vicinity of existing industrial development immediately adjacent to and directly served by driveways to/from US 101.

The purpose of the analysis is to determine the extent of potential impacts to jurisdictional wetlands based on wetland function and area affected associated with each of these options, and to identify opportunities for modifying existing US 101 access points while minimizing these impacts.

This memorandum is not a wetland delineation identifying potentially jurisdictional boundaries. Rather, it is a determination of wetland presence/absence observed within the study area. Parametrix staff performed wetland field determinations on August 21, 2007, visiting the various alternative route alignments where feasible. Additional wetland determination documentation performed includes a review of existing wetland inventories and reports, Lincoln County Soils Survey, National Wetland Inventory maps, and topographic maps.

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Figure 1: South Newport Proposed Improvements

Legend

- Intersection Improvements 1B
- Close Intersection

0 500 1,000 1,500 Feet

Project Symbology

1A, 1B, 2, 3, 4, 5, 7, 9, 10, 11, 12

Parametrix

*** Location of projects 7, 9, and 12 to be determined.**

Geographic Data Standards:
Projected Coordinate System
Oregon State Plane South

Data Source(s):
USDA, ESRI, Parametrix

Contact Information:
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700 NE Multnomah
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2. STUDY AREA DESCRIPTION

The study area is located in Newport's South Beach, on either side of US 101 south of the Yaquina Bay Bridge. Vicinity properties are a combination of residential, commercial and light industrial developments. Substantial new development is proposed in the area to the east of the state highway with new intersections proposed at 40th Street (and ultimately at 50th Street). This new development would consist of mixed employment and residential uses, a college campus and a county park. On the west side of the state highway land is dominated by various industrial and retail uses adjacent to the highway and the South Beach State Park (including both day use and campground areas) located between the developed parcels and the Pacific Ocean.

Topography in the project area consists of a series of north/south-oriented terraces comprised of sandstone and basalt. Elevations range from 0 feet to approximately 400 feet National Geodetic Vertical Datum (NGVD) on the hilltops to the east of the study area. Topography along the western alignment alternative is characterized by low hills on the northern one-sixth of the proposed alignment study area, with low-lying, flat topography in the southern five/sixths of the study area. Topography on the eastern alternative is relatively flat along the abandoned north/south-oriented railroad grade. Hills east of the railroad grade rise moderately steeply. To the west, the terrain varies between moderate slopes on the west to relative flat or slightly concave depressions.

Wetland resources in the project vicinity are commonly situated within these low-lying depressions, which were often inundated at the time field work was conducted. These depressions generally are linear in shape and are oriented north/south parallel to and located along the bases of hill slopes. Roadways and unpaved driveways cross wetlands near the eastern alignment in several locations.

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3. ANALYSIS METHODOLOGY

Prior to the field investigation, Parametrix staff reviewed available environmental data for the site. This included an examination of topographic maps, aerial photographs, the National Wetland Inventory (NWI) map (USFWS 1981) and NWI online mapper (USFWS 2007) which is shown in Figure 2, and the Soil Survey of Lincoln County Area, Oregon (NRCS 1997) which is shown in Figure 3. The NWI map for the site is based on the Newport 7.5-minute quadrangle, with imposed wetland polygons based on color infrared aerial photographs at a scale of 1:24,000.

Parametrix conducted on-site wetland determinations on August 21 2007. The determinations were conducted pursuant to the parameters detailed in the *Corps of Engineers Wetland Delineation Manual* and addendums (*1987 Manual*). The *1987 Manual* requires evidence of three parameters in order to determine that wetlands occur on a site: hydrophytic vegetation, hydric soils, and wetland hydrology.

3.1 VEGETATION

For an area to be classified as a wetland, a majority of the dominant plant species identified must be hydrophytes, plants adapted to life in saturated soil conditions. In the National List of Plant Species that Occur in Wetlands: 1988 National Summary and 1993 Supplement: Northwest (Region 9) (Reed 1988 and 1993), plant species are categorized according to their likelihood of occurring in wetlands. The categories include obligate (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), or upland (UPL). If greater than 50 percent of the dominant plant species are OBL, FACW, or FAC, the vegetation is considered to be hydrophytic.

3.2 SOILS

The *1987 Manual* defines wetland soil as soil that is "*...saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation.*" Acceptable field evidence of non-sandy mineral wetland soils is gleying, soils with a chroma of 1, and soils with a chroma of 2 with mottling. Chroma is the intensity of a color and a low chroma indicates that the soil has been exposed to reducing conditions. Mottling of the soil indicates a fluctuating water table that allows the soil to become oxidized for parts of the growing season. In addition, the Natural Resources Conservation Service (NRCS) Soil Survey of Lincoln County Area, Oregon (1997) was consulted to determine soil types potentially present within the study area.

3.3 HYDROLOGY

Wetland hydrology, as defined in the *1987 Manual*, must be "*inundated or saturated by water to the surface for at least 5 percent of the growing season. Areas that are inundated or saturated to the surface for 5 to 12.5 percent of the growing season may meet the requirement for wetland hydrology if other positive indicators are present. Areas that are inundated or saturated to the surface for more than 12.5 percent of the growing season always have wetland hydrology.*"

The hydrology of the site was documented by recording the presence or absence of surface water, saturation, and evidence of inundation (drainage patterns, oxidized root channels, etc.) within suspect wetland areas.

Figure 2: NWI Wetlands

Freshwater Pond/Lake
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland

0 500 1,000 1,500 Feet

Parametrix

Geographic Data Standards:
Projected Coordinate System
Oregon State Plane South

Data Source(s):
USDA, ESRI, Parametrix

Contact Information:
Parametrix
700 NE Multnomah
Suite 1000
Portland, OR 97232-2131
(503) 233-2400

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Figure 3: Hydric Soils

Hydric Soils

0 500 1,000 1,500 Feet

Parametrix

Geographic Data Standards:
Projected Coordinate System:
Oregon State Plane South

Data Source(s):
USDA, ESRI, Parametrix

Contact Information:
Parametrix
NE Multnomah
Suite 1000
Portland, OR 97232-2131
(503) 233-2400

This product is for informational purposes and may not have been prepared for legal, engineering or surveying purposes. Users of this information should review or consult the primary data and information source to ascertain the usability of this information.

4. RESULTS

4.1 DATA REVIEW

A review of the data described in the preceding chapter is presented in the following sub-sections and specific conclusions area identified.

National Wetland Inventory (NWI) Maps

The National Wetlands Inventory map for Newport, Oregon (as shown in Figure 2) identifies four wetland types within the project area. These are described in Table 1.

Table 1. National Wetlands Inventory (NWI) Mapping Analysis

Map Unit	Description
PEMF	Palustrine emergent
PSSC	Palustrine scrub-shrub
PUBH	Palustrine unconsolidated bottom
PFOC	Palustrine forested

Soils Survey

The Soil Survey of Lincoln County, OR (1997) includes sixteen soil types mapped within the study area vicinity (Table 2). Of the sixteen, five are recognized as hydric soils units. Figure 3 shows the location of the recognized hydric soils.

Table 2 - Soils Mapped Within the Study Area

Series	Soil Name	Drainage Class	Hydric
3C	Bandon fine sandy loam	Well drained	No
3E	Bandon fine sandy loam	Well drained	No
9A	Brenner silt loam	Poorly drained	Yes
12A	Coquille silt loam	Very poorly drained	Yes
14B	Depoe loam	Poorly drained	Yes
18G	Fendall-Templeton silt loam	Well drained	No
35E	Lint silt loam	Well drained	No
42C	Nelscott loam	Moderately-well drained	No
42E	Nelscott loam	Moderately-well drained	No
46A	Nestucca silt loam	Somewhat poorly drained	No
47C	Netarts fine sand	Well drained	Yes
47E	Netarts fine sand	Well drained	Yes
59C	Urban land-Nelscott complex	Moderately-well drained	No
60A	urban land-Waldport complex	Excessively drained	No
63A	Waldport fine sand	Excessively drained	No
67A	Yaquina fine sand	Well drained	No

South Beach State Park Master Plan

The South Beach State Park Master Plan (2003) identifies and ranks park habitat by suitability for park development. Suitability Classifications are as follows:

- Class 1: Highest quality resources. Trail development only
- Class 2: High quality resources. Trail development only
- Class 3: Moderate quality and/or common resource. Suitable for facility development.
- Class 4: Low quality resources, including developed areas. Suitable for facility development.

Except for a small section of park property (approximately 10 percent) in the northeast corner of the western alternative alignment, all areas within the alignment are **Class 1** habitat (see Figure 4).

4.2 FIELD SURVEY

Findings from the field survey of the two route alignments along either side of US 101 are described in the paragraphs below.

Western Alignment

The western alignment abuts the eastern boundary of South Beach State Park. Most of the area within this alignment is wetland, which extends west to east from the base of forested hills located in South Beach State Park on the west to the edge of commercial and industrial properties located to the east. Except for a small area to the north, wetlands occur along nearly the entire north-south alignment. Evidence indicates that most developed properties in this area required fill to avoid flooding.

Wetland areas appear to be semi-permanently inundated and include willow, Douglas spirea, and sedge. Vegetation throughout wetland areas is dense. Numerous snags are interspersed within dense emergent wetland vegetation in an otherwise open-canopy setting. The presence of snags may be indicative of historically drier conditions in these areas. One may speculate that development or other alterations to the landscape have confined or restricted drainage, leading to a more persistent and/or shallower water table. Upland vegetation assemblage consists of Sitka spruce/Douglas fir overstory with a broad-leaf shrub understory consisting mostly of salal and rhododendron

Wetland habitat in the western alternative has been affected by infringement from property development. Evidence of fill in wetlands is apparent in many places. Nevertheless, remaining wetlands are extensive and provide valuable habitat functions. The close proximity of a relatively intact forested upland buffer associated with South Beach State Park increases the value of habitat overall. There is no opportunity for sighting the western bypass without affecting significant wetland areas or without property acquisition.

Eastern Alignment

Wetlands along the eastern alignment are a mix of emergent and forested habitat. Wetlands in the vicinity of SE 40th Street and SE Ash Street have been disturbed through clearing, grading and placement of fill. Algal mats and drain patterns in the sandy soil are evidence of persistent wetland hydrology. Red alder and soft rush are becoming re-established in this wetland. Emergent wetlands farther south are populated primarily with slough sedge and soft rush, with willow, Douglas spirea, and Oregon ash fringing the area transitioning from wetland to upland. Adjacent upland species include lodgepole pine, Douglas fir, and red alder.

Forested areas west of the railroad grade and east of development are a well-interspersed matrix of wetland and upland. Areas observed during field work appeared to be approximately 40 percent wetland and 60 percent upland. Forested wetland areas consist primarily of red alder, willow and Oregon ash with occasional Sitka spruce and western red cedar. Groundcover includes skunk cabbage, slough sedge, western manna grass, small-fruited bulrush. Adjacent uplands include Douglas fir, Sitka spruce, lodgepole pine, and myrtle with an understory of salal, blackberry, evergreen huckleberry and rhododendron.

To the south, private and public roads dissect sections of presumably once contiguous wetland habitat. Wetlands to the south benefit from close proximity of forested upland habitat associated with Mike Miller County Park.

Wetlands within the proposed alignment are less extensive than those identified on NWI maps. Specifically, the abandoned railroad grade that roughly aligns with SE Ash Street was determined to be upland during field work (Figure 3, Symbol 12).

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Figure 4. Composite Suitability

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5. CONCLUSIONS

A public street network parallel to US 101 between SE 35th Street south to SE 65th Street would facilitate connectivity and access management along US 101. An adequate public street network would provide access to properties along US 101, minimizing the number of driveways onto the state highway. However, based on the findings of significant wetlands within the vicinity of both proposed alignments, implementing a street network parallel to US 101 would be a challenging prospect. Conclusions from this analysis are presented below for each of the alignment and/or local circulation options considered.

5.1 ROAD ALIGNMENT WEST OF US 101

The western alignment, running parallel to US 101 from SE 35th Street to SE 50th Street includes extensive semi-permanently flooded, scrub-shrub wetlands located on South Beach State Park property. These wetlands are relatively intact and make up part of a habitat complex that includes forested dunes on the adjacent park property to the west. Properties adjacent to US 101 and east of the potential western alignment appear to be located at least partially on fill material. Typically, this fill does not extend beyond the developed areas of each parcel. There is no opportunity for siting the proposed western alternative without affecting significant wetland areas.

In addition to the resource impacts of constructing a roadway alignment through wetlands, the west alternative will also difficult and costly to construct requiring the removal of compressible soils and stabilization of the roadbed. As avoidance of significant areas of mature, relatively intact wetland habitat is not considered to be feasible and construction would be costly, development of a continuous north/south roadway in this area is not recommended at this time.

5.2 ROAD ALIGNMENT EAST OF US 101

Development of a bypass along the eastern alternative would also affect wetlands. However, this area includes an abandoned railroad grade right-of-way established approximately at the toe of steeply sloped hills and terraces located to the east. The spatial extent of adverse effects to wetlands may be diminished considerably by use of the railroad grade alignment for development of a north/south local circulation system to reduce travel demand along US 101. It should be noted that sections of the abandoned railroad grade are now part of the Mike Miller County Park trail system and this trail function would need to be accommodated in any future roadway alignment. The eastern alignment would require grading and widening of the railroad bed and would be easier and more economical to construct than an entirely new alignment.

5.3 OPPORTUNITIES FOR MODIFYING US 101 ACCESS FOR EXISTING PROPERTIES

Based on the findings of the wetlands research and field surveys along the eastern and western sides of US 101, opportunities were considered for developing an access management strategy to reduce the number and/or location of existing driveways intersecting the state highway. Also useful in this assessment is the mapping of driveway locations and frequency that is illustrated in Figure 2-7 of Technical Memorandum #5 (a copy of which is included in Appendix A).

Opportunities along the West Side of US 101

Along the west side of US 101, existing development is largely built on former wetlands that have been filled to raise the grade roughly consistent with the adjacent highway. This development is concentrated between SE 32nd Street and the future SE 40th Street intersection, as well as further south from approximately one-half mile north of SE 50th Street to the vicinity of the SE 50th Street/US 101 intersection. The developed portions of parcels along the west side of the highway typically follow an irregular boundary with the adjacent wetlands, varying from one parcel to the next in terms of buildable depth from the highway. Additionally, the footprint of most development on these parcels is largely consistent with the filled area, leaving little space for a frontage or backage road that would not bisect or greatly impact this development.

Development of an access management strategy for the west side of US 101 between SE 32nd and SE 50th Streets must be responsive to a complex blend of needs and issues including:

- Maintaining the economic viability of local businesses which rely on highway access and visibility,
- Minimizing potential wetlands impacts, and
- Taking advantage of opportunities for changes that could occur with either redevelopment on specific parcels and/or with the proposed widening of US 101 identified in Technical Memorandum #8.

Review of existing parcels and driveway locations in relation to wetland findings along the west side of US 101 leads to the following proposed access management approach for the west side of the highway, moving from north to south:

- Area between SE 32nd Street and SE 35th Street:

  With the development of Project # (SW Abalone Street) a new alternative route to provide for local, South Beach circulation would be provided for the two existing parcels in this area which currently have driveways directly onto US 101. These parcels would also have direct access onto SW 35th Street when this street is improved to add a west leg and a signal at its intersection with US 101. Closure of the two driveways accessing these parcels should be considered as redevelopment occurs and/or highway improvements are made with access provided via SW 35th Street or SW Anchor Way (which would connect with SW Abalone Street).

- Area between SE 35th Street and SE 40th Street:

  There are six existing driveways on the west side of US 101 in this area, two of which currently serve a single parcel. With limited opportunities for backage road development in this area, access management options would largely consist of driveway consolidation (e.g., providing one access point per parcel), shared driveways (one opportunity may existing for this where existing developed parcels are adjacent), and/or development of a raised median when US 101 is improved to a five lane cross-section with local access limited to right-in/right-out turns. A provision for U-turns at the intersection of US 101 at SE 35th and 40th Streets could be provided to accommodate trips to/from destinations to the north and south.

- Area between SE 40th Street and SE 50th Street:

  There are eleven existing driveways on the west side of US 101 in this area. Two of these driveways currently serve a single parcel and consolidation could be considered. Additionally there may be opportunities for shared driveway access and/or crossover easements for two parcels near the center of this highway segment and for three parcels just north of SE 50th Street. If the existing access to/from South Beach State Park is relocated to the intersection of US 101 at SE 50th Street as proposed, some consideration should be give to providing a frontage road and/or connected parking lots with cross-over easements for the parcels immediately north of this intersection. This action would accommodate the closure of four existing driveways onto the highway and the relocation of access via the signalized intersection at SE 50th Street.

Opportunities along the East Side of US 101

Along the east side of US 101, existing development is also largely built on former wetlands that have been filled to raise the grade roughly consistent with the adjacent highway. This development is concentrated between SE 32nd Street and the future SE 40th Street intersection, and at various locations to south of SE 50th Street. The area north of SE 40th Avenue is well developed with little vacant land except around the future SE 40th Street intersection. Immediately south of SE 40th Street land adjacent to the highway is vacant for about a quarter of a mile. The highway frontage is fully developed south of this point to just south of the SE 50th Street intersection.

As with parcels on the west side of the highway, the developed portions of parcels along the east side of the highway south of SE 40th Street typically follow an irregular boundary with the adjacent wetlands, varying from one parcel to the next in terms of buildable depth from the highway. Additionally, the footprint of most development on these parcels is largely consistent with the filled area, leaving little space for a frontage or backage road that would not bisect or greatly impact this development.

Development of an access management strategy for the east side of US 101 between SE 32nd and SE 50th Streets must be responsive to a complex blend of needs and issues including:

- Maintaining the economic viability of local businesses which rely on highway access and visibility,
- Minimizing potential wetlands impacts, and
- Taking advantage of opportunities for changes that could occur with either redevelopment on specific parcels and/or with the proposed widening of US 101 identified in Technical Memorandum #8.

Review of existing parcels and driveway locations in relation to wetland findings along the east side of US 101 leads to the following proposed access management approach for this side of the highway, moving from north to south:

- Area between SE 32nd Street and SE 35th Street:

  There are two existing driveways in this area. Alternative access is available via SE 32nd Street, Ferry Slip Road and/or SE 35th Street. Consideration should be given to closing these existing driveways and relocating parcel access to a local street when the parcels redevelopment and/or highway widening occurs.

- Area between SE 35th Street and SE 40th Street:

  There are three existing driveways on the east side of US 101 along this highway segment. Generally, most parcels adjacent to the highway in this area also have access to SE Ferry Slip Road, SE Ash Street, and/or the future alignment of SE 40th Street. However, there appears to be at least one parcel which has no alternative access apart from the state highway. Additionally, there are limited opportunities to consolidate or share existing driveways in this area.

  As with the west side, an access management strategy along this highway segment should consider development of a raised median when US 101 is improved to a five lane cross-section with local access limited to right-in/right-out turns or relocated to side streets. A provision for U-turns at the intersection of US 101 at SE 35th and 40th Streets could be provided to accommodate trips to/from destinations to the north and south.

- Area between SE 40th Street and SE 50th Street:

  There are ten existing driveways on the east side of US 101 in this area. Four of these driveways currently serve two individual parcels (two driveway each) and at one location there appears to be use of a shared driveway. There may be opportunities for additional shared driveway access and/or crossover easements for three parcels near the center of this highway segment and for several parcels just north of SE 50th Street. While the relationship of existing business footprints to the filled area allows little room under current conditions for street extensions without wetland impacts, there may be some potential for the development of easements for local traffic circulation as parcels redevelop immediately north of SE 50th Street. Additionally, there are currently several small slivers of land running east/west between the highway and the railroad alignment which could be considered for local street circulation and parcel access as this area develops and redevelops.

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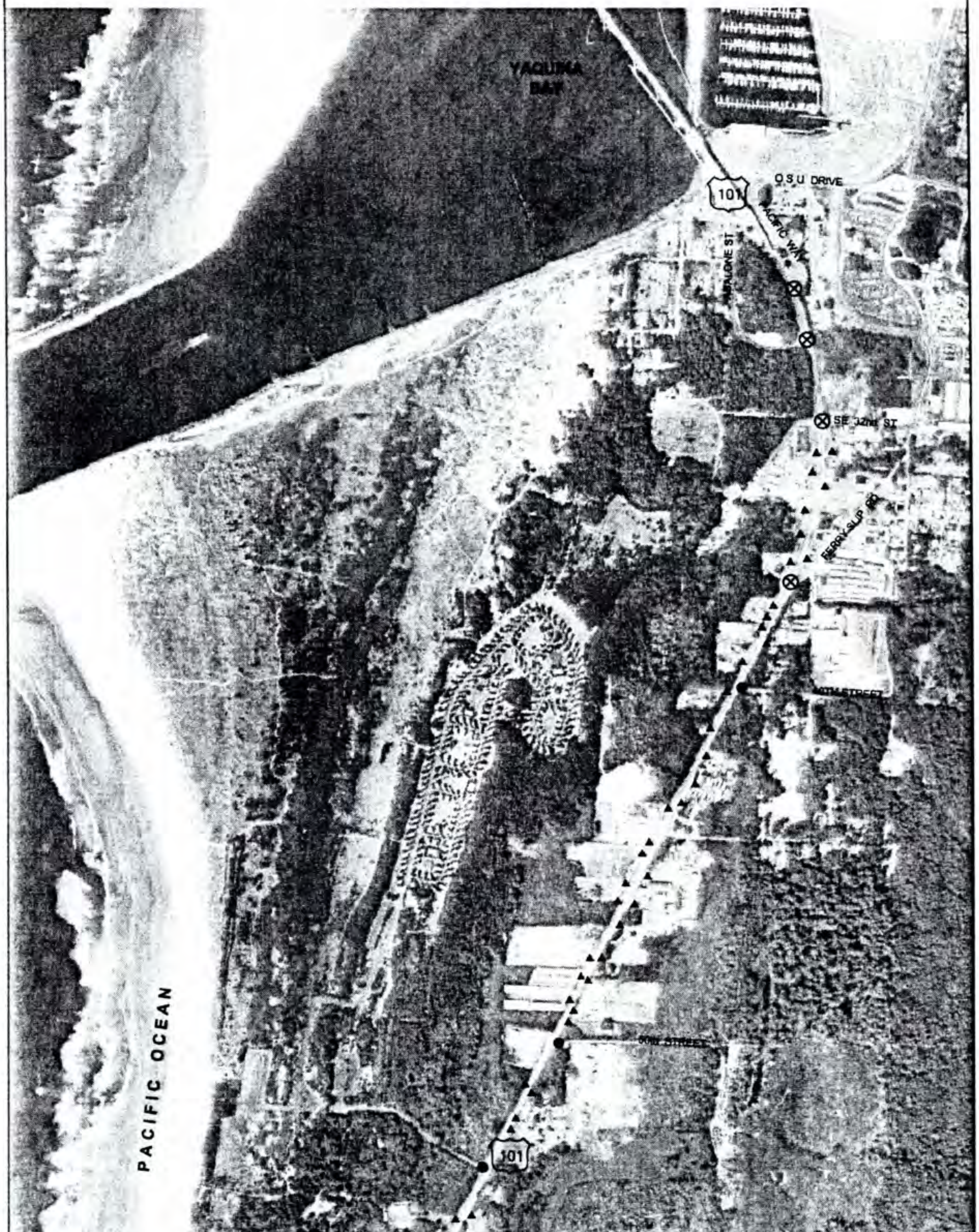
APPENDIX A

Existing Driveway Locations



Parametrix

LEGEND

⊗ STUDIED INTERSECTIONS

● PUBLIC STREETS

▲ DRIVEWAYS

Figure 2-7
South Beach Newport
Driveway Inventory

Exhibit B3
Newport TSP Amendments
File No. 2-CP-11

Newport Transportation System Plan Update - Alternate Mobility Standards Final Technical Memorandum #11 2030 Baseline System

Prepared for

City of Newport
169 SW Coast Highway
Newport, Oregon 97365

October 2009 |

CITATION

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and State of Oregon funds.

Parametrix. 2009. Newport Transportation System Plan Update - Alternate Mobility Standards
Final Technical Memorandum #11
2030 Baseline System. Prepared by Parametrix, Portland, Oregon. October 2009.

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30 HV	30th Highest Hourly Traffic Volumes
AAV	Average Annual Volume
ATR	Automatic Traffic Recorder
HCM	Highway Capacity Manual
LOS	Level of Service
ODOT	Oregon Department of Transportation
OHP	Oregon Highway Plan
Synchro	HCM compatible traffic analysis software for intersections
TGM	Transportation and Growth Management
TPAU	Transportation Planning and Analysis Unit
TSP	Transportation System Plan
UGB	Urban Growth Boundary
V/C	Volume-to-Capacity (ratio)
VPLPH	Vehicles per Lane per Hour

1. INTRODUCTION

1.1 REPORT PURPOSE AND CONTEXT

This report is one of several that will be prepared to inform the development of alternate mobility standards for US 101 in the South Beach study area. The development of these standards is based on the findings of earlier technical memoranda prepared for the Newport Transportation System Plan (TSP) Update which indicate that the Oregon Highway Plan's (OHP) mobility standards could not be met along US 101 during the planning period. As indicated in the memoranda, the combination of background traffic growth (e.g., through traffic) and anticipated development within the South Beach area would result in peak period and peak seasonal traffic volumes that could not be accommodated on US 101 without additional Yaquina Bay Bridge capacity and substantial highway improvements in South Beach.

The purpose of this report is to document the development of 2030 peak period / peak seasonal traffic volumes, to update the future baseline road and highway network that was initially analyzed for the TSP Update, and to explore the use of a variety of mobility measures that can be used to analysis future traffic impacts related to two land use alternatives for the South Beach area. The analysis of these alternatives will be documented in a future technical memorandum (#12).

Included in this report are the following:

- Documentation of the methods used to develop 2030 peak period traffic volume estimates for both the 30th highest hour (30 HV) and the annual average peak hour.
- Documentation of projected future street network and modeling assumptions.
- A summary of future traffic operations at study area intersections and roadway segments for both 30 HV and annual average time period.

This report is divided into five chapters, the first of which is this Introduction.

Chapter 2 presents a discussion of the development of 2030 volumes from the 2026 estimated that had previously been developed for the Newport TSP Update. 30 HV and annual average peak hour are identified and described, and the updates to the 2026 future baseline roadway network and traffic operations analysis model are documented.

Chapter 3 presents the results of traffic operational analysis for the 2030-30 HV for a 3 lane and 5 lane cross-sections along US 101 using the updated 2030 roadway network.

Chapter 4 presents the results of traffic operational analysis for the 2030 Average Annual Volume (AAV) for a 3 lane and 5 lane cross-sections on US 101.

Chapter 5 discusses suggested modifications to the method used in reporting system performance measures. These changes reflect discussions held with ODOT concerning the usefulness of the measures reported in Chapters 3 and 4, and include many of the same measures with some additions as described.

2. SOUTH BEACH GROWTH AND ANALYSIS ASSUMPTIONS

This chapter provides a summary of future growth expectations within the South Beach study area and documents assumptions used in the development of 2030 30 HV and average annual design hour traffic volumes. Also included is a discussion of the street network assumptions inherent in the 2030 Baseline condition.

2.1 DEVELOPMENT OF 2030 PEAK HOUR VOLUMES

Prior traffic analysis that supports the findings and recommendations of the Newport TSP Update is based on a 2026 planning horizon year. For the analysis and development of alternate mobility standards, the planning horizon year was extended to 2030, and identification was made of the peak travel periods that would form the basis of the analysis.

For the purposed of forecasting future growth in South Beach the study area was divided into ten sub-areas. The sub-areas were established based on information provided by the City of Newport and from other transportation studies that had previously been conducted for development in the South Beach area to support an urban growth boundary (UGB) adjustment and considered specific information about anticipated land uses (e.g., land development expectations by type and size) and property access characteristics. The variety of the land uses are assumed in each of the sub-areas are consistent with zoning designations and permitted uses and were based on an agreed reasonable scenario based on zoning designation and is not linked to actual population projections. The types of development include single family residential, condominiums/townhouses, industrial park, retail, research and development, park. See Appendix E excepts from Technical Memorandum #6 and for a more complete discussion see Technical Memorandum #6.

In addition to using anticipated land development in South Beach as a basis for developing 2030 peak period traffic forecasts, an increase from 2026 to 2030 was also made in background (or through) traffic movement. To develop 2030 volume from the 2026 estimates an annualized background traffic growth rate of 1.7 percent was assumed for all through traffic along US 101.

Two design hour volumes have been identified for traffic analysis – the 30th highest hourly volume (30 HV) and the average annual volume (AAV). Identification of these volumes is important for several reasons. The 30 HV is considered to represent a summertime weekday PM peak hour, the high travel season for the Oregon Coast. The AAV provides a baseline condition against which highway improvement needs can be assessed reflecting the entire year including both seasonal peaks (June through September) and off-seasonal peaks (October through May).

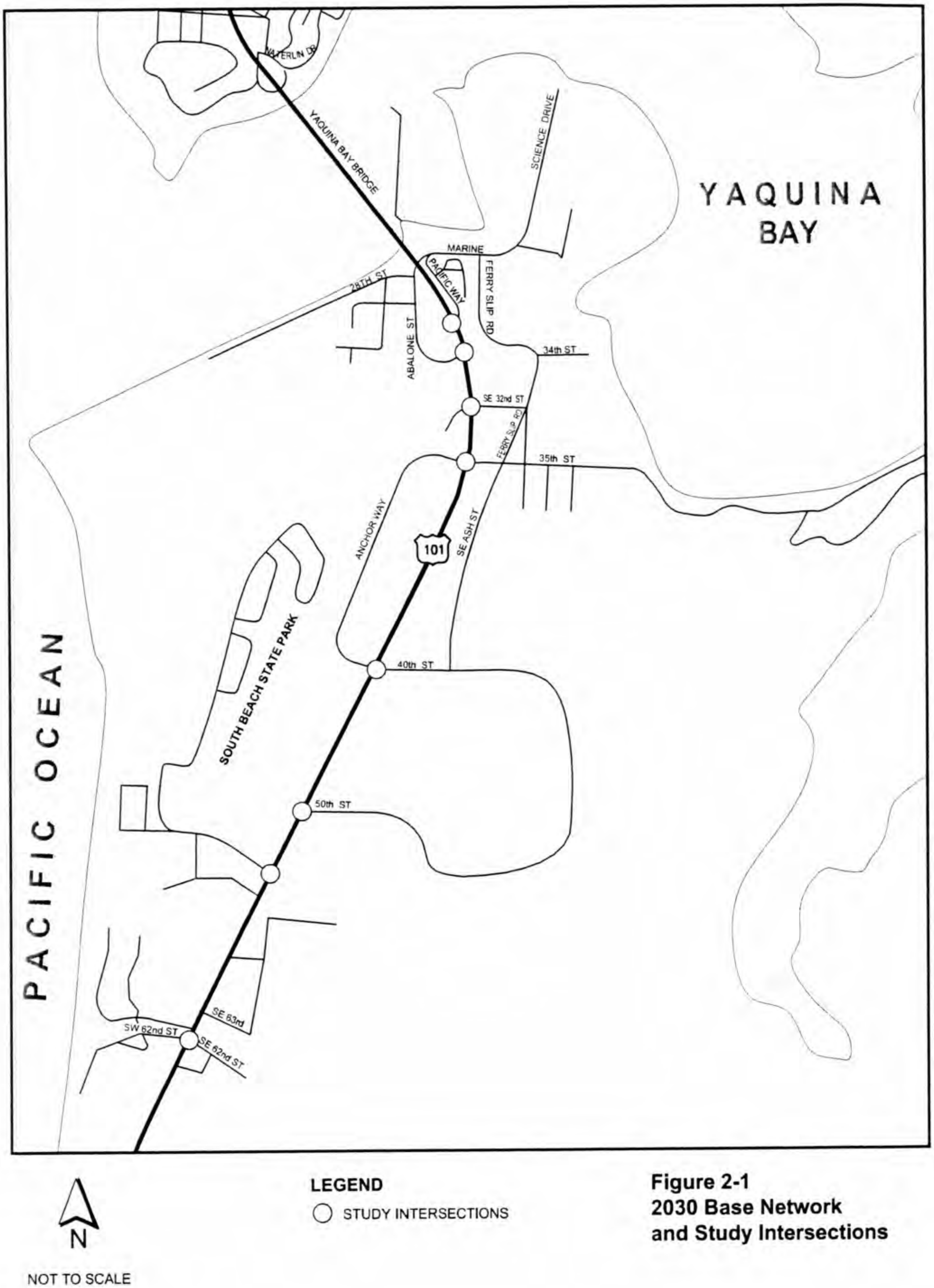
The identification of 30 HV and AAV was based on the 2007 summary trend data from the automatic traffic recorder (ATR) located in north Newport (# 21-009). The 30 HV is considered to represent a weekday PM peak hour during the high travel season for the coast (summertime), while the AAV represents the average weekday pm peak hour volume over the entire year. Based on the 2007 ATR summary trend data, the AAV is 17 percent lower than the 30 HV. Data and discussion supporting the identification of the 30 HV and the AAV is included in Appendix A. However, it should be noted that both the 30 HV and the AAV represent unconstrained travel demand, but these volumes are unlikely to occur in reality due to capacity constraints along US 101 including the Yaquina Bay Bridge.

2.2 STUDY AREA AND ROADWAY NETWORK

For purposes of the evaluation of alternate mobility standards, the study area focuses on US 101 in Newport and includes all of South Beach extending north of the Yaquina Bay Bridge to Hurbert Street and south to 62nd Street. As noted above, the roadway network was built using the original traffic operations model prepared to support the TSP (see Technical Memorandum #6 and subsequent memoranda for documentation related to the creation of this model). This model focused on South Beach and was extended north and south to reflect the requirements of this current study. The model uses the Synchro software analysis tool and includes the following specific network features.

- Traffic volumes for the Hurbert Street intersection came from the data in the original North side Synchro model that were adjusted to balance with volumes in the South Beach model. (Not shown in Figure 2-1)
- The intersection of US 101 with Fall Street was added to model using volumes from the earlier North side model, which were also adjusted to balance with volumes in the South Beach model. (Not shown in Figure 2-1)
- The intersection of US-101 with Ferry Slip Road is assumed to be closed.
- The intersection of US-101 with 32nd Street is assumed to be converted from serving all-way traffic to serve only right-in/right-out traffic. This intersection is currently signalized, but the signal is assumed to be relocated to the intersection of US 101 and 35th Street.
- The intersection of US-101 with 35th Street has been added to the original network and is assumed to be signalized. The signal was relocated from the existing intersection of US 101 with 32nd Street. The signal is assumed to function as actuated and coordinated. Intersection is assumed to have four approach legs, each with separate left, right, and thru lanes.
- The intersection of US-101 with 40th Street is assumed to be signalized with four approach legs, each with separate left, right, and thru lanes. The signal assumed to function as actuated and coordinated.
- The intersection of US-101 with 50th Street is assumed to be an unsignalized 'T' intersection with separate left, right, and thru lanes on each approach.
- The South Beach State Park access is modeled as it currently exists.
- The intersection of US 101 with SE 62nd Avenue was added to model with existing lane geometry.

Figure 2-1 presents a map of the South Beach study area, illustrating the baseline roadway network and study area intersections. For each traffic volume scenario (e.g., 30 HV or AAV), a three-lane and a five-lane cross section for US 101 was assumed within the South Beach south of the Yaquina Bay Bridge, with the five-lane section beginning and ending at 35th Street. No widening of the bridge is assumed. The updated base modeling assumptions are further documented in Appendix B.



LEGEND

○ STUDY INTERSECTIONS

Figure 2-1
2030 Base Network
and Study Intersections

3. 2030 30 HV TRAFFIC OPERATIONAL ANALYSIS

This chapter summarizes the analysis of the 2030 30 HV volumes at study area intersections and roadway segments and presents findings with respect to traffic operations in the South Beach study area. Performance measures for this analysis were identified in the project Scope of Services and included:

- Volume-to-capacity (V/C) ratios on roadway segments and at key intersections and signal progression assessment
- 95th percentile traffic queues
- Travel times on US 101 both northbound and southbound for segments including: Hurbert to 35th Street, 35th Street to 50th Street, and 50th Street to 62nd Street
- Average travel speeds on US 101 both northbound and southbound for segments including: Hurbert to 35th Street, 35th Street to 50th Street, and 50th Street to 62nd Street
- Unserved vehicles (number of vehicles projected that exceed the capacity of the network and, thus, are not included in the analysis)

Analysis also addresses both the existing 3-lane cross-section on US 101 and an improved 5-lane.

3.1 OPERATIONAL STANDARDS

As adopted in the 1999 Oregon Highway Plan (OHP), ODOT uses V/C ratios to measure state highway performance rather than intersection or roadway levels of service. A V/C ratio expresses the relationship between traffic volumes and the roadway or intersection's theoretical capacity. Various V/C thresholds are applied to all state highways based on functional classification of these facilities.

US 101 in the South Beach area is classified as a Statewide Highway. The peak hour, maximum V/C standards for US 101 signalized intersections inside the UGB boundary is as follows

- 0.85 with speed limit of ≤ 35 mph (Yaquina Bay Bridge to approx. 40th Street)
- 0.75 with speed limit of ≥ 45 mph (approx. 40th Street south to the City Limits)

For unsignalized intersections the V/C standards along US 101 are:

- 0.90 with speed limit of ≤ 35 mph (Yaquina Bay Bridge to approx. 40th Street)
- 0.85 with speed limit of ≥ 45 mph (approx. 40th Street south to the City Limits)

3.2 INTERSECTION OPERATIONS

The analysis of traffic operations was conducted using a Synchro traffic model developed specifically for the study area intersections. This model includes field-verified geometrics and other relevant physical data for each intersection. Analysis procedures to develop this model generally followed guidelines in the ODOT Transportation Planning and Analysis Unit (TPAU) *Analysis Procedures Manual* (2008). This model was used to assess traffic operations for the forecasted 2030 30 HV volumes found in Appendix C. Intersection analysis worksheets are also included in Appendix C.

Table 3-1 compares the existing 2030 30 HV base network with a 3-lane US 101 section and a 5-lane US 101 section in the South Beach study area. Data in these tables includes the overall intersection V/C ratios, and average intersection delay.

Table 3-1. 2030 Base Network 30 HV Intersection Operations Summary

			South Beach 3 Lane US 101		South Beach 5 Lane US 101	
		V/C Standard	V/C Ratio	Delay (sec/veh)	V/C Ratio	Delay (sec/veh)
Signalized Intersections						
US 101 & 35th Street		0.85	**2.44**	**>200**	**2.37**	**>200**
US 101 & 40th Street		0.85	**2.87**	**>200**	**2.21**	**>200**
Unsignalized Intersections Critical Movement/Control						
US 101 & Abalone Street	*Northbound Thru*	0.90	**1.99**	**0**	**1.99**	**0**
	Southbound Thru	0.90	**2.11**	**0**	**2.11**	**0**
	Southbound Right	0.90	0.23	0	0.23	0
	Eastbound Right	0.90	**30.44**	**N/A**	**30.44**	**N/A**
US 101 & Pacific Way	*Northbound Thru*	0.90	**1.91**	**0**	**1.91**	**0**
	Northbound Right	0.90	0.08	0	0.08	0
	Southbound Thru	0.90	**2.34**	**0**	**2.34**	**0**
	Westbound Right	0.90	**54.24**	**N/A**	**54.24**	**N/A**
US 101 & 32nd Street (RIRO)	*Northbound Thru*	0.90	**1.84**	**0**	**1.84**	**0**
	Northbound Right	0.90	0.03	0	0.03	0
	Southbound Thru-Right	0.90	**2.23**	**0**	**2.23**	**0**
	Eastbound Right	0.90	**6.92**	**N/A**	**6.92**	**N/A**
	Westbound Right	0.90	**N/A**	**N/A**	**N/A**	**N/A**
US 101 & 50th Street	*Northbound Thru*	0.85	**1.36**	**0**	0.68	0
	Northbound Right	0.85	0.03	0	0.03	0
	Southbound Thru	0.85	**1.65**	**0**	0.83	0
	Southbound Left	0.85	0.52	40.5	0.53	41.9
	Westbound Left	0.85	**3.44**	**N/A**	**1.24**	**>200**
	Westbound Right	0.85	**2.58**	**>200**	0.65	54.2
US 101 & S. Beach State Park	*Northbound Thru*	085	**1.34**	**0**	0.67	0
	Northbound Left	0.85	0.28	43.5	0.29	44.8
	Southbound Thru	0.85	**1.63**	**0**	0.81	0
	Southbound Right	0.85	0.06	0	0.06	0
	Eastbound Left-Right	0.85	**4.83**	**N/A**	**3.38**	**N/A**
US 101 & 62nd Street	*Northbound Thru*	0.85	**1.35**	**0**	**0.90**	**0**
	Northbound Left	0.85	0.04	32.4	0.04	33.1
	Southbound Thru	0.85	**1.63**	**0**	0.82	0
	Southbound Left	0.85	0.02	22.0	0.02	22.4
	Eastbound All	0.85	**1.44**	**>200**	**1.35**	**>200**
	Westbound All	0.85	0.58	>200	0.20	80.4

Note 1: RIRO = Right-in, right-out movements only
Note 2:V/C ratio is a ratio between traffic volumes and the roadway or intersection's capacity.
Note 3: "Critical Delay" and "Critical LOS" refers to the delay experienced for the specific intersection traffic movement listed.
Note 4: Widening of US 101 to five-lanes is assumed to begin at the intersection of 35th Street and proceed southward.
Bold numbers indicate that applicable ODOT Volume/capacity performance measure would be exceeded.
N/A indicates that projected volumes sufficiently exceed capacity such that Synchro cannot calculate a value.

Based on 2030 30 HV volumes, the intersections generally experience excessive delays and operate below acceptable V/C standards. Based on the projected volumes, the 3-lane cross-section will be insufficient to accommodate future traffic. Additionally, the high traffic volumes on US 101 in the South Beach Area result in insufficient gaps to accommodate the volume of traffic turning out from the intersecting streets and private accesses. With a 5-lane cross-section some improvement in traffic operations could be experienced at selected locations, however the predominant patterns is to exceed applicable ODOT performance thresholds.

3.3 TRAFFIC QUEUING

For purposes of this report, the 95th percentile vehicle queue length has been used to identify where potential traffic queuing problems might exist. Calculation of the 95th percentile queue is based on the anticipated arrival patterns, duration of interruptions, and the ability of the intersection to recover from momentary heavy arrival rates. Traffic queuing at signalized intersections was calculated using an Excel spreadsheet that considers a Poisson distribution of vehicle arrivals using intersection volumes, geometrics, signal phasing, available green time and other factors. For unsignalized intersections data was obtained from the Synchro operations worksheets. Queuing analysis worksheets are included in Appendix C and are summarized in Table 3-2.

Table 3-2. Summary of 2030 Base Network 30 HV Intersection Queuing

			South Beach 3 Lane US 101	South Beach 5 Lane US 101
Intersection	**Turn Lane**	**Existing/Assumed Storage (ft)**	**Estimate 95th Percentile Queue (ft)**	**Estimate 95th Percentile Queue (ft)**
US 101 & 35th Street	*Northbound Right*	175	0	0
	Northbound Left	TWCLT	125	125
	Southbound Right	175	0	75
	Southbound Left	TWCLT	275	275
	Eastbound Right	155	75	75
	Eastbound Left	120	**200**	**150**
	Westbound Right	155	**200**	**200**
	Westbound Left	120	**150**	**150**
US 101 & 40th Street	*Northbound Right*	215	**325**	**350**
	Southbound Left	TWCLT	900	825
	Southbound Right	175	75	75
	Eastbound Left	120	**125**	**125**
	Westbound Left	120	**425**	**425**
	Westbound Right	155	**800**	**800**
US 101 & Abalone St	*Eastbound Right*	•	**N/A**	**N/A**
US 101 & Pacific Way	*Westbound Right*	•	**N/A**	**N/A**
US 101 & 32nd Street (RIRO)	*Northbound Right*	175	0	0
	Eastbound Right	•	N/A	N/A
	Westbound Right	•	N/A	N/A

Table 3-2 Continued. Summary of 2030 Base Network 30 HV Intersection Queuing

Intersection	Turn Lane	Existing/Assumed Storage (ft)	South Beach 3 Lane US 101 Estimate 95th Percentile Queue (ft)	South Beach 5 Lane US 101 Estimate 95th Percentile Queue (ft)
US 101 & 50th Street	*Northbound Right*	320	0	0
	Southbound Left	TWCLT	50	75
	Westbound Left	120	N/A	125
	Westbound Right	*	325	100
US 101 & State Park	*Northbound Left*	150	25	25
	Eastbound	*	N/A	N/A
US 101 & 62nd Street	*Northbound Left*	TWCLT	25	25
	*Eastbound**	*	100	100
	*Westbound**	*	50	25

Notes:
Lengths rounded to nearest 25 feet.
Unsignalized intersections Estimated using Synchro.
NA: Indicates that projected volumes sufficiently exceeded capacity such that Synchro cannot calculate a value.
TWCLT: Two way center left turn lane
* Single Lane Approach
Bold number indicates that available vehicle storage space is expected to be exceeded.

Traffic queuing results in Table 3-2 indicate that in the future, some of the intersections will exceed the available vehicle storage for a movement.

3.4 ROADWAY SEGMENT OPERATIONS

To supplement the analysis of the intersection traffic operations, an assessment was conducted of several highway segments to determine how well US 101 would function as a highway in the South Beach Area. The results of this analysis are presented in Table 3-3. Worksheets are included in Appendix C.

Table 3-3. US 101 Roadway Segment Analysis for 2030 30 HV Base Network

Segment	Speed Limit (mph)	South Beach 3 Lane US 101 Volume/Capacity Ratio Northbound	South Beach 3 Lane US 101 Volume/Capacity Ratio Southbound
Pacific Way to 35th Street	35 mph	2.26	2.35
35th Street to 50th Street	35 & 45 mph	1.70	2.00
50th Street to 62nd Street	55 mph	1.37	1.66

Note: Roadway segment operations analysis using the Highway Capacity Manual (HCM) is limited to two-lane facilities with speeds greater than 45 mph. The results in this table reflect calculations using 45 and 55 mph speeds regardless of locations where a lower speed limit is posted

There are limitations to the HCM V/C calculations for two way highways, namely it considers speeds of 45 mph and greater. Multi-lane highway V/C cannot be calculated with 35 or 45 mph speed limits and was not included in the table. As indicated in Table 3-3, all segments of US 101 from the Yaquina Bay Bridge south through the South Beach study area would significantly exceed the theoretical capacities of these segments resulting in long traffic queues and extensive delays.

3.5 CALCULATION OF YAQUINA BRIDGE CAPACITY

The capacity of the Yaquina Bridge is limited and, to some extent, will meter some of the traffic entering and leaving the South Beach Area. The capacity of the Yaquina Bay Bridge was calculated based on a combination of the 1994 and 2000 HCM Rolling Terrain Methodology as summarized in Appendix B. The result indicates that the capacity on the bridge is about 1,300 vehicles per lane per hour (vplph).

3.6 OTHER MEASURES OF EFFECTIVENESS

The Synchro model was used to develop a traffic simulation to estimate other measures of effectiveness for US 101 including travel time, average travel speed, and unserved vehicles trying to enter the network. The results of the simulation are summarized in Table 3-4 below and documented in Appendix C.

Table 3-4. US 101 Travel Time and Speed Analysis for 2030 30 HV Base Network

		Travel Time (min)		Average Travel Speed (mph)	
Scenarios	**Distance**	**Northbound**	**Southbound**	**Northbound**	**Southbound**
3 Lane US 101	**3.4**	**52.6**	**52.9**	**3.9**	**2.5**
Hurbert St to 35th St	1.7	18.1	16.0	5.7	0.6
35th St to 40th St	0.3	11.3	15.4	1.5	6.7
40th St to 62nd St	1.4	23.2	21.5	3.7	0.8
5 Lane US 101	**3.4**	**23.7**	**23.9**	**8.5**	**5.4**
Hurbert St to 35th St	1.7	13.0	10.8	7.9	0.9
35th St to 40th St	0.3	2.9	7.3	5.9	14.1
40th St to 62nd St	1.4	8.2	5.8	10.4	2.9

As indicated in Table 3-4, all segments of US 101 from the Yaquina Bay Bridge south through the South Beach study area would experience low travel speed sand increased travel times.

Table 3-5. US 101 Unserved Vehicles for 2030 30 HV Base Network

	South Beach - 3 Lane US 101	South Beach - 5 Lane US 101
Location	**Number of Unserved Vehicles**	**Number of Unserved Vehicles**
Entering US 101 northbound at 62nd Street	5,369	1,698
Entering US 101 southbound at Hurbert Street	7,136	3,556

4. 2030 ANNUAL AVERAGE TRAFFIC OPERATIONAL ANALYSIS

This chapter summarizes the analysis of the 2030 Annual Average volumes (AAV) at study area intersections and roadway segments and presents findings with respect to traffic operations in the South Beach study area. Performance measures for this analysis are the same as those identified and discussed in Chapter 3.

4.1 INTERSECTION OPERATIONS

The analysis of traffic operations was conducted using a Synchro traffic model developed specifically for the study area intersections. This model includes field-verified geometrics and other relevant physical data for each intersection. Analysis procedures to develop this model generally followed guidelines in the ODOT Transportation Planning and Analysis Unit (TPAU) *Analysis Procedures Manual*. This model was used to assess traffic operations for the forecasted 2030 20 HV volumes found in Appendix D. Intersection analysis worksheets are also included in Appendix D.

Table 4-1 compares the existing 2030 Annual Average base network with a 3-lane US 101 section and a 5-lane US 101 section in the South Beach study area. Data in these tables includes the overall intersection V/C ratios, and average intersection delay.

Table 4-1. 2030 Base Network Annual Average Intersection Operations Summary

			South Beach 3 Lane US 101		South Beach 5 Lane US 101	
		V/C Standards	V/C Ratio	Delay (sec/veh)	V/C Ratio	Delay (sec/veh)
Signalized Intersections						
US 101 & 35th Street		0.85	**2.02**	**>200**	**1.35**	**187.1**
US 101 & 40th Street		0.85	**2.12**	**>200**	**1.92**	**>200**
Unsignalized Intersections Critical Movement/Control						
US 101 & Abalone Street	*Northbound Thru*	0.90	**1.65**	**0**	**1.65**	**0**
	Southbound Thru	0.90	**1.75**	**0**	**1.75**	**0**
	Southbound Right	0.90	0.19	0	0.19	0
	Eastbound Right	0.90	**10.35**	**N/A**	**10.35**	**N/A**
US 101 & Pacific Way	*Northbound Thru*	0.90	**1.58**	**0**	**1.58**	**0**
	Northbound Right	0.90	0.07	0	0.07	0
	Southbound Thru	0.90	**1.94**	**0**	**1.94**	**0**
	Westbound Right	0.90	**19.76**	**N/A**	**19.76**	**N/A**
US 101 & 32nd Street (RIRO)	*Northbound Thru*	0.90	**1.52**	**0**	**1.52**	**0**
	Northbound Right	0.90	0.03	0	0.03	0
	Southbound Thru-Right	0.90	**1.85**	**0**	**1.85**	**0**
	Eastbound Right	0.90	**2.31**	**>200**	**2.31**	**>200**
US 101 & 50th Street	*Northbound Thru*	0.90	**1.13**	**0**	0.57	0
	Northbound Right	0.85	0.02	0	0.02	0
	Southbound Thru	0.85	**1.37**	**0**	0.69	0
	Southbound Left	0.85	0.31	22.6	0.31	23.1
	Westbound Left	0.85	**1.05**	**>200**	0.53	94.2
	Westbound Right	0.85	**1.20**	**>200**	0.39	27.8

Table 4-1 Continued. 2030 Base Network Annual Average Study Intersection Operations Summary

			South Beach 3 Lane US 101		South Beach 5 Lane US 101	
		V/C Standards	V/C Ratio	Delay (sec/veh)	V/C Ratio	Delay (sec/veh)
Unsignalized Intersections Critical Movement/Control						
US 101 & State Park	*Northbound Thru*	085	**1.11**	**0**	0.56	0
	Northbound Left	0.85	0.16	26.0	0.16	26.5
	Southbound Thru	0.85	**1.35**	**0**	0.67	0
	Southbound Right	0.85	0.05	0	0.05	0
	Eastbound Left-Right	0.85	**2.14**	**>200**	**1.54**	**>200**
US 101 & 62nd Street	*Northbound Thru*	0.85	**1.12**	**0**	0.75	0
	Northbound Left	0.85	0.02	22.4	0.03	22.8
	Southbound Thru	0.85	**1.36**	**0**	0.68	0
	Southbound Left	0.85	0.02	16.9	0.02	17.1
	Eastbound	0.85	0.58	178.8	0.51	147.0
	Westbound	0.85	0.25	104.3	0.12	45.8

Note 1: RIRO = Right-in, right-out movements only
Note 2:V/C ratio is a ratio between traffic volumes and the roadway or intersection's capacity.
Note 3: "Critical Delay" and "Critical LOS" refers to the delay experienced for the specific intersection traffic movement listed.
Note 4: Widening of US 101 to five-lanes is assumed to begin at the intersection of 35th Street and proceed southward.
Bold numbers indicate that applicable ODOT Volume/capacity performance measure would be exceeded.
N/A indicates that projected volumes sufficiently exceed capacity such that Synchro cannot calculate a value.

Based on 2030 30 HV volumes, the intersections generally experience excessive delays and operate below acceptable V/C standards. Based on the projected volumes, the 3-lane cross-section will be insufficient to accommodate future traffic. Additionally, the high traffic volumes on US 101 in the South Beach Area result in insufficient gaps to accommodate the volume of traffic turning out from the intersecting streets. With a 5-lane cross-section intersection level traffic congestion problems appear to focus on the bridge area where widening is not assumed and for the unsignalized side street movement at the entrance to South Beach State Park.

4.2 TRAFFIC QUEUING

For purposes of this report, the 95th percentile vehicle queue length has been used to identify where potential traffic queuing problems might exist. Calculation of the 95th percentile queue is based on the anticipated arrival patterns, duration of interruptions, and the ability of the intersection to recover from momentary heavy arrival rates. Traffic queuing for signalized intersections was calculated using the Excel spreadsheet previously described. For unsignalized intersections data was obtained from the Synchro operations worksheets. Queuing analysis worksheets are included in Appendix D and are summarized in Table 4-2.

Table 4-2. Summary of 2030 Base Network Annual Average Intersection Queuing

			South Beach 3 Lane US 101	South Beach 5 Lane US 101
Intersection	**Turn Lane**	**Existing/Assumed Storage (ft)**	**Estimate 95th Percentile Queue (ft)**	**Estimate 95th Percentile Queue (ft)**
US 101 & 35th Street	*Northbound Right*	175	0	0
	Northbound Left	TWCLT	75	75
	Southbound Right	175	0	0
	Southbound Left	TWCLT	250	150
	Westbound Right	155	150	125
	Westbound Left	120	**125**	75
	Eastbound Right	155	75	0
	Eastbound Left	120	**150**	75
US 101 & 40th Street	*Northbound Right*	215	**250**	**225**
	Northbound Left	TWCLT	0	0
	Southbound Right	175	0	0
	Southbound Left	TWCLT	675	575
	Westbound Right	155	**675**	**450**
	Westbound Left	120	**350**	**225**
	Eastbound Right	155	0	0
	Eastbound Left	120	75	75
US 101 & Abalone St	*Eastbound Right*	*	**N/A**	**N/A**
US 101 & Pacific Way	*Westbound Right*	*	**N/A**	**N/A**
US 101 & 32nd Street (RIRO)	*Northbound Right*	175	0	0
	Westbound Right	*	**N/A**	**N/A**
	Eastbound Right	*	125	125
US 101 & 50th Street	*Northbound Right*	320	0	0
	Southbound Left	TWCLT	50	50
	Westbound Left	120	100	50
	Westbound Right	*	200	50
US 101 & State Park	*Northbound Left*	150	25	25
	Eastbound	*	300	250
US 101 & 62nd Street	*Northbound Left*	TWCLT	25	0
	*Eastbound**	*	50	50
	*Westbound**	*	25	25

Notes:
Lengths rounded to nearest 25 feet.
Unsignalized intersections Estimated using Synchro.
NA: Indicates that projected volumes sufficiently exceeded capacity such that Synchro cannot calculate a value.
TWCLT: Two way center left turn lane
* Single Lane Approach
Bold number indicates that available vehicle storage space is expected to be exceeded.

Traffic queuing results in Table 4-2 indicate that in the future, some of the intersections will exceed the available vehicle storage for a movement.

4.3 ROADWAY SEGMENT OPERATIONS

To supplement the analysis of the intersection traffic operations, an assessment was conducted of several highway segments to determine how well US 101 would function away from the intersections. The results of this analysis are presented in Table 4-3. Worksheets are included in Appendix D.

Table 4-3. US 101 Roadway Segment Analysis for 2030 Annual Average Base Network

		South Beach 3 Lane US 101	
		Volume/Capacity Ratio	
Segment	Speed Limit (mph)	Northbound	Southbound
Pacific Way to 35th Street	35 mph	1.87	1.95
35th Street to 50th Street	35 & 45 mph	1.40	1.66
50th Street to 62nd Street	55 mph	1.13	1.38

As indicated in Table 4-3, all segments of US 101 from the Yaquina Bay Bridge south through the South Beach study area would significantly exceed the theoretical capacities of these segments resulting in long traffic queues and extensive delays.

4.4 OTHER MEASURES OF EFFECTIVENESS

The Synchro model was used to develop a traffic simulation to estimate other measures of effectiveness for US 101 including travel time, average travel speed and unserved vehicles into the network. The results of the simulation are summarized in Table 4-4 below and documented in Appendix D.

Table 4-4. US 101 Travel Time and Speed Analysis for 2030 Annual Average Base Network

		Travel Time (min)		Average Travel Speed (mph)	
Scenarios	Distance	Northbound	Southbound	Northbound	Southbound
3 Lane US 101	**3.4**	**32.1**	**30.4**	**6.4**	**4.3**
Hurbert St to 35th St	1.7	13.0	10.8	7.9	0.9
35th St to 40th St	0.3	9.3	13.3	1.8	7.8
40th St to 62nd St	1.4	9.7	6.3	8.9	2.7
5 Lane US 101	**3.4**	**31.2**	**37.8**	**6.6**	**3.4**
Hurbert St to 35th St	1.7	17.9	15.9	5.8	0.6
35th St to 40th St	0.3	3.8	17.1	4.5	6.1
40th St to 62nd St	1.4	9.4	4.8	9.1	3.5

As indicated in Table 4-4, all segments of northbound US 101 from the South Beach study area north of the Yaquina Bay Bridge would experience low travel speeds and increased travel times.

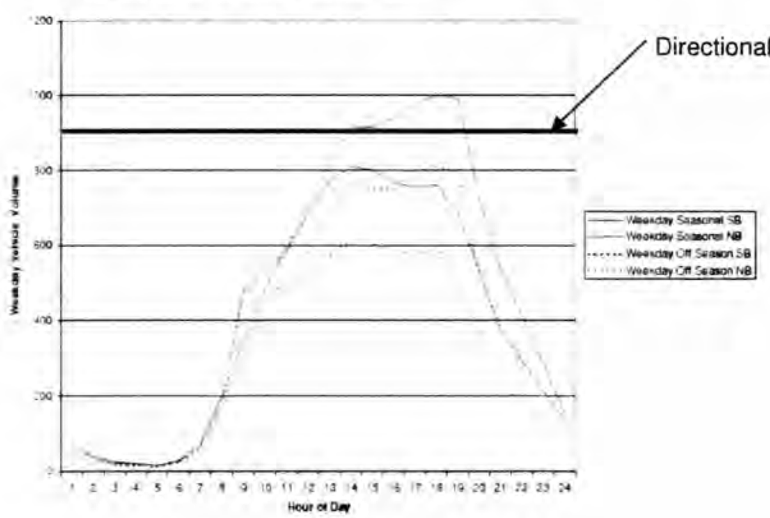
Table 4-5. US 101 Unserved Vehicles for 2030 Annual Average Base Network

	South Beach - 3 Lane US 101	South Beach - 5 Lane US 101
Location	**Number of Unserved Vehicles**	**Number of Unserved Vehicles**
Entering US 101 northbound at 62nd Street	2,825	1,978
Entering US 101 southbound at Hurbert Street	4,140	2,806

5. FINDINGS AND RECOMMENDATIONS

Based on review of the analysis process and findings for the South Beach roadway network under seasonal and annual average conditions, it becomes apparent that in many locations traffic congestion during peak hours (seasonal or average annual) will significantly exceed available capacity. Accordingly, to provide a more complete understanding of the extent and nature of future traffic congestion through South Beach and to offer useful comparisons among land use and network alternatives, it is recommended that the performance measures calculated and reported for each alternative and time period include the following:

- Volume-to-capacity ratios on segments and at intersections developed using the Synchro analysis software.
- Traffic queuing at signalized and unsignalized intersections calculated using Synchro analysis software.
- Signal progression assessment focusing on green band width during peak hours.
- Travel time on US 101 in northbound and southbound directions for three roadway segments – Hurbert Street to 35th Street, 35th Street to 50th Street, and 50th Street to 62nd Street.
- Average travel speeds on US 101 in northbound and southbound directions for three roadway segments – Hurbert Street to 35th Street, 35th Street to 50th Street, and 50th Street to 62nd Street.
- Unserved vehicles (that cannot enter the Synchro network due to extensive congestion).
- Duration of Congestion– Number of hours that roadway capacity will be exceeded during typical seasonal and annual average weekdays. Hourly distribution of traffic will be based on the percentages observed in data provided by TPAU. These percentages will be applied to the volumes projected for the 5 – 6 PM peak hour on US 101 in South Beach to derive 24-hour traffic estimates. See graphic below for an illustration of this assessment.



APPENDIX A

2030 Traffic Volume and Baseline Network Development

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TECHNICAL MEMORANDUM

Date:	July 31, 2009
To:	John DeTar, Derrick Tokos, Doug Norval, Dorothy Upton, Matt Spangler
From:	Shelley Oylear
Subject:	Task 9 -ATR Data Findings for 30 HV and Average Traffic Conditions-Final
Project Number:	274-2395-051-Ph 04
Project Name:	Newport TSP Update - Alternative Mobility Standards

Task 9 of the Newport TSP Update requires that traffic volume data and projections be evaluated for two time periods: the 30th highest hour of traffic (30 HV), and average weekday peak hour traffic. This memorandum attempts to identify when these time periods occur so that they can be used as a basis for further traffic analysis and the development of alternative mobility standards. Data from an ODOT Automatic Traffic Recorder (ATR) located to the north of Newport was reviewed to assist in identifying the days and times when these volumes occur. The following data summary and findings have been compiled for your review.

The 2007 ATR Trend Summary for ATR 21-009, located at on US 101 at the intersection of 25th Street north of most of the City of Newport, was consulted to assess existing traffic conditions. This data indicates that traffic volumes during the months of June through September range from 9 to 25 percent higher than the Annual Average Daily Traffic (AADT). June through September volumes represent a seasonal traffic condition, while the remaining months of October through May represents an off-season traffic condition. From here forward the traffic periods that will be used in developing alternative mobility standards will be referred to as Seasonal Traffic (June-September), and Off-Season Traffic (October-May). Data will also be summarized for Annual (January – December) traffic conditions. The 2007 ATR Trend summaries were used for this assessment as 2008 Trend summaries are not yet available.

To determine the day and time period that is represented by the 30 HV and the average peak hour, data from ATR 21-009 was provided by TPAU for 2008. This data included traffic volume counts by hour for a total of 342 days during that year.

The 30 HV for the Seasonal, Off-Season and Annual time periods are included in Table 1 below. The 50th highest hourly volume (50 HV) was added to the table as an additional reference point for unusual variations in the data. The full lists of data are included in the attached tables following this memorandum.

Table 1: 30 HV and 50 HV Summary

Period	Month	Day of Week	Hour	Total Volume
Annual-30 HV	July	Saturday	15	1994
Annual-50 HV	August	Sunday	14	1966
Seasonal 30 HV	August	Tuesday	16	1993
Seasonal 50 HV	August	Tuesday	19	1958
Off-Season 30 HV	March	Friday	16	1782
Off-Season 50 HV	May	Friday	17	1742

Note: Time based on a 24 hour clock.

Both the Seasonal and Off-Season 30 HV occur on a weekday at 16.00 hours or 4 pm, while the Annual 30 HV occurs on a weekend day during the mid-afternoon. The Off-Season 30 HV is approximately 11 percent lower than the Annual and Seasonal 30 HV.

The 2007 ATR Trend summary data for the Newport ATR indicates that the Seasonal average as percent of ADT is 117 percent, while the Annual average is 100 percent of ADT. Therefore the Seasonal average is 1.17 times the Annual average or 17 percent higher.

Because the occurrence of 30 HV and 50 HV as individual hours does not allow the ready identification of a specific time period to be used for transportation analysis, consideration was give to the aggregated top 30 and top 50 highest hourly volumes. The data is summarized in Table 2 which illustrates the number and percentages of times when the aggregated top 30 and 50 HVs occur on a weekday (Monday thru Thursday) versus a weekend (Friday thru Sunday) day.

Table 2: Day of Week Occurrences –Includes Top 30 HV and 50 HV

Time Period	Weekday Peak Hour Occurrences	Weekday Peak Hour Occurrences as Percent of Total	Weekend (Fri-Sun) Peak Hour Occurrences	Weekend (Fri-Sun) Peak Hour Occurrences as Percent of Total
Annual-1st thru 30th HV	6	20%	24	80%
Annual-1st thru 50th HV	20	40%	30	60%
Seasonal 1st thru 30th HV	8	26%	22	74%
Seasonal 1st thru 50th HV	22	44%	28	56%
Off-Season 1st thru 30th HV	11	36%	19	64%
Off-Season 1st thru 50th HV	11	22%	39	78%

Note: Includes all time hours during a typical day. Annual period excludes nationally observed holidays that fall on Monday thru Friday and if it occurs on a Friday, then also excludes the preceding Thursday.

For all the time periods, the peak hour commonly occurred on a weekend day.

Table 3 summarizes occurrences of the top 30 HVs over the course of the year by hour of the day and weekday versus weekend day.

Table 3: Peak Hour Occurrences for Annual Period-Includes Top 30 HV

Hour	Weekday (Mon-Thur)		Weekend (Fri- Sun)	
	Number of Occurrences	Occurrences as Percent of Total	Number of Occurrences	Occurrences as Percent of Total
14	2	7%	2	7%
15	1	3%	6	20%
16	0	0%	4	13%
17	0	0%	6	20%
18	3	10%	5	17%
19	0	0%	1	3%
Total	6	20%	24	80%

Note: Time based on a 24 hour clock. 16 and 17 represent the two hour PM peak period. Annual period excludes nationally observed holidays that fall on Mon-Fri and if it occurs on a Friday, then also excludes the preceding Thursday.

Table 4 summarizes occurrences of the top 30 HVs during the period from June to September by hour of the day and weekday versus weekend day.

Table 4: Peak Hour Occurrences for Seasonal Period-Includes Top 30 HV

Hour	Weekday (Mon-Thur)		Weekend (Fri- Sun)	
	Number of Occurrences	Occurrences as Percent of Total	Number of Occurrences	Occurrences as Percent of Total
14	2	7%	2	7%
15	1	3%	5	17%
16	**1**	**3%**	**3**	**10%**
17	**0**	**0%**	**6**	**20%**
18	4	13%	5	17%
19	0	0%	1	3%
Total	8	26%	22	74%

Note: Time based on a 24 hour clock. 16 and 17 represent the two hour PM peak period.

Table 5 summarizes occurrences of the top 30 HVs during the period from October to May by hour of the day and weekday versus weekend day.

Table 5: Peak Hour Occurrences for Off-Season Period-Includes Top 30 HV

Hour	Weekday (Mon-Thur)		Weekend (Fri- Sun)	
	Number of Occurrences	Occurrences as Percent of Total	Number of Occurrences	Occurrences as Percent of Total
14	1	3%	3	10%
15	3	10%	5	17%
16	**1**	**3%**	**6**	**20%**
17	**2**	**7%**	**3**	**10%**
18	4	13%	2	7%
19	0	0%	0	0%
Total	11	36%	19	64%

Note: Time based on a 24 hour clock. 16 and 17 represent the two hour PM peak period.

<u>Conclusions:</u>

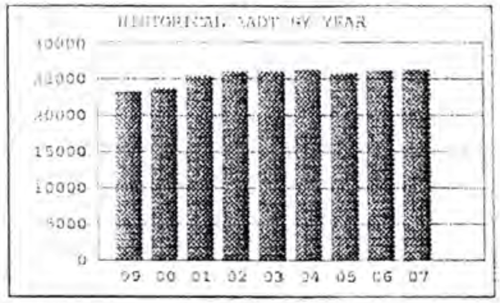
1. Review of the top 30 highest hourly volumes at ATR 21-009 in 2008 indicates that there are many instances when high volumes occur both on weekdays and on weekends. Table 1 under Annual 30 HV identifies Saturday at 3 PM as the 30^{th} HV; however the volumes during this time period are very close to the 30^{th} HV volumes for the Seasonal period which occur on a weekday in the pm peak. Thus, consistent with this data, and with the prior TSP traffic analysis that focused on a weekday PM peak, it was determined that the 30^{th} highest hourly volume (30 HV) will represent a summertime weekday PM peak hour (typically occurring between 5 and 6 PM).
2. Based on the ATR summary data the Seasonal period volumes are 17 percent higher than the Annual volumes. We propose that the Annual Average Peak Hour volume be determined by reducing the Seasonal volumes by 17 percent.

Location: US101 MP 114.91, OREGON COAST HIGHWAY, NO. 9 — 0.07 mile north of D River Wayside

Recorder: D RIVER WAYSIDE, 21-008
Installed: May, 1998

HISTORICAL TRAFFIC DATA

	Average	Percent of ADT				
Year	Daily Traffic	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
1999	24150	132	11.8	10.2	10.0	9.9
2000	25648	140	11.9	11.2	10.8	10.7
2001	25404	137	11.6	11.0	10.8	10.7
2002	26101	147	11.6	11.4	11.2	11.1
2003	26286	144	11.7	11.3	11.2	11.0
2004	26302	145	11.5	11.1	11.0	10.8
2005	25736	141	11.7	11.2	11.0	10.9
2006	26183	144	11.3	11.2	10.9	10.8
2007	26279	139	11.4	11.1	11.0	10.9



2007 TRAFFIC DATA

	Average Weekday Traffic	Percent of ADT	Average Daily Traffic	Percent of ADT
January	21125	80	21138	80
February	22829	87	23986	91
March	25220	96	25939	99
April	24804	94	25615	97
May	25133	96	26470	101
June	27356	104	27695	105
July	31825	121	32462	124
August	31883	121	32766	125
September	28126	107	29083	111
October	24559	93	25414	97
November	22115	84	23209	88
December	21860	83	21583	82

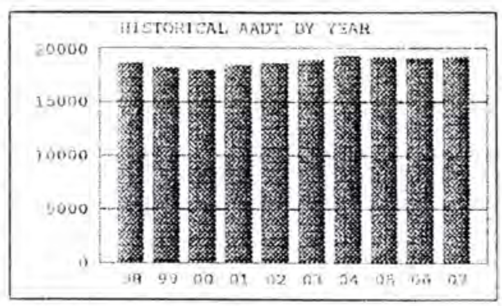
Classification Breakdown	Percent of ADT
Passenger Cars	40.4
Other 2 axle 4 tire vehicles	52.6
Single Unit 2 axle 6 tire	3.2
Single Unit 3 axle	0.8
Single Unit 4 axle or more	0.1
Single Trailer Truck 4 axle or less	0.4
Single Trailer Truck 5 axle	0.7
Single Trailer Truck 6 axle or more	0.4
Dbl-Trailer Truck 5 axle or less	0.0
Dbl-Trailer Truck 6 axle	0.1
Dbl-Trailer Truck 7 axle or more	0.2
Triple Trailer Trucks	0.0
Buses	0.8
Motorcycles & Scooters	0.2

Location: US101 MP 139.11, OREGON COAST HIGHWAY, NO. 9 — At the intersection of 25th street, in Newport

Recorder: NORTH NEWPORT, 21-009
Installed: October, 1996

HISTORICAL TRAFFIC DATA

	Average	Percent of ADT				
Year	Daily Traffic	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
1998	18541	130	18.6	12.7	12.0	11.8
1999	18146	135	11.9	11.3	11.1	11.0
2000	17951	141	12.4	11.7	11.5	11.3
2001	18375	***	****	****	****	****
2002	18598	149	12.5	11.9	11.6	11.5
2003	18930	141	12.1	11.6	11.4	11.3
2004	19254	142	12.1	11.4	11.2	11.1
2005	19153	***	****	****	****	****
2006	19083	***	****	****	****	****
2007	19159	139	11.7	11.3	11.1	11.1



2007 TRAFFIC DATA

	Average Weekday Traffic	Percent of ADT	Average Daily Traffic	Percent of ADT
January	15615	82	15321	80
February	16890	88	17121	89
March	18500	97	18700	98
April	18497	97	18768	98
May	19337	101	19568	102
June	20980	110	20796	109
July	23846	124	23676	124
August	23977	125	24032	125
September	21250	111	21256	111
October	18315	96	18181	95
November	16556	86	16643	87
December	16036	84	15807	83

Classification Breakdown	Percent of ADT
Passenger Cars	39.2
Other 2 axle 4 tire vehicles	54.6
Single Unit 2 axle 6 tire	2.2
Single Unit 3 axle	0.7
Single Unit 4 axle or more	0.1
Single Trailer Truck 4 axle or less	0.5
Single Trailer Truck 5 axle	0.7
Single Trailer Truck 6 axle or more	1.1
Dbl-Trailer Truck 5 axle or less	0.2
Dbl-Trailer Truck 6 axle	0.0
Dbl-Trailer Truck 7 axle or more	0.2
Triple Trailer Trucks	0.0
Buses	0.4
Motorcycles & Scooters	0.1

APPENDIX B

Identification of 30 HV and Annual Average Traffic Volumes

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TECHNICAL MEMORANDUM

Date:	July 31, 2009
To:	John DeTar, Doug Norval, Dorothy Upton
From:	Shelley Oylear
Subject:	Task 9 -Base System Network, Volumes and Modeling Assumptions
Project Number:	274-2395-51-Ph 04
Project Name:	Newport TSP Update - Alternative Mobility Standards

The following assumptions were used to develop the Base System Network and Volumes for Synchro Modeling. Please review the assumptions and the attached modeling files and volumes.

Volumes

- Assumes 1.7% annual thru traffic growth on US 101
- Assumes South Beach land use trip generation used in the original TSP update work. See attached table.
- 30 HV represents the seasonal weekday peak hour.
- Annual Average Weekday volumes were obtained by reducing 30 HV by 17% per Final ATR Memo.

Base System Network Assumptions

- Model begins just north of Hurbert Street and extends to just south of SE 62nd Street.
- Hurbert Street intersection added to model. Using volumes from previous modeling and balanced to calibrate with S. Beach model.
- Fall Street intersection added to model. Using volumes from previous modeling and balanced to calibrate with S. Beach model.
- US-101/Ferry Slip Road intersection is closed.
- US-101 at 32nd Street is a right-in/right-out intersection. This intersection is currently signalized, but the signal will be relocated to the 35th Street/US101 intersection.
- US-101 at 35th Street intersection is added and considered as signalized. The signal is being relocated from the 32nd Street/US 101 intersection. Signal assumed to function as actuated and coordinated. Intersection assumed with 4 approaches, each with separate left, right, and thru lanes.

- US-101 at 40th Street is assumed to be a signalized intersection with 4 approaches each with separate left, right, and thru lanes. Signal assumed to function as actuated and coordinated
- US-101 at 50th Street is assumed to be an unsignalized 'T' intersection with separate left, right, and thru lanes on each approach.
- The South Beach State Park access is modeled as it currently exists.
- SE 62nd Avenue intersection added to model with existing lane geometry.

Existing turn lane lengths are used except where at new intersections. New turn lanes lengths and tapers are based on theOregon Highway Design Manual (OHDM) and summarized the table below.

	Left Turn Channelization		Right Turn Channelization	
Design Speed	Minimum Storage Length (ft)	Minimum Taper (14' lane)	Minimum Storage Length (ft)	Minimum Taper (12' lane)
25	120	100	155	100
35	130	110	175	110
45	215	135	215	135
55	320	160	320	160

Note: Taper lengths are rounded up to closest 5 feet. Per figures 9-6 and 9-7 of OHDM (2003).

The functional classification for US 101 from mp 136.25 to 146.5 is Urban Principal Arterial. The OHDM design standard assumed for US 101 is the ODOT 4R/New Urban Standards for Urban Fringe/Suburban Area. US 101 is assumed to remain the same as the existing cross section from Pacific Way north, and a three lane section south of 35th Street.

Speeds on US 101 segments designated as follows:

- Hubert to 40th =35 mph
- 40th to 50th = 45 mph
- 50th to 62nd = 55 mph

Modeling Assumptions

Synchro model previously developed including assumptions that may deviate from ODOT's current Analysis Procedures Manual (APM).

- Truck percentages were calculated from count data and applied to the approaches. Percentages for new intersections were developed by review adjacent intersection data.
- A PHF of 0.95 for US 101 approaches and 0.85 for minor street approaches.
- A saturation flow rate of 1750 pcphgl is used.
- ODOT provided signal timing for existing intersections was utilized and optimized. New signalized intersections were coded as actuated and uncoordinated. All intersection timing was optimized.

APPENDIX C

Analysis of 2030 30 HV Baseline Volumes

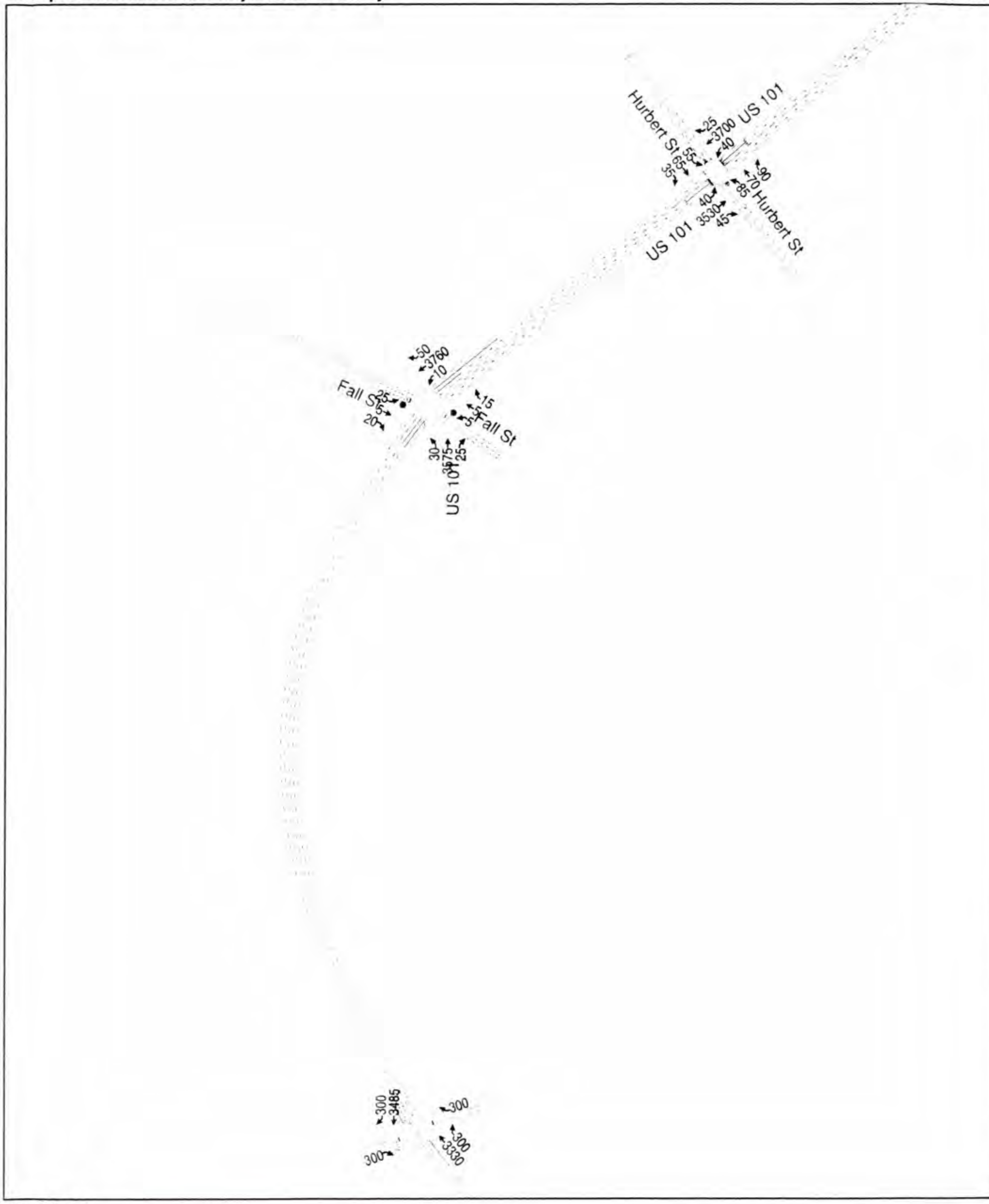
Hurbert St
US 101
Fall St
US 101

Figure 1 B **2030 Base System**
Newport Alternative Mobility Standard Study **30 HV**

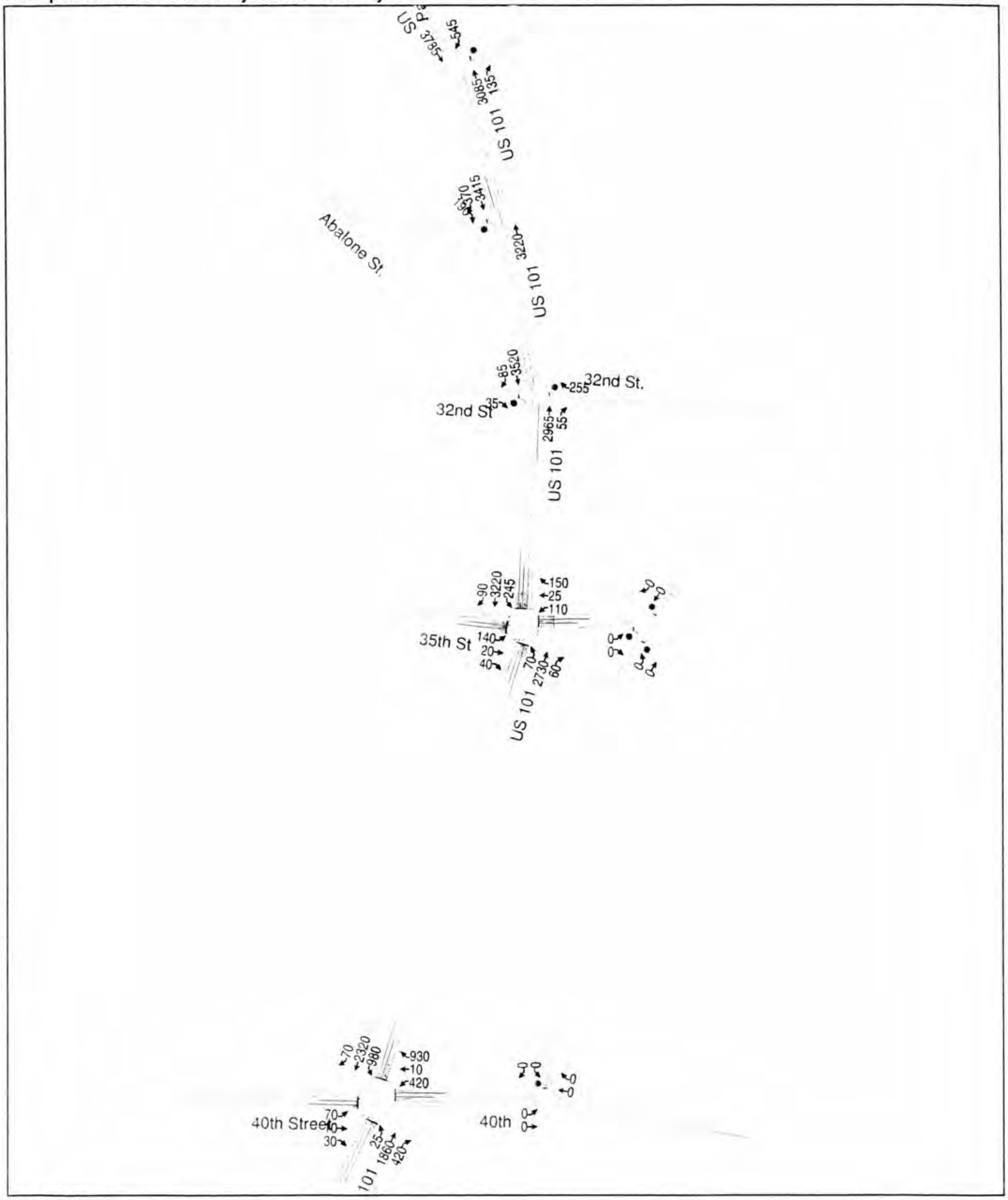

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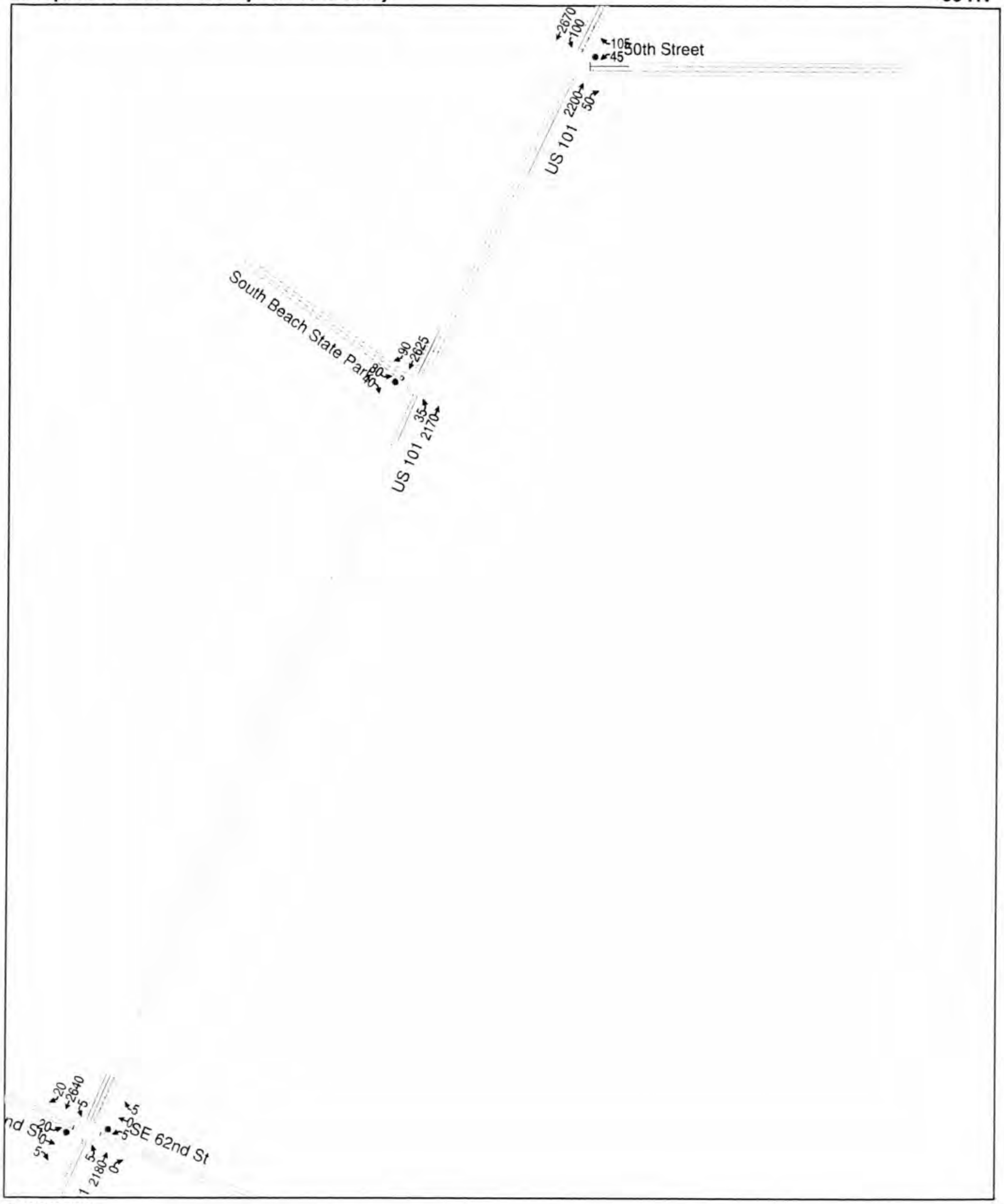
Figure 1 C
Newport Alternative Mobility Standard Study

2030 Base System
30 HV



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
Volume (vph)	140	20	40	110	25	150	70	2730	60	245	3220	90
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	1733	1434	1711	1699	1406	1722	1699	1406	1722	1699	1406
Flt Permitted	0.74	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1356	1733	1434	1336	1699	1406	1722	1699	1406	1722	1699	1406
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	165	24	47	129	29	176	74	2874	63	258	3389	95
RTOR Reduction (vph)	0	0	40	0	0	114	0	0	5	0	0	6
Lane Group Flow (vph)	165	24	7	129	29	62	74	2874	58	258	3389	89
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	17.9	17.9	17.9	17.9	17.9	17.9	4.0	78.0	78.0	11.1	85.1	85.1
Effective Green, g (s)	17.4	17.4	17.4	17.4	17.4	17.4	4.5	78.5	78.5	11.6	85.6	86.1
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.04	0.65	0.65	0.10	0.71	0.72
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	197	251	208	194	246	204	65	1111	920	166	1212	1009
v/s Ratio Prot		0.01			0.02		0.04	c1.69		0.15	c1.99	
v/s Ratio Perm	c0.12		0.00	0.10		0.04			0.04			0.06
v/c Ratio	0.84	0.10	0.03	0.66	0.12	0.31	1.14	2.59	0.06	1.55	2.80	0.09
Uniform Delay, d1	49.9	44.5	44.1	48.5	44.6	45.9	57.8	20.8	7.5	54.2	17.2	5.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.76	0.41	0.15	1.00	1.00	1.00
Incremental Delay, d2	26.4	0.2	0.1	9.1	0.3	1.2	78.6	714.3	0.0	276.8	810.6	0.2
Delay (s)	76.3	44.7	44.2	57.6	44.9	47.1	122.4	722.9	1.1	331.0	827.8	5.3
Level of Service	E	D	D	E	D	D	F	F	A	F	F	A
Approach Delay (s)		66.7			51.0			693.0			772.7	
Approach LOS		E			D			F			F	

Intersection Summary			
HCM Average Control Delay	684.2	**HCM Level of Service**	F
HCM Volume to Capacity ratio	2.44		
Actuated Cycle Length (s)	120.0	**Sum of lost time (s)**	9.0
Intersection Capacity Utilization	214.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
Volume (vph)	70	10	30	420	10	930	25	1860	420	980	2320	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1722	1716	1406	1739	1699	1406	1722	1699	1458
Flt Permitted	0.25	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	458	1716	1458	1722	1716	1406	1739	1699	1406	1722	1699	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	82	12	35	494	12	1094	26	1958	442	1032	2442	74
RTOR Reduction (vph)	0	0	30	0	0	289	0	0	66	0	0	7
Lane Group Flow (vph)	82	12	5	494	12	805	26	1958	376	1032	2442	67
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases		4		8	8		5	2		1	6	
Permitted Phases	4		4			8			2			6
Actuated Green, G (s)	16.0	16.0	16.0	24.5	24.5	24.5	2.4	42.9	42.9	19.6	60.1	60.1
Effective Green, g (s)	16.0	16.0	16.0	25.0	25.0	25.0	2.9	43.4	43.4	20.1	60.6	60.6
Actuated g/C Ratio	0.13	0.13	0.13	0.21	0.21	0.21	0.02	0.36	0.36	0.17	0.50	0.50
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	61	229	194	359	358	293	42	614	509	288	858	736
v/s Ratio Prot		0.01		0.29	0.01		0.01	c1.15		c0.60	1.44	
v/s Ratio Perm	c0.18		0.00			c0.57			0.27			0.05
v/c Ratio	1.34	0.05	0.02	1.38	0.03	2.75	0.62	3.19	0.74	3.58	2.85	0.09
Uniform Delay, d1	52.0	45.4	45.2	47.5	37.9	47.5	58.0	38.3	33.3	50.0	29.7	15.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.96	1.22
Incremental Delay, d2	231.9	0.1	0.1	185.9	0.1	796.0	24.2	989.3	9.2	1163.3	831.1	0.0
Delay (s)	283.9	45.5	45.3	233.4	37.9	843.5	82.2	1027.6	42.6	1211.9	859.5	18.9
Level of Service	F	D	D	F	D	F	F	F	D	F	F	B
Approach Delay (s)		197.0			649.1			838.0			944.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	837.0	HCM Level of Service	F
HCM Volume to Capacity ratio	2.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	207.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑	↑	↱
Volume (veh/h)	0	190	0	3220	3415	370
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	224	0	3389	3595	389
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				TWLTL	None	
Median storage veh)				2		
Upstream signal (ft)				1246		
pX, platoon unblocked	0.24					
vC, conflicting volume	6988	3599	3986			
vC1, stage 1 conf vol	3597					
vC2, stage 2 conf vol	3391					
vCu, unblocked vol	24222	3599	3986			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	7	45			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	224	3389	3595	389
Volume Left	0	0	0	0
Volume Right	224	0	0	389
cSH	7	1700	1700	1700
Volume to Capacity	30.44	1.99	2.11	0.23
Queue Length 95th (ft)	Err	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0
Lane LOS	F			
Approach Delay (s)	Err	0.0	0.0	
Approach LOS	F			

Intersection Summary			
Average Delay	294.2		
Intersection Capacity Utilization	214.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	545	3085	135	0	3785
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	641	3247	142	0	3984
Pedestrians	2		2			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	7236	3251			3391	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	7236	3251			3391	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	0			100	
cM capacity (veh/h)	0	12			79	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	641	3247	142	3984
Volume Left	0	0	0	0
Volume Right	641	0	142	0
cSH	12	1700	1700	1700
Volume to Capacity	54.24	1.91	0.08	2.34
Queue Length 95th (ft)	Err	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0
Lane LOS	F			
Approach Delay (s)	Err	0.0		0.0
Approach LOS	F			

Intersection Summary			
Average Delay	799.9		
Intersection Capacity Utilization	226.9%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑	↱		↓↱	
Volume (veh/h)	0	0	35	0	0	255	0	2965	55	0	3520	85
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	41	0	0	300	0	3121	58	0	3705	89
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								700				
pX, platoon unblocked	0.22	0.22		0.22	0.22	0.22				0.22		
vC, conflicting volume	7175	6933	3754	6916	6920	3125	3797			3181		
vC1, stage 1 conf vol	3752	3752		3123	3123							
vC2, stage 2 conf vol	3423	3181		3793	3797							
vCu, unblocked vol	27135	26042	3754	25966	25982	8841	3797			9093		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	0	0	100	0	100			100		
cM capacity (veh/h)	0	0	6	0	0	0	54			0		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	41	300	3121	58	3795
Volume Left	0	0	0	0	0
Volume Right	41	300	0	58	89
cSH	6	0	1700	1700	1700
Volume to Capacity	6.92	Err	1.84	0.03	2.23
Queue Length 95th (ft)	Err	Err	0	0	0
Control Delay (s)	Err	Err	0.0	0.0	0.0
Lane LOS	F	F			
Approach Delay (s)	Err	Err	0.0		0.0
Approach LOS	F	F			

Intersection Summary			
Average Delay	466.4		
Intersection Capacity Utilization	217.4%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
	↙	↖	↑	↗	↘	↓
Lane Configurations	↰	↱	↑	↱	↰	↑
Volume (veh/h)	45	105	2200	50	100	2670
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	53	124	2316	53	105	2811
Pedestrians	2		2			2
Lane Width (ft)	13.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5341	2320			2370	
vC1, stage 1 conf vol	2318					
vC2, stage 2 conf vol	3023					
vCu, unblocked vol	5341	2320			2370	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	0			48	
cM capacity (veh/h)	15	48			203	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	53	124	2316	53	105	2811
Volume Left	53	0	0	0	105	0
Volume Right	0	124	0	53	0	0
cSH	15	48	1700	1700	203	1700
Volume to Capacity	3.44	2.58	1.36	0.03	0.52	1.65
Queue Length 95th (ft)	Err	325	0	0	66	0
Control Delay (s)	Err	895.8	0.0	0.0	40.5	0.0
Lane LOS	F	F			E	
Approach Delay (s)	3626.8		0.0		1.5	
Approach LOS	F					

Intersection Summary			
Average Delay	118.0		
Intersection Capacity Utilization	163.2%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑	↑	↱
Volume (veh/h)	80	40	35	2170	2625	90
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	94	47	37	2284	2763	95
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5125	2767	2860			
vC1, stage 1 conf vol	2765					
vC2, stage 2 conf vol	2360					
vCu, unblocked vol	5125	2767	2860			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	0	72			
cM capacity (veh/h)	32	25	129			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	141	37	2284	2763	95
Volume Left	94	37	0	0	0
Volume Right	47	0	0	0	95
cSH	29	129	1700	1700	1700
Volume to Capacity	4.83	0.28	1.34	1.63	0.06
Queue Length 95th (ft)	Err	27	0	0	0
Control Delay (s)	Err	43.5	0.0	0.0	0.0
Lane LOS	F	E			
Approach Delay (s)	Err	0.7		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	265.6		
Intersection Capacity Utilization	164.6%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↱		↰	↑	↱
Volume (veh/h)	20	0	5	5	0	5	5	2180	0	5	2640	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	0	6	6	0	6	5	2295	0	5	2779	21
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	5105	5099	2783	5105	5120	2299	2802			2297		
vC1, stage 1 conf vol	2791	2791		2307	2307							
vC2, stage 2 conf vol	2313	2307		2797	2813							
vCu, unblocked vol	5105	5099	2783	5105	5120	2299	2802			2297		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	76	54	100	88	96			98		
cM capacity (veh/h)	20	32	25	13	28	49	137			217		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	29	12	5	2295	5	2779	21
Volume Left	24	6	5	0	5	0	0
Volume Right	6	6	0	0	0	0	21
cSH	20	20	137	1700	217	1700	1700
Volume to Capacity	1.44	0.58	0.04	1.35	0.02	1.63	0.01
Queue Length 95th (ft)	98	41	3	0	2	0	0
Control Delay (s)	630.2	319.6	32.4	0.0	22.0	0.0	0.0
Lane LOS	F	F	D		C		
Approach Delay (s)	630.2	319.6	0.1		0.0		
Approach LOS	F	F					

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	161.5%	ICU Level of Service	H
Analysis Period (min)	15		

INTERSECTION:	35th Street
SCENARIO:	2030 30HV -3 lane
DATE:	1-Aug-09
Future Cycle Length (C):	**120**
Vehicle Length (L):	25

# OF CYCLES QUEUE IS EXCEEDED		
@95%	@85%	@75%
2	5	8

Movement	Traffic Volume (vol) (veh/hr)	Number of Lanes (N)	Lane Storage Length (ft)	Green per Cycle (g/C)	Avg Total # Vehicles (veh)	Avg Queue Length / Lane (ft)	95% Total Vehicles (95% veh)	95% Queue Length / Lane (ft)
NB LT	70	1	**0**	**0.04**	2	75	5	**125**
NB TH & COMB	2730	1	**0**	**0.65**	32	800	40	1000
NB RT	60	1	**175**	**0.65**	1	25	0	0
SB LT	245	1	**0**	**0.10**	7	200	11	**275**
SB TH & COMB	3220	1	**0**	**0.71**	31	800	40	1000
SB RT	90	1	**175**	**0.72**	1	25	0	0
EB LT	140	1	**120**	**0.14**	4	125	8	**200**
EB TH & COMB	20	1	**0**	**0.14**	1	25	0	0
EB RT	40	1	**155**	**0.14**	1	50	3	75
WB LT	110	1	**120**	**0.14**	3	100	6	**150**
WB TH & COMB	25	1	**0**	**0.14**	1	25	0	0
WB RT	150	1	**155**	**0.14**	4	125	8	**200**

Average Total # Vehicles=[(1-g/C)x(vol)]/[3600/C]
Average Queue Length=ROUNDUP(average # vehicles) x L / N
95% Vehicle = (average total # vehicles) x (poisson distribution factor)
95% Queue Length = (95% total vehicles) x (vehicle length) / (number of lanes)
Formula calculated per instructions in ITE Traffic Engineering Handbook, 5th ed, pp.332-333, except uses poisson distribution and does not include truck % because it is already included in the LOS analysis, resulting in adjusted g/C ratios to reflect the inclusion of trucks.

INTERSECTION: 40th Street
SCENARIO: 2030 HV -3 lane
DATE: 1-Aug-09
Future Cycle Length (C): **120**
Vehicle Length (L): 25

# OF CYCLES QUEUE IS EXCEEDED		
@95%	@85%	@75%
2	5	8

Movement	Traffic Volume (vol) (veh/hr)	Number of Lanes (N)	Lane Storage Length (ft)	Green per Cycle (g/C)	Avg Total # Vehicles (veh)	Avg Queue Length / Lane (ft)	95% Total Vehicles (95% veh)	95% Queue Length / Lane (ft)
NB LT	25	1	**0**	**0.02**	1	25	0	0
NB TH & COMB	1860	1	**0**	**0.36**	40	1000	47	1175
NB RT	420	1	**175**	**0.36**	9	225	13	**325**
SB LT	980	1	**0**	**0.17**	27	700	36	**900**
SB TH & COMB	2320	1	**0**	**0.50**	39	975	47	1175
SB RT	70	1	**175**	**0.50**	1	50	3	75
EB LT	70	1	**120**	**0.13**	2	75	5	**125**
EB TH & COMB	10	1	**0**	**0.13**	0	25	0	0
EB RT	30	1	**155**	**0.13**	1	25	0	0
WB LT	420	1	**120**	**0.21**	11	300	17	**425**
WB TH & COMB	10	1	**0**	**0.21**	0	25	0	0
WB RT	930	1	**155**	**0.21**	24	625	32	**800**

Average Total # Vehicles=[(1-g/C)x(vol)]/[3600/C]
Average Queue Length=ROUNDUP(average # vehicles) x L / N
95% Vehicle = (average total # vehicles) x (poisson distribution factor)
95% Queue Length = (95% total vehicles) x (vehicle length) / (number of lanes)
Formula calculated per instructions in ITE Traffic Engineering Handbook, 5th ed, pp.332-333, except uses poisson distribution and does not include truck % because it is already included in the LOS analysis, resulting in adjusted g/C ratios to reflect the inclusion of trucks.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
40th Street	II	51	101.8	1289.2	1391.0	1.43	3.7	F
35th St.	II	35	31.2	649.8	681.0	0.28	1.5	F
Hurbert St	II	31	200.2	885.5	1085.7	1.73	5.7	F
Total	II		333.2	2824.5	3157.7	3.44	3.9	F

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	937.7	959.6	0.16	0.6	F
35th St	III	31	200.2	727.1	927.3	1.73	6.7	F
40th Street	III	35	34.1	1255.8	1289.9	0.28	0.8	F
Total	III		256.2	2920.6	3176.8	2.17	2.5	F

US 101

Direction	NB	SB	All
Total Delay (hr)	2136	3313	5449
Average Speed (mph)	**4**	**3**	**4**
Total Travel Time (hr)	2420	3636	6056
Distance Traveled (mi)	**10133**	**11358**	**21491**
Unserved Vehicles (#)	5369	7136	12506
Performance Index	**2307.1**	**3399.0**	**5706.1**

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Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	8/18/2009
Analysis Time Period	2030 30 HV-3 lane
Highway	US 101
From/To	Pacific Way to 35th Street
Jurisdiction	
Analysis Year	NB
Description Base Network	

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.95	
Shoulder width	6.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	2	/mi

Analysis direction volume, Vd 3630 veh/h
Opposing direction volume, Vo 3780 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	3836	pc/h	3995	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	0.5	mi/h
Free-flow speed, FFSd	44.5	mi/h
Adjustment for no-passing zones, fnp	0.6	mi/h
Average travel speed, ATSd	-16.9	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	3821 pc/h	3979 pc/h
Base percent time-spent-following,(note-4) BPTSFd	99.5 %	
Adjustment for no-passing zones, fnp	49.0	
Percent time-spent-following, PTSFd	123.5 %	

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	2.26	
Peak 15-min vehicle-miles of travel, VMT15	191	veh-mi
Peak-hour vehicle-miles of travel, VMT60	726	veh-mi
Peak 15-min total travel time, TT15	-11.3	veh-h

Notes:

1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	0.2	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	-16.9	mi/h
Percent time-spent-following, PTSFd (from above)	123.5	
Level of service,(note-1) LOSd (from above)	F	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-1.50	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane,(note-2) ATSpl	-18.6	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	3.60	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-3.40	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane,(note-3) PTSFpl	77.9	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	F	
Peak 15-min total travel time, TT15		veh-h

Notes:

1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	8/18/2009
Analysis Time Period	2030 30 HV-3 lane
Highway	US 101
From/To	Pacific Way to 35th Street
Jurisdiction	
Analysis Year	SB
Description Base Network	

Input Data

Highway class Class 1			Peak-hour factor, PHF	0.95	
Shoulder width	6.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	2	/mi

Analysis direction volume, Vd 3785 veh/h
Opposing direction volume, Vo 3630 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	4000	pc/h	3836	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	0.5	mi/h
Free-flow speed, FFSd	44.5	mi/h
Adjustment for no-passing zones, fnp	0.6	mi/h
Average travel speed, ATSd	-16.9	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	3984	pc/h	3821	pc/h
Base percent time-spent-following,(note-4) BPTSFd	99.6	%		
Adjustment for no-passing zones, fnp	-18.6			
Percent time-spent-following, PTSFd	90.1	%		

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	2.35	
Peak 15-min vehicle-miles of travel, VMT15	199	veh-mi
Peak-hour vehicle-miles of travel, VMT60	757	veh-mi
Peak 15-min total travel time, TT15	-11.8	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	0.2	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	-16.9	mi/h
Percent time-spent-following, PTSFd (from above)	90.1	
Level of service,(note-1) LOSd (from above)	F	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-1.50	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane,(note-2) ATSpl	-18.7	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	3.60	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-3.40	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane,(note-3) PTSFpl	56.8	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl F
Peak 15-min total travel time, TT15 veh-h

Notes:

1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

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Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	8/18/2009
Analysis Time Period	2030 30 HB 3 lane
Highway	US 101
From/To	35th Street to 50th
Jurisdiction	
Analysis Year	NB
Description Base Network	

Input Data

Highway class Class 2			Peak-hour factor, PHF	0.95	
Shoulder width	6.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.8	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	3	/mi

Analysis direction volume, Vd 2730 veh/h
Opposing direction volume, Vo 3220 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	2885	pc/h	3403	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	0.8	mi/h
Free-flow speed, FFSd	44.3	mi/h
Adjustment for no-passing zones, fnp	0.6	mi/h
Average travel speed, ATSd	-5.1	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	2874 pc/h	3389 pc/h

Base percent time-spent-following,(note-4) BPTSFd	98.4	%
Adjustment for no-passing zones, fnp	49.0	
Percent time-spent-following, PTSFd	120.9	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.70	
Peak 15-min vehicle-miles of travel, VMT15	575	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2184	veh-mi
Peak 15-min total travel time, TT15	-111.8	veh-h

Notes:

1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	0.8	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	-5.1	mi/h
Percent time-spent-following, PTSFd (from above)	120.9	
Level of service,(note-1) LOSd (from above)	F	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.90	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane,(note-2) ATSpl	-5.6	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	3.60	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-2.80	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane,(note-3) PTSFpl	80.1	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl D
Peak 15-min total travel time, TT15 veh-h

Notes:

1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

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_________________Directional Two-Lane Highway Segment Analysis________________

Analyst                 Parametrix
Agency/Co.
Date Performed          8/18/2009
Analysis Time Period    2030 30 HV 3 lane
Highway                 US 101
From/To                 35th Street to 50th
Jurisdiction
Analysis Year           SB
Description  Base Network

____________________________________Input Data_________________________________

Highway class  Class 2              Peak-hour factor, PHF      0.95
Shoulder width      6.0    ft       % Trucks and buses         4       %
Lane width          12.0   ft       % Trucks crawling          0.0     %
Segment length      0.8    mi       Truck crawl speed          0.0     mi/hr
Terrain type        Level           % Recreational vehicles    0       %
Grade:  Length             mi       % No-passing zones         100     %
        Up/down            %        Access points/mi           3       /mi

Analysis direction volume, Vd  3220    veh/h
Opposing direction volume, Vo  2730    veh/h

______________________________Average Travel Speed_____________________________

Direction                                 Analysis(d)        Opposing (o)
PCE for trucks, ET                            1.1                1.1
PCE for RVs, ER                               1.0                1.0
Heavy-vehicle adj. factor,(note-5) fHV       0.996              0.996
Grade adj. factor,(note-1) fG                 1.00               1.00
Directional flow rate,(note-2) vi             3403    pc/h       2885     pc/h

Free-Flow Speed from Field Measurement:
Field measured speed,(note-3) S FM                -       mi/h
Observed volume,(note-3) Vf                       -       veh/h
Estimated Free-Flow Speed:
Base free-flow speed,(note-3) BFFS               45.0     mi/h
Adj. for lane and shoulder width,(note-3) fLS    0.0      mi/h
Adj. for access points,(note-3) fA               0.8      mi/h

Free-flow speed, FFSd                            44.3     mi/h

Adjustment for no-passing zones, fnp             0.6      mi/h
Average travel speed, ATSd                       -5.1     mi/h
```

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	3389	pc/h	2874	pc/h
Base percent time-spent-following,(note-4) BPTSFd	99.1	%		
Adjustment for no-passing zones, fnp	10.4			
Percent time-spent-following, PTSFd	104.8	%		

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	2.00	
Peak 15-min vehicle-miles of travel, VMT15	678	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2576	veh-mi
Peak 15-min total travel time, TT15	-131.8	veh-h

Notes:

1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	0.8	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	-5.1	mi/h
Percent time-spent-following, PTSFd (from above)	104.8	
Level of service,(note-1) LOSd (from above)	F	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.90	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane,(note-2) ATSpl	-5.6	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	3.60	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-2.80	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane,(note-3) PTSFpl	69.4	%

Level of Service and Other Performance Measures (note-4)

```
Level of service including passing lane, LOSpl      C
Peak 15-min total travel time, TT15                          veh-h
```

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

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Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	8/18/2009
Analysis Time Period	2030 30 HV 3 lane
Highway	US 101
From/To	50th to 62nd
Jurisdiction	Newport
Analysis Year	NB
Description Base Network	

Input Data

Highway class Class 2			Peak-hour factor, PHF	0.95	
Shoulder width	6.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	3	/mi

Analysis direction volume, Vd 2200 veh/h
Opposing direction volume, Vo 2670 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	2325	pc/h	2822	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	55.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	0.8	mi/h
Free-flow speed, FFSd	54.3	mi/h
Adjustment for no-passing zones, fnp	0.7	mi/h
Average travel speed, ATSd	13.6	mi/h

```
____________________________Percent Time-Spent-Following____________________________

Direction                                    Analysis(d)          Opposing (o)
PCE for trucks, ET                               1.0                  1.0
PCE for RVs, ER                                  1.0                  1.0
Heavy-vehicle adjustment factor, fHV             1.000                1.000
Grade adjustment factor,(note-1) fG              1.00                 1.00
Directional flow rate,(note-2) vi                2316   pc/h          2811    pc/h
Base percent time-spent-following,(note-4) BPTSFd  96.9   %
Adjustment for no-passing zones, fnp                 49.0
Percent time-spent-following, PTSFd                  119.0  %

_________________Level of Service and Other Performance Measures________________

Level of service, LOS                                F
Volume to capacity ratio, v/c                        1.37
Peak 15-min vehicle-miles of travel, VMT15           405     veh-mi
Peak-hour vehicle-miles of travel, VMT60             1540    veh-mi
Peak 15-min total travel time, TT15                  29.7    veh-h
_________________________________________________________________________________

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo ) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds
   on a specific downgrade.

_________________________________Passing Lane Analysis_______________________________

Total length of analysis segment, Lt                                0.7      mi
Length of two-lane highway upstream of the passing lane, Lu         0.0      mi
Length of passing lane including tapers, Lpl                        0.0      mi
Average travel speed, ATSd (from above)                             13.6     mi/h
Percent time-spent-following, PTSFd (from above)                    119.0
Level of service,(note-1) LOSd (from above)                         F

_________________________________Average Travel Speed________________________________

Downstream length of two-lane highway within effective
    length of passing lane for average travel speed, Lde            1.70     mi
Length of two-lane highway downstream of effective
    length of the passing lane for average travel speed, Ld        -1.00     mi
Adj. factor for the effect of passing lane
    on average speed, fpl                                           1.11
Average travel speed including passing lane,(note-2) ATSpl         14.8

____________________________Percent Time-Spent-Following____________________________

Downstream length of two-lane highway within effective length
    of passing lane for percent time-spent-following, Lde           3.60     mi
Length of two-lane highway downstream of effective length of
    the passing lane for percent time-spent-following, Ld          -2.90     mi
Adj. factor for the effect of passing lane
    on percent time-spent-following, fpl                            0.62
Percent time-spent-following
    including passing lane,(note-3) PTSFpl                          78.2     %

____________Level of Service and Other Performance Measures (note-4)____________
```

Level of service including passing lane, LOSpl	D	
Peak 15-min total travel time, TT15	27.3	veh-h

Notes:

1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	8/18/2009
Analysis Time Period	2030 30 HV 3 lane
Highway	US 101
From/To	50th to 62nd
Jurisdiction	Newport
Analysis Year	Southbound
Description Base Network	

Input Data

Highway class Class 2			Peak-hour factor, PHF	0.95	
Shoulder width	6.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	3	/mi

Analysis direction volume, Vd 2670 veh/h
Opposing direction volume, Vo 2200 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	2822	pc/h	2325	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	55.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	0.8	mi/h
Free-flow speed, FFSd	54.3	mi/h
Adjustment for no-passing zones, fnp	0.7	mi/h
Average travel speed, ATSd	13.6	mi/h

```
_______________________Percent Time-Spent-Following_______________________

Direction                                 Analysis(d)        Opposing (o)
PCE for trucks, ET                           1.0                1.0
PCE for RVs, ER                              1.0                1.0
Heavy-vehicle adjustment factor, fHV       1.000              1.000
Grade adjustment factor,(note-1) fG         1.00               1.00
Directional flow rate,(note-2) vi           2811    pc/h       2316    pc/h
Base percent time-spent-following,(note-4) BPTSFd  98.3    %
Adjustment for no-passing zones, fnp               15.2
Percent time-spent-following, PTSFd                106.6   %

_______________Level of Service and Other Performance Measures_______________

Level of service, LOS                              F
Volume to capacity ratio, v/c                      1.66
Peak 15-min vehicle-miles of travel, VMT15         492     veh-mi
Peak-hour vehicle-miles of travel, VMT60           1869    veh-mi
Peak 15-min total travel time, TT15                36.1    veh-h
_____________________________________________________________________________
```

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

```
__________________________Passing Lane Analysis__________________________

Total length of analysis segment, Lt                          0.7      mi
Length of two-lane highway upstream of the passing lane, Lu   0.0      mi
Length of passing lane including tapers, Lpl                  0.0      mi
Average travel speed, ATSd (from above)                       13.6     mi/h
Percent time-spent-following, PTSFd (from above)              106.6
Level of service,(note-1) LOSd (from above)                   F

__________________________Average Travel Speed__________________________

Downstream length of two-lane highway within effective
    length of passing lane for average travel speed, Lde      1.70     mi
Length of two-lane highway downstream of effective
    length of the passing lane for average travel speed, Ld   -1.00    mi
Adj. factor for the effect of passing lane
    on average speed, fpl                                     1.11
Average travel speed including passing lane,(note-2) ATSpl    14.8

_______________________Percent Time-Spent-Following_______________________

Downstream length of two-lane highway within effective length
    of passing lane for percent time-spent-following, Lde     3.60     mi
Length of two-lane highway downstream of effective length of
    the passing lane for percent time-spent-following, Ld     -2.90    mi
Adj. factor for the effect of passing lane
    on percent time-spent-following, fpl                      0.62
Percent time-spent-following
    including passing lane,(note-3) PTSFpl                    70.0     %

__________Level of Service and Other Performance Measures (note-4)__________
```

Level of service including passing lane, LOSpl	D	
Peak 15-min total travel time, TT15	33.2	veh-h

Notes:

1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑	↱
Volume (vph)	**140**	**20**	**40**	**110**	**25**	**150**	**70**	**2730**	**60**	**245**	**3220**	**90**
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**1.00**	**1.00**
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (prot)	1749	1733	1450	1715	1699	1421	1722	3228	1406	1722	1699	1406
Flt Permitted	**0.74**	**1.00**	**1.00**	**0.74**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (perm)	1360	1733	1450	1339	1699	1421	1722	3228	1406	1722	1699	1406
Peak-hour factor, PHF	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**
Adj. Flow (vph)	165	24	47	129	29	176	74	2874	63	258	3389	95
RTOR Reduction (vph)	**0**	**0**	**40**	**0**	**0**	**135**	**0**	**0**	**10**	**0**	**0**	**6**
Lane Group Flow (vph)	165	24	7	129	29	41	74	2874	53	258	3389	89
Confl. Peds. (#/hr)	**2**		**2**	**2**		**2**	**2**		**2**	**2**		**2**
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	**Perm**		**Perm**	**Perm**		**Perm**	**Prot**		**Perm**	**Prot**		**Perm**
Protected Phases		4			8		5	2		1	6	
Permitted Phases	**4**		**4**	**8**		**8**			**2**			**6**
Actuated Green, G (s)	17.9	17.9	17.9	17.9	17.9	17.9	4.0	76.0	76.0	13.1	85.1	85.1
Effective Green, g (s)	**17.4**	**17.4**	**17.4**	**17.4**	**17.4**	**17.4**	**4.5**	**76.5**	**76.5**	**13.6**	**85.6**	**86.1**
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.04	0.64	0.64	0.11	0.71	0.72
Clearance Time (s)	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	**197**	**251**	**210**	**194**	**246**	**206**	**65**	**2058**	**896**	**195**	**1212**	**1009**
v/s Ratio Prot		0.01			0.02		0.04	c0.89		0.15	c1.99	
v/s Ratio Perm	**c0.12**		**0.00**	**0.10**		**0.03**			**0.04**			**0.06**
v/c Ratio	0.84	0.10	0.03	0.66	0.12	0.20	1.14	1.40	0.06	1.32	2.80	0.09
Uniform Delay, d1	**49.9**	**44.5**	**44.1**	**48.5**	**44.6**	**45.2**	**57.8**	**21.8**	**8.2**	**53.2**	**17.2**	**5.1**
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.51	0.09	0.84	1.00	1.41
Incremental Delay, d2	**26.4**	**0.2**	**0.1**	**9.1**	**0.3**	**0.6**	**78.6**	**178.7**	**0.0**	**148.7**	**808.5**	**0.0**
Delay (s)	76.3	44.7	44.2	57.6	44.9	45.8	124.9	189.9	0.8	193.2	825.7	7.2
Level of Service	**E**	**D**	**D**	**E**	**D**	**D**	**F**	**F**	**A**	**F**	**F**	**A**
Approach Delay (s)		66.7			50.3			184.3			761.3	
Approach LOS		**E**			**D**			**F**			**F**	

Intersection Summary			
HCM Average Control Delay	**469.2**	**HCM Level of Service**	**F**
HCM Volume to Capacity ratio	2.37		
Actuated Cycle Length (s)	**120.0**	**Sum of lost time (s)**	**9.0**
Intersection Capacity Utilization	214.2%	ICU Level of Service	H
Analysis Period (min)	**15**		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	70	10	30	420	10	930	25	1860	420	980	2320	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1722	1716	1421	1739	3228	1406	1722	3228	1458
Flt Permitted	0.24	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	431	1716	1458	1722	1716	1421	1739	3228	1406	1722	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	82	12	35	494	12	1094	26	1958	442	1032	2442	74
RTOR Reduction (vph)	0	0	30	0	0	374	0	0	126	0	0	13
Lane Group Flow (vph)	82	12	5	494	12	720	26	1958	316	1032	2442	61
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases		4		8	8		5	2		1	6	
Permitted Phases	4		4			8			2			6
Actuated Green, G (s)	17.0	17.0	17.0	25.5	25.5	25.5	2.4	34.9	34.9	25.6	58.1	58.1
Effective Green, g (s)	17.0	17.0	17.0	25.0	25.0	25.0	2.9	35.4	35.4	26.1	58.6	58.6
Actuated g/C Ratio	0.14	0.14	0.14	0.21	0.21	0.21	0.02	0.30	0.30	0.22	0.49	0.49
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	61	243	207	359	358	296	42	952	415	375	1576	712
v/s Ratio Prot		0.01		0.29	0.01		0.01	c0.61		c0.60	0.76	
v/s Ratio Perm	c0.19		0.00			c0.51			0.22			0.04
v/c Ratio	1.34	0.05	0.02	1.38	0.03	2.43	0.62	2.06	0.76	2.75	1.55	0.09
Uniform Delay, d1	51.5	44.5	44.4	47.5	37.9	47.5	58.0	42.3	38.5	46.9	30.7	16.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.98	1.27
Incremental Delay, d2	231.9	0.1	0.0	185.9	0.1	655.3	24.2	479.2	12.4	789.1	247.6	0.0
Delay (s)	283.4	44.6	44.4	233.4	37.9	702.8	82.2	521.5	50.8	835.3	277.7	20.9
Level of Service	F	D	D	F	D	F	F	F	D	F	F	C
Approach Delay (s)		196.3			552.9			431.0			434.5	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	454.0	HCM Level of Service	F
HCM Volume to Capacity ratio	2.21		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	157.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑	↑	↱
Volume (veh/h)	0	190	0	3220	3415	370
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	224	0	3389	3595	389
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				TWLTL	None	
Median storage veh)				2		
Upstream signal (ft)				1246		
pX, platoon unblocked	0.26					
vC, conflicting volume	6988	3599	3986			
vC1, stage 1 conf vol	3597					
vC2, stage 2 conf vol	3391					
vCu, unblocked vol	22473	3599	3986			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	7	45			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	224	3389	3595	389
Volume Left	0	0	0	0
Volume Right	224	0	0	389
cSH	7	1700	1700	1700
Volume to Capacity	30.44	1.99	2.11	0.23
Queue Length 95th (ft)	Err	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0
Lane LOS	F			
Approach Delay (s)	Err	0.0	0.0	
Approach LOS	F			

Intersection Summary			
Average Delay	294.2		
Intersection Capacity Utilization	214.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑	↱		↑
Volume (veh/h)	0	545	3085	135	0	3785
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	641	3247	142	0	3984
Pedestrians	2		2			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	7236	3251			3391	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	7236	3251			3391	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	0			100	
cM capacity (veh/h)	0	12			79	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	641	3247	142	3984
Volume Left	0	0	0	0
Volume Right	641	0	142	0
cSH	12	1700	1700	1700
Volume to Capacity	54.24	1.91	0.08	2.34
Queue Length 95th (ft)	Err	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0
Lane LOS	F			
Approach Delay (s)	Err	0.0		0.0
Approach LOS	F			

Intersection Summary			
Average Delay	799.9		
Intersection Capacity Utilization	226.9%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑	↱		↑↱	
Volume (veh/h)	0	0	35	0	0	255	0	2965	55	0	3520	85
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	41	0	0	300	0	3121	58	0	3705	89
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								700				
pX, platoon unblocked	0.26	0.26		0.26	0.26	0.26				0.26		
vC, conflicting volume	7175	6933	3754	6916	6920	3125	3797			3181		
vC1, stage 1 conf vol	3752	3752		3123	3123							
vC2, stage 2 conf vol	3423	3181		3793	3797							
vCu, unblocked vol	23463	22526	3754	22462	22475	7789	3797			8006		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	0	0	100	0	100			100		
cM capacity (veh/h)	0	0	6	0	0	0	54			0		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	41	300	3121	58	3795
Volume Left	0	0	0	0	0
Volume Right	41	300	0	58	89
cSH	6	0	1700	1700	1700
Volume to Capacity	6.92	Err	1.84	0.03	2.23
Queue Length 95th (ft)	Err	Err	0	0	0
Control Delay (s)	Err	Err	0.0	0.0	0.0
Lane LOS	F	F			
Approach Delay (s)	Err	Err	0.0		0.0
Approach LOS	F	F			

Intersection Summary			
Average Delay	466.4		
Intersection Capacity Utilization	217.4%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Volume (veh/h)	45	105	2200	50	100	2670
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	53	124	2316	53	105	2811
Pedestrians	2		2			2
Lane Width (ft)	13.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3936	1162			2370	
vC1, stage 1 conf vol	2318					
vC2, stage 2 conf vol	1618					
vCu, unblocked vol	3936	1162			2370	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	35			47	
cM capacity (veh/h)	43	189			199	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	53	124	1158	1158	53	105	1405	1405
Volume Left	53	0	0	0	0	105	0	0
Volume Right	0	124	0	0	53	0	0	0
cSH	43	189	1700	1700	1700	199	1700	1700
Volume to Capacity	1.24	0.65	0.68	0.68	0.03	0.53	0.83	0.83
Queue Length 95th (ft)	129	96	0	0	0	68	0	0
Control Delay (s)	367.1	54.2	0.0	0.0	0.0	41.9	0.0	0.0
Lane LOS	F	F				E		
Approach Delay (s)	148.0		0.0			1.5		
Approach LOS	F							

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↑	↱
Volume (veh/h)	80	40	35	2170	2625	90
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	94	47	37	2284	2763	95
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3983	1386	2860			
vC1, stage 1 conf vol	2765					
vC2, stage 2 conf vol	1218					
vCu, unblocked vol	3983	1386	2860			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)	5.9					
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	64	71			
cM capacity (veh/h)	31	131	126			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	141	37	1142	1142	1382	1382	95
Volume Left	94	37	0	0	0	0	0
Volume Right	47	0	0	0	0	0	95
cSH	42	126	1700	1700	1700	1700	1700
Volume to Capacity	3.38	0.29	0.67	0.67	0.81	0.81	0.06
Queue Length 95th (ft)	Err	28	0	0	0	0	0
Control Delay (s)	Err	44.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	E					
Approach Delay (s)	Err	0.7			0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	265.6		
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	20	0	5	5	0	5	5	2180	0	5	2640	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	0	6	6	0	6	5	2295	0	5	2779	21
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3957	5099	1393	3715	5120	1151	2802			2297		
vC1, stage 1 conf vol	2791	2791		2307	2307							
vC2, stage 2 conf vol	1166	2307		1408	2813							
vCu, unblocked vol	3957	5099	1393	3715	5120	1151	2802			2297		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	96	83	100	97	96			98		
cM capacity (veh/h)	18	31	132	35	28	192	133			213		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	29	12	5	1530	765	5	1389	1389	21
Volume Left	24	6	5	0	0	5	0	0	0
Volume Right	6	6	0	0	0	0	0	0	21
cSH	22	59	133	1700	1700	213	1700	1700	1700
Volume to Capacity	1.35	0.20	0.04	0.90	0.45	0.02	0.82	0.82	0.01
Queue Length 95th (ft)	96	17	3	0	0	2	0	0	0
Control Delay (s)	578.3	80.4	33.1	0.0	0.0	22.4	0.0	0.0	0.0
Lane LOS	F	F	D			C			
Approach Delay (s)	578.3	80.4	0.1			0.0			
Approach LOS	F	F							

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		

INTERSECTION: 35th Street
SCENARIO: 2030 30HV -5 lane
DATE: 1-Aug-09
Future Cycle Length (C): **120**
Vehicle Length (L): 25

# OF CYCLES QUEUE IS EXCEEDED		
@95%	@85%	@75%
2	5	8

Movement	Traffic Volume (vol) (veh/hr)	Number of Lanes (N)	Lane Storage Length (ft)	Green per Cycle (g/C)	Avg Total # Vehicles (veh)	Avg Queue Length / Lane (ft)	95% Total Vehicles (95% veh)	95% Queue Length / Lane (ft)
NB LT	70	1	**0**	**0.08**	2	75	5	**125**
NB TH & COMB	2730	2	**0**	**0.57**	39	500	47	600
NB RT	60	1	**175**	**0.57**	1	25	0	0
SB LT	245	1	**0**	**0.09**	7	200	11	**275**
SB TH & COMB	3220	2	**0**	**0.58**	45	575	47	600
SB RT	90	1	**175**	**0.58**	1	50	3	75
EB LT	140	1	**120**	**0.17**	4	100	6	**150**
EB TH & COMB	20	1	**0**	**0.17**	1	25	0	0
EB RT	40	1	**155**	**0.17**	1	50	3	75
WB LT	110	1	**120**	**0.17**	3	100	6	**150**
WB TH & COMB	25	1	**0**	**0.17**	1	25	0	0
WB RT	150	1	**155**	**0.17**	4	125	8	**200**

Average Total # Vehicles=[(1-g/C)x(vol)]/[3600/C]
Average Queue Length=ROUNDUP(average # vehicles) x L / N
95% Vehicle = (average total # vehicles) x (poisson distribution factor)
95% Queue Length = (95% total vehicles) x (vehicle length) / (number of lanes)
Formula calculated per instructions in ITE Traffic Engineering Handbook, 5th ed, pp.332-333, except uses poisson distribution and does not include truck % because it is already included in the LOS analysis, resulting in adjusted g/C ratios to reflect the inclusion of trucks.

INTERSECTION: 40th Street
SCENARIO: 2030 HV -5 lane
DATE: 1-Aug-09
Future Cycle Length (C): **120**
Vehicle Length (L): 25

# OF CYCLES QUEUE IS EXCEEDED		
@95%	@85%	@75%
2	5	8

Movement	Traffic Volume (vol) (veh/hr)	Number of Lanes (N)	Lane Storage Length (ft)	Green per Cycle (g/C)	Avg Total # Vehicles (veh)	Avg Queue Length / Lane (ft)	95% Total Vehicles (95% veh)	95% Queue Length / Lane (ft)
NB LT	25	1	**0**	**0.02**	1	25	0	0
NB TH & COMB	1860	1	**0**	**0.30**	43	1100	47	1175
NB RT	420	1	**175**	**0.30**	10	250	14	**350**
SB LT	980	1	**0**	**0.22**	25	650	33	**825**
SB TH & COMB	2320	1	**0**	**0.49**	39	1000	47	1175
SB RT	70	1	**175**	**0.49**	1	50	3	75
EB LT	70	1	**120**	**0.14**	2	75	5	**125**
EB TH & COMB	10	1	**0**	**0.14**	0	25	0	0
EB RT	30	1	**155**	**0.14**	1	25	0	0
WB LT	420	1	**120**	**0.21**	11	300	17	**425**
WB TH & COMB	10	1	**0**	**0.21**	0	25	0	0
WB RT	930	1	**155**	**0.21**	24	625	32	**800**

Average Total # Vehicles=[(1-g/C)x(vol)]/[3600/C]
Average Queue Length=ROUNDUP(average # vehicles) x L / N
95% Vehicle = (average total # vehicles) x (poisson distribution factor)
95% Queue Length = (95% total vehicles) x (vehicle length) / (number of lanes)
Formula calculated per instructions in ITE Traffic Engineering Handbook, 5th ed, pp.332-333, except uses poisson distribution and does not include truck % because it is already included in the LOS analysis, resulting in adjusted g/C ratios to reflect the inclusion of trucks.

Arterial Level of Service: NB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
40th Street	I	51	101.8	464.9	566.7	1.43	9.1	F
35th St.	I	35	31.2	196.6	227.8	0.28	4.5	F
Total	I		133.0	661.5	794.5	1.72	7.8	F

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
35th St	III	31	200.2	824.9	1025.1	1.73	6.1	F
40th Street	III	35	34.1	255.1	289.2	0.28	3.5	F
Total	III		234.3	1080.0	1314.3	2.01	5.5	F

US 101

Direction	NB	SB	All
Total Delay (hr)	397	1159	1555
Stops (#)	**3079**	**5134**	**8213**
Average Speed (mph)	10	6	7
Total Travel Time (hr)	**513**	**1378**	**1890**
Distance Traveled (mi)	5058	8232	13291
Unserved Vehicles (#)	**1698**	**3556**	**5254**
Performance Index	405.2	1172.8	1578.0

APPENDIX D

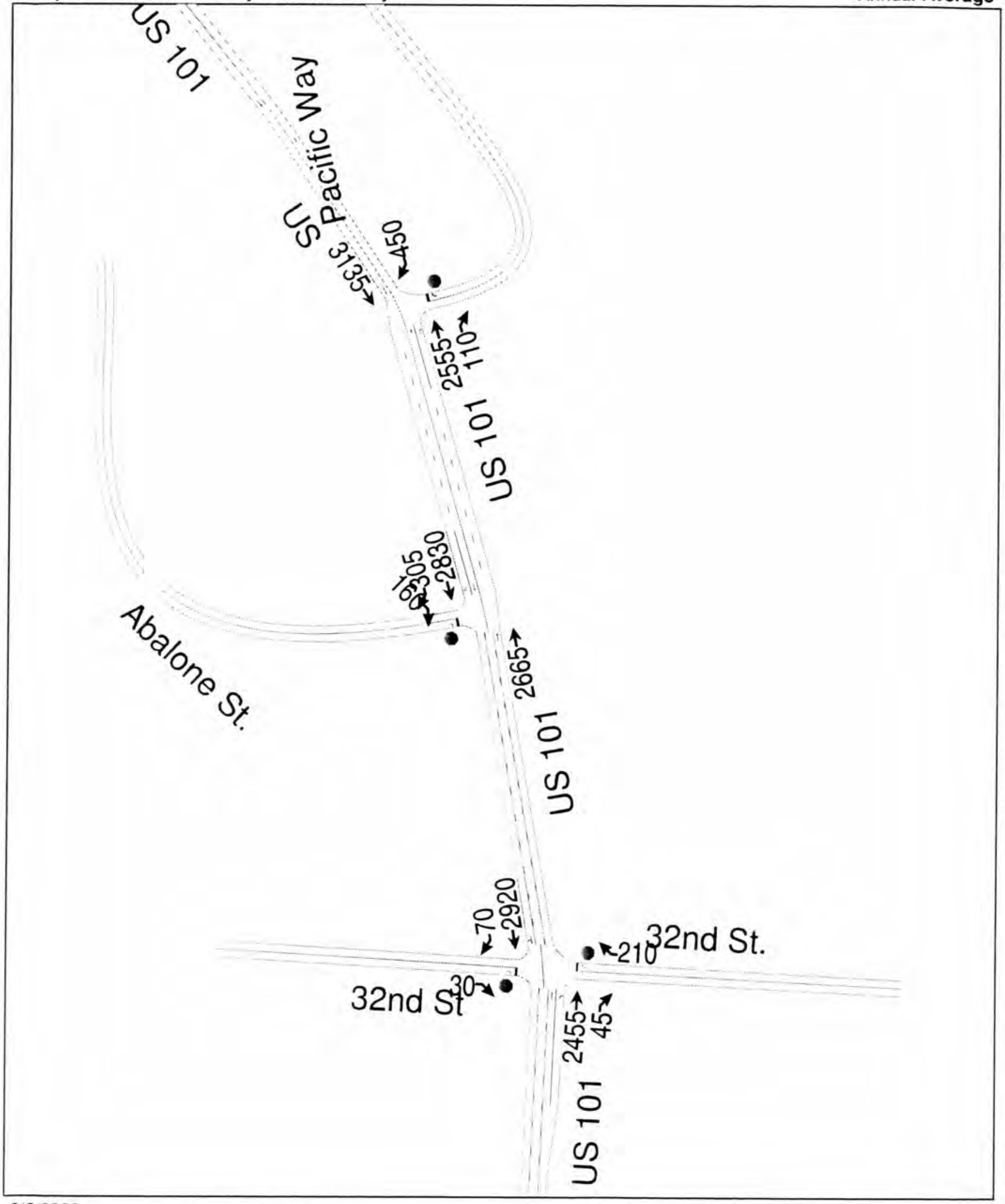
Analysis of 2030 Average Annual Baseline Volumes

Figure 2 C

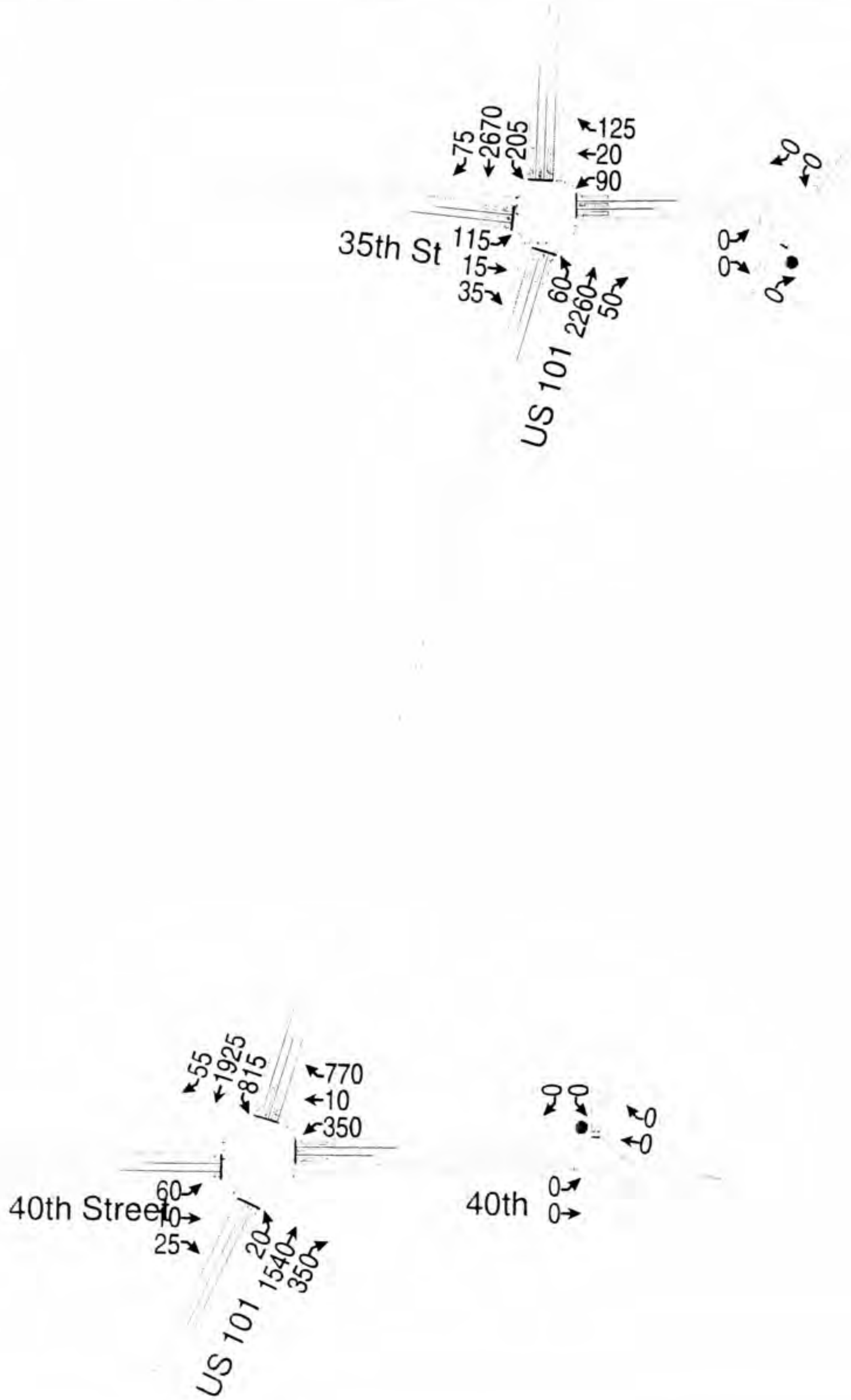
Newport Alternative Mobility Standard Study

2030 Base System-Annual Average

Annual Average



8/6/2009


75
2670
205
125
20
90
35th St
115
15
35
60
2260
50
US 101
0
0
0
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0
55
1925
815
770
10
350
40th Street
60
10
25
20
1540
350
US 101
0
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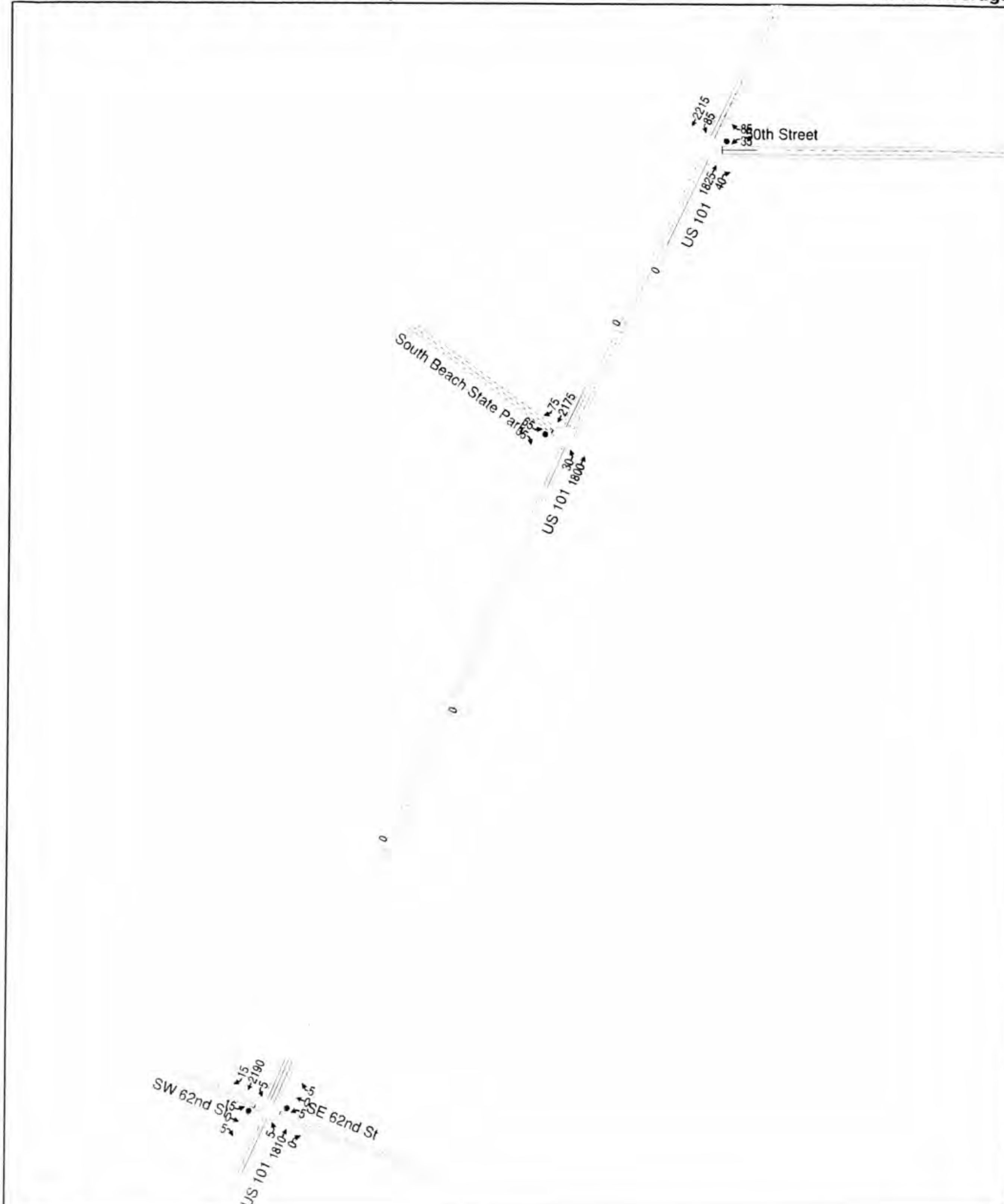
0
0
40th
0
0

Figure 2 A
Newport Alternative Mobility Standard Study

2030 Base System-Annual Average
Annual Average



8/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
Volume (vph)	115	15	35	90	20	125	60	2260	50	205	2670	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	1733	1434	1711	1699	1406	1722	1699	1406	1722	1699	1406
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1362	1733	1434	1343	1699	1406	1722	1699	1406	1722	1699	1406
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	135	18	41	106	24	147	63	2379	53	216	2811	79
RTOR Reduction (vph)	0	0	36	0	0	119	0	0	5	0	0	6
Lane Group Flow (vph)	135	18	5	106	24	28	63	2379	48	216	2811	73
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	16.5	16.5	16.5	16.5	16.5	16.5	4.0	78.0	78.0	12.5	86.5	86.5
Effective Green, g (s)	16.0	16.0	16.0	16.0	16.0	16.0	4.5	78.5	78.5	13.0	87.0	87.5
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.04	0.65	0.65	0.11	0.72	0.73
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	182	231	191	179	227	187	65	1111	920	187	1232	1025
v/s Ratio Prot		0.01			0.01		0.04	c1.40		0.13	c1.65	
v/s Ratio Perm	c0.10		0.00	0.08		0.02			0.03			0.05
v/c Ratio	0.74	0.08	0.03	0.59	0.11	0.15	0.97	2.14	0.05	1.16	2.28	0.07
Uniform Delay, d1	50.0	45.5	45.2	48.9	45.7	46.0	57.7	20.8	7.4	53.5	16.5	4.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.21	0.14	1.00	1.00	1.00
Incremental Delay, d2	15.9	0.2	0.1	6.0	0.3	0.5	25.7	513.9	0.0	113.8	579.3	0.1
Delay (s)	65.9	45.7	45.3	55.0	46.0	46.5	66.8	518.2	1.1	167.3	595.8	4.8
Level of Service	E	D	D	D	D	D	E	F	A	F	F	A
Approach Delay (s)		59.7			49.7			495.8			551.0	
Approach LOS		E			D			F			F	

Intersection Summary			
HCM Average Control Delay	489.7	HCM Level of Service	F
HCM Volume to Capacity ratio	2.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	180.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
Volume (vph)	60	10	25	350	10	770	20	1540	350	815	1925	55
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1900	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.5	4.5	4.5	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1709	1716	1406	1888	1699	1406	1722	1699	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1372	1716	1458	1349	1716	1406	1888	1699	1406	1722	1699	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	12	29	412	12	906	21	1621	368	858	2026	58
RTOR Reduction (vph)	0	0	23	0	0	280	0	0	68	0	0	7
Lane Group Flow (vph)	71	12	6	412	12	626	21	1621	300	858	2026	51
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	26.0	26.0	26.0	25.5	25.5	25.5	1.6	54.1	54.1	27.4	79.9	79.9
Effective Green, g (s)	25.5	25.5	25.5	25.0	25.0	25.0	2.1	54.6	54.6	27.9	80.4	80.4
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.02	0.46	0.46	0.23	0.67	0.67
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	292	365	310	281	358	293	33	773	640	400	1138	977
v/s Ratio Prot		0.01			0.01		0.01	c0.95		c0.50	1.19	
v/s Ratio Perm	0.05		0.00	0.31		c0.44			0.21			0.04
v/c Ratio	0.24	0.03	0.02	1.47	0.03	2.14	0.64	2.10	0.47	2.14	1.78	0.05
Uniform Delay, d1	39.2	37.5	37.4	47.5	37.9	47.5	58.6	32.7	22.7	46.1	19.8	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.84	0.60	1.03
Incremental Delay, d2	0.4	0.0	0.0	228.3	0.1	522.4	33.9	498.1	2.5	516.0	351.5	0.0
Delay (s)	39.7	37.5	37.4	275.8	37.9	569.9	92.4	530.8	25.1	554.6	363.3	7.0
Level of Service	D	D	D	F	D	F	F	F	C	F	F	A
Approach Delay (s)		38.8			474.0			433.6			412.0	
Approach LOS		D			F			F			F	

Intersection Summary			
HCM Average Control Delay	425.2	**HCM Level of Service**	F
HCM Volume to Capacity ratio	2.12		
Actuated Cycle Length (s)	120.0	**Sum of lost time (s)**	12.5
Intersection Capacity Utilization	175.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑	↑	↱
Volume (veh/h)	0	160	0	2665	2830	305
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	188	0	2805	2979	321
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				TWLTL	None	
Median storage veh)				2		
Upstream signal (ft)				1246		
pX, platoon unblocked	0.34					
vC, conflicting volume	5788	2983	3302			
vC1, stage 1 conf vol	2981					
vC2, stage 2 conf vol	2807					
vCu, unblocked vol	14100	2983	3302			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	1	18	86			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	188	2805	2979	321
Volume Left	0	0	0	0
Volume Right	188	0	0	321
cSH	18	1700	1700	1700
Volume to Capacity	10.35	1.65	1.75	0.19
Queue Length 95th (ft)	Err	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0
Lane LOS	F			
Approach Delay (s)	Err	0.0	0.0	
Approach LOS	F			

Intersection Summary			
Average Delay	299.1		
Intersection Capacity Utilization	179.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑	↱		↑
Volume (veh/h)	0	450	2555	110	0	3135
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	529	2689	116	0	3300
Pedestrians	2		2			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5993	2693			2807	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5993	2693			2807	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	0			100	
cM capacity (veh/h)	0	27			136	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	529	2689	116	3300
Volume Left	0	0	0	0
Volume Right	529	0	116	0
cSH	27	1700	1700	1700
Volume to Capacity	19.76	1.58	0.07	1.94
Queue Length 95th (ft)	Err	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0
Lane LOS	F			
Approach Delay (s)	Err	0.0		0.0
Approach LOS	F			

Intersection Summary			
Average Delay	797.9		
Intersection Capacity Utilization	189.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑	↱		↳	
Volume (veh/h)	0	0	30	0	0	210	0	2455	45	0	2920	70
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	35	0	0	247	0	2584	47	0	3074	74
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								700				
pX, platoon unblocked	0.30	0.30		0.30	0.30	0.30				0.30		
vC, conflicting volume	5946	5746	3115	5734	5736	2588	3149			2634		
vC1, stage 1 conf vol	3113	3113		2586	2586							
vC2, stage 2 conf vol	2833	2634		3148	3149							
vCu, unblocked vol	16166	15508	3115	15468	15473	5090	3149			5240		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	0	0	100	0	100			100		
cM capacity (veh/h)	0	1	15	0	1	0	99			4		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	35	247	2584	47	3147
Volume Left	0	0	0	0	0
Volume Right	35	247	0	47	74
cSH	15	0	1700	1700	1700
Volume to Capacity	2.31	1050.06	1.52	0.03	1.85
Queue Length 95th (ft)	127	Err	0	0	0
Control Delay (s)	1111.0	Err	0.0	0.0	0.0
Lane LOS	F	F			
Approach Delay (s)	1111.0	Err	0.0		0.0
Approach LOS	F	F			

Intersection Summary			
Average Delay	414.0		
Intersection Capacity Utilization	182.1%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑	↱	↰	↑
Volume (veh/h)	35	85	1825	40	85	2215
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	41	100	1921	42	89	2332
Pedestrians	2		2			2
Lane Width (ft)	13.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	4436	1925			1965	
vC1, stage 1 conf vol	1923					
vC2, stage 2 conf vol	2513					
vCu, unblocked vol	4436	1925			1965	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	0			69	
cM capacity (veh/h)	39	84			293	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	41	100	1921	42	89	2332
Volume Left	41	0	0	0	89	0
Volume Right	0	100	0	42	0	0
cSH	39	84	1700	1700	293	1700
Volume to Capacity	1.05	1.20	1.13	0.02	0.31	1.37
Queue Length 95th (ft)	101	181	0	0	31	0
Control Delay (s)	314.9	251.1	0.0	0.0	22.6	0.0
Lane LOS	F	F			C	
Approach Delay (s)	269.7		0.0		0.8	
Approach LOS	F					

Intersection Summary			
Average Delay	8.9		
Intersection Capacity Utilization	137.2%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	65	35	30	1800	2175	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	76	41	32	1895	2289	79
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	4251	2293	2370			
vC1, stage 1 conf vol	2291					
vC2, stage 2 conf vol	1960					
vCu, unblocked vol	4251	2293	2370			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	16	84			
cM capacity (veh/h)	59	49	203			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	118	32	1895	2289	79
Volume Left	76	32	0	0	0
Volume Right	41	0	0	0	79
cSH	55	203	1700	1700	1700
Volume to Capacity	2.14	0.16	1.11	1.35	0.05
Queue Length 95th (ft)	291	13	0	0	0
Control Delay (s)	687.3	26.0	0.0	0.0	0.0
Lane LOS	F	D			
Approach Delay (s)	687.3	0.4		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	18.5		
Intersection Capacity Utilization	137.7%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↱		↰	↑	↱
Volume (veh/h)	15	0	5	5	0	5	5	1810	0	5	2190	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	0	6	6	0	6	5	1905	0	5	2305	16
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	4241	4236	2309	4241	4251	1909	2323			1907		
vC1, stage 1 conf vol	2318	2318		1918	1918							
vC2, stage 2 conf vol	1924	1918		2324	2334							
vCu, unblocked vol	4241	4236	2309	4241	4251	1909	2323			1907		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	54	100	88	82	100	93	98			98		
cM capacity (veh/h)	38	55	49	33	52	85	212			308		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	24	12	5	1905	5	2305	16
Volume Left	18	6	5	0	5	0	0
Volume Right	6	6	0	0	0	0	16
cSH	41	47	212	1700	308	1700	1700
Volume to Capacity	0.58	0.25	0.02	1.12	0.02	1.36	0.01
Queue Length 95th (ft)	52	21	2	0	1	0	0
Control Delay (s)	178.8	104.3	22.4	0.0	16.9	0.0	0.0
Lane LOS	F	F	C		C		
Approach Delay (s)	178.8	104.3	0.1		0.0		
Approach LOS	F	F					

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	135.8%	ICU Level of Service	H
Analysis Period (min)	15		

INTERSECTION: 35th Street
SCENARIO: 2030 Annual Avg -3 lane
DATE: 1-Aug-09
Future Cycle Length (C): **120**
Vehicle Length (L): 25

# OF CYCLES QUEUE IS EXCEEDED		
@95%	@85%	@75%
2	5	8

Movement	Traffic Volume (vol) (veh/hr)	Number of Lanes (N)	Lane Storage Length (ft)	Green per Cycle (g/C)	Avg Total # Vehicles (veh)	Avg Queue Length / Lane (ft)	95% Total Vehicles (95% veh)	95% Queue Length / Lane (ft)
NB LT	60	1	**0**	**0.04**	2	50	3	**75**
NB TH & COMB	2260	1	**0**	**0.65**	26	675	34	850
NB RT	50	1	**175**	**0.65**	1	25	0	0
SB LT	205	1	**0**	**0.11**	6	175	10	**250**
SB TH & COMB	2670	1	**0**	**0.72**	25	625	32	800
SB RT	75	1	**175**	**0.73**	1	25	0	0
EB LT	115	1	**120**	**0.13**	3	100	6	**150**
EB TH & COMB	15	1	**0**	**0.13**	0	25	0	0
EB RT	35	1	**155**	**0.13**	1	50	3	75
WB LT	90	1	**120**	**0.13**	3	75	5	**125**
WB TH & COMB	20	1	**0**	**0.13**	1	25	0	0
WB RT	125	1	**155**	**0.13**	4	100	6	150

Average Total # Vehicles=[(1-g/C)x(vol)]/[3600/C]
Average Queue Length=ROUNDUP(average # vehicles) x L / N
95% Vehicle = (average total # vehicles) x (poisson distribution factor)
95% Queue Length = (95% total vehicles) x (vehicle length) / (number of lanes)
Formula calculated per instructions in ITE Traffic Engineering Handbook, 5th ed, pp.332-333, except uses poisson distribution and does not include truck % because it is already included in the LOS analysis, resulting in adjusted g/C ratios to reflect the inclusion of trucks.

INTERSECTION:	40th Street
SCENARIO:	2030 AAV -3 lane
DATE:	1-Aug-09
Future Cycle Length (C):	**120**
Vehicle Length (L):	25

# OF CYCLES QUEUE IS EXCEEDED		
@95%	@85%	@75%
2	5	8

Movement	Traffic Volume (vol) (veh/hr)	Number of Lanes (N)	Lane Storage Length (ft)	Green per Cycle (g/C)	Avg Total # Vehicles (veh)	Avg Queue Length / Lane (ft)	95% Total Vehicles (95% veh)	95% Queue Length / Lane (ft)
NB LT	20	1	**0**	**0.02**	1	25	0	0
NB TH & COMB	1540	1	**0**	**0.46**	28	700	36	900
NB RT	350	1	**175**	**0.46**	6	175	10	**250**
SB LT	815	1	**0**	**0.23**	21	525	27	**675**
SB TH & COMB	1925	1	**0**	**0.67**	21	550	29	725
SB RT	55	1	**175**	**0.67**	1	25	0	0
EB LT	60	1	**120**	**0.21**	2	50	3	75
EB TH & COMB	10	1	**0**	**0.21**	0	25	0	0
EB RT	25	1	**155**	**0.21**	1	25	0	0
WB LT	350	1	**120**	**0.21**	9	250	14	**350**
WB TH & COMB	10	1	**0**	**0.21**	0	25	0	0
WB RT	770	1	**155**	**0.21**	20	525	27	**675**

Average Total # Vehicles=[(1-g/C)x(vol)]/[3600/C]
Average Queue Length=ROUNDUP(average # vehicles) x L / N
95% Vehicle = (average total # vehicles) x (poisson distribution factor)
95% Queue Length = (95% total vehicles) x (vehicle length) / (number of lanes)
Formula calculated per instructions in ITE Traffic Engineering Handbook, 5th ed, pp.332-333, except uses poisson distribution and does not include truck % because it is already included in the LOS analysis, resulting in adjusted g/C ratios to reflect the inclusion of trucks.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
40th Street	II	51	101.8	481.1	582.9	1.43	8.9	F
35th St.	II	35	31.2	529.7	560.9	0.28	1.8	F
Hurbert St	II	31	200.2	582.6	782.8	1.73	7.9	F
Total	II		333.2	1593.4	1926.6	3.44	6.4	F

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	625.1	647.0	0.16	0.9	F
35th St	III	31	200.2	597.6	797.8	1.73	7.8	F
40th Street	III	35	34.1	346.3	380.4	0.28	2.7	F
Total	III		256.2	1569.0	1825.2	2.17	4.3	F

US 101

Direction	NB	SB	All
Total Delay (hr)	542	780	1322
Average Speed (mph)	**7**	**7**	**7**
Total Travel Time (hr)	638	962	1600
Distance Traveled (mi)	**4193**	**6826**	**11019**
Unserved Vehicles (#)	1978	2806	4784
Performance Index	**547.8**	**790.7**	**1338.4**

HCS+: Two-Lane Highways Release 5.3

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	8/18/2009
Analysis Time Period	2030 AA-3 lane
Highway	US 101
From/To	Pacific Way to 35th Street
Jurisdiction	
Analysis Year	NB
Description	Base Network

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.95	
Shoulder width	6.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	2	/mi

Analysis direction volume, Vd 3005 veh/h
Opposing direction volume, Vo 3135 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	3176	pc/h	3313	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	0.5	mi/h
Free-flow speed, FFSd	44.5	mi/h
Adjustment for no-passing zones, fnp	0.6	mi/h
Average travel speed, ATSd	-6.5	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	3163	pc/h	3300	pc/h
Base percent time-spent-following,(note-4) BPTSFd	98.9	%		
Adjustment for no-passing zones, fnp	49.0			
Percent time-spent-following, PTSFd	122.9	%		

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.87	
Peak 15-min vehicle-miles of travel, VMT15	158	veh-mi
Peak-hour vehicle-miles of travel, VMT60	601	veh-mi
Peak 15-min total travel time, TT15	-24.5	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	0.2	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	-6.5	mi/h
Percent time-spent-following, PTSFd (from above)	122.9	
Level of service,(note-1) LOSd (from above)	F	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-1.50	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane,(note-2) ATSpl	-7.1	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	3.60	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-3.40	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane,(note-3) PTSFpl	77.5	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	F	
Peak 15-min total travel time, TT15		veh-h

Notes:

1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	8/18/2009
Analysis Time Period	2030 AA-3 lane
Highway	US 101
From/To	Pacific Way to 35th Street
Jurisdiction	
Analysis Year	SB
Description Base Network	

Input Data

Highway class Class 1			Peak-hour factor, PHF	0.95	
Shoulder width	6.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	2	/mi

Analysis direction volume, Vd 3135 veh/h
Opposing direction volume, Vo 3005 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	3313	pc/h	3176	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	0.5	mi/h
Free-flow speed, FFSd	44.5	mi/h
Adjustment for no-passing zones, fnp	0.6	mi/h
Average travel speed, ATSd	-6.5	mi/h

```
__________________________Percent Time-Spent-Following__________________________

Direction                                 Analysis(d)          Opposing (o)
PCE for trucks, ET                            1.0                  1.0
PCE for RVs, ER                               1.0                  1.0
Heavy-vehicle adjustment factor, fHV          1.000                1.000
Grade adjustment factor,(note-1) fG           1.00                 1.00
Directional flow rate,(note-2) vi             3300   pc/h          3163     pc/h
Base percent time-spent-following,(note-4) BPTSFd   99.0   %
Adjustment for no-passing zones, fnp                -10.2
Percent time-spent-following, PTSFd                 93.8   %

________________Level of Service and Other Performance Measures_______________

Level of service, LOS                               F
Volume to capacity ratio, v/c                       1.95
Peak 15-min vehicle-miles of travel, VMT15          165      veh-mi
Peak-hour vehicle-miles of travel, VMT60            627      veh-mi
Peak 15-min total travel time, TT15                 -25.6    veh-h
_____________________________________________________________________________

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo ) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds
   on a specific downgrade.

_____________________________Passing Lane Analysis_____________________________

Total length of analysis segment, Lt                               0.2      mi
Length of two-lane highway upstream of the passing lane, Lu        0.0      mi
Length of passing lane including tapers, Lpl                       0.0      mi
Average travel speed, ATSd (from above)                            -6.5     mi/h
Percent time-spent-following, PTSFd (from above)                   93.8
Level of service,(note-1) LOSd (from above)                        F

_____________________________Average Travel Speed______________________________

Downstream length of two-lane highway within effective
    length of passing lane for average travel speed, Lde           1.70     mi
Length of two-lane highway downstream of effective
    length of the passing lane for average travel speed, Ld        -1.50    mi
Adj. factor for the effect of passing lane
    on average speed, fpl                                          1.11
Average travel speed including passing lane,(note-2) ATSpl         -7.1

__________________________Percent Time-Spent-Following_________________________

Downstream length of two-lane highway within effective length
    of passing lane for percent time-spent-following, Lde          3.60     mi
Length of two-lane highway downstream of effective length of
    the passing lane for percent time-spent-following, Ld          -3.40    mi
Adj. factor for the effect of passing lane
    on percent time-spent-following, fpl                           0.62
Percent time-spent-following
    including passing lane,(note-3) PTSFpl                         59.2     %

___________Level of Service and Other Performance Measures (note-4)___________
```

Level of service including passing lane, LOSpl F
Peak 15-min total travel time, TT15 veh-h

Notes:

1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

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Phone: Fax:
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Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	8/18/2009
Analysis Time Period	2030 AA-3 lane
Highway	US 101
From/To	35th Street to 50th
Jurisdiction	
Analysis Year	NB
Description	Base Network

Input Data

Highway class	Class 2		Peak-hour factor, PHF	0.95	
Shoulder width	6.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.8	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	3	/mi

Analysis direction volume, Vd 2260 veh/h
Opposing direction volume, Vo 2670 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	2388	pc/h	2822	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	0.8	mi/h
Free-flow speed, FFSd	44.3	mi/h
Adjustment for no-passing zones, fnp	0.6	mi/h
Average travel speed, ATSd	3.2	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	2379	pc/h	2811	pc/h
Base percent time-spent-following,(note-4) BPTSFd	97.1	%		
Adjustment for no-passing zones, fnp	49.0			
Percent time-spent-following, PTSFd	119.6	%		

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.40	
Peak 15-min vehicle-miles of travel, VMT15	476	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1808	veh-mi
Peak 15-min total travel time, TT15	147.8	veh-h

Notes:

1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	0.8	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	3.2	mi/h
Percent time-spent-following, PTSFd (from above)	119.6	
Level of service,(note-1) LOSd (from above)	F	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.90	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane,(note-2) ATSpl	3.5	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	3.60	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-2.80	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane,(note-3) PTSFpl	79.2	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	D	
Peak 15-min total travel time, TT15	136.3	veh-h

Notes:

1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

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Phone: Fax:
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Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	8/18/2009
Analysis Time Period	2030 AA-3 lane
Highway	US 101
From/To	35th Street to 50th
Jurisdiction	
Analysis Year	SB
Description Base Network	

Input Data

Highway class	Class 2		Peak-hour factor, PHF	0.95	
Shoulder width	6.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.8	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	3	/mi

Analysis direction volume, Vd 2670 veh/h
Opposing direction volume, Vo 2260 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	2822	pc/h	2388	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	0.8	mi/h
Free-flow speed, FFSd	44.3	mi/h
Adjustment for no-passing zones, fnp	0.6	mi/h
Average travel speed, ATSd	3.2	mi/h

______Percent Time-Spent-Following______

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	2811 pc/h	2379 pc/h
Base percent time-spent-following,(note-4) BPTSFd	98.3 %	
Adjustment for no-passing zones, fnp	14.9	
Percent time-spent-following, PTSFd	106.4 %	

______Level of Service and Other Performance Measures______

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.66	
Peak 15-min vehicle-miles of travel, VMT15	562	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2136	veh-mi
Peak 15-min total travel time, TT15	174.5	veh-h

Notes:

1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

______Passing Lane Analysis______

Total length of analysis segment, Lt	0.8	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	3.2	mi/h
Percent time-spent-following, PTSFd (from above)	106.4	
Level of service,(note-1) LOSd (from above)	F	

______Average Travel Speed______

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.90	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane,(note-2) ATSpl	3.5	

______Percent Time-Spent-Following______

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	3.60	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-2.80	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane,(note-3) PTSFpl	70.4	%

______Level of Service and Other Performance Measures (note-4)______

Level of service including passing lane, LOSpl D
Peak 15-min total travel time, TT15 161.0 veh-h

Notes:

1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

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Phone: Fax:
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Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	8/18/2009
Analysis Time Period	2030 AA-3 lane
Highway	US 101
From/To	50th to 62nd
Jurisdiction	
Analysis Year	NB
Description Base Network	

Input Data

Highway class Class 2			Peak-hour factor, PHF	0.95	
Shoulder width	6.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	3	/mi

Analysis direction volume, Vd 1825 veh/h
Opposing direction volume, Vo 2215 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	1929	pc/h	2341	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	55.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	0.8	mi/h
Free-flow speed, FFSd	54.3	mi/h
Adjustment for no-passing zones, fnp	0.7	mi/h
Average travel speed, ATSd	20.4	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	1921 pc/h	2332 pc/h

Base percent time-spent-following,(note-4) BPTSFd	94.9	%
Adjustment for no-passing zones, fnp	49.0	
Percent time-spent-following, PTSFd	117.1	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.13	
Peak 15-min vehicle-miles of travel, VMT15	336	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1277	veh-mi
Peak 15-min total travel time, TT15	16.4	veh-h

Notes:

1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	0.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	20.4	mi/h
Percent time-spent-following, PTSFd (from above)	117.1	
Level of service,(note-1) LOSd (from above)	F	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane,(note-2) ATSpl	22.2	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	3.60	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-2.90	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane,(note-3) PTSFpl	76.9	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	D	
Peak 15-min total travel time, TT15	15.1	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

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Phone: Fax:
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Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	8/18/2009
Analysis Time Period	2030 AA-3 lane
Highway	US 101
From/To	50th to 62nd
Jurisdiction	
Analysis Year	SB
Description Base Network	

Input Data

Highway class	Class 2		Peak-hour factor, PHF	0.95	
Shoulder width	6.0	ft	% Trucks and buses	4	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	3	/mi

Analysis direction volume, Vd 2215 veh/h
Opposing direction volume, Vo 1825 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	2341	pc/h	1929	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	55.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	0.8	mi/h
Free-flow speed, FFSd	54.3	mi/h
Adjustment for no-passing zones, fnp	0.7	mi/h
Average travel speed, ATSd	20.4	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	2332 pc/h	1921 pc/h

Base percent time-spent-following,(note-4) BPTSFd	97.0	%
Adjustment for no-passing zones, fnp	18.8	
Percent time-spent-following, PTSFd	107.3	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.38	
Peak 15-min vehicle-miles of travel, VMT15	408	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1550	veh-mi
Peak 15-min total travel time, TT15	20.0	veh-h

Notes:

1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	0.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	20.4	mi/h
Percent time-spent-following, PTSFd (from above)	107.3	
Level of service,(note-1) LOSd (from above)	F	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane,(note-2) ATSpl	22.2	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	3.60	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-2.90	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane,(note-3) PTSFpl	70.5	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	D	
Peak 15-min total travel time, TT15	18.4	veh-h

Notes:

1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	115	15	35	90	20	125	60	2260	50	205	2670	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	1733	1452	1718	1699	1424	1722	3228	1410	1722	3228	1410
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1368	1733	1452	1348	1699	1424	1722	3228	1410	1722	3228	1410
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	135	18	41	106	24	147	63	2379	53	216	2811	79
RTOR Reduction (vph)	0	0	34	0	0	109	0	0	14	0	0	18
Lane Group Flow (vph)	135	18	7	106	24	38	63	2379	39	216	2811	61
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	13.4	13.4	13.4	13.4	13.4	13.4	5.5	41.7	41.7	5.9	42.1	42.1
Effective Green, g (s)	12.9	12.9	12.9	12.9	12.9	12.9	6.0	42.2	42.2	6.4	42.6	43.1
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.08	0.57	0.57	0.09	0.58	0.58
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	238	302	253	235	296	248	140	1841	804	149	1858	821
v/s Ratio Prot		0.01			0.01		0.04	c0.74		0.13	c0.87	
v/s Ratio Perm	c0.10		0.00	0.08		0.03			0.03			0.04
v/c Ratio	0.57	0.06	0.03	0.45	0.08	0.15	0.45	1.29	0.05	1.45	1.51	0.07
Uniform Delay, d1	28.0	25.5	25.3	27.4	25.6	25.9	32.4	15.9	7.0	33.8	15.7	6.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	0.1	0.1	1.9	0.2	0.4	2.3	135.7	0.1	235.8	233.6	0.2
Delay (s)	31.7	25.6	25.4	29.3	25.7	26.3	34.7	151.6	7.1	269.6	249.3	6.9
Level of Service	C	C	C	C	C	C	C	F	A	F	F	A
Approach Delay (s)		29.8			27.4			145.6			244.6	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM Average Control Delay	187.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.32		
Actuated Cycle Length (s)	74.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	108.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	60	10	25	350	10	770	20	1540	350	815	1925	55
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.5	4.5	4.5	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1722	1716	1423	1739	3228	1409	1722	3228	1458
Flt Permitted	0.33	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	595	1716	1458	1722	1716	1423	1739	3228	1409	1722	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	12	29	412	12	906	21	1621	368	858	2026	58
RTOR Reduction (vph)	0	0	25	0	0	257	0	0	182	0	0	18
Lane Group Flow (vph)	71	12	4	412	12	649	21	1621	186	858	2026	40
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases		4		8	8		5	2		1	6	
Permitted Phases	4		4			8			2			6
Actuated Green, G (s)	12.8	12.8	12.8	23.5	23.5	23.5	1.6	21.7	21.7	8.0	28.1	28.1
Effective Green, g (s)	12.3	12.3	12.3	23.0	23.0	23.0	2.1	22.2	22.2	8.5	28.6	28.6
Actuated g/C Ratio	0.15	0.15	0.15	0.28	0.28	0.28	0.03	0.27	0.27	0.10	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	88	254	216	477	476	394	44	863	377	176	1112	502
v/s Ratio Prot		0.01		0.24	0.01		0.01	0.50		c0.50	c0.63	
v/s Ratio Perm	c0.12		0.00			c0.46			0.13			0.03
v/c Ratio	0.81	0.05	0.02	0.86	0.03	1.65	0.48	1.88	0.49	4.88	1.82	0.08
Uniform Delay, d1	34.2	30.3	30.2	28.5	21.8	30.0	39.9	30.4	25.7	37.2	27.2	18.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	39.8	0.1	0.0	15.4	0.0	302.9	7.9	399.7	4.6	1756.5	373.4	0.3
Delay (s)	74.0	30.4	30.2	43.9	21.9	332.9	47.9	430.1	30.2	1793.8	400.6	18.6
Level of Service	E	C	C	D	C	F	D	F	C	F	F	B
Approach Delay (s)		58.0			240.5			352.9			799.4	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM Average Control Delay	529.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.92		
Actuated Cycle Length (s)	83.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	133.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑	↑	↱
Volume (veh/h)	0	160	0	2665	2830	305
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	188	0	2805	2979	321
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				TWLTL	None	
Median storage veh)				2		
Upstream signal (ft)				1246		
pX, platoon unblocked	0.35					
vC, conflicting volume	5788	2983	3302			
vC1, stage 1 conf vol	2981					
vC2, stage 2 conf vol	2807					
vCu, unblocked vol	13755	2983	3302			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	1	18	86			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	188	2805	2979	321
Volume Left	0	0	0	0
Volume Right	188	0	0	321
cSH	18	1700	1700	1700
Volume to Capacity	10.35	1.65	1.75	0.19
Queue Length 95th (ft)	Err	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0
Lane LOS	F			
Approach Delay (s)	Err	0.0	0.0	
Approach LOS	F			

Intersection Summary			
Average Delay	299.1		
Intersection Capacity Utilization	179.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑	↗		↑
Volume (veh/h)	0	450	2555	110	0	3135
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	529	2689	116	0	3300
Pedestrians	2		2			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5993	2693			2807	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5993	2693			2807	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	0			100	
cM capacity (veh/h)	0	27			136	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	529	2689	116	3300
Volume Left	0	0	0	0
Volume Right	529	0	116	0
cSH	27	1700	1700	1700
Volume to Capacity	19.76	1.58	0.07	1.94
Queue Length 95th (ft)	Err	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0
Lane LOS	F			
Approach Delay (s)	Err	0.0		0.0
Approach LOS	F			

Intersection Summary			
Average Delay	797.9		
Intersection Capacity Utilization	189.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑	↱		↑↱	
Volume (veh/h)	0	0	30	0	0	210	0	2455	45	0	2920	70
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	35	0	0	247	0	2584	47	0	3074	74
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								700				
pX, platoon unblocked	0.36	0.36		0.36	0.36	0.36				0.36		
vC, conflicting volume	5946	5746	3115	5734	5736	2588	3149			2634		
vC1, stage 1 conf vol	3113	3113		2586	2586							
vC2, stage 2 conf vol	2833	2634		3148	3149							
vCu, unblocked vol	14018	13456	3115	13422	13426	4564	3149			4692		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	0	0	100	0	100			100		
cM capacity (veh/h)	0	1	15	0	1	1	99			8		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	35	247	2584	47	3147
Volume Left	0	0	0	0	0
Volume Right	35	247	0	47	74
cSH	15	1	1700	1700	1700
Volume to Capacity	2.31	400.54	1.52	0.03	1.85
Queue Length 95th (ft)	127	Err	0	0	0
Control Delay (s)	1111.0	Err	0.0	0.0	0.0
Lane LOS	F	F			
Approach Delay (s)	1111.0	Err	0.0		0.0
Approach LOS	F	F			

Intersection Summary			
Average Delay	414.0		
Intersection Capacity Utilization	182.1%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Volume (veh/h)	35	85	1825	40	85	2215
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	41	100	1921	42	89	2332
Pedestrians	2		2			2
Lane Width (ft)	13.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3270	965			1965	
vC1, stage 1 conf vol	1923					
vC2, stage 2 conf vol	1347					
vCu, unblocked vol	3270	965			1965	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	47	61			69	
cM capacity (veh/h)	78	256			288	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	41	100	961	961	42	89	1166	1166
Volume Left	41	0	0	0	0	89	0	0
Volume Right	0	100	0	0	42	0	0	0
cSH	78	256	1700	1700	1700	288	1700	1700
Volume to Capacity	0.53	0.39	0.57	0.57	0.02	0.31	0.69	0.69
Queue Length 95th (ft)	56	44	0	0	0	32	0	0
Control Delay (s)	94.2	27.8	0.0	0.0	0.0	23.1	0.0	0.0
Lane LOS	F	D				C		
Approach Delay (s)	47.2		0.0			0.9		
Approach LOS	E							

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↑	↱
Volume (veh/h)	65	35	30	1800	2175	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	76	41	32	1895	2289	79
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3304	1149	2370			
vC1, stage 1 conf vol	2291					
vC2, stage 2 conf vol	1013					
vCu, unblocked vol	3304	1149	2370			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)	5.9					
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	78	84			
cM capacity (veh/h)	58	190	199			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	118	32	947	947	1145	1145	79
Volume Left	76	32	0	0	0	0	0
Volume Right	41	0	0	0	0	0	79
cSH	76	199	1700	1700	1700	1700	1700
Volume to Capacity	1.54	0.16	0.56	0.56	0.67	0.67	0.05
Queue Length 95th (ft)	243	14	0	0	0	0	0
Control Delay (s)	391.1	26.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	D					
Approach Delay (s)	391.1	0.4			0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	10.6		
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✢			✢		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	15	0	5	5	0	5	5	1810	0	5	2190	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	0	6	6	0	6	5	1905	0	5	2305	16
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3289	4236	1157	3089	4251	957	2323			1907		
vC1, stage 1 conf vol	2318	2318		1918	1918							
vC2, stage 2 conf vol	971	1918		1171	2334							
vCu, unblocked vol	3289	4236	1157	3089	4251	957	2323			1907		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	52	100	97	90	100	98	97			98		
cM capacity (veh/h)	37	55	191	62	52	259	208			303		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	24	12	5	1270	635	5	1153	1153	16
Volume Left	18	6	5	0	0	5	0	0	0
Volume Right	6	6	0	0	0	0	0	0	16
cSH	46	100	208	1700	1700	303	1700	1700	1700
Volume to Capacity	0.51	0.12	0.03	0.75	0.37	0.02	0.68	0.68	0.01
Queue Length 95th (ft)	47	10	2	0	0	1	0	0	0
Control Delay (s)	147.0	45.8	22.8	0.0	0.0	17.1	0.0	0.0	0.0
Lane LOS	F	E	C			C			
Approach Delay (s)	147.0	45.8	0.1			0.0			
Approach LOS	F	E							

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

INTERSECTION:	35th Street
SCENARIO:	2030 AAV -3 lane
DATE:	1-Aug-09
Future Cycle Length (C):	**74**
Vehicle Length (L):	25

# OF CYCLES QUEUE IS EXCEEDED		
@95%	@85%	@75%
2	7	12

Movement	Traffic Volume (vol) (veh/hr)	Number of Lanes (N)	Lane Storage Length (ft)	Green per Cycle (g/C)	Avg Total # Vehicles (veh)	Avg Queue Length / Lane (ft)	95% Total Vehicles (95% veh)	95% Queue Length / Lane (ft)
NB LT	60	1	**0**	**0.08**	1	50	3	**75**
NB TH & COMB	2260	2	**0**	**0.57**	20	250	26	325
NB RT	50	1	**175**	**0.57**	0	25	0	0
SB LT	205	1	**0**	**0.09**	4	100	6	**150**
SB TH & COMB	2670	2	**0**	**0.58**	23	300	31	400
SB RT	75	1	**175**	**0.58**	1	25	0	0
EB LT	115	1	**120**	**0.17**	2	50	3	75
EB TH & COMB	15	1	**0**	**0.17**	0	25	0	0
EB RT	35	1	**155**	**0.17**	1	25	0	0
WB LT	90	1	**120**	**0.17**	2	50	3	75
WB TH & COMB	20	1	**0**	**0.17**	0	25	0	0
WB RT	125	1	**155**	**0.17**	2	75	5	125

Average Total # Vehicles=[(1-g/C)x(vol)]/[3600/C]
Average Queue Length=ROUNDUP(average # vehicles) x L / N
95% Vehicle = (average total # vehicles) x (poisson distribution factor)
95% Queue Length = (95% total vehicles) x (vehicle length) / (number of lanes)
Formula calculated per instructions in ITE Traffic Engineering Handbook, 5th ed, pp.332-333, except uses poisson distribution and does not include truck % because it is already included in the LOS analysis, resulting in adjusted g/C ratios to reflect the inclusion of trucks.

INTERSECTION:	40th Street
SCENARIO:	2030 AAV -5 lane
DATE:	1-Aug-09
Future Cycle Length (C):	**83**
Vehicle Length (L):	25

# OF CYCLES QUEUE IS EXCEEDED		
@95%	@85%	@75%
2	7	11

Movement	Traffic Volume (vol) (veh/hr)	Number of Lanes (N)	Lane Storage Length (ft)	Green per Cycle (g/C)	Avg Total # Vehicles (veh)	Avg Queue Length / Lane (ft)	95% Total Vehicles (95% veh)	95% Queue Length / Lane (ft)
NB LT	20	1	**0**	**0.03**	0	25	0	0
NB TH & COMB	1540	2	**0**	**0.27**	26	325	33	425
NB RT	350	1	**175**	**0.27**	6	150	9	**225**
SB LT	815	1	**0**	**0.10**	17	425	23	**575**
SB TH & COMB	1925	2	**0**	**0.34**	29	375	38	475
SB RT	55	1	**175**	**0.34**	1	25	0	0
EB LT	60	1	**120**	**0.15**	1	50	3	75
EB TH & COMB	10	1	**0**	**0.15**	0	25	0	0
EB RT	25	1	**155**	**0.15**	0	25	0	0
WB LT	350	1	**120**	**0.28**	6	150	9	**225**
WB TH & COMB	10	1	**0**	**0.28**	0	25	0	0
WB RT	770	1	**155**	**0.28**	13	325	18	**450**

Average Total # Vehicles=[(1-g/C)x(vol)]/[3600/C]
Average Queue Length=ROUNDUP(average # vehicles) x L / N
95% Vehicle = (average total # vehicles) x (poisson distribution factor)
95% Queue Length = (95% total vehicles) x (vehicle length) / (number of lanes)
Formula calculated per instructions in ITE Traffic Engineering Handbook, 5th ed, pp.332-333, except uses poisson distribution and does not include truck % because it is already included in the LOS analysis, resulting in adjusted g/C ratios to reflect the inclusion of trucks.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
40th Street	II	51	101.8	393.4	495.2	1.43	10.4	F
35th St.	II	35	31.2	143.3	174.5	0.28	5.9	F
Hurbert St	II	31	200.2	582.6	782.8	1.73	7.9	F
Total	II		333.2	1119.3	1452.5	3.44	8.5	F

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	625.1	647.0	0.16	0.9	F
35th St	III	31	200.2	240.3	440.5	1.73	14.1	D
40th Street	III	35	34.1	314.7	348.8	0.28	2.9	F
Total	III		256.2	1180.1	1436.3	2.17	5.4	F

US 101

Direction	NB	SB	All
Total Delay (hr)	754	1315	2069
Average Speed (mph)	**8**	**6**	**7**
Total Travel Time (hr)	989	1582	2572
Distance Traveled (mi)	**8394**	**9415**	**17809**
Unserved Vehicles (#)	2825	4140	6965
Performance Index	**786.8**	**1342.2**	**2129.0**

APPENDIX E

Select Sections from Technical Memorandum #6

2. SOUTH BEACH GROWTH AND ANALYSIS ASSUMPTIONS

This chapter provides a summary of future growth expectations within the South Beach study area and documents assumptions used in the development of 2026 design hour traffic volumes. Also included is a discussion of the street network assumptions inherent in the No-Build condition.

2.1 STUDY AREA

The South Beach study area includes existing development and vacant properties that lie in the area generally bounded by the Pacific Ocean on the west, Yaquina Bay on the east, Abbey Street on the north, and South 65th Street on the south.

For the purpose of forecasting future growth, this study area was divided into ten sub-areas that represented unique geographical districts with individual development and roadway access expectations. These sub-areas were established based on information provided by the City of Newport and from other transportation studies that had previously been conducted for development in the South Beach area to support an urban growth boundary (UGB) adjustment. Local plans for economic and community development were also considered. These studies included the Newport South Beach Transportation Analysis prepared for the City by Lancaster Engineering (February 2005), the South Beach Properties/40th Street Traffic Impact Analysis prepared by David Evans and Associates (DEA) for Double E Northwest (October 2006), and the South Beach Neighborhood Plan (2005). See Appendix A for the land use areas designated in these studies. See Figure 2-1 for a map of the South Beach study area and the analysis sub-area boundaries.

2.2 SOUTH BEACH LAND USE BY SUB-AREAS

As noted above each of the ten sub-areas identified within the larger South Beach study area included unique information about anticipated land uses (e.g., land development expectations by type and size) and property access characteristics. A variety of the land uses are assumed in each of the sub-areas which are consistent with zoning designations and permitted uses. The land usage assumed is based on an agreed reasonable scenario based on zoning designation and is not linked to actual population projections. The types of development included in each sub-area are described below.

- Area A is the largest area and includes the proposed South Beach Village development. The area is located east of US 101 and runs from 40th Street on the north to almost 62nd Street on the south. The only portion of the area fronting on US 101 is south of 50th Street. The proposed uses include a variety of residential development, a community college, retail and business park/industrial. Access for this area is provided by 40th Street and 50th Street, however, for the purpose of this study, the roadways are not assumed to connect with each other.
- Areas B and C are located south of 40th Street and east of US 101, with access assumed onto 50th and 40th Street, respectively. These strips of land front onto US 101 and are zoned for industrial uses. This zoning designation also allows for commercial development. It is assumed that both of these uses will be present in these sub-areas.

- Area D is located east of US 101 between 32nd Street and 40th Street. This area is comprised of industrially-zoned land that allows uses such as hotel and retail development, which are assumed for analysis.
- Area E is located west of US 101 from 35th Street south to 40th Street and is characterized by industrial zoned properties. Because of the frontage to US 101, some of the property in this sub-area will likely develop into commercial uses as allowed by land use regulations.
- Area F includes bay frontage west of US 101 and extends south to 35th Street. The area is anticipated to develop into condominium and townhouse residential uses with retail adjacent to US 101.
- Area G is located west of US 101, from 40th Street to just south of 50th Street. This area is primarily comprised of industrially-zoned land, but is anticipated to also include some retail.
- Area H includes properties east of US 101 adjacent to Yaquina Bay including the Oregon Coast Aquarium, Hatfield Marine Science Center, and Port of Newport Properties. Future growth in the area is represented by expansion and support of these uses including some nominal retail, general office, research/development activities and higher density residential.
- Area I is located in the Southshore Development and would include retail and hotel facilities.
- Area J is an area that was originally zoned for industrial but included residential and retail uses, however, as documented in the Newport Airport Master Plan, the land is to be acquired and existing zoning and uses will be abandoned to meet airport safety operation requirements. The potential trips from this area are identified as reductions from the total new trips ultimately associated with future development in the South Beach area.

2.3 TRIP GENERATION AND DISTRIBUTION

The proposed land development and redevelopment for each of the land use sub-areas results in increase trip-making and traffic volumes to and from these sub-areas. The design hour volumes used for planning and project analysis is the 30th highest hour volumes (30HV). The 30th highest hour is based on a year round automatic traffic recorder (ATR) located in north Newport. The data collected from the location over several years indicates that the traffic trends to weekday commuter characteristics. The 30 HV could occur either on a weekday or weekend in the pm peak. Therefore, the future PM peak hour trips were estimated using the trip generation rates provided in the Institute of Transportation Engineers (ITE) *Trip Generation*, 7th Edition, 2003. Assumptions have been made with respect to internal trip making and pass-by trip reduction rates as documented in Table 2-1 below. The complete trip generation and forecasting methodology was previously reviewed and approved by the Oregon Department of Transportation (ODOT) and City Staff and is included in Appendix B. Table 2-1 represents a summary of trip generation by sub-area.

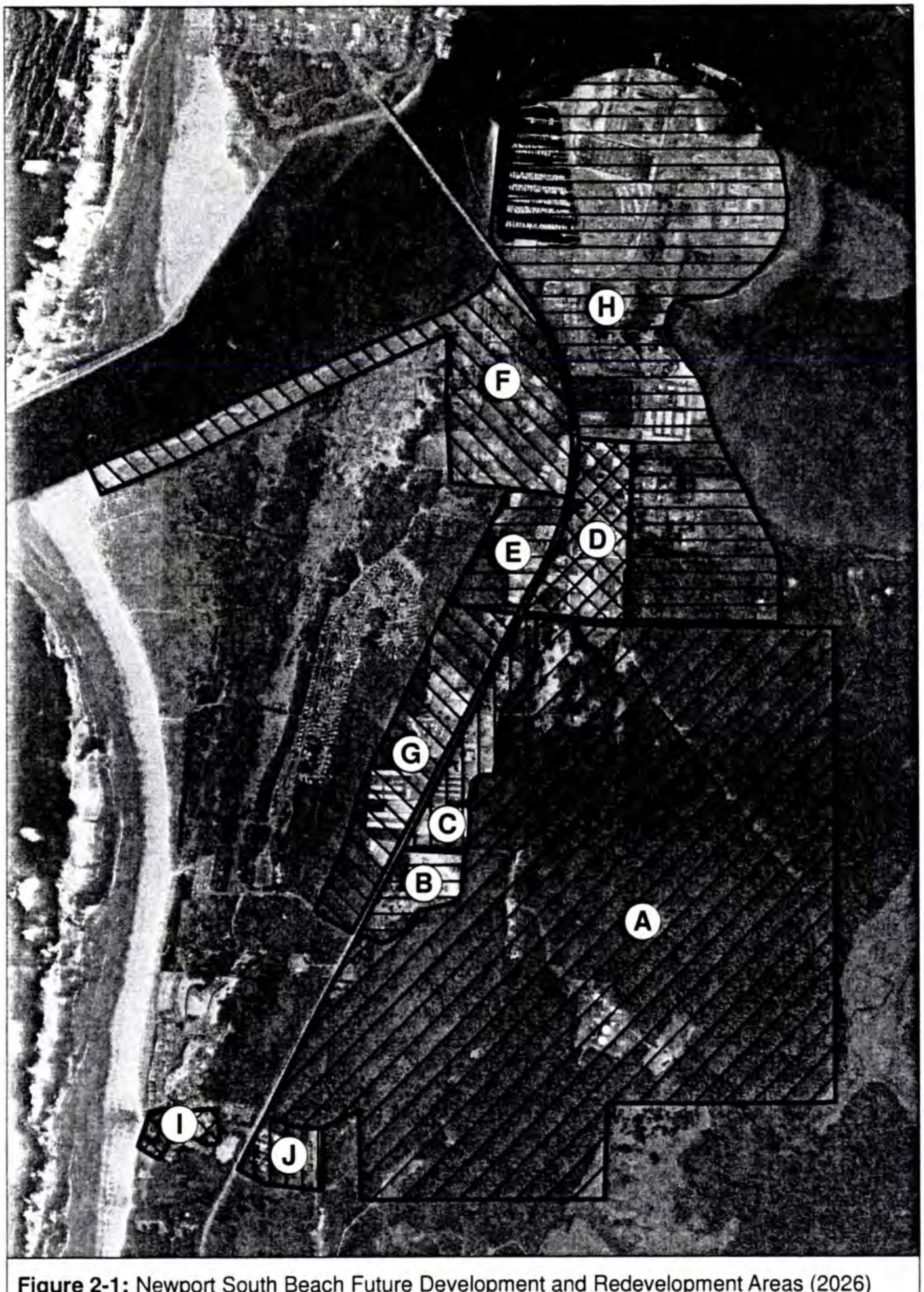

Figure 2-1: Newport South Beach Future Development and Redevelopment Areas (2026)

A E I
B F J
C G
D H

0 1,000 2,000 Feet

Geographic Data Standards:
Projected Coordinate System
Oregon State Plane South

Data Source(s):
USDA, ESRI, Parametrix

Contact Information:
Parametrix
700 NE Multnomah
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Parametrix

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Table 2-1. South Beach Area Trip Generation Estimate

Area A (Campus Village)				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**Total**	**In**	**Out**
Single Family Residence	210	680	Dwellings	602	379	223
Condominium/Townhouse	230	702	Dwellings	297	199	98
University/College (4)	550	1,470	Students	405	121	283
Retail (2)	820	272,200	Sq. Feet	1212	582	630
County Park (4)(3)	412	78.1	Acres	46	16	30
Gross Trips				2562	1298	1264
Internal Trip Reduction				(384)	(195)	(190)
Net Trips				2178	1103	1075

Area A and B and C				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**Total**	**In**	**Out**
Industrial Park (5)	130	142,350	Sq. Feet	152	32	120
Commercial (1)		142,350	Sq. Feet			
Retail	820	71,175	Sq. Feet	500	240	260
Retail(Adjacent to US 101)	820	71,175	Sq. Feet	500	240	260
Gross Trips				1152	512	640
Internal Trip Reduction	(All Retail)			(100)	(48)	(52)
Pass-by Reduction	(Retail Adjacent to US 101 only)			(55)	(26)	(29)
Net Trips				997	438	559

Area D				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**Total**	**In**	**Out**
Hotel(3)	310	150	Rooms	89	47	42
Retail(2)	820	90,000	Sq. Feet	584	280	304
Gross				672	327	345
Internal Trip Reduction				(67)	(33)	(35)
Pass-by Reduction (6)				(121)	(59)	(62)
Net Trips				484	236	249

Area E				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**Total**	**In**	**Out**
Industrial Park (5)	130	10,000	Sq. Feet	50	10	39
Retail(Adjacent to US 101)	820	10,000	Sq. Feet	137	66	71
Gross Trips				187	76	111
Pass-by Reduction	(All Retail)			(27)	(13)	(14)
Net Trips				160	63	97

Area F				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**Total**	**In**	**Out**
Retail	820	185,000	Sq. Feet	940	451	489
Condominium/Townhouse	230	100	Dwellings	60	40	20
Gross Trips				1000	491	508
Internal Trip Reduction	(All Uses)			(100)	(49)	(51)
Pass-by Reduction (6)	(Retail Adjacent to US 101 only)			(103)	(50)	(54)
Net Trips				796	393	404

Table 2-1. South Beach Area Trip Generation Estimate Continued

Area G (west of US 101))				**PM Peak Trips**		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**Total**	**In**	**Out**
Industrial Park (5)	130	50,000	Sq. Feet	81	17	64
Retail		50,000	Sq. Feet	396	190	206
Gross Trips				477	207	270
Internal Trip Reduction	(All Uses)			(48)	(21)	(27)
Pass-by Reduction	(All Retail)			(87)	(42)	(45)
Net Trips				342	145	197
Area H (incl. OCA & HMSC)				**PM Peak Trips**		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**Total**	**In**	**Out**
Condominium/Townhouse	230	100	Dwellings	60	40	20
Research and Development	760	77,000	Sq. Feet	83	12	71
General Office	710	42	Employees	19	3	16
Retail	820	10,000	Sq. Feet	137	66	71
Gross Trips				239	82	158
Internal Trip Reduction	(All Uses)			(16)	(7)	(9)
Net Trips				224	75	149
Area I (Southshore)				**PM Peak Trips**		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**Total**	**In**	**Out**
Hotel (3)	310	65	Rooms	38	20	18
Retail	820	13,000	Sq. Feet	163	78	85
Gross Trips				300	122	178
Internal Trip Reduction	(All Uses)			(30)	(12)	(18)
Net Trips				270	110	160
Area J Planned Reduction (8)				**PM Peak Trips**		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**Total**	**In**	**Out**
Retail	820	20,000	Sq. Feet	216	104	113
Single Family Residence	210	3	Dwellings	5	3	2
Gross Trips				221	107	114
Internal Trip Reduction	(All Uses)			(22)	(11)	(11)
Net Trips				199	96	103
PM Peak Trip Summary				**Total**	**In**	**Out**
Gross Trips				6772	3239	3533
Total Internal				(771)	(378)	(393)
Total Pass-by				(394)	(190)	(204)
Area J Reductions				(199)	(96)	(103)
Net Total Trips				**5,407**	**2,575**	**2,833**

Notes:

(1) Approximately half of the industrial acreage is assumed to develop into commercial uses.
(2) Specialty Retail was combined with Retail because category does not contain sufficient data.
(3) ITE Trip Generation rate used.
(4) Different ITE Code Category used than source studies. Categories used in previous studies do not contain sufficient data.
(5) Different ITE Code Category used than source studies. Categories used in previous studies cover scope of allowed uses.
(6) Half of the commercial is assumed adjacent to Hwy 101 and subject Pass-by rate 20% reduction
(7) This is primarily laboratory and classroom use related to Hatfield Marine Science Center and the Oregon Coast Aquarium
(8) As documented in the Newport Airport Master Plan, the Airport intends to acquire this area and abandon the existing uses to increase air safety.

Exhibit B4
Newport TSP Amendments
File No. 2-CP-11

Newport Transportation System Plan Update - Alternate Mobility Standards Final Technical Memorandum #12 Analysis of South Beach Land Use Scenarios

Prepared for

Oregon Department of Transportation
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City of Newport
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CITATION

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Parametrix. 2011. Newport Transportation System Plan Update - Alternate Mobility Standards
Final Technical Memorandum #12 Analysis of South Beach Land Use Scenarios. Prepared by Parametrix, Portland, Oregon. March 2011.

CERTIFICATION

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.

Prepared by Shelley Oylear

Checked by Anne Sylvester, PTE

Approved by Anne Sylvester, PTE

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ACRONYMS AND TERMS

30 HV	30^{th} Highest Hourly Traffic Volumes (experienced during the summertime weekday peak hour)
AAV	Average Annual Volume (average of PM peak hours over the entire year)
ATR	Automatic Traffic Recorder
HCM	Highway Capacity Manual
ODOT	Oregon Department of Transportation
Off-Season	Refers to traffic volumes and operations typically experienced during the weekday PM peak hour from September through May, excluding the summertime peak season, Fridays, holidays and Spring Break week.
OHP	Oregon Highway Plan
PHF	Peak Hour Factor
Summertime	Refers to traffic volumes and operations typically experienced during the weekday PM peak hour from June through August excluding Fridays and holidays.
Synchro	HCM compatible traffic analysis software for intersections
TAZ	Transportation Analysis Zone
TGM	Transportation and Growth Management
TPAU	Transportation Planning and Analysis Unit
TSP	Transportation System Plan
UGB	Urban Growth Boundary
V/C	Volume-to-Capacity (ratio)
VPHPL	Vehicles per Hour per Lane

1. INTRODUCTION

1.1 REPORT PURPOSE AND CONTEXT

This report is one of several that will be prepared to inform the development of alternate mobility standards for US 101 in the South Beach study area. The development of these standards is based on the findings of earlier technical memoranda prepared for the Newport Transportation System Plan (TSP) Update which indicate that the Oregon Highway Plan's (OHP) mobility standards could not be met along US 101 during the planning period. As indicated in the memoranda, the combination of background traffic growth (e.g., through traffic) and anticipated development within the South Beach area would result in peak period and peak seasonal traffic volumes that could not be accommodated on US 101 without additional Yaquina Bay Bridge capacity and substantial highway improvements in South Beach.

The purpose of this report is to document the analysis of 2030 peak period traffic volumes on a roadway network for South Beach that includes a variety of improvements that were identified through earlier analyses. This analysis is focused on two land use scenarios for three time periods including: 30 HV (30^{th} highest hourly volume which occurs during the weekday PM peak summer months), AAV (Average Annual Volumes which reflect an average weekday PM peak hour volume over the entire year, and Off-Season. Analysis results are presented in a series of mobility measures one or more of which can contribute to the discussion of establishing alternate mobility standards for the South Beach area.

Included in this report are the following:

- Documentation of the methodology and assumptions used to analyze 2030 peak period traffic volumes including assumed roadway network improvements and trip generation for the South Beach area.
- A summary of anticipated 2030 traffic operations for study area intersections and roadway segments for 30 HV, average annual, off-season time periods.

This report is divided into six chapters, the first of which is this Introduction.

Chapter 2 presents a discussion of the analysis methodology and assumptions inherent in the evaluation of land use scenarios and time periods evaluated for 2030 conditions. Included is a summary of the performance measures that will be addressed in the analysis, identification of current operational standards for signalized and unsignalized intersections along US 101 in South Beach, roadway network assumptions for 2030 (which include the provision of four through lanes along the highway with left and right turning lanes as appropriate), development of 2030 peak hour background traffic volumes, and trip generation and distribution for the land use scenarios.

Chapter 3 presents the results of traffic operational analysis for the 2030-30 HV for the two land use scenarios along US 101 using the updated 2030 roadway network. Results for each of the performance measures identified in Chapter 2 are included for both scenarios.

Chapter 4 presents the results of traffic operational analysis for the 2030 AAV for the two land use scenarios.

Chapter 5 presents the results of traffic operational analysis for the 2030 Off-Season Volumes for the two land use scenarios.

Chapter 6 summarizes findings related to the duration of congestion over a 16-hour period in 2030 under conditions with either land use scenario and average annual weekday conditions.

1.2 SUMMARY OF FINDINGS AND CONCLUSIONS

Trip Generation Estimates for Each Land Use Scenario

Land Use Scenario #1

The variety of the land uses assumed in the South Beach study area for this scenario are consistent with zoning designations and permitted uses, and were tied to the projected population growth of the City of Newport. This scenario assumes that 50 percent of the population growth anticipated in Newport by 2030 will occur in South Beach with the remainder occurring generally north of the Yaquina Bay Bridge. The types of development assumed for South Beach are consistent with the uses called for in the Newport Comprehensive Plan, including single family residential, condominiums/townhouses, industrial park, retail, research and development, community college and a state park with campgrounds.

Land Use Scenario #1 is expected to generate 4,317 PM peak hour trip ends, with about 45 percent of the trips inbound and 55 percent outbound. Sub-area A, by the South Beach Campus Village development, would generate the largest percentage of the total PM peak hour trips, about 27 percent. Development activity assumed along both sides of US 101, Sub-areas B and C, would generate about 23 percent of the total trip ends. Sub-area F, located west of US 101 and generally between 32^nd^ and 40^th^ Streets, is expected to generate 11 percent. The remaining areas depicted in Figure 1-1, sub-areas C, G, H, I and J, are each expected to generate less than 10 percent of the total trip ends. Together these areas represent about 26 percent of total trip ends.

Land Use Scenario #2

Land Use Scenario #2 is built upon the development assumptions prepared for Scenario #1 but also incorporates potential development constraints associated with wetland resources in the study area. Generally these constraints exist along both sides of US 101 behind existing development from approximately 32^nd^ Street to 62^nd^ Street. The types of the land uses are assumed in each of the sub-areas are consistent with Comprehensive Plan designations and permitted uses but less total development is assumed to occur. Development includes single family residential, condominiums/townhouses, industrial park, retail, research and development, community college and a state park with campgrounds.

This land use scenario is anticipated to generate fewer total trips than Scenario #1--3901 trip ends rather than 4317 trip ends. While inbound trips still represent 45 percent of the total trips (and outbound 55 percent), the trip ends in each of the sub-areas cause each sub-area to represent a different percentage of the total trips than presented for Scenario #1. Sub-area A generates the same number of trip ends, but its share of the total trip ends increases to about 30 percent. Areas B and C include changes in the expected extent of development that reduce the number of trip ends for the areas and reduce the share of total trip ends. While the number of trip ends in Areas F and D remain the same, their share of the total trips increases because of reductions in other areas.

Performance Measures

To provide a more complete understanding of the extent and nature of future traffic congestion through South Beach and to offer useful comparisons among land use and network alternatives, a variety of performance measures have been identified. These have been calculated to determine the nature, type, location and duration of congestion for each scenario and time period analyzed and include the following:

- Volume-to-capacity ratios at intersections developed using the Synchro analysis software.
- 95th percentile traffic queues using Synchro output for both signalized and unsignalized intersections. Traffic queue estimates are not based on simulations and, as a result, they reflect the treatment of each signal as if it was in an isolated location rather than part of a system of traffic signals. The interactions between signals and their affects on traffic queuing are not reflected in the results presented in this report.
- Signal progression assessment focusing on green band width during peak hours.
- Travel time on US 101 in northbound and southbound directions for three roadway segments – Hurbert Street to 35th Street, 35th Street to 50th Street, and 50th Street to 62nd Street.
- Average travel speeds on US 101 in northbound and southbound directions for three roadway segments – Hurbert Street to 35th Street, 35th Street to 50th Street, and 50th Street to 62nd Street.
- Unserved vehicles (that cannot enter the Synchro network due to extensive congestion and, thus, are not included in the analysis).
- Duration of congestion – Number of hours that roadway capacity will be exceeded during projected 2030 average annual weekdays. The methodology used to calculate duration of congestion along US 101 in South Beach is more fully described in Chapter 6 along with analysis results.

Traffic Operations Key Findings

The results of analysis for each performance measure, land use scenario and time period are presented in detail in the later chapters of this technical memorandum. This executive summary highlights some of the key findings including both traffic operations results and estimates related to the duration of congestion beyond the PM peak hour. Key findings are as follows:

- Major roadway improvements would be needed along US 101 including such elements as widening of US 101 south of Abalone Street to provide four through lanes, and signalization of the intersections of 35th, 40th and 50th Streets with multiple turning lanes as needed.
- Even with these improvements, a significant increase in congestion along US 101 is anticipated over current conditions with either Land Use Scenario. No intersection would operate without one or more significantly congested movements and delays are anticipated along the length of the highway through South Beach, particularly approaching the Yaquina Bay Bridge with its limited 2-lane capacity.
- Traffic congestion will be at its most severe during the summertime peak season (represented by 30 HV). Tables 1-1 and 1-2 present the results of intersection

operations analysis for this time period and indicate that all three signalized intersections would operate at v/c > 1.00. Many of the side street movements at the unsignalized intersections would experience significant delays with a v/c of 2.00 or greater in many locations. Approaching the Yaquina Bay Bridge (e.g., north of 35th Street) north and southbound through movements are also significantly congested.

- Traffic congestion based on Average Annual traffic volumes would also experience significant congestion. This time period includes both the summertime peak and the remainder of the year.
- Traffic congestion during the Off-Season peak period (typically from September through May) would be less than the 30 HV or Average Annual, but significant congestion problems would still be experienced.

Traffic operations analyses for each time period are presented in Chapters 3, 4 and 5, respectively for both Land Use Scenarios.

Duration of Congestion

To provide greater understanding of the magnitude of expected 2030 congestion along US 101, an investigation was conducted to determine whether the worst impacts were limited to the PM peak hour and/or a few hours on either shoulder of the peak, or whether the congestion would be more pervasive. The analysis of duration of congestion attempts to identify the length of time over a 16-hour period on a typical Average Annual or Off-Season weekday when the study area highway and intersections would exceed the applicable OHP mobility standards for each location. Key findings from this analysis are presented in Table 1-3 and 1-4 and are summarized below. It should be noted that the analysis in this section differs slightly from the analysis in the preceding section in that Peak Hour Factors (PHFs) were adjusted from 0.85 to 1.00 to reflect the expectation that congestion would be sufficiently heavy to minimize traffic peaking within the peak hour. A peak hour factor is typically applied to traffic volume data to adjust for the common experience of a higher short peak (e.g., approximately 15 to 30 minutes) within a peak hour. Operations analysis is based on that peak within the peak.

Analysis worksheets for Average Annual are included in Appendix I and J for Scenarios 1 and 2, respectively. Worksheets for Off-Season are included in Appendix K and L for Scenarios 1 and 2, respectively.

Average Annual Weekday Conditions

Land Use Scenario #1

With full build-out of this scenario, intersection operations from north to south are expected to be as follows:

- For the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the 2-lane roadway section of the highway leading to/from the Yaquina Bay Bridge would result in operations exceeding applicable mobility standards for 11 or 12 hours, respectively, out of each typical 2030 Average Annual weekday. With a 19 percent reduction in approach volumes, the two near intersections would operate in excess of their mobility standard of V/C > 0.85 for US 101 and V/C > 0.90 for side street traffic for 11 hours each typical weekday.
- For the unsignalized intersection of US 101 with 32nd Street, operations would exceed the applicable mobility standard for an estimated seven hours out of each weekday. With a 19 percent reduction in approach volumes, this intersection is

expected to meet its applicable mobility standards (V/C >0.85 for traffic on US 101 and V/C > 0.90 for side street traffic).

- The signalized intersection of US 101 with 35th Street, is expected to operate at V/C = 0.96 during the weekday PM peak hour in comparison to its standard of V/C > 0.85. Operations would exceed this standard for an estimated four hours each weekday. Through an iterative process that included all three signalized intersections along US 101 in South Beach, it was determined that a 19 percent reduction in total approach volumes would be needed to meet the applicable mobility standards for each.
- The signalized intersection of US 101 with 40th Street is also expected to operate at V/C = 0.96 during the PM peak hour. This intersection would exceed its applicable standard of V/C > 0.75 for approximately seven hours each weekday. With a 19 percent reduction in total approach volumes, this intersection would meet its applicable mobility standard.
- The signalized intersection of US 101 with 50th Street is expected to operate at V/C = 0.82 during the PM peak hour. This intersection would exceed its V/C > 0.75 standard for approximately two hours during each weekday. With a 19 percent reduction in total approach traffic volumes this intersection would meet its applicable mobility standard.
- For the unsignalized intersection of US 101 with 62nd Street, operations would exceed applicable mobility standards for an estimated seven hours out of each weekday. With a 19 percent reduction in approach volumes, this intersection is expected to meet its relevant mobility standard (V/C > 0.75 for traffic on US 101 and V/C > 0.80 for side street traffic).

It should be noted that none of these intersections operates in isolation from the others and that the anticipated traffic queuing from the bridge will likely have a significant impact on northbound traffic operations through much of the study area.

Land Use Scenario #2

With full build-out of this scenario, intersection operations from north to south are expected to be as follows:

- For the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the 2-lane roadway section of the highway leading to/from the Yaquina Bay Bridge would result in operations exceeding applicable mobility standards for 12 hours out of each typical 2030 Average Annual weekday. With a 14 percent reduction in total approach traffic, some improvement would occur but the standard would still be exceeded for up to 11 hours for each typical weekday.
- For the unsignalized intersection of US 101 with 32nd Street, traffic operations would exceed the applicable mobility standards for up to seven hours each weekday. With a 14 percent reduction in approach volume, this intersection would exceed its applicable mobility standards (V/C >0.85 for traffic on US 101 and V/C > 0.90 for side street traffic) for an estimated one hour during each typical 2030 Average Annual weekday.
- The signalized intersection of US 101 with 35th Street, is expected to operate at V/C = 0.92 during the weekday PM peak hour in comparison to its standard of V/C > 0.85. Operations are expected to exceed this standard for an estimated four hours out of each weekday. Through an iterative process that included all three signalized

intersections along US 101 in South Beach, it was determined that a 14 percent reduction in total approach volumes would be needed to meet the applicable mobility standards for each.

- The signalized intersection of US 101 with 40th Street is expected to operate at V/C = 0.88 during the weekday PM peak hour. This intersection would exceed its applicable standard of V/C > 0.75 for approximately six hours each weekday. With a 14 percent reduction in total approach volumes, this intersection would meet its applicable mobility standard.
- The signalized intersection of US 101 with 50th Street is expected to operate at V/C = 0.78 during the weekday PM peak hour. This intersection would exceed its V/C > 0.75 standard for only one hour during each weekday. With a 14 percent reduction in total approach traffic volumes, this intersection would meet its applicable mobility standard.
- At the unsignalized intersection with 62nd Street, the applicable standard for side streets of V/C > 0.80 would be exceeded for four hours each weekday. With a 14 percent reduction in approach volume this intersection is expected to meet its mobility standard for each typical 2030 Average Annual weekday.

As with Scenario #1, it should be noted that none of these intersections operates in isolation from the others and that the anticipated traffic queuing from the bridge will likely have a significant impact on northbound traffic operations through much of the study area.

Off-Season Weekday Conditions

Land Use Scenario #1

With full build-out of this scenario, intersection operations from north to south are expected to be as follows:

- For the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the 2-lane roadway section of the highway leading to/from the Yaquina Bay Bridge would result in operations exceeding applicable mobility standards for 11 hours out of each typical 2030 Off-Season weekday. The eight percent reduction in approach volumes that benefits the signalized intersections would not materially affect operations at these two intersections.
- For the unsignalized intersection of US 101 with 32nd Street, traffic operations would exceed the applicable mobility standards for an estimated two hours each weekday. With an eight percent reduction in approach volumes, this intersection would exceed its applicable mobility standards (V/C >0.85 for traffic on US 101 and V/C > 0.90 for side street traffic) for only one hour each weekday.
- The signalized intersection of US 101 with 35th Street, is expected to operate at V/C = 0.85 during the weekday PM peak hour which meets its existing mobility standard.
- The signalized intersection of US 101 with 40th Street is expected to operate at V/C = 0.82 during the weekday PM peak hour. This intersection would exceed its applicable standard of V/C > 0.75 for approximately three hours each weekday. With an eight percent reduction in total approach volumes, this intersection would meet its applicable mobility standard.

- The signalized intersection of US 101 with 50th Street is expected to operate at V/C = 0.72 during the weekday PM peak hour which is less than its existing mobility standard of V/C > 0.75.
- For the unsignalized intersection of US 101 with 62nd Street, operations would exceed applicable mobility standards for side streets of V/C > 0.80 for an estimated one hour out of each weekday. With an eight percent reduction in approach volumes, this intersection would meet its applicable standard.

Land Use Scenario #2

With full build-out of this scenario, intersection operations from north to south are expected to be as follows:

- For the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the 2-lane roadway section of the highway leading to/from the Yaquina Bay Bridge would exceed their applicable mobility standards for 11 hours out of each typical 2030 Off-Season weekday.
- For the unsignalized intersection of US 101 with 32nd Street, traffic operations would exceed the applicable mobility standards (V/C >0.85 for traffic on US 101 and V/C > 0.90 for side street traffic) for an estimated one hour each weekday.
- The signalized intersection of US 101 with 35th Street, is expected to operate at V/C = 0.83 during the weekday PM peak hour which meets its existing mobility standard of V/C > 0.85.
- The signalized intersection of US 101 with 40th Street, is expected to operate at V/C = 0.75 during the weekday PM peak hour which meets its existing mobility standard of V/C > 0.75.
- The signalized intersection of US 101 with 50th Street, is expected to operate at V/C = 0.70 during the weekday PM peak hour which meets its existing mobility standard of V/C > 0.75.
- For the unsignalized intersection of US 101 with 62nd Street, the applicable standard for side streets of V/C > 0.80 would also be exceeded for one hour each weekday.

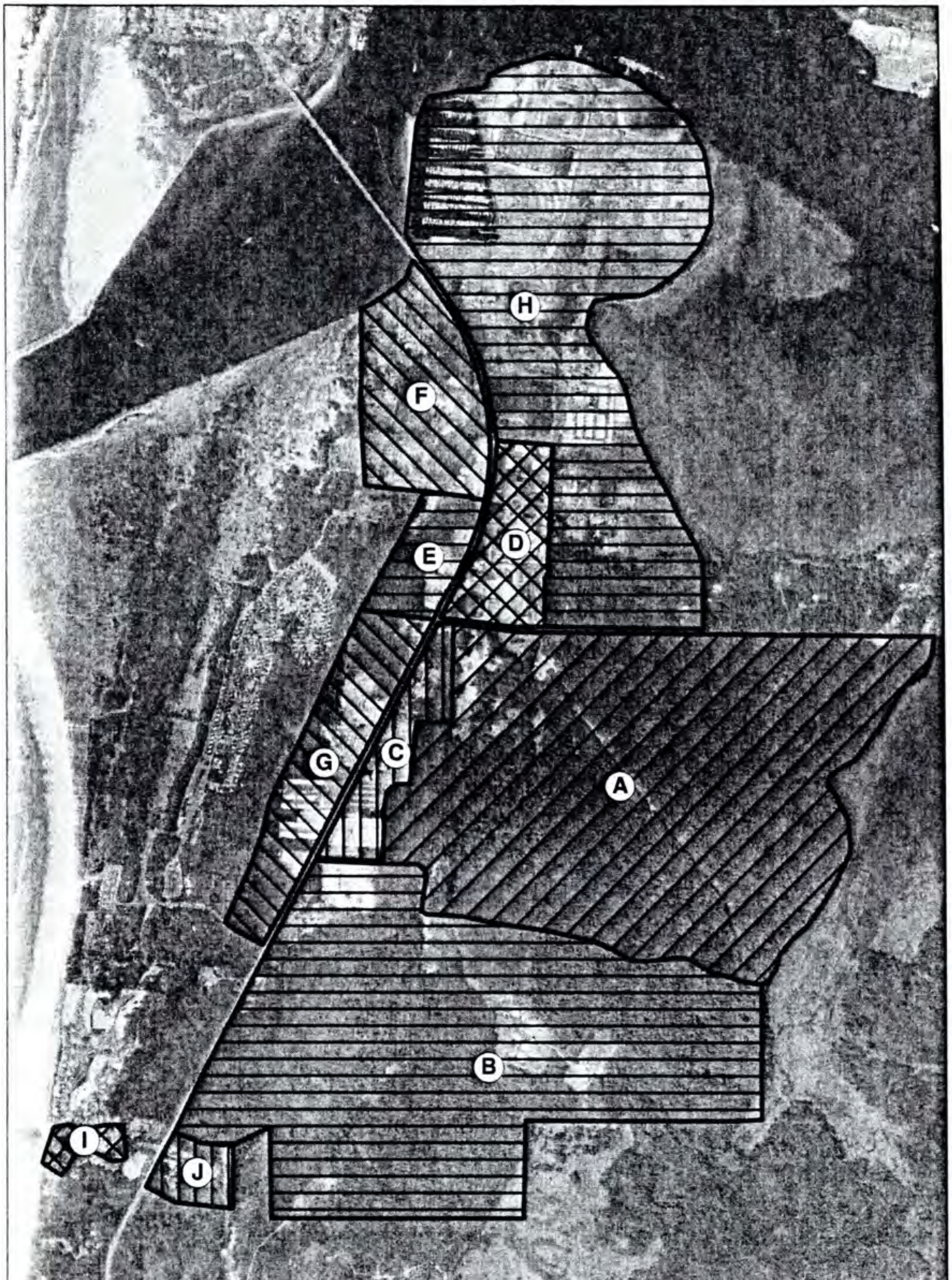
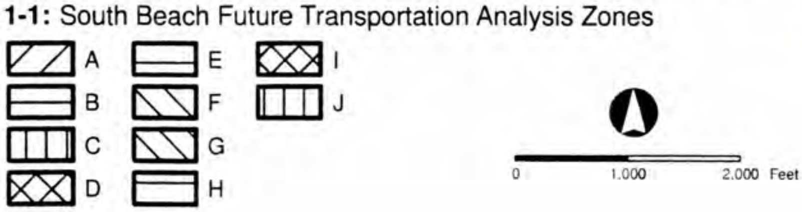


Figure 1-1: South Beach Future Transportation Analysis Zones



Geographic Data Standards:
Projected Coordinate System:
Oregon State Plane South

Data Source(s):
USDA, ESRI, Parametrix

Contact Information:
Parametrix

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Table 1-1. 2030 Land Use Scenario 1 – Traffic Operations Comparison with Standard Peak Hour Factors

		OHP V/C Standard	2030 30 HV V/C Ratio	2030 30 HV Delay (sec/veh)	2030 AA V/C Ratio	2030 AA Delay (sec/veh)	2030 Off-Season V/C Ratio	2030 Off-Season Delay (sec/veh)
Signalized Intersections								
US 101 & 35th Street		0.85	1.19	116.1	1.00	36.6	0.90	16.6
US 101 & 40th Street		0.75	1.24	126.6	1.04	58.8	0.94	37.8
US 101 & 50th Street		0.75	1.04	31.9	0.88	18.6	0.77	13.4
Unsignalized Intersections	***Critical Movement/Control***							
US 101 & Pacific Way	*Northbound Thru*	0.85	2.10	0	1.77	0	1.58	0
	Northbound Right	0.85	0.08	0	0.07	0	0.06	0
	Southbound Thru	0.85	2.04	0	1.70	0	1.52	0
US 101 & Abalone Street	*Northbound Thru*	0.85	1.09	0	0.92	0	0.82	0
	Southbound Thru	0.85	1.88	0	1.57	0	1.40	0
	Southbound Right	0.85	0.16	0	0.13	0	0.12	0
	Eastbound Right	0.90	31.96	N/A	11.34	N/A	6.18	N/A
US 101 & 32nd Street	*Northbound Thru*	0.85	0.82	0	0.69	0	0.62	0
	Northbound Right	0.85	0.04	0	0.04	0	0.03	0
	Southbound Thru-Right	0.85	1.31	0	1.10	0	0.98	0
	Eastbound Right	0.90	0.79	135.7	0.42	52.7	0.29	36.4
	Westbound Right	0.90	2.71	>200.0	2.25	>200.0	1.73	>200.0
US 101 & 62nd Street	*Northbound Left*	0.75	0.34	42.8	0.17	25.3	0.14	20.7
	Northbound Thru-Right	0.75	0.85	0	0.71	0	0.63	0
	Southbound Left	075	0.04	20.9	0.03	16.3	0.01	14.3
	Southbound Thru	0.75	0.78	0	0.65	0	0.58	0
	Southbound Right	0.75	0.05	0	0.04	0	0.04	0
	Eastbound Left	0.80	4.86	N/A	2.07	>200.0	1.32	>200.0
	Eastbound Thru-Right	0.80	0.24	37.4	0.14	25.7	0.10	21.3
	Westbound Left	0.80	0.97	>200.0	0.33	102.8	0.24	67.9
	Westbound Thru-Right	0.80	0.06	23.1	0.04	18.5	0.02	16.3

Note: N/A indicates that projected volumes sufficiently exceed capacity such that Synchro cannot calculate a value.

(black) Entire intersection or a specific movement that would operate in an over-capacity condition.

(gray) Entire intersection or a specific movement that would exceed the OHP standard but would operate at less than capacity conditions.

Table 1-2. 2030 Land Use Scenario 2 Operations Comparison with Standard Peak Hour Factors

		OHP V/C Standard	2030 30 HV V/C Ratio	2030 30 HV Delay (sec/veh)	2030 AA V/C Ratio	2030 AA Delay (sec/veh)	2030 Off-Season V/C Ratio	2030 Off-Season Delay (sec/veh)
Signalized Intersections								
US 101 & 35th Street		0.85	1.15	89.3	0.97	24.5	0.85	23.0
US 101 & 40th Street		0.75	1.18	85.5	0.99	42.7	0.86	27.4
US 101 & 50th Street		0.75	0.99	23.9	0.83	16.9	0.74	11.4
Unsignalized Intersections	***Critical Movement/Control***							
US 101 & Pacific Way	*Northbound Thru*	0.85	1.99	0	1.68	0	1.50	0
	Northbound Right	0.85	0.08	0	0.07	0	0.06	0
	Southbound Thru	0.85	1.97	0	1.64	0	1.46	0
US 101 & Abalone Street	*Northbound Thru*	0.85	1.04	0	0.88	0	0.78	0
	Southbound Thru	0.85	1.80	0	1.51	0	1.35	0
	Southbound Right	0.85	0.16	0	0.13	0	0.12	0
	Eastbound Right	0.90	27.49	N/A	9.93	N/A	5.73	N/A
US 101 & 32nd Street	*Northbound Thru*	0.85	0.77	0	0.65	0	0.58	0
	Northbound Right	0.85	0.05	0	0.04	0	0.04	0
	Southbound Thru-Right	0.85	1.27	0	1.06	0	0.95	0
	Eastbound Right	0.90	0.73	113.8	0.39	47.5	0.28	33.9
	Westbound Right	0.90	2.73	>200.0	2.01	>200.0	1.33	182.6
US 101 & 62nd Street	*Northbound Left*	0.75	0.31	39.3	0.16	24.2	0.13	19.8
	Northbound Thru-Right	0.75	0.80	0	0.67	0	0.60	0
	Southbound Left	075	0.04	19.2	0.03	15.3	0.01	13.6
	Southbound Thru	0.75	0.76	0	0.64	0	0.57	0
	Southbound Right	0.75	0.05	0	0.04	0	0.04	0
	Eastbound Left	0.80	4.32	N/A	1.91	>200.0	1.22	>200.0
	Eastbound Thru-Right	0.80	0.23	35.1	0.14	24.7	0.09	20.6
	Westbound Left	0.80	0.40	193.7	0.19	77.8	0.07	51.4
	Westbound Thru-Right	0.80	0.05	21.5	0.04	17.5	0.02	15.6

Note: N/A indicates that projected volumes sufficiently exceed capacity such that Synchro cannot calculate a value.

Entire intersection or a specific movement that would operate in an over-capacity condition.

Entire intersection or a specific movement that would exceed the OHP standard but would operate at less than capacity conditions.

Table 1-3. Summary of Duration of Congestion Evaluation –Average Annual Conditions with Adjusted Peak Hour Factors(Note #1)

			Land Use Scenario #1			Land Use Scenario #2		
			Full Development		With 19% Reduction in Traffic (1)	Full Development)		With 14% Reduction in Traffic (2)
Intersection	Critical Movement	OHP V/C Standard	Peak V/C	Congested Hours (4)	Congested Hours (4)	Peak V/C	Congested Hours (4)	Congested Hours (4)
Signalized Intersections								
US 101 & 35th Street	All	0.85	0.96	4 hours	0 hours	0.92	4 hours	0 hours
US 101 & 40th Street	All	0.75	0.96	7 hours	0 hours	0.88	6 hours	0 hours
US 101 & 50th Street	All	0.75	0.82	2 hours	0 hours	0.78	1 hour	0 hours
Unsignalized Intersections (3)								
US 101 & Pacific Way	NB Thru	0.85	1.68			1.60		
	NB Right	0.85	0.06	11 hours	11 hours	0.06	12 hours	11 hours
	SB Thru	0.85	1.62			1.56		
US 101 & Abalone Street	NB Thru	0.85	0.87			0.83		
	SB Thru	0.85	1.49	12 hours	11 hours	1.44	12 hours	11 hours
	SB Right	0.85	0.13			0.13		
	EB Right	0.90	7.75			6.84		
US 101 & 32nd Street	NB Thru	0.85	0.66			0.62		
	NB Right	0.85	0.04			0.04		
	SB Thru/Right	0.85	1.04	7 hours	0 hours	1.01	7 hours	1 hour
	EB Right	0.90	0.32			0.30		
	WB Right	0.90	1.70			1.60		
US 101 & 62nd Street	NB Left	0.75	0.15			0.14		
	NB Thru/Right	0.75	0.67			0.64		
	SB Left	0.75	0.03			0.03		
	SB Thru	0.75	0.62	7 hours	0 hours	0.61	4 hours	0 hours
	SB Right	0.75	0.04			0.04		
	EB Left	0.80	1.49			1.38		
	EB Thru/Right	0.80	0.11			0.11		
	WB Left	0.80	0.24			0.14		
	WB Thru/Right	0.80	0.03			0.03		

(Black) Entire intersection or a specific movement that would operate in an over-capacity condition.
(Grey) Entire intersection or a specific movement that would exceed the OHP standard but would operate at less than capacity conditions.

Note 1: The results of this table are based on different peak hour factor assumptions (PHF=1.00) than the results reported in the tables in Chapters 2, 4 and 5 (PHF=0.85).

Note 2: Intersection performance is measured at the relevant V/C standard. For stop-controlled intersections, the side street standard was used as the basis for estimating when an intersection would exceed its performance standard.

(1) 19% reduction from Full Development to meet OHP standards.
(2) 14% reduction from Full Development to meet OHP standards.
(3) Congested hours for stop-controlled intersections refers to worst side street movement
(4) "Congested Hours" refers to the number of hours that an intersection would exceed the OHP V/C performance standard.

Table 1-4. Summary of Duration of Congestion Evaluation – Off-Season Conditions with Adjusted Peak Hour Factors(Note #1)

			Land Use Scenario #1			Land Use Scenario #2	
			Full Development		With 8% Reduction in Traffic [1]	Full Development)	
Intersection	Critical Movement	OHP Standard	Peak V/C	Congested Hours [3]	Congested Hours [3]	Peak V/C	Congested Hours [3]
Signalized Intersections							
US 101 & 35th Street	All	0.85	0.85	0 hours	0 hours	**0.83**	0 hours
US 101 & 40th Street	All	0.75	0.82	3 hours	0 hours	**0.75**	0 hours
US 101 & 50th Street	All	0.75	**0.72**	0 hours	0 hours	**0.70**	0 hours
Unsignalized Intersections [2]							
US 101 & Pacific Way	NB Thru	0.85	1.50			1.43	
	NB Right	0.85	0.06	11 hours	11 hours	006	11 hours
	SB Thru	0.85	1.44			1.39	
US 101 & Abalone Street	NB Thru	0.85	**0.78**			0.74	
	SB Thru	0.85	1.33	11 hours	11 hours	1.28	11 hours
	SB Right	0.85	0.11			0.11	
	EB Right	0.90	>2.00			>2.00	
US 101 & 32nd Street	NB Thru	0.85	0.59			0.55	
	NB Right	0.85	0.03			0.04	
	SB Thru/Right	0.85	0.93	2 hours	1 hour	0.90	1 hour
	EB Right	0.90	0.23			0.21	
	WB Right	0.90	1.24			1.01	
US 101 & 62nd Street	NB Left	0.75	0.12			0.11	
	NB Thru/Right	0.75	0.60			0.57	
	SB Left	0.75	0.01			0.01	
	SB Thru	0.75	0.55	1 hour	0 hours	0.54	1 hour
	SB Right	0.75	0.04			0.04	
	EB Left	0.80	0.97			0.90	
	EB Thru/Right	0.80	0.08			0.07	
	WB Left	0.80	0.17			0.05	
	WB Thru/Right	0.80	0.01			0.01	

(black) Intersections that would operate in an over-capacity condition.
(gray) Intersections that would exceed the OHP standard but would operate at less than capacity conditions.

Note 1: The results of this table are based on different peak hour factor assumptions (PHF=1.00) than the results reported in the tables in Table 1-3 and Chapters 2, 4 and 5 (PHF=0.85).
Note 2: Intersection performance is measured at the relevant V/C standard. For stop-controlled intersections, the side street standard was used as the basis for estimating when an intersection would exceed its performance standard.
(1) 8% reduction from Full Development to meet OHP standards.
(2) Congested hours for stop-controlled intersections refers to worst side street movement
(3) "Congested Hours" refers to the number of hours that an intersection would exceed the OHP V/C performance standard

2. ANALYSIS METHODOLOGY AND ASSUMPTIONS

2.1 OVERVIEW OF ANALYSIS METHODOLOGY

The analysis of 2030 traffic volumes associated with community growth in the South Beach area of the City of Newport is based on a multi-step process that includes the following:

1. Update of assumptions related to the existing roadway network to reflect, at a minimum, earlier findings concerning the need for highway improvements through the South Beach area to accommodate both background traffic growth and South Beach development.
2. Development of background traffic volumes along US 101 for 2030 conditions during three time periods – the summer seasonal peak hour (30th highest hourly volume or 30 HV), average annual weekday peak hour (AAV), and off-seasonal weekday peak hour (typically representing an average of volumes occurring from September through May).
3. Development of trip generation and distribution assumptions for the South Beach area based on the two land use scenarios. These scenarios are:
    a. Newport Population Growth – which reflects the anticipated population growth for the community as a whole over the planning period of which approximately 50 percent has been assumed to occur in South Beach.
    b. Environmentally Constrained – which recognizes the presence of extensive wetlands in the South Beach area which may limit growth and development opportunities.
4. Identification of performance measures and assumptions related to the capacity of the Yaquina Bay Bridge and non-bridge segments of US 101 through South Beach.
5. Documentation of key findings and conclusions related to each land use scenario and time period.

2.2 2030 ROADWAY NETWORK ASSUMPTIONS

For purposes of the evaluation of alternate mobility standards, the study area focuses on US 101 in Newport and includes all of South Beach extending north of the Yaquina Bay Bridge to Hurbert Street and south to 62nd Street. Analysis of traffic operations for the land use scenarios and seasonal time periods was conducted using a modified Synchro traffic operations model that includes the following specific network features.

- Capacity of the Yaquina Bay Bridge remains unchanged from today.
- Two through lanes in each direction are assumed on US 101 southbound from the intersection with Abalone Street through the intersection with 62nd Street, and on US 101 northbound from south of 62nd Street to the intersection with Pacific Way where the outside lane would become a right-turn only drop lane. US 101 from the Yaquina Bay Bridge to 40th Street is assumed to be built as an urban roadway section.
- The intersection of US 101 with Pacific Avenue will accommodate only northbound right turns in and not out.
- The intersection of US 101 with Ferry Slip Road is assumed to be closed.

- The intersection of US 101 with 32nd Street is assumed to be converted from serving all-way traffic to serve only right-in/right-out traffic. This intersection is currently signalized, but the signal is assumed to be relocated to the intersection of US 101 and 35th Street.
- The intersection of US 101 with 35th Street has been added to the original network and is assumed to be signalized. The signal was relocated from the existing intersection of US 101 with 32nd Street. The signal is assumed to function as actuated and coordinated. Intersection is assumed to have four approach legs, each with separate left, right, and through lanes.
- The intersection of US 101 with 40th Street is assumed to be signalized with four approach legs, each with separate left, right, and through lanes. A second southbound left turn lane is also assumed as this improvement would be necessary to meet the needs of projected volumes for this movement which would exceed 500 peak hour vehicles. The signal is assumed to function as actuated and coordinated.
- The intersection of US 101 with 50th Street is assumed to be realigned to serve as the fourth, easterly leg of the existing intersection with the entrance to South Beach State Park. This intersection is assumed to be signalized and to include separate left, right, and thru lanes on the north/south approaches. Separate left and through/right lanes are assumed for the side streets.
- The intersection of US 101 with 62nd Avenue is assumed to include separate left, right and through lanes in the southbound direction of US 101 and to include separate left and through lanes in the northbound direction. Left turn and through/right approaches are assumed for the side streets which are stop-controlled.
- An alternative will be considered that includes a north/south internal street between 50th and 62nd Streets would be located along old railroad right-of-way. The effect of this alternative on traffic operations at the intersections of US 101 with 50th and 62nd Streets will be addressed.

Figure 2-1 presents a map of the South Beach study area, illustrating the baseline roadway network and study area intersections.

2.3 DEVELOPMENT OF 2030 BACKGROUND TRAFFIC VOLUMES

Prior traffic analysis that supports the findings and recommendations of the Newport TSP Update is based on a 2026 planning horizon year. For the analysis and development of alternate mobility standards, the planning horizon year was extended to 2030 by applying an annualized background traffic growth rate of 1.7 percent for all through traffic along US 101. Through traffic is assumed to represent traffic passing through the study area without stopping at or utilizing any services within the study area.

Three design hours were also identified for 2030 that would be used to assess the impacts of background and community growth on transportation system performance. These time periods include:

- 30th Highest Hourly Volume (30 HV) which is considered to represent a summertime weekday PM peak hour, the high travel season for the Oregon Coast.

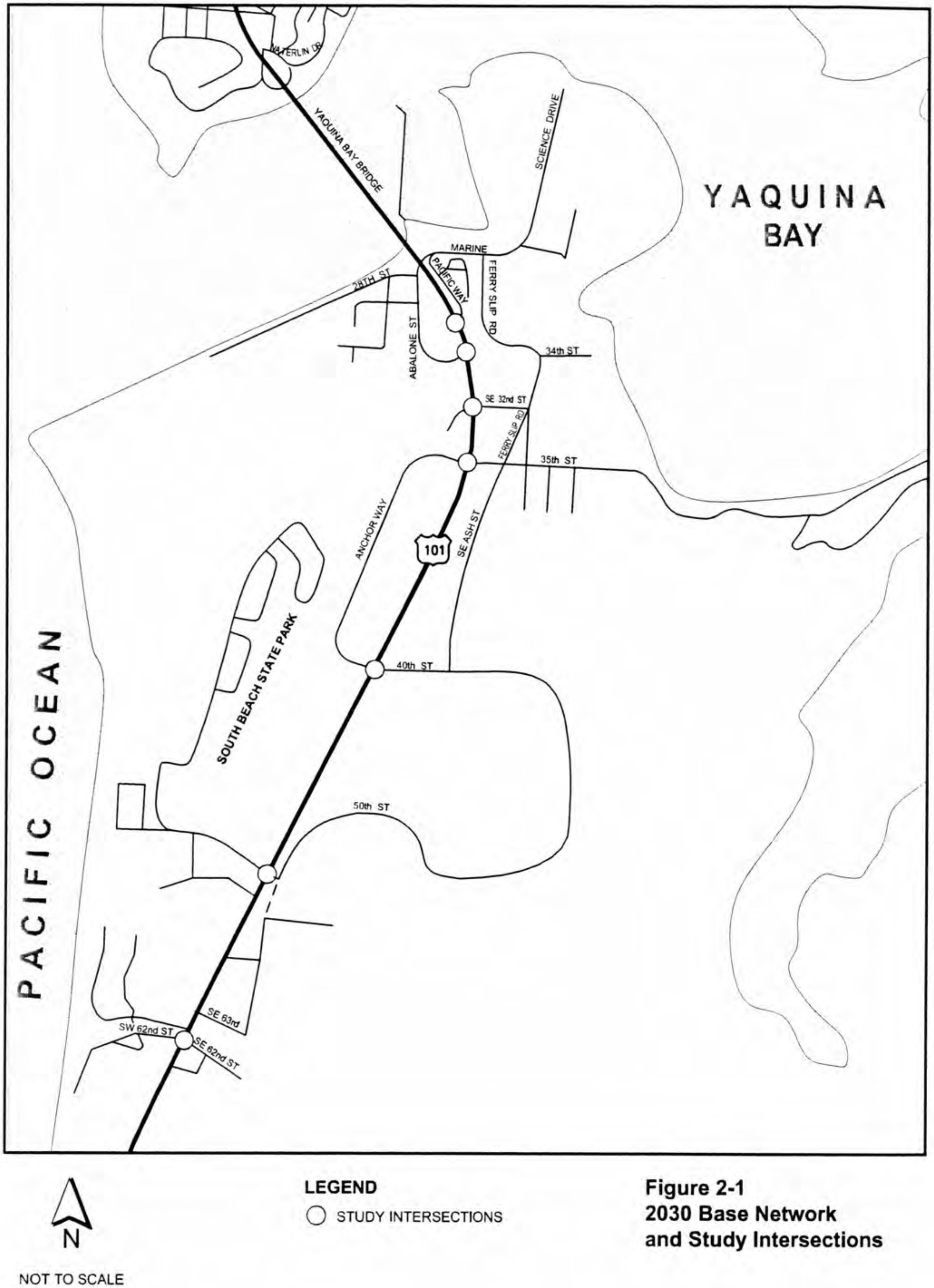


Figure 2-1
2030 Base Network and Study Intersections

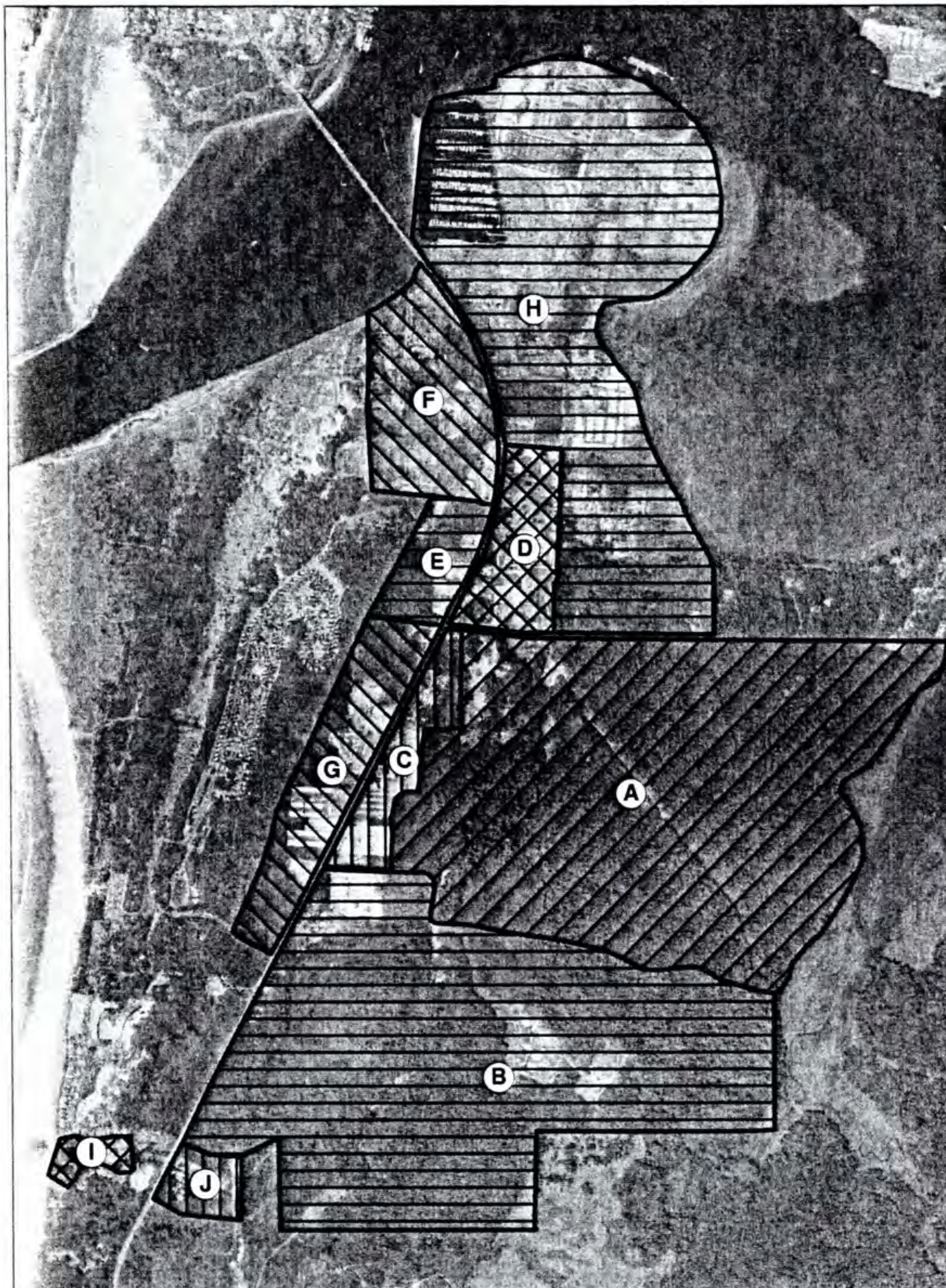
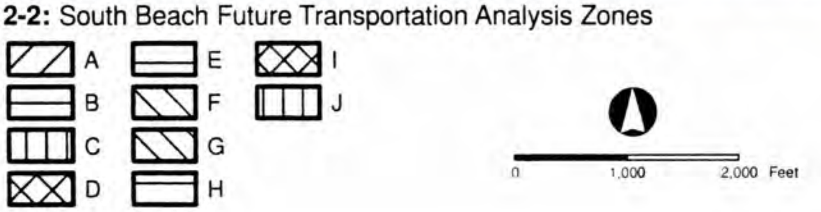


Figure 2-2: South Beach Future Transportation Analysis Zones



Geographic Data Standards:
Projected Coordinate System:
Oregon State Plane South

Data Source(s):
USDA, ESRI, Parametrix

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- Average Annual Volume (AAV) which provides a baseline against which highway improvement needs can be assessed reflecting the entire year including both seasonal peaks (June through August) and off-seasonal peaks (September through May).
- Off-Season which averages traffic volumes occurring along US 101 during the period between September and May, typical the lowest travel season on the Oregon Coast.

The identification of 30 HV, AAV and Off-Season was based on the 2007 summary trend data from the automatic traffic recorder (ATR) located in north Newport (# 21-009). The 30 HV is considered to represent a weekday PM peak hour during the high travel season for the coast (summertime), while the AAV represents the average weekday PM peak hour volume over the entire year, and the Off-Season the weekday PM peak hour during the non-summertime period.

Typically, the study area's 30 HV is 17 percent higher than the AAV, and 26 percent higher than the Off-Season. The AAV is 9 percent higher than the Off-Season. Data and discussion supporting the identification of the 30 HV, the AAV, and Off-Season is included in Appendix A. However, it should be noted that each of these time periods represent unconstrained travel demand. It is unlikely that this level of traffic would occur in reality due to capacity constraints along US 101 including the Yaquina Bay Bridge.

2.4 DEVELOPMENT ASSUMPTIONS AND TRIP GENERATION ESTIMATES

This section presents a summary of the assumed land use growth in South Beach over the planning period. Land uses are identified by type and location for both scenarios.

Land Use Scenario #1 – Newport Population Growth

For the purpose of forecasting future growth in South Beach, the study area was divided into ten sub-areas or Transportation Analysis Zones (TAZs). The sub-areas were established based on information provided by the City of Newport and from other transportation studies that had previously been conducted for development in the South Beach area. The purpose of that analysis was to support an urban growth boundary (UGB) adjustment and to consider specific information about anticipated land uses (e.g., land development expectations by type and size and property access characteristics). TAZ boundaries are presented in Figure 2-2.

The variety of the land uses assumed in each of the sub-areas are consistent with zoning designations and permitted uses, and were based on an agreed reasonable scenario that is tied to the projected population growth of the City of Newport. This scenario assumes that 50 percent of the population growth anticipated in Newport by 2030 will occur in South Beach with the remainder occurring generally north of the Yaquina Bay Bridge.

The types of development assumed for South Beach include single family residential, condominiums/townhouses, industrial park, retail, research and development, community college and a park. See Technical Memorandum #6 for a detailed discussion of the land use assumptions.

Table 2-1 presents a summary of the South Beach land development assumptions and the estimated weekday PM peak hour trips associated with that development. As noted in the table, Land Use Scenario #1 is expected to generate a total of just over 4,300 PM peak hour trip ends, with 1,923 inbound and 2,394 outbound. Over 1,100 PM peak hour trip ends are expected to be generated by the South Beach Campus Village development which includes a large residential component and a community college. Development in TAZs B and C including anticipated redevelopment along US 101 to increase development density would generate nearly 1,000 PM peak hour trips. Other TAZs with significant traffic-generating development would include TAZ D (including hotel and retail uses) and TAZ F (with retail and condominium/townhouse development).

Table 2-1. Land Use Scenario #1 – Newport Population Growth

Area A (Campus Village)				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Single Family Residence	210	260	Dwellings	160	94	254
Condominium/Townhouse	230	261	Dwellings	88	44	132
Community College	550	1,000	Students	95	221	316
Retail	820	100,000	Sq. Feet	300	326	626
County Park (2)	412	78.1	Acres	16	30	46
Gross Trips				659	715	1,374
Internal Trip Reduction (15%)				(99)	(107)	(206)
Net Trips				**560**	**608**	**1,168**

Area B and C				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Industrial Park	130	142,350	Sq. Feet	32	120	152
Commercial (1)		142,350	Sq. Feet			
Retail	820	71,175	Sq. Feet	240	260	500
Retail adjacent to US 101 (3)	820	71,175	Sq. Feet	240	260	500
Gross Trips				512	640	1,152
Internal Trip Reduction (10%)	(All Retail)			(48)	(52)	(100)
Pass-by Reduction (20%)	(Retail Adjacent to US 101 only)			(26)	(29)	(55)
Net Trips				**438**	**559**	**997**

Area D				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Hotel (2)	310	150	Rooms	47	42	89
Retail (3)	820	90,000	Sq. Feet	280	304	584
Gross Trips				327	346	673
Internal Trip Reduction (10%)				(33)	(35)	(68)
Pass-by Reduction (20%)				(59)	(62)	(121)
Net Trips				**235**	**249**	**485**

Area E				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Industrial Park	130	10,000	Sq. Feet	10	39	49
Retail adjacent to US 101 (3)	820	10,000	Sq. Feet	66	71	137
Gross Trips				76	110	186
Pass-by Reduction (20%)	(All Retail)			(13)	(14)	(27)
Net Trips				**63**	**96**	**159**

Area F				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Retail (3)	820	100,000	Sq. Feet	300	326	626
Condominium/Townhouse	230	120	Dwellings	47	23	70
Gross Trips				347	349	696
Internal Trip Reduction (10%)	(All Uses)			(35)	(35)	(70)
Pass-by Reduction (20%)	(Retail Adjacent to US 101 only)			(33)	(36)	(69)
Net Trips				**279**	**278**	**557**

Table 2-1 Continued. Land Use Scenario #1 – Newport Population Growth

Area G (west of US 101)				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Industrial Park	130	50,000	Sq. Feet	17	64	81
Retail (3)		50,000	Sq. Feet	190	206	396
Campground/RV Park	416	55	Sites	14	6	20
Gross Trips				221	276	497
Internal Trip Reduction (10%)	(All Uses)			(22)	(28)	(50)
Pass-by Reduction (20%)	(All Retail)			(42)	(45)	(87)
Net Trips				**157**	**203**	**360**

Area H (incl. OCA & HMSC)				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Research and Development (4)	760	250,000	Sq. Feet	41	230	270
General Office	710	42	Employees	3	16	19
Retail	820	10,000	Sq. Feet	66	71	137
Gross Trips				110	317	426
Internal Trip Reduction (10%)	(Retail & Office Uses)			(7)	(9)	(16)
Net Trips				**103**	**308**	**410**

Area I (Southshore PD)				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Hotel (2)	310	65	Rooms	20	18	38
Retail	820	13,000	Sq. Feet	78	85	163
Gross Trips				98	103	201
Internal Trip Reduction (10%)	(All Uses)			(10)	(10)	(20)
Net Trips				**88**	**93**	**181**

Area J -Planned Reduction (5)				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Retail		20,000	Sq. Feet	104	113	217
Single Family Residence	210	3	Dwellings	3	2	5
Gross Trips				107	115	222
Internal Trip Reduction (10%)	(All Uses)			(11)	(11)	(22)
Net Trips				**96**	**104**	**200**

PM Peak Trip Summary	**In**	**Out**	**Total**
Gross Trips	**2,457**	**2,971**	**5,428**
Total Internal	**(265)**	**(287)**	**(552)**
Total Pass-by	**(173)**	**(186)**	**(359)**
Area J Reductions	**(96)**	**(104)**	**(200)**
Net Total Trips	**1,923**	**2,394**	**4,317**

Notes:
1 Approximately half of the industrial acreage is assumed to develop into commercial uses.
2 ITE Trip Generation rate used.
3 Commercial is assumed adjacent to Hwy 101 and subject to Pass-by rate 20% reduction.
4 This is primarily laboratory and classroom use related to Hatfield Marine Science Center (HMSC) and the Oregon Coast Aquarium. Includes 45, 000 sq ft for NOAA, 45, 000 sq ft for Port of Newport, and 160,000 for HMSC.
5 As documented in the Newport Airport Master Plan, the Airport intends to acquire this area and abandon the existing uses to increase air safety.

The estimate of student enrollment information for the Oregon Coast Community College was based on enrollment data obtained from the college for Spring and Summer 2008. A comparison was made of enrollment during a typical weekday during the regular school season and during the summer session. To determine the typical weekday, the lowest (Friday; zero enrollment) and the highest (Tuesday, 57%) enrollment days were eliminated and the remaining days were averaged for both regular and summer sessions. The comparison indicates that summertime enrollment is 27 percent of the regular term enrollment. For both of land use scenarios, a student enrollment of 1,000 students was assumed for 2030. This estimate was included in the trip generation forecasts prepared for average annual and offseason time periods. For the summertime peak (30 HV), 270 students (or 27 percent of the regular term enrollment) was used to estimate trips for this time period under both land use scenarios. The total trip difference between the regular and summer student enrollment amounts to 138 trips or 118 net trips for TAZ A.

Land Use Scenario #2 – Environmentally Constrained Growth

Land Use Scenario #2 is built upon the development assumptions prepared for Scenario #1 but also incorporates potential development constraints associated with wetland resources in the study area. The variety of the land uses are assumed in each of the sub-areas are still consistent with zoning designations and permitted uses. Development includes single family residential, condominiums/townhouses, industrial park, retail, research and development, community college and a park.

Table 2-2 presents a summary of the South Beach land development assumptions for Scenario #2, and the estimated weekday PM peak hour trips associated with that development. As noted in the table, Scenario #2 is expected to generate a total of approximately 3,900 PM peak hour trip ends, with 1,755 inbound and 2,150 outbound. Over 1,100 PM peak hour trip ends are expected to be generated by the South Beach Campus Village development which includes a large residential component and a community college. Development in TAZs B and C including anticipated redevelopment along US 101 to increase development density would generate nearly 800 PM peak hour trips. Other TAZs with significant traffic-generating development would include TAZ D (including hotel and retail uses) and TAZ F (with retail and condominium/townhouse development).

Table 2-2. Land Use Scenario #2 – Environmentally Constrained Growth

Area A (Campus Village)				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Single Family Residence	210	260	Dwellings	160	94	254
Condominium/Townhouse	230	261	Dwellings	88	44	132
Community College	550	1,000	Students	95	221	316
Retail	820	100,000	Sq. Feet	300	326	626
County Park (2)	412	78.1	Acres	16	30	46
Gross Trips				659	715	1,374
Internal Trip Reduction (15%)				(99)	(107)	(206)
Net Trips				**560**	**608**	**1,168**

Table 2-2 Continued. Land Use Scenario #2 – Environmentally Constrained Growth

Area B and C				**PM Peak Trips**		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Industrial Park	130	100,000	Sq. Feet	25	94	119
Commercial (1)		100,000	Sq. Feet			
Retail	820	75,000	Sq. Feet	249	269	518
Retail adjacent to US 101 (3)	820	25,000	Sq. Feet	120	130	250
Gross Trips				394	493	887
Internal Trip Reduction (10%)	(All Retail)			(37)	(40)	(77)
Pass-by Reduction (20%)	(Retail Adjacent to US 101 only)			(13)	(14)	(27)
Net Trips				**344**	**439**	**783**
Area D				**PM Peak Trips**		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Hotel (2)	310	150	Rooms	47	42	89
Retail (3)	820	90,000	Sq. Feet	280	304	584
Gross Trips				327	346	673
Internal Trip Reduction (10%)				(33)	(35)	(68)
Pass-by Reduction (20%) (5)				(59)	(62)	(121)
Net Trips				**235**	**249**	**484**
Area E				**PM Peak Trips**		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Industrial Park	130	10,000	Sq. Feet	10	39	49
Retail adjacent to US 101 (3)	820	10,000	Sq. Feet	66	71	137
Gross Trips				76	110	186
Pass-by Reduction (20%)	(All Retail)			(13)	(14)	(27)
Net Trips				**63**	**96**	**159**
Area F				**PM Peak Trips**		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Retail (3)	820	100,000	Sq. Feet	300	326	626
Condominium/Townhouse	230	120	Dwellings	47	23	70
Gross Trips				347	349	696
Internal Trip Reduction (10%)	(All Uses)			(35)	(35)	(70)
Pass-by Reduction (20%)	(Retail Adjacent to US 101 only)			(33)	(36)	(69)
Net Trips				**279**	**278**	**557**
Area G (west of US 101)				**PM Peak Trips**		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Industrial Park	130	32,500	Sq. Feet	14	53	67
Retail (3)		17,500	Sq. Feet	95	103	198
Campground/RV Park	416	55	Sites	14	6	20
Gross Trips				123	162	285
Internal Trip Reduction (10%)	(All Uses)			(12)	(16)	(28)
Pass-by Reduction (20%)	(All Retail)			(21)	(23)	(44)
Net Trips				**90**	**123**	**213**

Table 2-2 Continued. Land Use Scenario #2 – Environmentally Constrained Growth

Area H (incl. OCA & HMSC)				PM Peak Trips		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Research and Development (4)	760	200,000	Sq. Feet	32	184	216
General Office	710	42	Employees	3	16	19
Retail	820	10,000	Sq. Feet	66	71	137
Gross Trips				101	271	372
Internal Trip Reduction (10%)	(Retail & Office Uses)			(7)	(9)	(16)
Net Trips				**94**	**262**	**356**
Area I (Southshore PD)				**PM Peak Trips**		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Hotel (2)	310	65	Rooms	20	18	38
Retail	820	13,000	Sq. Feet	78	85	163
Gross Trips				98	103	201
Internal Trip Reduction (10%)	(All Uses)			(10)	(10)	(20)
Net Trips				**88**	**93**	**181**
Area J -Planned Reduction (5)				**PM Peak Trips**		
Land Use Assumed	**ITE Code**	**Count**	**Units**	**In**	**Out**	**Total**
Retail		20,000	Sq. Feet	104	113	217
Single Family Residence	210	3	Dwellings	3	2	5
Gross Trips				107	115	222
Internal Trip Reduction (10%)	(All Uses)			(11)	(11)	(22)
Net Trips				**96**	**104**	**200**
PM Peak Trip Summary				**In**	**Out**	**Total**
Gross Trips				**2,232**	**2,662**	**4,896**
Total Internal				**(244)**	**(263)**	**(507)**
Total Pass-by				**(139)**	**(149)**	**(289)**
Area J Reductions				**(96)**	**(104)**	**(200)**
Net Total Trips				**1,753**	**2,148**	**3,901**

Notes:
1 Approximately half of the industrial acreage is assumed to develop into commercial uses.
2 ITE Trip Generation rate used.
3 Commercial is assumed adjacent to Hwy 101 and subject to Pass-by rate 20% reduction.
4 This is primarily laboratory and classroom use related to Hatfield Marine Science Center (HMSC) and the Oregon Coast Aquarium. Includes 45, 000 sq ft for NOAA, and 155,000 for HMSC.
5 As documented in the Newport Airport Master Plan, the Airport intends to acquire this area and abandon the existing uses to increase air safety.

2.5 PERFORMANCE MEASURES

Based on review of the analysis process and findings for the South Beach roadway network under seasonal, average annual, and off-season conditions, it became apparent that in many locations traffic congestion during peak hours will significantly exceed available intersection capacity. To provide a more complete understanding of the extent and nature of future traffic congestion through South Beach and to offer useful comparisons among land use and network alternatives, a variety of performance measures have been identified. These have been calculated to determine the nature, type, location and duration of congestion for each scenario and time period analyzed and include the following:

- Volume-to-capacity (V/C) ratios at intersections developed using the Synchro analysis software.
- 95th percentile traffic queues using Synchro output for both signalized and unsignalized intersections.
- Signal progression assessment focusing on green band width during peak hours.
- Travel time on US 101 in northbound and southbound directions for three roadway segments – Hurbert Street to 35th Street, 35th Street to 50th Street, and 50th Street to 62nd Street.
- Average travel speeds on US 101 in northbound and southbound directions for three roadway segments – Hurbert Street to 35th Street, 35th Street to 50th Street, and 50th Street to 62nd Street.
- Unserved vehicles (that cannot enter the Synchro network due to extensive congestion and, thus, are not included in the analysis)
- Duration of congestion – Number of hours that roadway capacity will be exceeded during projected 2030 average annual weekdays. The methodology used to calculate duration of congestion along US 101 in South Beach is more fully described in Chapter 6 along with analysis results.

Calculation of Yaquina Bridge Capacity

The capacity of the Yaquina Bridge is limited and, to some extent, will meter some of the traffic entering and leaving the South Beach area. The capacity of the Yaquina Bay Bridge was calculated based on a combination of the 1994 and 2000 HCM Rolling Terrain Methodology as summarized in Appendix B. The result indicates that the capacity on the bridge is about 1,300 vehicles per hour per lane (vphpl). The analysis performed does not calculate the controlling affect of bridge capacity on roadway segment operations, so results are likely to understate performance under future conditions.

Roadway Segment Capacity

South of the bridge, roadway capacity is influenced more by the operation of signalized intersections and the provision of separate storage space for left and some right-turning vehicles than is the capacity of the Yaquina Bay Bridge. While intersection operations largely control overall roadway operations in this area, for sketch planning purposes an estimate of roadway segment capacity was prepared. This estimate is derived from the saturation flow rates for through movements on US 101 at the signalized intersections. Analysis determined that a planning level capacity value of 1,750 vehicles per hour per lane would be appropriate to use on US 101 through the South Beach area (typically south of 35th Street to the southern end of the study area). Regardless of this value, it should be noted that the analysis in this report will largely focus on signalized intersections as the controlling factor affecting the through movement of traffic and not on this planning level capacity value.

Current Operational Standards

As adopted in the 1999 OHP, ODOT uses V/C ratios to measure state highway performance rather than intersection or roadway levels of service. A V/C ratio expresses the relationship between traffic volumes and the roadway or intersection's theoretical capacity. Various V/C thresholds are applied to all state highways based on functional classification of these facilities.

US 101 in the South Beach area is classified as a Statewide Highway. The peak hour, maximum V/C standards for US 101 signalized intersections inside the UGB boundary is as follows

- 0.85 with speed limit of ≤ 35 mph (Yaquina Bay Bridge to just north of 40th Street)
- 0.75 with speed limit of ≥ 45 mph (40th Street south to the City Limits)

For unsignalized intersections the V/C standards along US 101 are:

- 0.85 with speed limit of < 35 mph (Yaquina Bay Bridge to just north of 40th Street) for the highway mainline, 0.90 for side streets
- 0.75 with speed limit of ≥ 45 mph (40th Street south to the City Limits) for the highway mainline, 0.80 for side streets

3. 2030 30 HV TRAFFIC OPERATIONAL ANALYSIS

This chapter summarizes the analysis of the 2030 30 HV volumes at study area intersections and roadway segments and presents findings with respect to traffic operations in the South Beach area. Two land use scenarios are included in this analysis – Land Use Scenario #1 and Land Use Scenario #2. Scenario #1 represents South Beach growth based on serving approximately half of the total population growth projected for the Newport UGB by 2030. Scenario #2 is derived from Scenario #1 but also incorporates a reduction in developable land due to the presence of extensive wetlands in the study area.

3.1 LAND USE SCENARIO #1 – NEWPORT POPULATION GROWTH

Intersection Operations Analysis

The analysis of traffic operations was conducted using a Synchro traffic model developed specifically for the study area intersections. This model includes field-verified geometrics and other relevant physical data for each intersection updated to reflect an assumed 2030 roadway network as described in Chapter 2. Analysis procedures to develop this model generally followed guidelines in the ODOT Transportation Planning and Analysis Unit (TPAU) *Analysis Procedures Manual* (2008). This model was used to assess traffic operations for the forecasted 2030 30 HV volumes found in Appendix C. Intersection analysis worksheets are also included in Appendix C.

Table 3-1 summarizes analysis results for the 2030 30 HV network with Land Use Scenario #1 and assumed a 5-lane US 101 cross-section in the South Beach study area. Data in this table includes the overall intersection V/C ratios, and average intersection delay.

Table 3-1. 2030 30 HV Intersection Operations Summary with Land Use Scenario #1

		V/C Standard	2030 HV	
			V/C Ratio	Delay (sec/veh)
Signalized Intersections				
US 101 & 35th Street		0.85	**1.19**	**116.1**
US 101 & 40th Street		0.75	**1.24**	**126.6**
US 101 & 50th Street/S. Beach State Park		0.75	**1.04**	**31.9**
Unsignalized Intersections	**Critical Movement/Control**			
US 101 & Pacific Way	*Northbound Thru*	0.85	**2.10**	**0**
	Northbound Right	0.85	0.08	0
	Southbound Thru	0.85	**2.04**	**0**
US 101 & Abalone Street	*Northbound Thru*	0.85	**1.09**	**0**
	Southbound Thru	0.85	**1.88**	**0**
	Southbound Right	0.85	0.16	0
	Eastbound Right	0.90	**31.96**	**N/A**
US 101 & 32nd Street	*Northbound Thru*	0.85	0.82	0
	Northbound Right	0.85	0.04	0
	Southbound Thru-Right	0.85	**1.31**	**0**
	Eastbound Right	0.90	0.79	135.7
	Westbound Right	0.90	**2.71**	**>200.0**

Table 3-1 Continued. 2030 30 HV Intersection Operations Summary with Land Use Scenario #1

		V/C Standard	2030 HV V/C Ratio	2030 HV Delay (sec/veh)
Unsignalized Intersections	**Critical Movement/Control**			
US 101 & 62nd Street	*Northbound Left*	0.75	0.34	42.8
	Northbound Thru-Right	0.75	**0.85**	0
	Southbound Left	0.75	0.04	20.9
	Southbound Thru	0.75	**0.78**	0
	Southbound Right	0.75	0.05	0
	Eastbound Left	0.80	**4.86**	**N/A**
	Eastbound Thru-Right	0.80	0.24	37.4
	Westbound Left	0.80	**0.97**	**>200.0**
	Westbound Thru-Right	0.80	0.06	23.1

Note 1: V/C ratio is a ratio between traffic volumes and the roadway or intersection's capacity.
Note 2: "Delay" refers to the delay experienced for the specific intersection traffic movement listed.
Note 3: Widening of US 101 to five-lanes is assumed to begin at the intersection of Abalone Street and proceed southward.
Note 4: 30 HV means 30th highest hourly volume and represents the summertime weekday PM peak hour.
Bold numbers indicate that applicable ODOT Volume/capacity performance measure would be exceeded.
N/A indicates that projected volumes sufficiently exceed capacity such that Synchro cannot calculate a value.

Based on 2030 30 HV volumes, the South Beach study area intersections along US 101 would generally experience excessive delays and operate above acceptable V/C standards. The traffic signals do meter traffic to some extent, providing periodic gaps in the traffic stream for side street operations. However, the thru traffic volumes projected along US 101 are sufficient to cause long delay for the right out movements at the intersections of US 101 with Abalone and 32nd Streets, and the east and westbound left turn movements at 62nd Street. Preliminary signal warrants for minimum vehicular traffic and interruption of continuous flow were evaluated for the intersection of US 101 and 62nd Street. The analysis indicates that this intersection would not meet either warrant. Worksheets are included in Appendix C.

Traffic Queuing

For purposes of this report, the 95th percentile vehicle queue length has been used to identify where potential traffic queuing problems might exist. 95th percentile queues as calculated by Synchro are based on the anticipated arrival patterns, duration of interruptions, and the ability of the intersection to recover from momentary heavy arrival rates. Queuing analysis worksheets are included in Appendix C and are summarized in Table 3-2.

Table 3-2. 2030 30 HV Intersection Queuing with Land Use Scenario #1

Intersection	Turn Lane	Existing/Assumed Storage (ft)	Estimate 95th Percentile Queue (ft)
US 101 & 32nd Street (RIRO)	*Northbound Right*	100	25
	Eastbound Right	*	100
	Westbound Right	*	2,125
US 101 & 35th Street	*Northbound Thru*		200
	Northbound Left	TWCLT	50
	Northbound Right	175	25
	Southbound Thru		275
	Southbound Left	TWCLT	125

Table 3-2 Continued. 2030 30 HV Intersection Queuing with Land Use Scenario #1

Intersection	Turn Lane	Existing/Assumed Storage (ft)	Estimate 95th Percentile Queue (ft)
US 101 & 35th Street Cont.	*Southbound Right*	175	25
	Eastbound Thru		50
	Eastbound Left	120	**150**
	Eastbound Right	155	50
	Westbound Thru		50
	Westbound Left	120	**200**
	Westbound Right	155	100
US 101 & 40th Street	*Northbound Thru*		1,150
	Northbound Left	215	50
	Northbound Right	215	25
	Southbound Thru		750
	Southbound Left	TWCLT	200
	Southbound Right	175	25
	Eastbound Thru		50
	Eastbound Left	120	100
	Eastbound Right	155	25
	Westbound Thru		50
	Westbound Left	120	**350**
	Westbound Right	155	**600**
US 101 & 50th Street/State Park	*Northbound Thru*		1025
	Northbound Left	TWCLT	100
	Northbound Right	320	25
	Southbound Thru		100
	Southbound Left	215	75
	Southbound Right	155	25
	Eastbound Left	120	**150**
	Eastbound Thru/Right		50
	Westbound Thru/Right		100
	Westbound Left	120	100
US 101 & 62nd Street	*Northbound Left*	TWCLT	50
	Southbound Right	150	25
	Southbound Left	TWCLT	25
	Eastbound Left	120	**N/A**
	Eastbound Thru-Right		25
	Westbound Left	120	75
	Westbound Thru/Right		25

Notes:
30 HV means 30th highest hourly volume and represents the summertime weekday PM peak hour.
Lengths rounded to nearest 25 feet.
NA: Indicates that projected volumes sufficiently exceeded capacity such that Synchro cannot calculate a value.
TWCLT: Two way center left turn lane
* Single Lane Approach
Bold number indicates that available vehicle storage space is expected to be exceeded.
Queue lengths are from Synchro analysis results and do not reflect queues calculated from a simulation model that accounts for interactions among intersections.

Traffic queuing results in Table 3-2 indicate that in the future, some of the intersections will exceed the available vehicle storage for a specific movement. The left turn movements on most of the minor street approaches are expected to exceed capacity. The westbound right out movement at the intersection of US 101 and 32nd Street has an excessive queue in the single lane approach. The northbound thru movements at the signalized intersections also have lengthy queues due to the high volumes of traffic.

Roadway Segment Operations

To supplement the analysis of the intersection traffic operations, an assessment was conducted of several highway segments to determine how well US 101 would function as a highway in the South Beach area. There are limitations to the HCM V/C calculations for two way highways in that it considers only highway segments with speeds of 45 mph and greater. Multi-lane highway V/C cannot be calculated for locations with 35 or 45 mph speeds as is the case along US 101 in most of South Beach. Thus, the analysis in Table 3-3 is based on an assumed roadway segment capacity of 1,300 vphpl for the Yaquina Bay Bridge and along the immediate roadway approaches which it influences, transitioning to 1,750 vphpl for the highway segments south of 35th Street. The results of this analysis are presented in Table 3-3.

Table 3-3. US 101 Roadway Segment Analysis for 2030 30 HV with Scenario #1

Segment	Speed Limit (mph)	Volume/Capacity Ratio	
		Northbound	Southbound
Hubert Street to 35th Street	35 mph	2.70	2.48
35th Street to 50th Street	35 & 45 mph	0.64	0.88
50th Street to 62nd Street	55 mph	0.61	0.75

Note 1: The calculation represents the ratio of projected segment volume to calculated lane capacity.
Note 2: 30 HV means 30th highest hourly volume and represents the summertime weekday PM peak hour.

As indicated in the table, the segment of US 101 affected by the constrained cross-section on the Yaquina Bay Bridge would see volumes that significantly exceed the theoretical capacities of this segment. South of 35th Street, the five-lane cross-section proposed for US 101 would have sufficient capacity to accommodate projected traffic (when measured using planning level capacity values) if it were not for the effects of traffic queuing to/from the bridge. These queues are expected to heavily influence actual traffic operations on US 101 south of the bridge causing significant delays. Worksheets are included in Appendix C.

Other Measures of Effectiveness

The Synchro model was used to estimate other measures of effectiveness for US 101 including travel time, average travel speed, and unserved vehicles trying to enter the network. The results of the simulation are summarized in Table 3-4 below and documented in Appendix C.

Table 3-4. US 101 Travel Time and Speeds for 2030 30 HV with Land Use Scenario #1

Scenarios	Travel Time (min)		Average Travel Speed (mph)	
	Northbound	Southbound	Northbound	Southbound
US 101 Totals	**23.9**	**23.9**	**8.7**	**7.3**
Hurbert Street to 35th Street	16.6	13.1	6.2	0.7
35th Street to 40th Street	2.6	6.0	6.5	17.1
40th Street to 50th Street	3.5	3.0	12.9	5.5
50th Street to 62nd Street	1.2	1.6	33.9	28.4

Note: 30 HV means 30th highest hourly volume and represents the summertime weekday PM peak hour.
Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.

As indicated in Table 3-4, all segments of US 101 from the Yaquina Bay Bridge south through the South Beach study area would experience low travel speeds and relatively high travel times.

Table 3-5 reports the unserved vehicles from the Synchro analysis. The unserved number of vehicles indicates an approximate number of vehicles projected to exceed the capacity of the corridor and, thus, are not included in the analysis. If these volumes were included, the performance measures discussed in Tables 3-1 through 3-4 above would likely indicate a higher level of congestion than is shown.

Table 3-5. US 101 Unserved Vehicles for 2030 30 HV with Land Use Scenario #1

Location	Number of Unserved Vehicles
Entering US 101 northbound at 62nd Street	3,069
Entering US 101 southbound at Hurbert Street	3,682

Note: 30 HV means 30th highest hourly volume and represents the summertime weekday PM peak hour. Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.

Effect of Adding Road Connection from 50th to 62nd

The effects of adding a road connection between 50th and 62nd Streets parallel to and east of US 101 can be assessed in several ways. First, would be the potential for reducing traffic volumes along US 101 by diverting north/south traffic from the area near 62nd Street to areas further north such as South Beach Village and commercial areas along the east side of US 101 south of 40th Street. Second, the addition of a road connection could provide an attractive alternative to the provision of direct property access to/from the highway. This would also benefit traffic operations along US 101.

The potential for diverting north/south vehicle trips away from US 101 would likely be small. As many of the projected land uses at the south end of the study area (near 62nd Street) are similar to those further north, a minimal amount of trip interaction is anticipated. Additionally, to enhance clear zone protection around the Newport Airport, some existing development on the east side of the highway near 62nd Street will be eliminated and new development will be restricted. The reduction of traffic using the US 101 intersections of 40th, 50th, and 62nd Streets as a result of trips diverting to a new connector road is not expected to alter the volume/capacity ratios anticipated at these intersections under Scenario 1 with 30HV traffic levels.

A more significant benefit of this connector road might be its ability to provide direct property access from existing and potential future development along the east side of US 101 north of 62nd Street. By offering a "backage" connection to these properties, direct access to/from the highway could be reduced or eliminated, thus enhancing both safety and traffic operations.

3.2 LAND USE SCENARIO #2 – ENVIRONMENTALLY CONSTRAINED GROWTH

Intersection Operations Analysis

The analysis of traffic operations was conducted using a Synchro traffic model developed specifically for the study area intersections as described earlier in this chapter. 2030 PM peak hour intersection volumes and traffic operations worksheets for this scenario are included in Appendix D.

Table 3-6 summarizes analysis results for the 2030 30 HV network with Land Use Scenario #2 and assumed a 5-lane US 101 cross-section in the South Beach study area. Data in this table includes the overall intersection V/C ratios, and average intersection delay.

Table 3-6. 2030 30 HV Intersection Operations Summary with Land Use Scenario #2

		2030 HV		
		V/C Standard	**V/C Ratio**	**Delay (sec/veh)**
Signalized Intersections				
US 101 & 35th Street		0.85	**1.15**	**89.3**
US 101 & 40th Street		0.75	**1.18**	**85.5**
US 101 & 50th Street/S. Beach State Park		0.75	**0.99**	**23.9**
Unsignalized Intersections	**Critical Movement/Control**			
US 101 & Pacific Way	*Northbound Thru*	0.85	**1.99**	**0**
	Northbound Right	0.85	0.08	0
	Southbound Thru	0.85	**1.97**	**0**
US 101 & Abalone Street	*Northbound Thru*	0.85	**1.04**	**0**
	Southbound Thru	0.85	**1.80**	**0**
	Southbound Right	0.85	0.16	0
	Eastbound Right	0.90	**27.49**	**N/A**
US 101 & 32nd Street	*Northbound Thru*	0.85	0.77	0
	Northbound Right	0.85	0.05	0
	Southbound Thru-Right	0.85	**1.27**	**0**
	Eastbound Right	0.90	0.73	113.8
	Westbound Right	0.90	**2.73**	**>200.0**
US 101 & 62nd Street	*Northbound Left*	0.75	0.31	39.3
	Northbound Thru-Right	0.75	**0.80**	0
	Southbound Left	0.75	0.04	19.2
	Southbound Thru	0.75	**0.76**	0
US 101 & 62nd Street Cont.	*Southbound Right*	0.75	0.05	0
	Eastbound Left	0.80	**4.32**	**N/A**
	Eastbound Thru-Right	0.80	0.23	35.1
	Westbound Left	0.80	0.40	193.7
	Westbound Thru-Right	0.80	0.05	21.5

Note 1: V/C ratio is a ratio between traffic volumes and the roadway or intersection's capacity.
Note 2: "Delay" refers to the delay experienced for the specific intersection traffic movement listed.
Note 3: Widening of US 101 to five-lanes would begin at the intersection of Abalone Street and proceed southward.
Note 4: 30 HV means 30th highest hourly volume and represents the summertime weekday PM peak hour.
Bold numbers indicate that applicable ODOT Volume/capacity performance measure would be exceeded.
N/A indicates that projected volumes sufficiently exceed capacity such that Synchro cannot calculate a value.

Based on 2030 30 HV volumes, the South Beach study area intersections along US 101 would generally experience excessive delays and operate above acceptable V/C standards. The traffic signals do meter traffic to some extent, providing periodic gaps in the traffic stream for side street operations. However, the thru traffic volumes projected along US 101 are sufficient to cause long delay for the right out movements at the intersections of US 101 with Abalone and 32nd Streets, and the eastbound left turn movements at 62nd Street. Preliminary signal warrants for minimum vehicular traffic and interruption of continuous flow were evaluated for the intersection of US 101 and 62nd Street. The analysis indicates that this intersection would not meet either warrant. Worksheets are included in Appendix D.

Traffic Queuing

For purposes of this report, the 95th percentile vehicle queue length has been used to identify where potential traffic queuing problems might exist. 95th percentile queues as calculated by Synchro are based on the anticipated arrival patterns, duration of interruptions, and the ability of the intersection to recover from momentary heavy arrival rates. Queuing analysis worksheets are included in Appendix D and are summarized in Table 3-7.

Table 3-7. 2030 30 HV Intersection Queuing with Land Use Scenario #2

Intersection	Turn Lane	Existing/Assumed Storage (ft)	Estimate 95th Percentile Queue (ft)
US 101 & 32nd Street (RIRO)	*Northbound Right*	100	25
	Eastbound Right	*	100
	Westbound Right	*	2,150
US 101 & 35th Street	*Northbound Thru*		925
	Northbound Left	TWCLT	50
	Northbound Right	175	25
	Southbound Thru		275
	Southbound Left	TWCLT	125
	Southbound Right	175	25
	Eastbound Thru		50
	Eastbound Left	120	**150**
	Eastbound Right	155	50
	Westbound Thru		50
	Westbound Left	120	**200**
	Westbound Right	155	100
US 101 & 40th Street	*Northbound Thru*		1,050
	Northbound Left	215	25
	Northbound Right	215	25
	Southbound Thru		375
	Southbound Left	TWCLT	175
	Southbound Right	175	25
	Eastbound Thru		25
	Eastbound Left	120	100
	Eastbound Right	155	25
	Westbound Thru		25
	Westbound Left	120	**325**
	Westbound Right	155	**550**
US 101 & 50th Street/State Park	*Northbound Thru*		800
	Northbound Left	TWCLT	100
	Northbound Right	320	25
	Southbound Thru		100
	Southbound Left	215	75
	Southbound Right	155	25
	Eastbound Left	120	**150**
	Eastbound Thru/Right		50
	Westbound Thru/Right		75
	Westbound Left	120	75
US 101 & 62nd Street	*Northbound Left*	TWCLT	50
	Southbound Right	150	0
	Southbound Left	TWCLT	25
	Eastbound Left	120	**N/A**
	Eastbound Thru-Right		25
	Westbound Left	120	50
	Westbound Thru/Right		25

Notes:
30 HV means 30th highest hourly volume and represents the summertime weekday PM peak hour.
Lengths rounded to nearest 25 feet.
NA: Indicates that projected volumes sufficiently exceeded capacity such that Synchro cannot calculate a value.
TWCLT: Two way center left turn lane
* Single Lane Approach
Bold number indicates that available vehicle storage space is expected to be exceeded.
Queue lengths are from Synchro analysis results and do not reflect queues calculated from a simulation model that accounts for interactions among intersections.

Traffic queuing results in Table 3-7 indicate that in the future, some of the intersections will exceed the available vehicle storage for a movement. The left turn movements on several of the minor street approaches exceed capacity. The westbound right out movement at 32nd Street has an excessive queue in the single lane approach. The northbound thru movements at the signalized intersections also have lengthy queues due to the high volume of traffic.

Roadway Segment Operations

To supplement the analysis of the intersection traffic operations, an assessment was conducted of several highway segments to determine how well US 101 would function as a highway in the South Beach Area. The results of this analysis are presented in Table 3-8. Worksheets are included in Appendix D.

Table 3-8. US 101 Roadway Segment Analysis for 2030 30 HV with Scenario #2

Segment	Speed Limit (mph)	Volume/Capacity Ratio	
		Northbound	Southbound
Hubert Street to 35th Street	35 mph	2.58	2.40
35th Street to 50th Street	35 & 45 mph	0.61	0.85
50th Street to 62nd Street	55 mph	0.58	0.73

Note 1: The calculation represents the ratio of projected segment volume to calculated lane capacity.
Note 2: 30 HV means 30th highest hourly volume and represents the summertime weekday PM peak hour.

As noted under the discussion of Table 3-5 earlier in this chapter, there are limitations to the calculation of V/C ratios using the HCM for two way highways with speeds below 45 mph. Accordingly, an alternative methodology was used that is based on assumed roadway capacity for specific segments of US 101. The results are included in Table 3-8 and indicate that the segment of US 101 affected by the constrained cross-section on the Yaquina Bay Bridge would see volumes that significantly exceed the theoretical capacities of this segment. South of 35th Street, the five-lane cross-section proposed for US 101 would have sufficient capacity to accommodate projected traffic (when measured using planning level capacity values) if it were not for the effects of traffic queuing to/from the bridge. These queues are expected to heavily influence actual traffic operations on US 101 south of the bridge causing significant delays.

Other Measures of Effectiveness

The Synchro model was used to estimate other measures of effectiveness for US 101 including travel time, average travel speed, and unserved vehicles trying to enter the network. Results are summarized in Table 3-9 below and documented in Appendix D.

Table 3-9. US 101 Travel Time and Speed for 2030 30 HV with Land Use Scenario #2

Scenarios	Travel Time (min)		Average Travel Speed (mph)	
	Northbound	Southbound	Northbound	Southbound
US 101 Totals	**21.9**	**22.1**	**9.4**	**7.9**
Hurbert Street to 35th Street	16.6	13.2	6.2	0.7
35th Street to 40th Street	1.9	5.7	8.6	18.1
40th Street to 50th Street	2.2	1.8	20.3	9.3
50th Street to 62nd Street	1.1	1.3	36.5	33.7

Note: 30 HV means 30th highest hourly volume and represents the summertime weekday PM peak hour. Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.

As indicated in Table 3-9, all segments of US 101 from the Yaquina Bay Bridge south through the South Beach study area would experience low travel speeds and increased travel times.

Table 3-10 reports the unserved vehicles from the Synchro analysis. The unserved number of vehicles indicates an approximate number of vehicles projected to exceed the capacity of the corridor and, thus, are not included in the analysis.

Table 3-10. US 101 Unserved Vehicles for 2030 30 HV with Land Use Scenario #2

Location	Number of Unserved Vehicles
Entering US 101 northbound at 62nd Street	2,666
Entering US 101 southbound at Hurbert Street	3,188

Note: 30 HV means 30th highest hourly volume and represents the summertime weekday PM peak hour. Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.

Effect of Adding Road Connection from 50th to 62nd

Similar to the discussion presented under Scenario 1, the effects of adding a road connection between 50th and 62nd Streets parallel to and east of US 101 can be assessed in several ways. First, would be the potential for reducing traffic volumes along US 101 by diverting north/south traffic from the area near 62nd Street to areas further north such as South Beach Village and commercial areas along the east side of US 101 south of 40th Street. Second, the addition of a road connection could provide an attractive alternative to the provision of direct property access to/from the highway. This would also benefit traffic operations along US 101.

The reduction in traffic volumes diverted from US 101 is expected to be small and to not alter the volume/capacity ratios anticipated at the intersections of US 101 interchanges at 40th, 50th, and 62nd Streets under Scenario 2 with 30HV traffic levels.

A more significant benefit of this connector road might be its ability to provide direct property access from existing and potential future development along the east side of US 101 north of 62nd Street. By offering a "backage" connection to these properties, direct access to/from the highway could be reduced or eliminated, thus enhancing both safety and traffic operations.

4. 2030 AVERAGE ANNUAL TRAFFIC OPERATIONAL ANALYSIS

This chapter summarizes the analysis of the 2030 Average Annual volumes (AAV) at study area intersections and roadway segments and presents findings with respect to traffic operations in the South Beach study area. Performance measures for this analysis are the same as those identified and discussed in Chapter 3.

4.1 LAND USE SCENARIO #1 – NEWPORT POPULATION GROWTH

Intersection Operations Analysis

As with the analysis of 30 HV traffic, the analysis of 2030 AAV traffic was conducted using a Synchro traffic model developed specifically for the study area intersections. This model includes field-verified geometrics and other relevant physical data for each intersection updated to reflect an assumed 2030 roadway network as described in Chapter 2. 2030 PM peak hour intersection turning movement volumes and intersection analysis worksheets are presented in Appendix E.

Table 4-1 summarizes analysis results for the 2030 30 HV network with Land Use Scenario #1 and assuming a 5-lane US 101 cross-section in the South Beach study area. Data in this table includes the overall intersection V/C ratios, and average intersection delay.

Table 4-1. 2030 AAV Intersection Operations Summary with Land Use Scenario #1

			2030 Annual Avg.	
		V/C Standard	V/C Ratio	Delay (sec/veh)
Signalized Intersections				
US 101 & 35th Street		0.85	**1.00**	**36.6**
US 101 & 40th Street		0.75	**1.04**	**58.8**
US 101 & 50th Street/S. Beach State Park		0.75	**0.88**	**18.6**
Unsignalized Intersections	**Critical Movement/Control**			
US 101 & Pacific Way	*Northbound Thru*	0.85	**1.77**	**0**
	Northbound Right	0.85	0.07	0
	Southbound Thru	0.85	**1.70**	**0**
US 101 & Abalone Street	*Northbound Thru*	0.85	**0.92**	**0**
	Southbound Thru	0.85	**1.57**	**0**
	Southbound Right	0.85	0.13	0
	Eastbound Right	0.90	**11.34**	**N/A**
US 101 & 32nd Street	*Northbound Thru*	0.85	0.69	0
	Northbound Right	0.85	0.04	0
	Southbound Thru-Right	0.85	**1.10**	**0**
	Eastbound Right	0.90	0.42	52.7
	Westbound Right	0.90	**2.25**	**>200.0**
US 101 & 62nd Street	*Northbound Left*	0.75	0.17	25.3
	Northbound Thru-Right	0.75	0.71	0
	Southbound Left	0.75	0.03	16.3
	Southbound Thru	0.75	0.65	0
	Southbound Right	0.75	0.04	0
	Eastbound Left	0.80	**2.07**	**>200.0**

Table 4-1 Cont. 2030 AAV Intersection Operations Summary with Land Use Scenario #1

			2030 Annual Avg.	
		V/C Standard	V/C Ratio	Delay (sec/veh)
Unsignalized Intersections	**Critical Movement/Control**			
US 101 & 62nd Street Cont.	*Eastbound Thru-Right*	0.80	0.14	25.7
	Westbound Left	0.80	0.33	102.8
	Westbound Thru-Right	0.80	0.04	18.5

Note 1: V/C ratio is a ratio between traffic volumes and the roadway or intersection's capacity.
Note 2: "Delay" refers to the delay experienced for the specific intersection traffic movement listed.
Note 3: Widening of US 101 to five-lanes is assumed to begin at the intersection of Abalone Street and proceed southward.
Note 4: AAV means Average Annual Volumes.
Bold numbers indicate that applicable ODOT Volume/capacity performance measure would be exceeded.
N/A indicates that projected volumes sufficiently exceed capacity such that Synchro cannot calculate a value.

Based on 2030 Average Annual volumes, the South Beach study area intersections along US 101 would generally experience excessive delays and operate above acceptable V/C standards. The traffic signals do meter traffic to some extent, providing periodic gaps in the traffic stream for side street operations. However, the thru traffic volumes projected along US 101 are sufficient to cause long delay for the right out movements at the intersections of US 101 with Abalone and 32nd Streets, and the eastbound left turn movements at 62nd Street. Preliminary signal warrants for minimum vehicular traffic and interruption of continuous flow were evaluated for the intersection of US 101 and 62nd Street. The analysis indicates that this intersection would not meet either warrant. Worksheets are included in Appendix E.

Traffic Queuing

For purposes of this report, the 95th percentile vehicle queue length has been used to identify where potential traffic queuing problems might exist. 95th percentile queues as calculated by Synchro are based on the anticipated arrival patterns, duration of interruptions, and the ability of the intersection to recover from momentary heavy arrival rates. Queuing analysis worksheets are included in Appendix E and are summarized in Table 4-2.

Table 4-2. 2030 AAV Intersection Queuing with Land Use Scenario #1

Intersection	Turn Lane	Existing/Assumed Storage (ft)	Estimate 95th Percentile Queue (ft)
US 101 & 32nd Street (RIRO)	*Northbound Right*	100	25
	Eastbound Right	*	50
	Westbound Right	*	1,600
US 101 & 35th Street	*Northbound Thru*		250
	Northbound Left	TWCLT	50
	Northbound Right	175	25
	Southbound Thru		275
	Southbound Left	TWCLT	125
	Southbound Right	175	25
	Eastbound Thru		50
	Eastbound Left	120	**125**
	Eastbound Right	155	25
	Westbound Thru		50
	Westbound Left	120	150
	Westbound Right	155	50

Table 4-2 Continued. 2030 AAV Intersection Queuing with Land Use Scenario #1

Intersection	Turn Lane	Existing/Assumed Storage (ft)	Estimate 95th Percentile Queue (ft)
US 101 & 40th Street	*Northbound Thru*		900
	Northbound Left	215	50
	Northbound Right	215	25
	Southbound Thru		700
	Southbound Left	TWCLT	225
	Southbound Right	175	25
	Eastbound Thru		25
	Eastbound Left	120	75
	Eastbound Right	155	25
	Westbound Thru		25
	Westbound Left	120	**300**
	Westbound Right	155	**525**
US 101 & 50th Street/State Park	*Northbound Thru*		575
	Northbound Left	TWCLT	75
	Northbound Right	320	25
	Southbound Thru		125
	Southbound Left	215	100
	Southbound Right	155	0
	Eastbound Left	120	100
	Eastbound Thru/Right		50
	Westbound Thru/Right		50
	Westbound Left	120	100
US 101 & 62nd Street	*Northbound Left*	TWCLT	25
	Southbound Right	150	0
	Southbound Left	TWCLT	25
	Eastbound Left	120	**225**
	Eastbound Thru-Right		25
	Westbound Left	120	25
	Westbound Thru/Right		25

Notes:
AAV means Average Annual Volumes.
Lengths rounded to nearest 25 feet.
Unsignalized intersections estimated using Synchro.
TWCLT: Two way center left turn lane
* Single Lane Approach
Bold number indicates that available vehicle storage space is expected to be exceeded.
Queue lengths are from Synchro analysis results and do not reflect queues calculated from a simulation model that accounts for interactions among intersections.

Traffic queuing results in Table 4-2 indicate that in the future, some of the intersections will exceed the available vehicle storage for a movement. The left turn movements on some of the minor street approaches exceed capacity. The westbound right out movement at 32nd Street has an excessive queue in the single lane approach. The westbound right turns at US 101 and 40th Street also exceed the available storage space.

Roadway Segment Operations

To supplement the analysis of the intersection traffic operations, an assessment was conducted of several highway segments to determine how well US 101 would function as a highway in the South Beach area. The results of this analysis are presented in Table 4-3.

Table 4-3. US 101 Roadway Segment Analysis for 2030 AAV with Land Use Scenario #1

Segment	Speed Limit (mph)	Volume/Capacity Ratio	
		Northbound	Southbound
Hurbert Street to 35th Street	35 mph	2.28	2.08
35th Street to 50th Street	35 & 45 mph	0.53	0.73
50th Street to 62nd Street	55 mph	0.51	0.62

Note 1: The calculation represents the ratio of projected segment volume to calculated lane capacity.
Note 2: AAV means Average Annual Volumes.

The analysis is Table 4-3 is based on an assumed roadway segment capacity of 1,300 vphpl for the Yaquina Bay Bridge and influence area, and 1,750 vphpl for the highway segments south of 35th Street. The table indicates that the segment of US 101 affected by the constrained cross-section on the Yaquina Bay Bridge would see volumes that significantly exceed the theoretical capacities of this segment. South of 35th Street, the five-lane cross-section proposed for US 101 would have sufficient capacity to accommodate projected traffic (when measured using planning level capacity values) if it were not for the effects of traffic queuing to/from the bridge. These queues are expected to heavily influence actual traffic operations on US 101 south of the bridge causing significant delays. Worksheets are included in Appendix E.

Other Measures of Effectiveness

The Synchro model was used to estimate other measures of effectiveness for US 101 including travel time, average travel speed, and unserved vehicles trying to enter the network. The results of the simulation are summarized in Table 4-4 below and documented in Appendix E.

Table 4-4. US 101 Travel Time and Speed for 2030 AAV with Land Use Scenario #1

Scenarios	Travel Time (min)		Average Travel Speed (mph)	
	Northbound	Southbound	Northbound	Southbound
US 101 Totals	**16.9**	**15.9**	**12.2**	**11.1**
Hurbert Street to 35th Street	12.7	9.4	8.2	1.0
35th Street to 40th Street	1.2	4.3	13.5	24.5
40th Street to 50th Street	1.9	1.2	23.2	13.5
50th Street to 62nd Street	1.0	0.9	41.4	49.0

Note: AAV means Average Annual Volumes.
Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.

As indicated in Table 4-4, all segments of US 101 from the Yaquina Bay Bridge south through the South Beach study area would experience low travel speeds and increased travel times.

Table 4-5 reports the unserved vehicles from the Synchro analysis. The unserved number of vehicles indicates an approximate number of vehicles projected to exceed the capacity of the corridor and, thus, are not included in the analysis.

Table 4-5. US 101 Unserved Vehicles for 2030 AAV with Land Use Scenario #1

Location	Number of Unserved Vehicles
Entering US 101 northbound at 62nd Street	1,748
Entering US 101 southbound at Hurbert Street	1,842

Note: AAV means Average Annual Volumes.
Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.

Effect of Adding Road Connection from 50th to 62nd

Similar to the discussion presented under Scenario 1 for 30 HV, the effects of adding a road connection between 50th and 62nd Streets parallel to and east of US 101 can be assessed in several ways. First, would be the potential for reducing traffic volumes along US 101 by diverting north/south traffic from the area near 62nd Street to areas further north such as South Beach Village and commercial areas along the east side of US 101 south of 40th Street. Second, the addition of a road connection could provide an attractive alternative to the provision of direct property access to/from the highway. This would also benefit traffic operations along US 101.

The reduction in traffic volumes diverted from US 101 is expected to be small and to not alter the volume/capacity ratios anticipated at the intersections of US 101 interchanges at 40th, 50th, and 62nd Streets under Scenario 1 with AAV traffic levels.

A more significant benefit of this connector road might be its ability to provide direct property access from existing and potential future development along the east side of US 101 north of 62nd Street. By offering a "backage" connection to these properties, direct access to/from the highway could be reduced or eliminated, thus enhancing both safety and traffic operations.

4.2 LAND USE SCENARIO #2 – ENVIRONMENTALLY CONSTRAINED GROWTH

Intersection Operations Analysis

The analysis of traffic operations was conducted using a Synchro traffic model developed specifically for the study area intersections as described earlier in this chapter. Table 4-6 summarizes analysis results for the 2030 30 HV network with Land Use Scenario #2 and assuming a 5-lane US 101 cross-section in the South Beach study area. Data in this table includes the overall intersection V/C ratios, and average intersection delay. 2030 PM peak hour intersection volumes and traffic operations worksheets for this scenario are included in Appendix F.

Based on 2030 Average Annual volumes, all three of the signalized intersections generally experience excessive delays and operate above acceptable V/C standards. Northbound and southbound through traffic on US 101, generally north of 40th Street, is also expected to exceeds the capacity of a 5-lane cross section. Additionally, the high traffic volumes on US 101 in the South Beach area would result in insufficient gaps to accommodate westbound right turns at 32nd Street and eastbound left turns at 62nd Street.

Table 4-6. 2030 AAV Intersection Operations Summary with Land Use Scenario #2

			2030 Annual Avg.	
		V/C Standard	**V/C Ratio**	**Delay (sec/veh)**
Signalized Intersections				
US 101 & 35th Street		0.85	**0.99**	**24.5**
US 101 & 40th Street		0.75	**1.00**	**42.7**
US 101 & 50th Street/S. Beach State Park		0.75	**0.82**	**16.9**
Unsignalized Intersections	**Critical Movement/Control**			
US 101 & Pacific Way	*Northbound Thru*	0.85	**1.68**	**0**
	Northbound Right	0.85	0.07	0
	Southbound Thru	0.85	**1.64**	**0**
US 101 & Abalone Street	*Northbound Thru*	0.85	0.88	0
	Southbound Thru	0.85	**1.51**	**0**
	Southbound Right	0.85	0.13	0
	Eastbound Right	0.90	**9.93**	**N/A**
US 101 & 32nd Street	*Northbound Thru*	0.85	0.65	0
	Northbound Right	0.85	0.04	0
	Southbound Thru-Right	0.85	**1.06**	**0**
	Eastbound Right	0.90	0.39	47.5
	Westbound Right	0.90	**2.01**	**>200.0**
US 101 & 62nd Street	*Northbound Left*	0.75	0.16	24.2
	Northbound Thru-Right	0.75	0.67	0
	Southbound Left	0.75	0.03	15.3
	Southbound Thru	0.75	0.64	0
	Southbound Right	0.75	0.04	0
	Eastbound Left	0.80	**1.91**	**>200.0**
	Eastbound Thru-Right	0.80	0.14	24.7
	Westbound Left	0.80	0.19	77.8
	Westbound Thru-Right	0.80	0.04	17.5

Note 1: V/C ratio is a ratio between traffic volumes and the roadway or intersection's capacity.
Note 2: "Delay" refers to the delay experienced for the specific intersection traffic movement listed.
Note 3: Widening of US 101 to five-lanes is assumed to begin at the intersection of Abalone Street and proceed southward.
Note 4: AAV means Average Annual Volumes.
Bold numbers indicate that applicable ODOT Volume/capacity performance measure would be exceeded.
N/A indicates that projected volumes sufficiently exceed capacity such that Synchro cannot calculate a value.

Traffic Queuing

For purposes of this report, the 95th percentile vehicle queue length has been used to identify where potential traffic queuing problems might exist. 95th percentile queues as calculated by Synchro are based on the anticipated arrival patterns, duration of interruptions, and the ability of the intersection to recover from momentary heavy arrival rates. Queuing analysis worksheets are included in Appendix F and are summarized in Table 4-7.

Table 4-7. 2030 AAV Intersection Queuing with Land Use Scenario #2

Intersection	Turn Lane	Existing/Assumed Storage (ft)	Estimate 95th Percentile Queue (ft)
US 101 & 32nd Street (RIRO)	*Northbound Right*	100	25
	Eastbound Right	*	50
	Westbound Right	*	1,425

Table 4-7 Continued. 2030 AAV Intersection Queuing with Land Use Scenario #2

Intersection	Turn Lane	Existing/Assumed Storage (ft)	Estimate 95th Percentile Queue (ft)
US 101 & 35th Street	*Northbound Thru*		925
	Northbound Left	TWCLT	50
	Northbound Right	175	25
	Southbound Thru		225
	Southbound Left	TWCLT	125
	Southbound Right	175	25
	Eastbound Thru		50
	Eastbound Left	120	**125**
	Eastbound Right	155	25
	Westbound Thru		50
	Westbound Left	120	**150**
	Westbound Right	155	50
US 101 & 40th Street	*Northbound Thru*		800
	Northbound Left	215	25
	Northbound Right	215	25
	Southbound Thru		450
	Southbound Left	TWCLT	200
	Southbound Right	175	25
U	*Eastbound Thru*		25
	Eastbound Left	120	75
	Eastbound Right	155	25
	Westbound Thru		25
	Westbound Left	120	**275**
	Westbound Right	155	**450**
US 101 & 50th Street/State Park	*Northbound Thru*		550
	Northbound Left	TWCLT	75
	Northbound Right	320	25
	Southbound Thru		125
	Southbound Left	215	75
	Southbound Right	155	0
	Eastbound Left	120	100
	Eastbound Thru/Right		50
	Westbound Thru/Right		50
	Westbound Left	120	75
US 101 & 62nd Street	*Northbound Left*	TWCLT	25
	Southbound Right	150	0
	Southbound Left	TWCLT	25
	Eastbound Left	120	**225**
	Eastbound Thru-Right		25
	Westbound Left	120	25
	Westbound Thru/Right		25

Notes:
AAV means Average Annual Volumes.
Lengths rounded to nearest 25 feet.
Unsignalized intersections estimated using Synchro.
TWCLT: Two way center left turn lane
* Single Lane Approach
Bold number indicates that available vehicle storage space is expected to be exceeded.
Queue lengths are from Synchro analysis results and do not reflect queues calculated from a simulation model that accounts for interactions among intersections.

Traffic queuing results in Table 4-7 indicate that in the future, some of the intersections will exceed the available vehicle storage for a movement. The left turn movements on several of the minor street approaches exceed capacity. The westbound right out movement at 32nd Street has an excessive queue in the single lane approach. The westbound right turns at US 101 and 40th Street also exceed the available storage space.

Roadway Segment Operations

To supplement the analysis of the intersection traffic operations, an assessment was conducted of several highway segments to determine how well US 101 would function as a highway in the South Beach area. The results of this analysis are presented in Table 4-8.

The table indicates that the segment of US 101 affected by the constrained cross-section on the Yaquina Bay Bridge would see volumes that significantly exceed the theoretical capacities of this segment. South of 35th Street, the five-lane cross-section proposed for US 101 would have sufficient capacity to accommodate projected traffic (when measured using planning level capacity values) if it were not for the effects of traffic queuing to/from the bridge. These queues are expected to heavily influence actual traffic operations on US 101 south of the bridge causing significant delays. Worksheets are included in Appendix F.

Table 4-8. US 101 Roadway Segment Analysis for 2030 AAV with Land Use Scenario #2

Segment	Speed Limit (mph)	Volume/Capacity Ratio	
		Northbound	Southbound
Hurbert Street to 35th Street	35 mph	2.18	2.01
35th Street to 50th Street	35 & 45 mph	0.51	0.71
50th Street to 62nd Street	55 mph	0.49	0.61

Note 1: The calculation represents the ratio of projected segment volume to calculated lane capacity.
Note 2: AAVV means Average Annual Volumes.

Other Measures of Effectiveness

The Synchro model was used to estimate other measures of effectiveness for US 101 including travel time, average travel speed, and unserved vehicles trying to enter the network. The results of the simulation are summarized in Table 4-9 below and documented in Appendix F.

Table 4-9. US 101 Travel Time and Speed for 2030 AAV with Land Use Scenario #2

Scenarios	Travel Time (min)		Average Travel Speed (mph)	
	Northbound	Southbound	Northbound	Southbound
US 101 Totals	**16.1**	**15.1**	**12.8**	**11.6**
Hurbert Street to 35th Street	12.7	9.4	8.2	1.0
35th Street to 40th Street	0.9	3.9	17.5	26.1
40th Street to 50th Street	1.5	0.8	29.5	21.5
50th Street to 62nd Street	0.9	0.9	42.7	48.8

Note: AAV means Average Annual Volumes.
Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.

As indicated in Table 4-9, all segments of US 101 from the Yaquina Bay Bridge south through the South Beach study area would experience low travel speeds and increased travel times. South of 50th Street the average travel speed is nearer the posted speed of 55 mph.

Table 4-10 reports the unserved vehicles from the Synchro analysis. The unserved number of vehicles indicates an approximate number of vehicles projected to exceed the capacity of the corridor and, thus, are not included in the analysis.

Table 4-10. US 101 Unserved Vehicles for 2030 AAV with Land Use Scenario #2

Location	Number of Unserved Vehicles
Entering US 101 northbound at 62nd Street	1,572
Entering US 101 southbound at Hurbert Street	1,587

Note: AAV means Average Annual Volumes.
Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.

Effect of Adding Road Connection from 50th to 62nd

Similar to the discussion presented under Scenario 1 for 30 HV, the effects of adding a road connection between 50th and 62nd Streets parallel to and east of US 101 can be assessed in several ways. First, would be the potential for reducing traffic volumes along US 101 by diverting north/south traffic from the area near 62nd Street to areas further north such as South Beach Village and commercial areas along the east side of US 101 south of 40th Street. Second, the addition of a road connection could provide an attractive alternative to the provision of direct property access to/from the highway. This would also benefit traffic operations along US 101.

The reduction in traffic volumes diverted from US 101 is expected to be small and to not alter the volume/capacity ratios anticipated at the intersections of US 101 interchanges at 40th, 50th, and 62nd Streets under Scenario 2 with AAV traffic levels.

A more significant benefit of this connector road might be its ability to provide direct property access from existing and potential future development along the east side of US 101 north of 62nd Street. By offering a "backage" connection to these properties, direct access to/from the highway could be reduced or eliminated, thus enhancing both safety and traffic operations.

5. 2030 OFF-SEASON TRAFFIC OPERATIONAL ANALYSIS

This chapter summarizes the analysis of the 2030 Off-Season volumes at study area intersections and roadway segments and presents findings with respect to traffic operations in the South Beach study area. Performance measures for this analysis are the same as those identified and discussed in Chapters 3 and 4.

5.1 LAND USE SCENARIO #1 – NEWPORT POPULATION GROWTH

Intersection Operations Analysis

As with the analysis of 30 HV and AAV traffic, the analysis of 2030 Off-Season traffic was conducted using a Synchro traffic model developed specifically for the study area intersections. This model includes field-verified geometrics and other relevant physical data for each intersection updated to reflect an assumed 2030 roadway network as described in Chapter 2. 2030 PM peak hour intersection turning movement volumes and intersection analysis worksheets are presented in Appendix G.

Table 5-1 summarizes analysis results for the 2030 30 HV network with Land Use Scenario #1 and assuming a 5-lane US 101 cross-section in the South Beach study area. Data in this table includes the overall intersection V/C ratios, and average intersection delay.

Table 5-1. 2030 Off-Season Intersection Operations Summary with Scenario #1

			2030 Off-Season	
		V/C Standard	V/C Ratio	Delay (sec/veh)
Signalized Intersections				
US 101 & 35th Street		0.85	**0.90**	**16.6**
US 101 & 40th Street		0.75	**0.94**	**37.8**
US 101 & 50th Street/S. Beach State Park		0.75	**0.77**	**13.4**
Unsignalized Intersections	**Critical Movement/Control**			
US 101 & Pacific Way	*Northbound Thru*	0.85	**1.58**	**0**
	Northbound Right	0.85	0.06	0
	Southbound Thru	0.85	**1.52**	**0**
US 101 & Abalone Street	*Northbound Thru*	0.85	0.82	0
	Southbound Thru	0.85	**1.40**	**0**
	Southbound Right	0.85	0.12	0
	Eastbound Right	0.90	**6.18**	N/A
US 101 & 32nd Street	*Northbound Thru*	0.85	0.62	0
	Northbound Right	0.85	0.03	0
	Southbound Thru-Right	0.85	**0.98**	**0**
	Eastbound Right	0.90	0.29	36.4
	Westbound Right	0.90	**1.73**	**>200.0**
US 101 & 62nd Street	*Northbound Left*	0.80	0.14	20.7
	Northbound Thru-Right	0.80	0.63	0
	Southbound Left	0.80	0.01	14.3
	Southbound Thru	0.80	0.58	0
	Southbound Right	0.80	0.04	0
	Eastbound Left	0.80	**1.32**	**>200.0**
	Eastbound Thru-Right	0.80	0.10	21.3

Table 5-1 Cont. 2030 Off-Season Intersection Operations Summary with Scenario #1

			2030 Off-Season	
		V/C Standard	V/C Ratio	Delay (sec/veh)
Unsignalized Intersections	**Critical Movement/Control**			
US 101 & 62nd Street Cont.	*Westbound Left*	0.80	0.24	67.9
	Westbound Thru-Right	0.80	0.02	16.3

Note 1: V/C ratio is a ratio between traffic volumes and the roadway or intersection's capacity.
Note 2: "Delay" refers to the delay experienced for the specific intersection traffic movement listed.
Note 3: Assumes widening of US 101 to five-lanes begins at the intersection of Abalone Street and proceeds south.
Bold numbers indicate that applicable ODOT Volume/capacity performance measure would be exceeded.
N/A indicates that projected volumes sufficiently exceed capacity such that Synchro cannot calculate a value.

Based on 2030 Off-Season volumes, two of the signalized intersections generally experience excessive delays and operate above acceptable V/C standards. The northbound thru traffic on US 101 generally north of 40th Street exceeds the capacity of the 5-lane cross-section. Additionally, the high traffic volumes on US 101 in the South Beach area result in insufficient gaps to accommodate some of the side street turning vehicles at the unsignalized intersections of Abalone Street, 32nd Street and 62nd Street.

Traffic Queuing

For purposes of this report, the 95th percentile vehicle queue length has been used to identify where potential traffic queuing problems might exist. 95th percentile queues as calculated by Synchro are based on the anticipated arrival patterns, duration of interruptions, and the ability of the intersection to recover from momentary heavy arrival rates. Queuing analysis worksheets are included in Appendix G and are summarized in Table 5-2.

Table 5-2. 2030 Off-Season Intersection Queuing with Land Use Scenario #1

Intersection	Turn Lane	Existing/Assumed Storage (ft)	Estimate 95th Percentile Queue (ft)
US 101 & 32nd Street (RIRO)	*Northbound Right*	100	25
	Eastbound Right	*	25
	Westbound Right	*	1,150
US 101 & 35th Street	*Northbound Thru*		250
	Northbound Left	TWCLT	50
	Northbound Right	175	25
	Southbound Thru		125
	Southbound Left	TWCLT	100
	Southbound Right	175	25
	Eastbound Thru		50
	Eastbound Left	120	100
	Eastbound Right	155	25
	Westbound Thru		50
	Westbound Left	120	**150**
	Westbound Right	155	50
US 101 & 40th Street	*Northbound Thru*		750
	Northbound Left	215	25
	Northbound Right	215	25
	Southbound Thru		550
	Southbound Left	TWCLT	225
	Southbound Right	175	25
	Eastbound Thru		25

Table 5-2 Continued. 2030 Off-Season Intersection Queuing with Land Use Scenario #1

Intersection	Turn Lane	Existing/Assumed Storage (ft)	Estimate 95th Percentile Queue (ft)
US 101 & 40th Street Cont.	*Eastbound Left*	120	75
	Eastbound Right	155	25
	Westbound Thru		25
	Westbound Left	120	**250**
	Westbound Right	155	**400**
US 101 & 50th Street/State Park	*Northbound Thru*		500
	Northbound Left	TWCLT	50
	Northbound Right	320	25
	Southbound Thru		325
	Southbound Left	215	75
	Southbound Right	155	25
	Eastbound Left	120	100
	Eastbound Thru/Right		50
	Westbound Thru/Right		50
	Westbound Left	120	75
US 101 & 62nd Street	*Northbound Left*	TWCLT	25
	Southbound Right	150	0
	Southbound Left	TWCLT	25
	Eastbound Left	120	**175**
	Eastbound Thru-Right		25
	Westbound Left	120	25
	Westbound Thru/Right		25

Notes:
Lengths rounded to nearest 25 feet.
Unsignalized intersections estimated using Synchro.
TWCLT: Two way center left turn lane
* Single Lane Approach
Bold number indicates that available vehicle storage space is expected to be exceeded.
Queue lengths are from Synchro analysis results and do not reflect queues calculated from a simulation model that accounts for interactions among intersections.

Traffic queuing results in Table 5-2 indicate that in the future, some of the intersections will exceed the available vehicle storage for a specific movement. The left turn movements on several of the minor street approaches exceed capacity. The westbound right out movement at 32nd Street has an excessive queue in the single lane approach. The westbound right turns at US 101 and 40th Street also exceed the available storage space.

Roadway Segment Operations

To supplement the analysis of the intersection traffic operations, an assessment was conducted of several highway segments to determine how well US 101 would function as a highway in the South Beach area. The results of this analysis are presented in Table 5-3.

The analysis in Table 5-3 is based on an assumed roadway segment capacity of 1,300 vphpl for the Yaquina Bay Bridge and influence area, and 1,750 vphpl for the highway segments south of 35th Street. The table indicates that the segment of US 101 affected by the constrained cross-section on the Yaquina Bay Bridge would see volumes that significantly exceed the theoretical capacities of this segment. South of 35th Street, the five-lane cross-section proposed for US 101 would have sufficient capacity to accommodate projected traffic (when measured using planning level capacity values) if it were not for the effects of traffic queuing to/from the bridge. These queues are expected to heavily influence actual traffic operations on US 101 south of the bridge causing significant delays. Worksheets are included in Appendix G.

Table 5-3. US 101 Roadway Segment Analysis for 2030 Off-Season with Land Use Scenario #1

Segment	Speed Limit (mph)	Volume/Capacity Ratio	
		Northbound	Southbound
Hurbert Street to 35th Street	35 mph	2.03	1.85
35th Street to 50th Street	35 & 45 mph	0.48	0.65
50th Street to 62nd Street	55 mph	0.45	0.56

Note: The calculation represents the ratio of projected segment volume to calculated lane capacity.

Other Measures of Effectiveness

The Synchro model was used to estimate other measures of effectiveness for US 101 including travel time, average travel speed, and unserved vehicles trying to enter the network. The results of the simulation are summarized in Table 5-4 below and documented in Appendix G.

Table 5-4. US 101 Travel Time and Speed for 2030 Off-Season with Scenario #1

Scenarios	Travel Time (min)		Average Travel Speed (mph)	
	Northbound	Southbound	Northbound	Southbound
US 101 Totals	**13.8**	**12.7**	**15.0**	**13.8**
Hurbert Street to 35th Street	10.5	7.2	9.9	1.4
35th Street to 40th Street	0.7	3.5	23.9	29.3
40th Street to 50th Street	1.6	0.9	27.3	19.5
50th Street to 62nd Street	0.9	1.0	42.3	43.9

Note: Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.

As indicated in Table 5-4, all segments of US 101 from the Yaquina Bay Bridge south through the South Beach study area would experience low travel speeds and increased travel times. South of 50th Street the travel speed is nearer to the posted speed of 55 mph.

Table 5-5 reports the unserved vehicles from the Synchro analysis. The unserved number of vehicles indicates an approximate number of vehicles projected to exceed the capacity of the corridor and, thus, are not included in the analysis.

Table 5-5. US 101 Unserved Vehicles for 2030 Off-Season with Land Use Scenario #1

Location	Number of Unserved Vehicles
Entering US 101 northbound at 62nd Street	1,186
Entering US 101 southbound at Hurbert Street	1,141

Note: Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.

Effect of Adding Road Connection from 50th to 62nd

Similar to the discussion presented under Scenario 1 for 30 HV, the effects of adding a road connection between 50th and 62nd Streets parallel to and east of US 101 can be assessed in several ways. First, would be the potential for reducing traffic volumes along US 101 by diverting north/south traffic from the area near 62nd Street to areas further north such as South Beach Village and commercial areas along the east side of US 101 south of 40th Street.

Second, the addition of a road connection could provide an attractive alternative to the provision of direct property access to/from the highway. This would also benefit traffic operations along US 101.

The reduction in traffic volumes diverted from US 101 is expected to be small and to not alter the volume/capacity ratios anticipated at the intersections of US 101 interchanges at 40th, 50th, and 62nd Streets under Scenario 1 with Off-Season traffic levels.

A more significant benefit of this connector road might be its ability to provide direct property access from existing and potential future development along the east side of US 101 north of 62nd Street. By offering a "backage" connection to these properties, direct access to/from the highway could be reduced or eliminated, thus enhancing both safety and traffic operations.

5.2 LAND USE SCENARIO #2 – ENVIRONMENTALLY CONSTRAINED GROWTH

Intersection Operations Analysis

The analysis of traffic operations was conducted using a Synchro traffic model developed specifically for the study area intersections as described earlier in this chapter. 2030 PM peak hour intersection volumes and traffic operations worksheets for this scenario are included in Appendix H.

Table 5-6 summarizes analysis results for the 2030 30 HV network with Land Use Scenario #2 and assuming a 5-lane US 101 cross-section in the South Beach study area. Data in this table includes the overall intersection V/C ratios, and average intersection delay.

Table 5-6. 2030 Off-Season Intersection Operations Summary with Scenario #2

			2030 Off-Season	
		V/C Standard	**V/C Ratio**	**Delay (sec/veh)**
Signalized Intersections				
US 101 & 35th Street		0.85	**0.88**	**23.0**
US 101 & 40th Street		0.75	**0.85**	**27.4**
US 101 & 50th Street-S. Beach State Park		0.75	0.74	11.4
Unsignalized Intersections	**Critical Movement/Control**			
US 101 & Pacific Way	*Northbound Thru*	0.85	**1.50**	**0**
	Northbound Right	0.85	0.06	0
	Southbound Thru	0.85	**1.46**	**0**
US 101 & Abalone Street	*Northbound Thru*	0.85	0.78	0
	Southbound Thru	0.85	**1.35**	**0**
	Southbound Right	0.85	0.12	0
	Eastbound Right	0.90	**5.73**	**N/A**
US 101 & 32nd Street	*Northbound Thru*	0.85	0.58	0
	Northbound Right	0.85	0.04	0
	Southbound Thru-Right	0.85	**0.95**	**0**
	Eastbound Right	0.90	0.28	33.9
	Westbound Right	0.90	**1.33**	**182.6**
US 101 & 62nd Street	*Northbound Left*	0.80	0.13	19.8
	Northbound Thru-Right	0.80	0.60	0
	Southbound Left	0.80	0.01	13.6
	Southbound Thru	0.80	0.57	0
	Southbound Right	0.80	0.04	0

Table 5-6 Cont. 2030 Off-Season Intersection Operations Summary with Scenario #2

			2030 Off-Season	
Unsignalized Intersections	**Critical Movement/Control**	**V/C Standard**	**V/C Ratio**	**Delay (sec/veh)**
US 101 & 62nd Street Cont.	*Eastbound Left*	0.80	**1.22**	**>200.0**
	Eastbound Thru-Right	0.80	0.09	20.6
	Westbound Left	0.80	0.07	51.4
	Westbound Thru-Right	0.80	0.02	15.6

Note 1: V/C ratio is a ratio between traffic volumes and the roadway or intersection's capacity.
Note 2: "Delay" refers to the delay experienced for the specific intersection traffic movement listed.
Note 3: Widening of US 101 to five-lanes is assumed to begin at the intersection of Abalone Street and proceed southward.
Bold numbers indicate that applicable ODOT Volume/capacity performance measure would be exceeded.
N/A indicates that projected volumes sufficiently exceed capacity such that Synchro cannot calculate a value.

Based on 2030 Off-Season volumes, two of the signalized intersections generally experience excessive delays and operate above acceptable V/C standards. The northbound thru traffic on US 101 north of 40th Street exceeds the capacity of the 5-lane cross-section. Additionally, the high traffic volumes on US 101 in the South Beach area result in insufficient gaps to accommodate right turning traffic at 32nd Street and left turning vehicles at 62nd Street.

Traffic Queuing

For purposes of this report, the 95th percentile vehicle queue length has been used to identify where potential traffic queuing problems might exist. 95th percentile queues as calculated by Synchro are based on the anticipated arrival patterns, duration of interruptions, and the ability of the intersection to recover from momentary heavy arrival rates. Queuing analysis worksheets are included in Appendix H and are summarized in Table 5-7.

Table 5-7. 2030 Off-Season Intersection Queuing with Land Use Scenario #2

Intersection	Turn Lane	Existing/Assumed Storage (ft)	Estimate 95th Percentile Queue (ft)
US 101 & 32nd Street (RIRO)	*Northbound Right*	100	25
	Eastbound Right	*	25
	Westbound Right	*	875
US 101 & 35th Street	*Northbound Thru*		225
	Northbound Left	TWCLT	50
	Northbound Right	175	25
	Southbound Thru		250
	Southbound Left	TWCLT	125
	Southbound Right	175	25
	Eastbound Thru		50
	Eastbound Left	120	100
	Eastbound Right	155	25
	Westbound Thru		50
	Westbound Left	120	**150**
	Westbound Right	155	50
US 101 & 40th Street	*Northbound Thru*		450
	Northbound Left	215	25
	Northbound Right	215	25
	Southbound Thru		550
	Southbound Left	TWCLT	200
	Southbound Right	175	25
	Eastbound Thru		25

Table 5-7 Cont. 2030 Off-Season Intersection Queuing with Land Use Scenario #2

Intersection	Turn Lane	Existing/Assumed Storage (ft)	Estimate 95th Percentile Queue (ft)
US 101 & 40th Street Cont.	*Eastbound Left*	120	75
	Eastbound Right	155	25
	Westbound Thru		25
	Westbound Left	120	**225**
	Westbound Right	155	**350**
US 101 & 50th Street/State Park	*Northbound Thru*		425
	Northbound Left	TWCLT	50
	Northbound Right	320	25
	Southbound Thru		100
	Southbound Left	215	75
	Southbound Right	155	25
	Eastbound Left	120	100
	Eastbound Thru/Right		50
	Westbound Thru/Right		50
	Westbound Left	120	50
US 101 & 62nd Street	*Northbound Left*	TWCLT	25
	Southbound Right	150	0
	Southbound Left	TWCLT	25
	Eastbound Left	120	**150**
	Eastbound Thru-Right		25
	Westbound Left	120	25
	Westbound Thru/Right		25

Notes:
Lengths rounded to nearest 25 feet.
Unsignalized intersections estimated using Synchro.
TWCLT: Two way center left turn lane
* Single Lane Approach
Bold number indicates that available vehicle storage space is expected to be exceeded.
Queue lengths are from Synchro analysis results and do not reflect queues calculated from a simulation model that accounts for interactions among intersections.

Traffic queuing results in Table 5-7 indicate that in the future, some of the intersections will exceed the projected vehicle storage for a movement. The left turn movements on several of the minor street approaches exceed capacity. The westbound right out movement at 32nd Street has an excessive queue in the single lane approach. The westbound right turns at US 101 and 40th Street also exceed the available storage space.

Roadway Segment Operations

To supplement the analysis of the intersection traffic operations, an assessment was conducted of several highway segments to determine how well US 101 would function as a highway in the South Beach area. The results of this analysis are presented in Table 5-8.

Table 5-8. US 101 Roadway Segment Analysis for 2030 Off-Season with Land Use Scenario #2

Segment	Speed Limit (mph)	Volume/Capacity Ratio	
		Northbound	Southbound
Hurbert to 35th Street	35 mph	1.94	1.79
35th Street to 50th Street	35 & 45 mph	0.45	0.63
50th Street to 62nd Street	55 mph	0.43	0.54

Note: The calculation represents the ratio of projected segment volume to calculated lane capacity.

The table indicates that the segment of US 101 affected by the constrained cross-section on the Yaquina Bay Bridge would see volumes that significantly exceed the theoretical capacities of this segment. South of 35th Street, the five-lane cross-section proposed for US 101 would have sufficient capacity to accommodate projected traffic (when measured using planning level capacity values) if it were not for the effects of traffic queuing to/from the bridge. These queues are expected to heavily influence actual traffic operations on US 101 south of the bridge causing significant delays. Worksheets are included in Appendix H.

Other Measures of Effectiveness

The Synchro model was used to estimate other measures of effectiveness for US 101 including travel time, average travel speed, and unserved vehicles trying to enter the network. The results of the simulation are summarized in Table 5-9 below and documented in Appendix H.

Table 5-9. US 101 Travel Time and Speed for 2030 Off-Season with Scenario #2

	Travel Time (min)		Average Travel Speed (mph)	
Scenarios	**Northbound**	**Southbound**	**Northbound**	**Southbound**
US 101 Totals	**13.4**	**12.5**	**15.4**	**14.0**
Hurbert Street to 35th Street	10.5	7.2	9.9	1.4
35th Street to 40th Street	0.7	3.6	24.9	28.9
40th Street to 50th Street	1.3	0.8	33.2	21.1
50th Street to 62nd Street	0.9	0.9	44.9	50.5

Note: Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.

As indicated in Table 5-9, all segments of US 101 from the Yaquina Bay Bridge south through the South Beach study area would experience low travel speeds and increased travel times. South of 50th Street the average travel speed is nearer the posted speed of 55 mph.

Table 5-10 reports the unserved vehicles from the Synchro analysis. The unserved number of vehicles indicates an approximate number of vehicles projected to exceed the capacity of the corridor and, thus, are not included in the analysis.

Table 5-10. US 101 Unserved Vehicles for 2030 Off-Season with Land Use Scenario #2

Location	Number of Unserved Vehicles
Entering US 101 northbound at 62nd Street	1,191
Entering US 101 southbound at Hurbert Street	1,141

Note: Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.

Effect of Adding Road Connection from 50th to 62nd

Similar to the discussion presented under Scenario 1 for 30 HV, the effects of adding a road connection between 50th and 62nd Streets parallel to and east of US 101 can be assessed in several ways. First, would be the potential for reducing traffic volumes along US 101 by diverting north/south traffic from the area near 62nd Street to areas further north such as South Beach Village and commercial areas along the east side of US 101 south of 40th Street. Second, the addition of a road connection could provide an attractive alternative to the provision of direct property access to/from the highway. This would also benefit traffic operations along US 101.

The reduction in traffic volumes diverted from US 101 is expected to be small and to not alter the volume/capacity ratios anticipated at the intersections of US 101 interchanges at 40^{th}, 50^{th}, and 62^{nd} Streets under Scenario 2 with Off-Season traffic levels.

A more significant benefit of this connector road might be its ability to provide direct property access from existing and potential future development along the east side of US 101 north of 62^{nd} Street. By offering a "backage" connection to these properties, direct access to/from the highway could be reduced or eliminated, thus enhancing both safety and traffic operations.

6. DURATION OF CONGESTION

As noted in Chapter 2 an additional performance measure has been identified to aid in the development of alternate mobility standard for US 101 in South Beach. This measure is duration of congestion and was used to explore options for both increasing the acceptable V/C mobility threshold, and for determining the length of time during a typical average annual weekday when that standard might be exceeded or allow to be exceeded. The methodology used to calculate duration of congestion and the results of analysis for 2030 average annual and off-season conditions with the two land use scenarios are discussed in this chapter.

6.1 METHODOLOGY

Calculation of the duration of congestion for the study area intersections included a multi-step process as described below:

1. *Identify the peak analysis hour for 2030 average annual or off-season conditions.* Review of recent traffic counts taken over the past few years at several locations along US 101 in South Beach indicates that the PM peak hour (which is also the peak hour of a typical weekday) occurs between 4 and 5 PM. It is assumed that this time period continues to represent the weekday peak under average annual or off-season conditions in 2030.
2. *Identify hourly traffic volumes over the course of the 16-hour analysis period for a typical average annual or off-season weekday in 2030.* Using the PM peak hour as a starting point (and assuming that it represents the 100% hour), the percentage of the PM peak that could be experienced in all other hours is based on current experience as evidenced from a variety of recent traffic counts. Counts that were reviewed included roadway tube counts from April 2009 along US 101 north and south of Ferry Slip Road and south of Pacific Way, and a turning movement count taken in April 2005 at the intersection of US 101 and 32nd Street (see Appendix I for a summary table of this data). While the percentages that each of the 16 hours measured represents of the PM peak vary a little from location to location, a general pattern emerges that is useful in developing an estimate of hour 2030 traffic distribution. For purposes of this report, the hourly distribution of traffic was developed using the April 2005 count at the intersection of US 101 at 32nd Street. This count was chosen because it represents conditions that might be more prevalent through the signalized intersections proposed along US 101 in 2030 (e.g., from 35th to 50th) as it is located farther from the Yaquina Bay Bridge influence area than the other counts.
3. *Identify reductions in total approach volumes that would be needed to meet applicable OHP mobility standards.* The 2030 PM peak hour projections for AAV or Off-Season conditions at each intersection with both land use scenarios were evaluated to determine the percent reduction in overall approach volumes that would be needed to meet the OHP standards. It should be noted that, for purposes of assessing the duration of congestion, traffic operations analysis described in this chapter differs slightly from the analysis in earlier chapters in that Peak Hour Factors (PHFs) were adjusted from 0.85 to 1.00. This adjustment reflects the expectation that congestion would be sufficiently heavy to minimize traffic peaking within the peak hour. A peak hour factor is typically applied to traffic volume data to adjust for the common experience of a higher short peak (e.g., 15 to 30 minutes) within a peak hour. Operations analysis is based on that peak within the peak.
4. *Identify intersection capacities at each intersection for both time periods and land use scenarios.* These theoretical capacities were assumed to represent the total approach

volumes at an intersection when it achieved operations approximating the OHP mobility standards. These were determined from the analysis of each intersection based on the relevant trip reduction percentages.

5. *Identify the total number of hours that each intersection would exceed capacity for both time periods and land use scenario, and at each trip reduction level.* To accomplish this calculation, the estimated capacity value for each intersection was compared with the estimated traffic volume for each hour of the 16-hour day under 2030 average annual and off-season conditions with each land use scenario and trip reduction level. Based on this comparison, an estimate was prepared of the number of hours each weekday when traffic operations could be expected to exceed the capacity of the signalized and unsignalized intersections along US 101 in South Beach.

6.2 CONDITIONS WITH AVERAGE ANNUAL TRAFFIC VOLUMES

Land Use Scenario #1 – Newport Population Growth

Estimates of the duration of 2030 average annual weekday congestion were prepared using the methodology described above. Hourly traffic volumes were determined for each intersection and operations analysis was conducted assuming two levels of trip reductions as described above. Turning movement projections for this land use scenario under average annual conditions are included in Appendix I along with a summary of the 16-hour distribution of traffic and the comparison with theoretical intersection capacities that identify total anticipated hours of congestion. Intersection operations spreadsheets for each intersection and trip reduction level are also included in this Appendix.

Table 6-1 summarizes the estimated duration of congestion for the study area intersections for Land Use Scenario #1. Analysis results are described for each intersection, from the north to the south, in the following paragraphs.

- For the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the 2-lane roadway section of the highway leading to/from the Yaquina Bay Bridge would result in operations exceeding applicable mobility standards for 11 or 12 hours, respectively, out of each typical 2030 Average Annual weekday. With a 19 percent reduction in approach volumes, the two near intersections would operate in excess of their mobility standard of V/C > 0.85 for US 101 and V/C > 0.90 for side street traffic for 11 hours each typical weekday.
- For the unsignalized intersection of US 101 with 32nd Street, operations would exceed the applicable mobility standard for an estimated seven hours out of each weekday. With a 19 percent reduction in approach volumes, this intersection is expected to meet its applicable mobility standards (V/C >0.85 for traffic on US 101 and V/C > 0.90 for side street traffic).
- The signalized intersection of US 101 with 35th Street, is expected to operate at V/C = 0.96 during the weekday PM peak hour in comparison to its standard of V/C > 0.85. Operations would exceed this standard for an estimated four hours each weekday. Through an iterative process that included all three signalized intersections along US 101 in South Beach, it was determined that a 19 percent reduction in total approach volumes would be needed to meet the applicable mobility standards for each.
- The signalized intersection of US 101 with 40th Street is also expected to operate at V/C = 0.96 during the PM peak hour. This intersection would exceed its applicable

standard of V/C > 0.75 for approximately seven hours each weekday. With a 19 percent reduction in total approach volumes, this intersection would meet its applicable mobility standard.

- The signalized intersection of US 101 with 50th Street is expected to operate at V/C = 0.82 during the PM peak hour. This intersection would exceed its V/C > 0.75 standard for approximately two hours during each weekday. With a 19 percent reduction in total approach traffic volumes this intersection would meet its applicable mobility standard.
- For the unsignalized intersection of US 101 with 62nd Street, operations would exceed applicable mobility standards for an estimated seven hours out of each weekday. With a 19 percent reduction in approach volumes, this intersection is expected to meet its relevant mobility standard (V/C > 0.75 for traffic on US 101 and V/C > 0.80 for side street traffic).

It should be noted that none of these intersections operates in isolation from the others and that the anticipated traffic queuing from the bridge will likely have a significant impact on northbound traffic operations through much of the study area.

Land Use Scenario #2 – Environmentally-Constrained Growth

Turning movement projections for this land use scenario under average annual conditions are included in Appendix J along with a summary of the 16-hour distribution of traffic and the comparison with theoretical intersection capacities that identify total anticipated hours of congestion. Intersection operations spreadsheets for each intersection and trip reduction level are also included in this Appendix.

Table 6-1 also summarizes the estimated duration of congestion for the study area intersections for Land Use Scenario #2. Analysis results are described for each intersection, from the north to the south, in the following paragraphs.

- For the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the 2-lane roadway section of the highway leading to/from the Yaquina Bay Bridge would result in operations exceeding applicable mobility standards for 12 hours out of each typical 2030 Average Annual weekday. With a 14 percent reduction in total approach traffic, some improvement would occur but the standard would still be exceeded for up to 11 hours for each typical weekday.
- For the unsignalized intersection of US 101 with 32nd Street, traffic operations would exceed the applicable mobility standards for up to seven hours each weekday. With a 14 percent reduction in approach volume, this intersection would exceed its applicable mobility standards (V/C >0.85 for traffic on US 101 and V/C > 0.90 for side street traffic) for an estimated one hour during each typical 2030 Average Annual weekday.
- The signalized intersection of US 101 with 35th Street, is expected to operate at V/C = 0.92 during the weekday PM peak hour in comparison to its standard of V/C > 0.85. Operations are expected to exceed this standard for an estimated four hours out of each weekday. Through an iterative process that included all three signalized intersections along US 101 in South Beach, it was determined that a 14 percent reduction in total approach volumes would be needed to meet the applicable mobility standards for each.

Table 6-1. Summary of Duration of Congestion Evaluation – Average Annual Conditions with Adjusted Peak Hour Factors(Note #1)

			Land Use Scenario #1			Land Use Scenario #2		
			Full Development		With 19% Reduction in Traffic (1)	Full Development)		With 14% Reduction in Traffic (2)
Intersection	Critical Movement	OHP Standard	Peak V/C	Congested Hours (4)	Congested Hours (4)	Peak V/C	Congested Hours (4)	Congested Hours (4)
Signalized Intersections								
US 101 & 35th Street	All	0.85	0.95	4 hours	0 hours	0.92	4 hours	0 hours
US 101 & 40th Street	All	0.75	0.96	7 hours	0 hours	0.88	6 hours	0 hours
US 101 & 50th Street	All	0.75	0.82	2 hours	0 hours	0.78	1 hour	0 hours
Unsignalized Intersections (3)								
US 101 & Pacific Way	NB Thru	0.85	1.68			1.60		
	NB Right	0.85	0.06	11 hours	11 hours	0.06	12 hours	11 hours
	SB Thru	0.85	1.62			1.56		
US 101 & Abalone Street	NB Thru	0.85	0.87			0.83		
	SB Thru	0.85	1.49	12 hours	11 hours	1.44	12 hours	11 hours
	SB Right	0.85	0.13			0.13		
	EB Right	0.90	7.75			6.84		
US 101 & 32nd Street	NB Thru	0.85	0.66			0.62		
	NB Right	0.85	0.04			0.04		
	SB Thru/Right	0.85	1.04	7 hours	0 hours	1.01	7 hours	1 hour
	EB Right	0.90	0.32			0.30		
	WB Right	0.90	1.70			1.60		
US 101 & 62nd Street	NB Left	0.75	0.15			0.14		
	NB Thru/Right	0.75	0.67			0.64		
	SB Left	0.75	0.03			0.03		
	SB Thru	0.75	0.62	7 hours	0 hours	0.61	4 hours	0 hours
	SB Right	0.75	0.04			0.04		
	EB Left	0.80	1.49			1.38		
	EB Thru/Right	0.80	0.11			0.11		
	WB Left	0.80	0.24			0.14		
	WB Thru/Right	0.80	0.03			0.03		

[black] Entire intersection or a specific movement that would operate in an over-capacity condition.
[grey] Entire intersection or a specific movement that would exceed the OHP standard but would operate at less than capacity conditions.

Note 1: The results of this table are based on different peak hour factor assumptions (PHF=1.00) than the results reported in the tables in Chapters 2, 4 and 5 (PHF=0.85).
Note 2: Intersection performance is measured at the relevant V/C standard. For stop-controlled intersections, the side street standard was used as the basis for estimating when an intersection would exceed its performance standard.
(1) 19% reduction from Full Development to meet OHP standards.
(2) 14% reduction from Full Development to meet OHP standards.
(3) Congested hours for stop-controlled intersections refers to worst side street movement.
(4) "Congested Hours" refers to the number of hours that an intersection would exceed the OHP V/C performance standard.

- The signalized intersection of US 101 with 40th Street is expected to operate at V/C = 0.88 during the weekday PM peak hour. This intersection would exceed its applicable standard of V/C > 0.75 for approximately six hours each weekday. With a 14 percent reduction in total approach volumes, this intersection would meet its applicable mobility standard.
- The signalized intersection of US 101 with 50th Street is expected to operate at V/C = 0.78 during the weekday PM peak hour. This intersection would exceed its V/C > 0.75 standard for only one hour during each weekday. With a 14 percent reduction in total approach traffic volumes, this intersection would meet its applicable mobility standard.
- At the unsignalized intersection with 62nd Street, the applicable standard for side streets of V/C > 0.80 would be exceeded for four hours each weekday. With a 14 percent reduction in approach volume this intersection is expected to meet its mobility standard for each typical 2030 Average Annual weekday.

As with Scenario #1, it should be noted that none of these intersections operates in isolation from the others and that the anticipated traffic queuing from the bridge will likely have a significant impact on northbound traffic operations through much of the study area.

Other Measures of Effectiveness

The Synchro model was used to estimate other measures of effectiveness for US 101 including travel time, average travel speed, and unserved vehicles trying to enter the network. This analysis differs from that presented in earlier chapters for the reasons documented at the beginning of this chapter – namely the change in peak hour factors assumed in the intersection operations analysis. The results of the simulation are summarized in Table 6-2 below and documented in Appendices I and J for Land Use Scenarios 1 and 2, respectively.

As indicated in Table 6-2, all segments of US 101 from Hurbert Street to 50th Street would experience low travel speeds and increased travel times. South of 50th Street the average travel speed is nearer the posted speed of 55 mph.

Table 6-2. US 101 Travel Time and Speed for 2030 Average Annual Conditions

	Travel Time (min)		Average Travel Speed (mph)	
Scenario and Location	**Northbound**	**Southbound**	**Northbound**	**Southbound**
Scenario 1 – Full Development				
US 101 Totals	**15.8**	**14.7**	**13.1**	**11.9**
Hurbert Street to 35th Street	12.7	9.4	8.1	1.0
35th Street to 40th Street	0.8	3.6	20.4	29.0
40th Street to 50th Street	1.4	0.8	33.0	21.5
50th Street to 62nd Street	0.9	1.0	45.6	46.8
Scenario 1 – 19% Reduction				
US 101 Totals	**15.5**	**14.6**	**13.3**	**12.0**
Hurbert Street to 35th Street	12.7	9.4	8.1	1.0
35th Street to 40th Street	0.6	3.5	27.0	29.4
40th Street to 50th Street	1.3	0.7	34.5	22.8
50th Street to 62nd Street	0.9	0.9	45.6	50.2

Table 6-2 Cont. US 101 Travel Time and Speed for 2030 Average Annual Conditions

	Travel Time (min)		Average Travel Speed (mph)	
Scenario and Location	**Northbound**	**Southbound**	**Northbound**	**Southbound**
Scenario 2 – Full Development				
US 101 Totals	**15.3**	**14.1**	**13.5**	**12.4**
Hurbert Street to 35th Street	12.1	8.8	8.6	1.1
35th Street to 40th Street	0.8	3.5	22.7	29.8
40th Street to 50th Street	1.5	0.8	29.8	22.6
50th Street to 62nd Street	1.0	1.1	42.6	43.5
Scenario 2 – 14% Reduction				
US 101 Totals	**15.0**	**14.0**	**13.7**	**12.5**
Hurbert Street to 35th Street	12.1	8.8	8.5	1.1
35th Street to 40th Street	0.8	3.6	22.3	28.6
40th Street to 50th Street	1.3	0.6	35.8	26.4
50th Street to 62nd Street	0.9	0.9	45.4	51.1

Note 1: Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.
Note 2: The results of this table are based on different peak hour factor assumptions (PHF=1.00) than the results reported in the tables in Chapters 2, 4 and 5 (PHF=0.85).

Table 6-3 reports the unserved vehicles from the Synchro analysis. The unserved number of vehicles indicates an approximate number of vehicles projected to exceed the capacity of the corridor and, thus, are not included in the analysis.

Table 6-3. US 101 Unserved Vehicles for 2030 Average Annual Volumes

	Number of Unserved Vehicles	
Scenario and Location	**Full Development**	**Reduced Development**
Scenario 1		
Entering US 101 northbound at 62nd Street	1,536	1,536
Entering US 101 southbound at Hurbert Street	1,479	1,479
Scenario 2		
Entering US 101 northbound at 62nd Street	1.488	1.488
Entering US 101 southbound at Hurbert Street	1.432	1.432

6.3 CONDITIONS WITH OFF-SEASON TRAFFIC VOLUMES

Land Use Scenario #1 – Newport Population Growth

Estimates of the duration of 2030 average annual weekday congestion were prepared using the methodology described above. Hourly traffic volumes were determined for each intersection and operations analysis was conducted assuming three levels of trip reductions as described above. Turning movement projections for this land use scenario under average annual conditions are included in Appendix I along with a summary of the 16-hour distribution of traffic and the comparison with theoretical intersection capacities that identify total anticipated hours of congestion. Intersection operations spreadsheets for each intersection and trip reduction level are also included in this Appendix.

Table 6-4 summarizes the estimated duration of congestion for the study area intersections for Land Use Scenario #1. Analysis results are described for each intersection, from the north to the south, in the following paragraphs.

- For the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the 2-lane roadway section of the highway leading to/from the Yaquina Bay Bridge would result in operations exceeding applicable mobility standards for 11 hours out of each typical 2030 Off-Season weekday. The eight percent reduction in approach volumes that benefits the signalized intersections would not materially affect operations at these two intersections.
- For the unsignalized intersection of US 101 with 32nd Street, traffic operations would exceed the applicable mobility standards for an estimated two hours each weekday. With an eight percent reduction in approach volumes, this intersection would exceed its applicable mobility standards (V/C >0.85 for traffic on US 101 and V/C > 0.90 for side street traffic) for only one hour each weekday.
- The signalized intersection of US 101 with 35th Street, is expected to operate at V/C = 0.85 during the weekday PM peak hour which meets its existing mobility standard.
- The signalized intersection of US 101 with 40th Street is expected to operate at V/C = 0.82 during the weekday PM peak hour. This intersection would exceed its applicable standard of V/C > 0.75 for approximately three hours each weekday. With an eight percent reduction in total approach volumes, this intersection would meet its applicable mobility standard.
- The signalized intersection of US 101 with 50th Street is expected to operate at V/C = 0.72 during the weekday PM peak hour which is less than its existing mobility standard of V/C > 0.75.
- For the unsignalized intersection of US 101 with 62nd Street, operations would exceed applicable mobility standards for side streets of V/C > 0.80 for an estimated one hour out of each weekday. With an eight percent reduction in approach volumes, this intersection would meet its applicable standard.

It should be noted that none of these intersections operates in isolation from the others and that the anticipated traffic queuing from the bridge will likely have a significant impact on northbound traffic operations through much of the study area.

Land Use Scenario #2 – Environmentally-Constrained Growth

Turning movement projections for Scenario #2 under off-season conditions are included in Appendix L along with a summary of the 16-hour distribution of traffic and a comparison with theoretical intersection capacities to identify total estimated hours of congestion. Intersection operations worksheets for each intersection are also included in this Appendix.

Table 6-4 summarizes the estimated duration of congestion for the study area intersections for Land Use Scenario #2. Analysis results are described for each intersection, from the north to the south, in the following paragraphs.

- For the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the 2-lane roadway section of the highway leading to/from the Yaquina Bay Bridge would exceed their applicable mobility standards for 11 hours out of each typical 2030 Off-Season weekday.
- For the unsignalized intersection of US 101 with 32nd Street, traffic operations would exceed the applicable mobility standards (V/C >0.85 for traffic on US 101 and V/C > 0.90 for side street traffic) for an estimated one hour each weekday.

Table 6-4. Summary of Duration of Congestion Evaluation – Off-Season Conditions with Adjusted Peak Hour Factors(Note #1)

			Land Use Scenario #1			Land Use Scenario #2	
			Full Development		With 8% Reduction in Traffic (1)	Full Development)	
Intersection	Critical Movement	OHP Standard	Peak V/C	Congested Hours (4)	Congested Hours (4)	Peak V/C	Congested Hours (4)
Signalized Intersections							
US 101 & 35th Street	All	0.85	0.85	0 hours	0 hours	**0.83**	0 hours
US 101 & 40th Street	All	0.75	0.82	3 hours	0 hours	**0.75**	0 hours
US 101 & 50th Street	All	0.75	0.72	0 hours	0 hours	**0.70**	0 hours
Unsignalized Intersections (3)							
US 101 & Pacific Way	NB Thru	0.85	1.50	11 hours	11 hours	1.43	11 hours
	NB Right	0.85	0.06			006	
	SB Thru	0.85	1.44			1.39	
US 101 & Abalone Street	NB Thru	0.85	0.78	11 hours	11 hours	0.74	11 hours
	SB Thru	0.85	1.33			1.28	
	SB Right	0.85	0.11			0.11	
	EB Right	0.90	>2.00			>2.00	
US 101 & 32nd Street	NB Thru	0.85	0.59	2 hours	1 hour	0.55	1 hour
	NB Right	0.85	0.03			0.04	
	SB Thru/Right	0.85	0.93			0.90	
	EB Right	0.90	0.23			0.21	
	WB Right	0.90	1.24			1.01	
US 101 & 62nd Street	NB Left	0.75	0.12	1 hour	0 hours	0.11	1 hour
	NB Thru/Right	0.75	0.60			0.57	
	SB Left	0.75	0.01			0.01	
	SB Thru	0.75	0.55			0.54	
	SB Right	0.75	0.04			0.04	
	EB Left	0.80	0.87			0.90	
	EB Thru/Right	0.80	0.08			0.07	
	WB Left	0.80	0.17			0.05	
	WB Thru/Right	0.80	0.01			0.01	

(black box) Entire intersection or a specific movement that would operate in an over-capacity condition.

(grey box) Entire intersection or a specific movement that would exceed the OHP standard but would operate at less than capacity conditions.

Note 1: The results of this table are based on different peak hour factor assumptions (PHF=1.00) than the results reported in the tables in Table 1-3 and Chapters 2, 4 and 5 (PHF=0.85).

Note 2: Intersection performance is measured at the relevant V/C standard. For stop-controlled intersections, the side street standard was used as the basis for estimating when an intersection would exceed its performance standard.

(1) 19% reduction from Full Development to meet OHP standards.
(2) 14% reduction from Full Development to meet OHP standards.
(3) Congested hours for stop-controlled intersections refers to worst side street movement
(4) "Congested Hours" refers to the number of hours that an intersection would exceed the OHP V/C performance standard.

- The signalized intersection of US 101 with 35th Street, is expected to operate at V/C = 0.83 during the weekday PM peak hour which meets its existing mobility standard of V/C > 0.85.
- The signalized intersection of US 101 with 40th Street, is expected to operate at V/C = 0.75 during the weekday PM peak hour which meets its existing mobility standard of V/C > 0.75.
- The signalized intersection of US 101 with 50th Street, is expected to operate at V/C = 0.70 during the weekday PM peak hour which meets its existing mobility standard of V/C > 0.75.
- For the unsignalized intersection of US 101 with 62nd Street, the applicable standard for side streets of V/C > 0.80 would also be exceeded for one hour each weekday.

Other Measures of Effectiveness

The Synchro model was used to estimate other measures of effectiveness for US 101 including travel time, average travel speed, and unserved vehicles trying to enter the network. This analysis differs from that presented in earlier chapters for the reasons documented at the beginning of this chapter – namely the change in peak hour factors assumed in the intersection operations analysis. The results of the simulation are summarized in Table 6-5 below and documented in Appendices K and L for Land Use Scenarios 1 and 2, respectively.

As indicated in Table 6-5, all segments of UA 101 from Hurbert Street to 50th Street would experience low travel speeds and long travel times. South of 50th Street, the average travel speed is nearer the posted speed of 55 mph.

Table 6-5. US 101 Travel Time and Speed for 2030 Off-Season Conditions

	Travel Time (min)		Average Travel Speed (mph)	
Scenario and Location	**Northbound**	**Southbound**	**Northbound**	**Southbound**
Scenario 1 – Full Development				
US 101 Totals	**12.2**	**11.6**	**17.0**	**15.2**
Hurbert Street to 35th Street	9.1	6.3	11.4	1.6
35th Street to 40th Street	0.7	3.4	26.0	30.2
40th Street to 50th Street	1.5	0.8	30.4	19.8
50th Street to 62nd Street	0.9	1.0	43.0	45.3
Scenario 1 – 8% Reduction				
US 101 Totals	**9.7**	**9.0**	**21.4**	**19.5**
Hurbert Street to 35th Street	6.7	3.8	15.5	2.6
35th Street to 40th Street	0.6	3.4	27.2	30.2
40th Street to 50th Street	1.4	0.8	31.8	20.5
50th Street to 62nd Street	0.9	0.9	43.7	46.6
Scenario 2 – Full Development				
US 101 Totals	**12.0**	**11.6**	**17.2**	**15.2**
Hurbert Street to 35th Street	9.1	6.3	11.3	1.6
35th Street to 40th Street	0.7	3.6	25.6	28.4
40th Street to 50th Street	1.3	0.7	33.9	24.3
50th Street to 62nd Street	0.9	0.9	45.7	50.7

Note 1: Results are based on Synchro output and not from a simulation model that accounts for interaction among intersections.

Note 2: The results of this table are based on different peak hour factor assumptions (PHF=1.00) than the results reported in the tables in Chapters 2, 4 and 5 (PHF=0.85).

Table 6-6 reports the unserved vehicles from the Synchro analysis. The unserved number of vehicles indicates an approximate number of vehicles projected to exceed the capacity of the corridor and, thus, are not included in the analysis.

Table 6-6. US 101 Unserved Vehicles for 2030 Off-Season Volumes

	Number of Unserved Vehicles	
Scenario and Location	**Full Development**	**Reduced Development**
Scenario 1		
Entering US 101 northbound at 62nd Street	1,045	654
Entering US 101 southbound at Hurbert Street	1,042	646
Scenario 2		
Entering US 101 northbound at 62nd Street	1,050	NA
Entering US 101 southbound at Hurbert Street	1,047	NA

APPENDIX A

2030 Traffic Volume and Baseline Network Development

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TECHNICAL MEMORANDUM

Date:	July 31, 2009
To:	John DeTar, Doug Norval, Dorothy Upton
From:	Shelley Oylear
Subject:	Task 9 -Base System Network, Volumes and Modeling Assumptions
Project Number:	274-2395-51-Ph 04
Project Name:	Newport TSP Update - Alternative Mobility Standards

The following assumptions were used to develop the Base System Network and Volumes for Synchro Modeling. Please review the assumptions and the attached modeling files and volumes in preparation for our conference call on Friday at 10:30 AM.

Volumes

- Starting with Assumes 1.7% annual thru traffic growth on US 101
- Assumes South Beach land use trip generation used in the original TSP update work. See attached table.
- 30 HV represents the seasonal weekday peak hour.
- Annual Average Weekday volumes were obtained by reducing 30 HV by 13% per Final ATR Memo.

Base System Network Assumptions

- Model begins just north of Hurbert Street and extends to just south of SE 62nd Street.
- Hurbert Street intersection added to model. Using volumes from previous modeling and balanced to calibrate with S. Beach model.
- Fall Street intersection added to model. Using volumes from previous modeling and balanced to calibrate with S. Beach model.
- US-101/Ferry Slip Road intersection is closed.
- US-101 at 32nd Street is a right-in/right-out intersection. This intersection is currently signalized, but the signal will be relocated to the 35th Street/US101 intersection.
- US-101 at 35th Street intersection is added and considered as signalized. The signal is being relocated from the 32nd Street/US 101 intersection. Signal assumed to function as actuated and coordinated. Intersection assumed with 4 approaches, each with separate left, right, and thru lanes.
- US-101 at 40th Street is assumed to be a signalized intersection with 4 approaches each with separate left, right, and thru lanes. Signal assumed to function as actuated and coordinated

- US-101 at 50th Street is assumed to be an unsignalized 'T' intersection with separate left, right, and thru lanes on each approach.
- The South Beach State Park access is modeled as it currently exists.
- SE 62nd Avenue intersection added to model with existing lane geometry.

Existing turn lane lengths are used except where at new intersections. New turn lanes lengths and tapers are based on the Oregon Highway Design Manual (OHDM) and summarized the table below.

	Left Turn Channelization		Right Turn Channelization	
Design Speed	Minimum Storage Length (ft)	Minimum Taper (14' lane)	Minimum Storage Length (ft)	Minimum Taper (12' lane)
25	120	100	155	100
35	130	110	175	110
45	215	135	215	135
55	320	160	320	160

Note: Taper lengths are rounded up to closest 5 feet. Per figures 9-6 and 9-7 of OHDM (2003).

The functional classification for US 101 from mp 136.25 to 146.5 is Urban Principal Arterial. The OHDM design standard assumed for US 101 is the ODOT 4R/New Urban Standards for Urban Fringe/Suburban Area. US 101 is assumed to remain the same as the existing cross section from Pacific Way north, and a three lane section south of 35th Street.

Speeds on US 101 segments designated as follows:

- Hubert to 40th =35 mph
- 40th to 50th = 45 mph
- 50th to 62nd = 55 mph

Modeling Assumptions

Synchro model previously developed including assumptions that may deviate from ODOT's current Analysis Procedures Manual (APM).

- Truck percentages were calculated from count data and applied to the approaches. Percentages for new intersections were developed by review adjacent intersection data.
- A PHF of 0.95 was used for US 101 approaches and 0.85 for minor street approaches.
- A saturation flow rate of 1750 pcphgl is used.
- ODOT provided signal timing for existing intersections was utilized and optimized. New signalized intersections were coded as actuated and uncoordinated. All intersection timing was optimized.

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TECHNICAL MEMORANDUM

Date:	July 31, 2009
To:	John DeTar, Derrick Tokos, Doug Norval, Dorothy Upton, Matt Spangler
From:	Shelley Oylear
Subject:	Task 9 -ATR Data Findings for 30 HV and Average Traffic Conditions-Final
Project Number:	274-2395-051-Ph 04
Project Name:	Newport TSP Update - Alternative Mobility Standards

Task 9 of the Newport TSP Update requires that traffic volume data and projections be evaluated for two time periods: the 30th highest hour of traffic (30 HV), and average weekday peak hour traffic. This memorandum attempts to identify when these time periods occur so that they can be used as a basis for further traffic analysis and the development of alternative mobility standards. Data from an ODOT Automatic Traffic Recorder (ATR) located to the north of Newport was reviewed to assist in identifying the days and times when these volumes occur. The following data summary and findings have been compiled for your review.

The 2007 ATR Trend Summary for ATR 21-009, located at on US 101 at the intersection of 25th Street north of most of the City of Newport, was consulted to assess existing traffic conditions. This data indicates that traffic volumes during the months of June through September range from 9 to 25 percent higher than the Annual Average Daily Traffic (AADT). June through September volumes represent a seasonal traffic condition, while the remaining months of October through May represents an off-season traffic condition. From here forward the traffic periods that will be used in developing alternative mobility standards will be referred to as Seasonal Traffic (June-September), and Off-Season Traffic (October-May). Data will also be summarized for Annual (January – December) traffic conditions. The 2007 ATR Trend summaries were used for this assessment as 2008 Trend summaries are not yet available.

To determine the day and time period that is represented by the 30 HV and the average peak hour, data from ATR 21-009 was provided by TPAU for 2008. This data included traffic volume counts by hour for a total of 342 days during that year.

The 30 HV for the Seasonal, Off-Season and Annual time periods are included in Table 1 below. The 50th highest hourly volume (50 HV) was added to the table as an additional reference point for unusual variations in the data. The full lists of data are included in the attached tables following this memorandum.

Table 1: 30 HV and 50 HV Summary

Period	Month	Day of Week	Hour	Total Volume
Annual-30 HV	July	Saturday	15	1994
Annual-50 HV	August	Sunday	14	1966
Seasonal 30 HV	August	Tuesday	16	1993
Seasonal 50 HV	August	Tuesday	19	1958
Off-Season 30 HV	March	Friday	16	1782
Off-Season 50 HV	May	Friday	17	1742

Note: Time based on a 24 hour clock.

Both the Seasonal and Off-Season 30 HV occur on a weekday at 16.00 hours or 4 pm, while the Annual 30 HV occurs on a weekend day during the mid-afternoon.

The 2007 ATR Trend summary data for the Newport ATR indicates that the Seasonal average as percent of ADT is 117 percent, while the Annual average is 100 percent of ADT. Therefore the Seasonal average is 1.17 times the Annual average or 17 percent higher. The Off-Season 30 HV is approximately 9 percent lower than the Annual and Seasonal 30 HV or 26% lower than the Seasonal average.

Because the occurrence of 30 HV and 50 HV as individual hours does not allow the ready identification of a specific time period to be used for transportation analysis, consideration was give to the aggregated top 30 and top 50 highest hourly volumes. The data is summarized in Table 2 which illustrates the number and percentages of times when the aggregated top 30 and 50 HVs occur on a weekday (Monday thru Thursday) versus a weekend (Friday thru Sunday) day.

Table 2: Day of Week Occurrences –Includes Top 30 HV and 50 HV

Time Period	Weekday Peak Hour Occurrences	Weekday Peak Hour Occurrences as Percent of Total	Weekend (Fri-Sun) Peak Hour Occurrences	Weekend (Fri-Sun) Peak Hour Occurrences as Percent of Total
Annual-1st thru 30th HV	6	20%	24	80%
Annual-1st thru 50th HV	20	40%	30	60%
Seasonal 1st thru 30th HV	8	26%	22	74%
Seasonal 1st thru 50th HV	22	44%	28	56%
Off-Season 1st thru 30th HV	11	36%	19	64%
Off-Season 1st thru 50th HV	11	22%	39	78%

Note: Includes all time hours during a typical day. Annual period excludes nationally observed holidays that fall on Monday thru Friday and if it occurs on a Friday, then also excludes the preceding Thursday.

For all the time periods, the peak hour commonly occurred on a weekend day.

Table 3 summarizes occurrences of the top 30 HVs over the course of the year by hour of the day and weekday versus weekend day.

Table 3: Peak Hour Occurrences for Annual Period-Includes Top 30 HV

	Weekday (Mon-Thur)		Weekend (Fri- Sun)	
Hour	Number of Occurrences	Occurrences as Percent of Total	Number of Occurrences	Occurrences as Percent of Total
14	2	7%	2	7%
15	1	3%	6	20%
16	0	0%	4	13%
17	0	0%	6	20%
18	3	10%	5	17%
19	0	0%	1	3%
Total	6	20%	24	80%

Note: Time based on a 24 hour clock. 16 and 17 represent the two hour PM peak period. Annual period excludes nationally observed holidays that fall on Mon-Fri and if it occurs on a Friday, then also excludes the preceding Thursday.

Table 4 summarizes occurrences of the top 30 HVs during the period from June to September by hour of the day and weekday versus weekend day.

Table 4: Peak Hour Occurrences for Seasonal Period-Includes Top 30 HV

Hour	Weekday (Mon-Thur)		Weekend (Fri- Sun)	
	Number of Occurrences	Occurrences as Percent of Total	Number of Occurrences	Occurrences as Percent of Total
14	2	7%	2	7%
15	1	3%	5	17%
16	**1**	**3%**	**3**	**10%**
17	**0**	**0%**	**6**	**20%**
18	4	13%	5	17%
19	0	0%	1	3%
Total	8	26%	22	74%

Note: Time based on a 24 hour clock. 16 and 17 represent the two hour PM peak period.

Table 5 summarizes occurrences of the top 30 HVs during the period from October to May by hour of the day and weekday versus weekend day.

Table 5: Peak Hour Occurrences for Off-Season Period-Includes Top 30 HV

Hour	Weekday (Mon-Thur)		Weekend (Fri- Sun)	
	Number of Occurrences	Occurrences as Percent of Total	Number of Occurrences	Occurrences as Percent of Total
14	1	3%	3	10%
15	3	10%	5	17%
16	**1**	**3%**	**6**	**20%**
17	**2**	**7%**	**3**	**10%**
18	4	13%	2	7%
19	0	0%	0	0%
Total	11	36%	19	64%

Note: Time based on a 24 hour clock. 16 and 17 represent the two hour PM peak period.

Conclusions:

1. Review of the top 30 highest hourly volumes at ATR 21-009 in 2008 indicates that there are many instances when high volumes occur both on weekdays and on weekends. Table 1 under Annual 30 HV identifies Saturday at 3 PM as the 30th HV; however the volumes during this time period are very close to the 30th HV volumes for the Seasonal period which occur on a weekday in the pm peak. Thus, consistent with this data, and with the prior TSP traffic analysis that focused on a weekday PM peak, it was determined that the 30th highest hourly volume (30 HV) will represent a summertime weekday PM peak hour (typically occurring between 5 and 6 PM).

2. Based on the ATR summary data the Seasonal period volumes are 17 percent higher than the Annual volumes. We propose that the Annual Average Peak Hour volume be determined by reducing the Seasonal volumes by 13 percent.

APPENDIX B

Yaquina Bay Bridge Capacity Calculation

2000 HCM Chapter 20 Rolling Terrain Methodology

Variables		
PHF=	0.95	
fg=	0.99	Exhibit 20-7
Equation 20-4		
Pt	0.04	
Et	1.5	
Pr	0	
Er	0	
fhv=1/(1+Pt(Et-1) +Pr(Er-1)		
fhv=	0.98	
Capacity=1700*PHF*fg*fhv		
Capacity =	1568	v/h

1994 HCM Chapter 8 Rolling Terrain Methodology

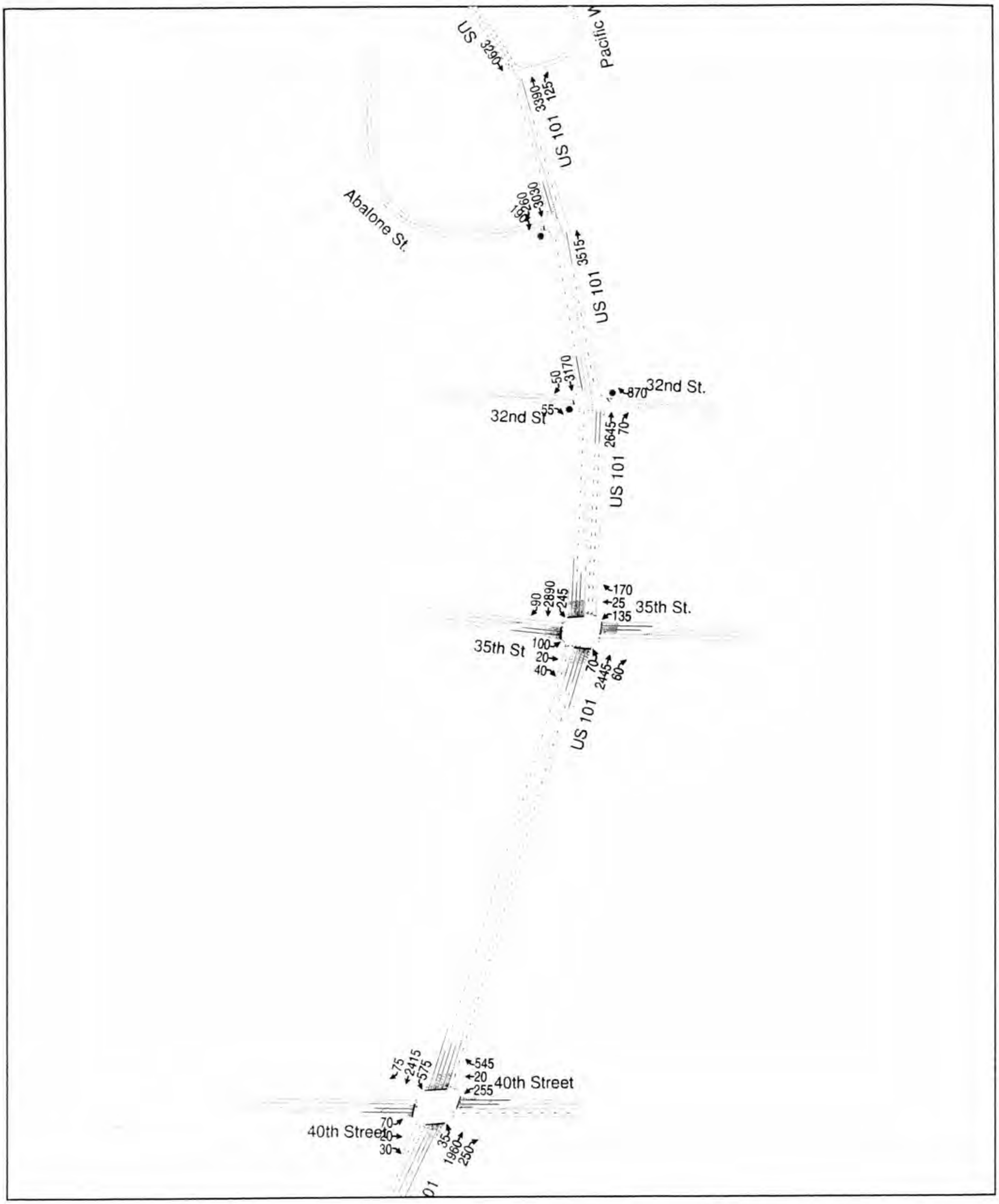
Variables		
PHF=	0.95	
fg=	0.99	Equation 8-4
fw=	0.88	Table 8-5
Equation 8-1 Modified		
Pt	0.04	
Et (1)	3.25	
Pr	0	
Er	0	
fhv=1/(1+Pt(Et-1) +Pr(Er-1)		
fhv=	0.92	
fg=1/(1+(PpIp))		
Ip=0.02(E-Eo)		
E	1.3	Table 8-9
Eo	2	
Ip	0.014	
fg	0.99	
Capacity=1700*PHF*fg*fhv*Fw		
Capacity =	1287	v/h

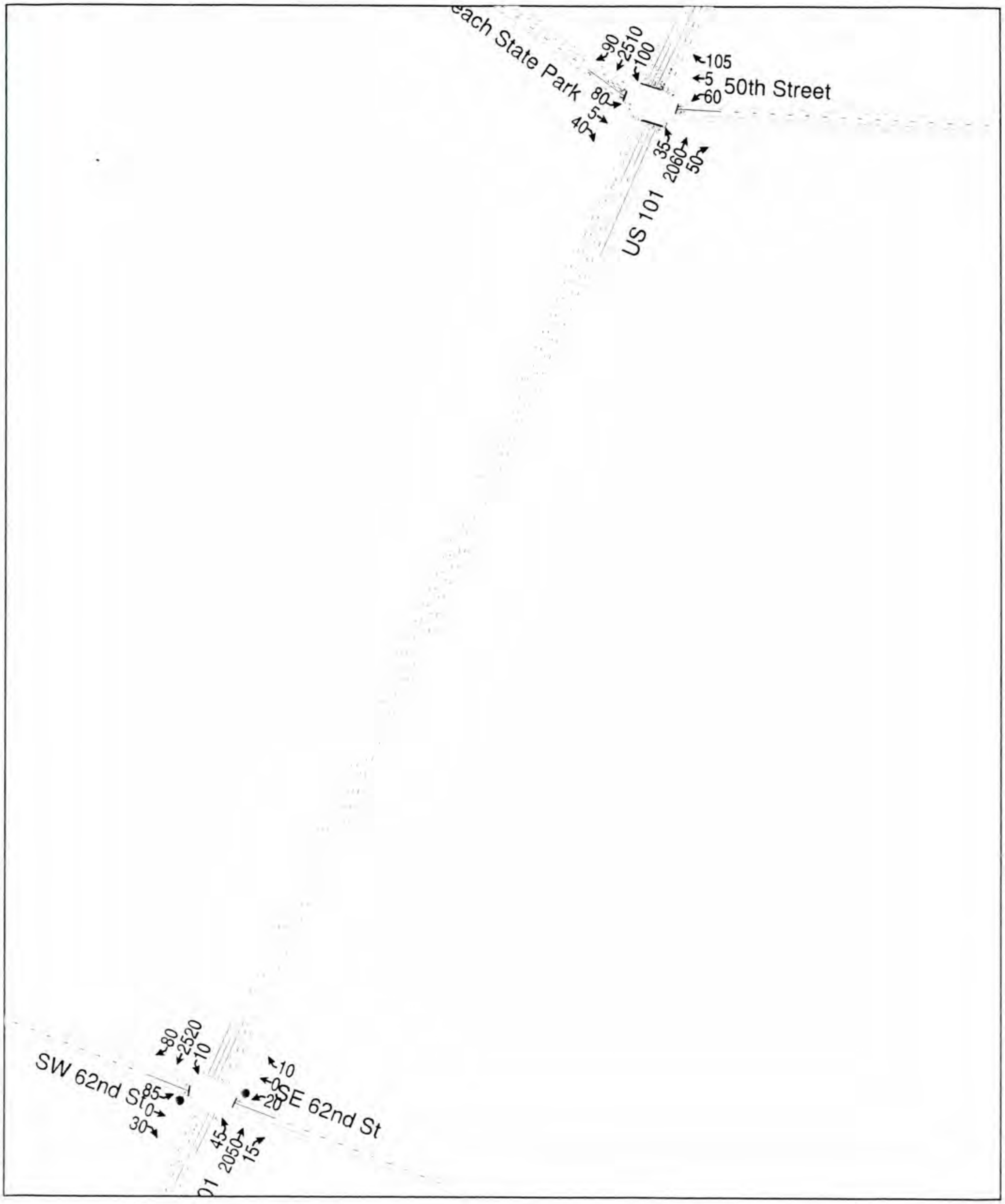
(1) Average of 1994 and 2000 HCM methods

APPENDIX C

2030 Traffic Volumes and Traffic Operations Analysis for 30 HV Conditions and Land Use Scenario #1

2030 Scenario 1-30 HV




each State Park
50th Street
US 101
90
2510
100
105
5
60
80
5
40
35
2060
50
SW 62nd St
SE 62nd St
80
2520
10
10
0
20
85
0
30
45
2050
15

Preliminary Signal Warrant Calculation					
Project:	Newport Alternate Mobility Standard				
Year:	2030				
Alternative	Scenario 1 & Scenario 2				
Percentage of Standard:	70%				

Intersection:	62nd / US 101 – Scen 1 30 HV				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	47500	Yes
	Minor	1	1850	850	NO
Case B	Major	2	11100	47500	Yes
	Minor	1	950	850	NO

Intersection:	62nd / US 101 – Scen 1 AAvg				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	39400	Yes
	Minor	1	1850	700	NO
Case B	Major	2	11100	39400	Yes
	Minor	1	950	700	No

Intersection:	62nd / US 101 – Scen 1 Off-Season				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	35200	Yes
	Minor	1	[illegible]	650	NO
Case B	Major	2	11100	35,200	Yes
	Minor	1	950	650	NO

Intersection:	62nd / US 101 – Scen 2 30 HV				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	45750	Yes
	Minor	1	1850	1850	NO
Case B	Major	2	11100	45750	Yes
	Minor	1	950	850	NO

Intersection:	62nd / US 101 – Scen 2 AAvg				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	38000	Yes
	Minor	1	1850	700	No
Case B	Major	2	11100	38000	Yes
	Minor	1	950	700	NO

Intersection:	62nd / US 101 – Scen 2 Off-Season				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	33900	Yes
	Minor	1	1850	650	No
Case B	Major	2	11100	33900	Yes
	Minor	1	950	650	NO

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	100	20	40	135	25	170	70	2445	60	245	2890	90
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1748	1733	1449	1714	1699	1421	1722	3228	1405	1722	3228	1405
Flt Permitted	0.74	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1359	1733	1449	1338	1699	1421	1722	3228	1405	1722	3228	1405
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	118	24	47	159	29	200	74	2574	63	258	3042	95
RTOR Reduction (vph)	0	0	35	0	0	142	0	0	10	0	0	12
Lane Group Flow (vph)	118	24	12	159	29	58	74	2574	53	258	3042	83
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	18.7	18.7	18.7	18.7	18.7	18.7	4.0	93.0	93.0	15.3	104.3	104.3
Effective Green, g (s)	18.2	18.2	18.2	18.2	18.2	18.2	4.5	93.5	93.5	15.8	104.8	105.3
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.03	0.67	0.67	0.11	0.75	0.75
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	177	225	188	174	221	185	55	2156	938	194	2416	1057
v/s Ratio Prot		0.01			0.02		0.04	c0.80		0.15	c0.94	
v/s Ratio Perm	0.09		0.01	c0.12		0.04			0.04			0.06
v/c Ratio	0.67	0.11	0.06	0.91	0.13	0.31	1.35	1.19	0.06	1.33	1.26	0.08
Uniform Delay, d1	58.0	53.7	53.4	60.1	53.9	55.2	67.8	23.3	8.0	62.1	17.6	4.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.19	0.14	1.00	1.00	1.00
Incremental Delay, d2	10.0	0.3	0.2	44.6	0.4	1.3	166.2	87.7	0.0	179.4	120.1	0.1
Delay (s)	68.0	54.0	53.6	104.7	54.3	56.6	214.3	92.1	1.1	241.5	137.7	4.7
Level of Service	E	D	D	F	D	E	F	F	A	F	F	A
Approach Delay (s)		62.7			76.1			93.4			141.9	
Approach LOS		E			E			F			F	

Intersection Summary			
HCM Average Control Delay	116.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	116.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	70	20	30	255	20	545	35	1960	250	575	2415	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1713	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.74	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1357	1716	1458	1337	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	82	24	35	300	24	641	37	2063	263	605	2542	79
RTOR Reduction (vph)	0	0	26	0	0	176	0	0	61	0	0	12
Lane Group Flow (vph)	82	24	9	300	24	465	37	2063	202	605	2542	67
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	35.0	35.0	35.0	34.5	34.5	34.5	3.2	72.7	72.7	19.8	89.3	89.3
Effective Green, g (s)	35.0	35.0	35.0	34.0	34.0	34.0	3.7	73.2	73.2	20.3	89.8	89.8
Actuated g/C Ratio	0.25	0.25	0.25	0.24	0.24	0.24	0.03	0.52	0.52	0.15	0.64	0.64
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	339	429	365	325	417	345	46	1688	743	484	2071	935
v/s Ratio Prot		0.01			0.01		0.02	c0.64		0.18	c0.79	
v/s Ratio Perm	0.06		0.01	0.22		c0.33			0.14			0.05
v/c Ratio	0.24	0.06	0.02	0.92	0.06	1.35	0.80	1.22	0.27	1.25	1.23	0.07
Uniform Delay, d1	41.9	39.9	39.6	51.7	40.7	53.0	67.8	33.4	18.6	59.8	25.1	9.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.65	0.31	0.88	0.72	0.97
Incremental Delay, d2	0.4	0.1	0.0	31.1	0.1	174.1	32.1	102.3	0.4	114.1	102.8	0.0
Delay (s)	42.3	40.0	39.6	82.8	40.8	227.1	109.0	124.1	6.1	167.0	120.7	9.1
Level of Service	D	D	D	F	D	F	F	F	A	F	F	A
Approach Delay (s)		41.2			177.6			110.7			126.7	
Approach LOS		D			F			F			F	

Intersection Summary			
HCM Average Control Delay	126.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	110.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	80	5	40	60	5	105	35	2060	50	100	2510	90
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1608	1452		1630	1470		1614	3228	1458	1630	3228	1403
Flt Permitted	0.44	1.00		0.72	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	750	1452		1239	1470		1614	3228	1458	1630	3228	1403
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.85	0.85	0.95	0.95
Adj. Flow (vph)	94	6	47	71	6	124	37	2168	59	118	2642	95
RTOR Reduction (vph)	0	42	0	0	110	0	0	0	16	0	0	12
Lane Group Flow (vph)	94	11	0	71	20	0	37	2168	43	118	2642	83
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	16.0	16.0		16.0	16.0		3.2	101.0	101.0	11.0	108.8	108.8
Effective Green, g (s)	16.5	16.0		16.0	16.0		3.7	101.5	101.0	11.0	109.3	109.3
Actuated g/C Ratio	0.12	0.11		0.11	0.11		0.03	0.72	0.72	0.08	0.78	0.78
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	88	166		142	168		43	2340	1052	128	2520	1095
v/s Ratio Prot		0.01			0.01		0.02	c0.67		0.07	c0.82	
v/s Ratio Perm	c0.13			0.06					0.03			0.06
v/c Ratio	1.07	0.07		0.50	0.12		0.86	0.93	0.04	0.92	1.05	0.08
Uniform Delay, d1	61.8	55.3		58.2	55.7		67.9	16.1	5.6	64.1	15.4	3.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.27	0.33	0.06
Incremental Delay, d2	115.7	0.2		2.8	0.3		85.1	7.8	0.1	10.1	23.1	0.0
Delay (s)	177.4	55.5		61.0	56.0		153.0	24.0	5.7	91.5	28.2	0.2
Level of Service	F	E		E	E		F	C	A	F	C	A
Approach Delay (s)		133.5			57.8			25.6			29.9	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM Average Control Delay	31.9	HCM Level of Service	C
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	100.3%	**ICU Level of Service**	G
Analysis Period (min)	15		
c **Critical Lane Group**			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	3390	125	0	3290
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	3568	132	0	3463
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	7036	3572			3702	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	7036	3572			3702	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	7			59	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	3568	132	3463
Volume Left	0	0	0
Volume Right	0	132	0
cSH	1700	1700	1700
Volume to Capacity	2.10	0.08	2.04
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	204.4%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	190	0	3515	3030	260
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	224	0	3700	3189	274
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.36					
vC, conflicting volume	5043	3193	3465			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	8646	3193	3465			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	7	71			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	224	1850	1850	3189	274
Volume Left	0	0	0	0	0
Volume Right	224	0	0	0	274
cSH	7	1700	1700	1700	1700
Volume to Capacity	31.96	1.09	1.09	1.88	0.16
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	302.6		
Intersection Capacity Utilization	192.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	55	0	0	870	0	2645	70	0	3170	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	65	0	0	1024	0	2784	74	0	3337	53
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.35	0.35		0.35	0.35	0.35				0.35		
vC, conflicting volume	5783	6225	1699	4521	6178	1396	3391			2860		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	10959	12224	1699	7351	12089	0	3391			2599		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	21	100	100	0	100			100		
cM capacity (veh/h)	0	0	82	0	0	378	77			56		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	65	1024	1392	1392	74	2225	1165
Volume Left	0	0	0	0	0	0	0
Volume Right	65	1024	0	0	74	0	53
cSH	82	378	1700	1700	1700	1700	1700
Volume to Capacity	0.79	2.71	0.82	0.82	0.04	1.31	0.69
Queue Length 95th (ft)	99	2130	0	0	0	0	0
Control Delay (s)	135.7	798.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F					
Approach Delay (s)	135.7	798.3	0.0			0.0	
Approach LOS	F	F					

Intersection Summary			
Average Delay	112.6		
Intersection Capacity Utilization	144.8%	ICU Level of Service	H
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: SW 62nd St & US 101

2030 Scenario 1-30 HV

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑↱		↰	↑↑	↱
Volume (veh/h)	85	0	30	20	0	10	45	2050	15	10	2520	80
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	100	0	35	24	0	12	47	2158	16	11	2653	84
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3863	4946	1330	3647	5022	1091	2739			2176		
vC1, stage 1 conf vol	2676	2676		2263	2263							
vC2, stage 2 conf vol	1187	2270		1385	2760							
vCu, unblocked vol	3863	4946	1330	3647	5022	1091	2739			2176		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	76	3	100	94	66			96		
cM capacity (veh/h)	21	27	146	24	0	211	141			238		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	100	35	24	12	47	1439	735	11	1326	1326	84
Volume Left	100	0	24	0	47	0	0	11	0	0	0
Volume Right	0	35	0	12	0	0	16	0	0	0	84
cSH	21	146	24	211	141	1700	1700	238	1700	1700	1700
Volume to Capacity	4.86	0.24	0.97	0.06	0.34	0.85	0.43	0.04	0.78	0.78	0.05
Queue Length 95th (ft)	Err	23	73	4	34	0	0	3	0	0	0
Control Delay (s)	Err	37.4	401.2	23.1	42.8	0.0	0.0	20.9	0.0	0.0	0.0
Lane LOS	F	E	F	C	E			C			
Approach Delay (s)	7400.3		275.2		0.9			0.1			
Approach LOS	F		F								

Intersection Summary			
Average Delay	197.2		
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

2030 US 101 Segment V/C Analysis

Volumes

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3515	3225	2960	2700	2640	2400
35th to 50th	2245	3065	1870	2565	1665	2285
50th to 62nd	2145	2610	1790	2185	1590	1950

V/C

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.70	2.48	2.28	2.08	2.03	1.85
35th to 50th	0.64	0.88	0.53	0.73	0.48	0.65
50th to 62nd	0.61	0.75	0.51	0.62	0.45	0.56

Volumes

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3355	3125	2830	2615	2525	2330
35th to 50th	2125	2965	1770	2480	1585	2215
50th to 62nd	2035	2540	1700	2135	1515	1900

V/C

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.58	2.40	2.18	2.01	1.94	1.79
35th to 50th	0.61	0.85	0.51	0.71	0.45	0.63
50th to 62nd	0.58	0.73	0.49	0.61	0.43	0.54

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	118	24	47	159	29	200	74	2574	63	258	3042	95
v/c Ratio	0.61	0.10	0.19	0.83	0.12	0.59	1.14	1.25	0.07	1.30	1.32	0.09
Control Delay	61.6	44.8	14.4	82.2	45.2	19.4	119.1	125.3	0.8	180.7	162.4	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.6	44.8	14.4	82.2	45.2	19.4	119.1	125.3	0.8	180.7	162.4	4.3
Queue Length 50th (ft)	86	16	0	120	20	27	~68	~1307	2	~278	~1615	14
Queue Length 95th (ft)	141	40	32	#208	46	89	m48	m#191	m1	m123	m273	m6
Internal Link Dist (ft)		441			300			1419			620	
Turn Bay Length (ft)	120		155	120		155	130		175	130		175
Base Capacity (vph)	210	267	263	207	262	354	65	2058	908	198	2309	1025
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.09	0.18	0.77	0.11	0.56	1.14	1.25	0.07	1.30	1.32	0.09

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	82	24	35	300	24	641	37	2063	263	605	2542	79
v/c Ratio	0.23	0.05	0.08	0.87	0.05	1.17	0.57	1.28	0.34	1.32	1.28	0.09
Control Delay	36.4	33.2	11.1	67.7	34.0	122.1	77.9	149.2	3.1	183.1	150.2	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.4	33.2	11.1	67.7	34.0	122.1	77.9	149.2	3.1	183.1	150.2	7.7
Queue Length 50th (ft)	50	14	0	223	14	~447	28	~1060	11	~311	~1331	13
Queue Length 95th (ft)	88	34	23	#347	35	#608	m32	m#1153	m13	m#203	m#731	m9
Internal Link Dist (ft)		558			358			3870			1419	
Turn Bay Length (ft)	120		155	120		155	215		215	130		175
Base Capacity (vph)	362	458	414	346	443	546	65	1614	780	459	1980	908
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.05	0.08	0.87	0.05	1.17	0.57	1.28	0.34	1.32	1.28	0.09

Intersection Summary

~ **Volume exceeds capacity, queue is theoretically infinite.**
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m **Volume for 95th percentile queue is metered by upstream signal.**

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	94	53	71	130	37	2168	59	118	2642	95
v/c Ratio	0.87	0.22	0.42	0.49	0.61	0.95	0.05	0.89	1.08	0.09
Control Delay	108.2	17.9	56.2	27.8	95.1	27.9	1.6	57.8	45.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	108.2	17.9	56.2	27.8	95.1	27.9	1.6	57.8	45.7	0.1
Queue Length 50th (ft)	72	4	51	37	29	737	0	95	~1254	0
Queue Length 95th (ft)	#156	38	94	91	#85	#1023	11	m79	m88	m0
Internal Link Dist (ft)		573		801		2367			3870	
Turn Bay Length (ft)					150		320	215		150
Base Capacity (vph)	115	251	179	280	61	2272	1125	133	2450	1080
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.21	0.40	0.46	0.61	0.95	0.05	0.89	1.08	0.09

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
50th Street	II	55	44.9	27.9	72.8	0.69	33.9	B
40th Street	II	45	59.8	149.2	209.0	0.75	12.9	F
35th St.	II	35	31.2	125.3	156.5	0.28	6.5	F
Hurbert St	II	31	200.2	794.3	994.5	1.73	6.2	F
Total	II		336.1	1096.7	1432.8	3.44	8.7	F

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	769.8	791.7	0.16	0.7	F
35th St	III	31	200.2	162.4	362.6	1.73	17.1	D
40th Street	III	35	34.1	150.2	184.3	0.28	5.5	F
South Beach State Pa	III	55	49.0	45.7	94.7	0.75	28.4	B
Total	III		305.2	1128.1	1433.3	2.92	7.3	F

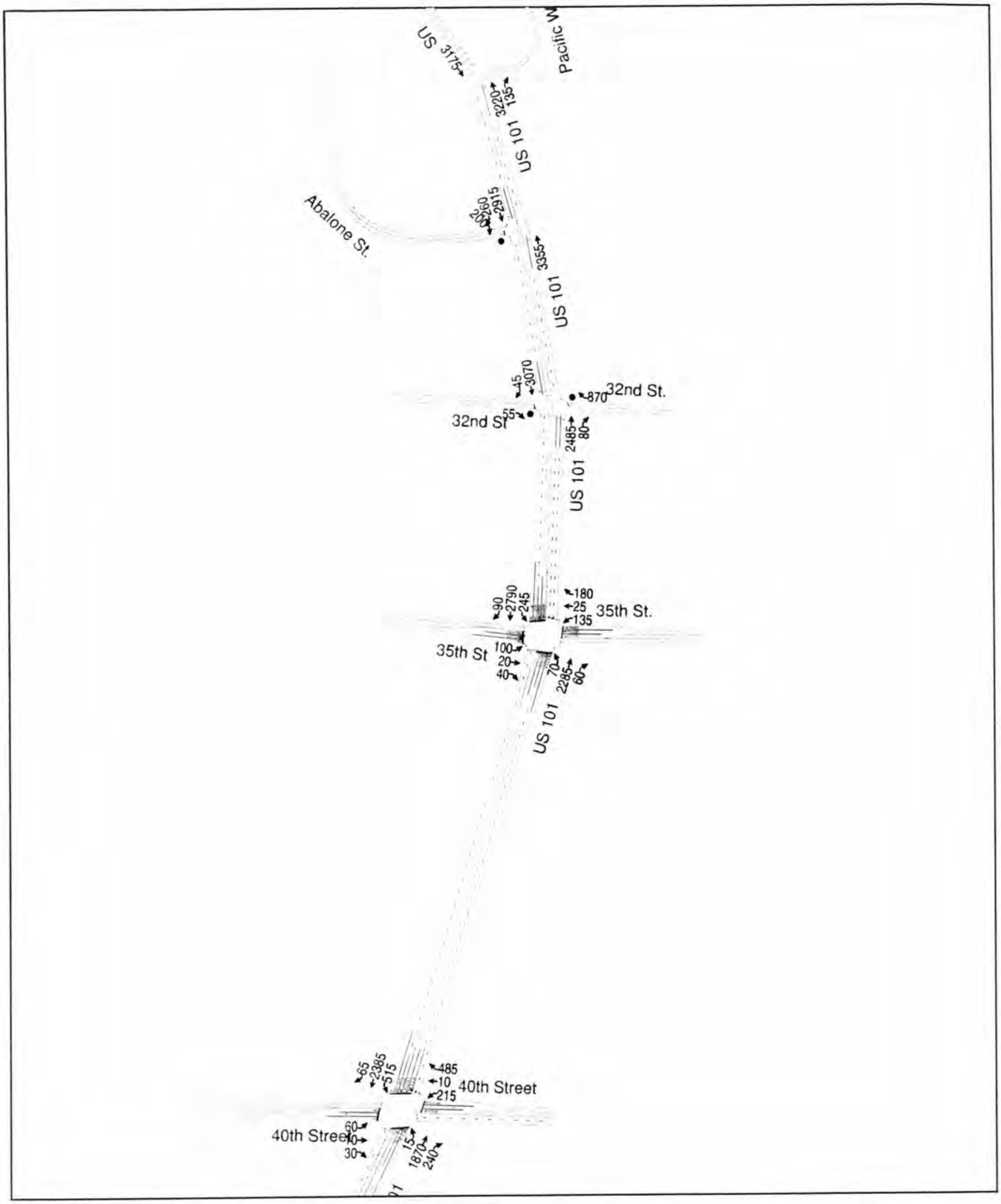
US 101

Direction	NB	SB	All
Average Speed (mph)	8	8	8
Total Travel Time (hr)	**1228**	**1311**	**2540**
Distance Traveled (mi)	9663	10318	19981
Unserved Vehicles (#)	**3069**	**3682**	**6751**
Performance Index	1018.4	1068.0	2086.5

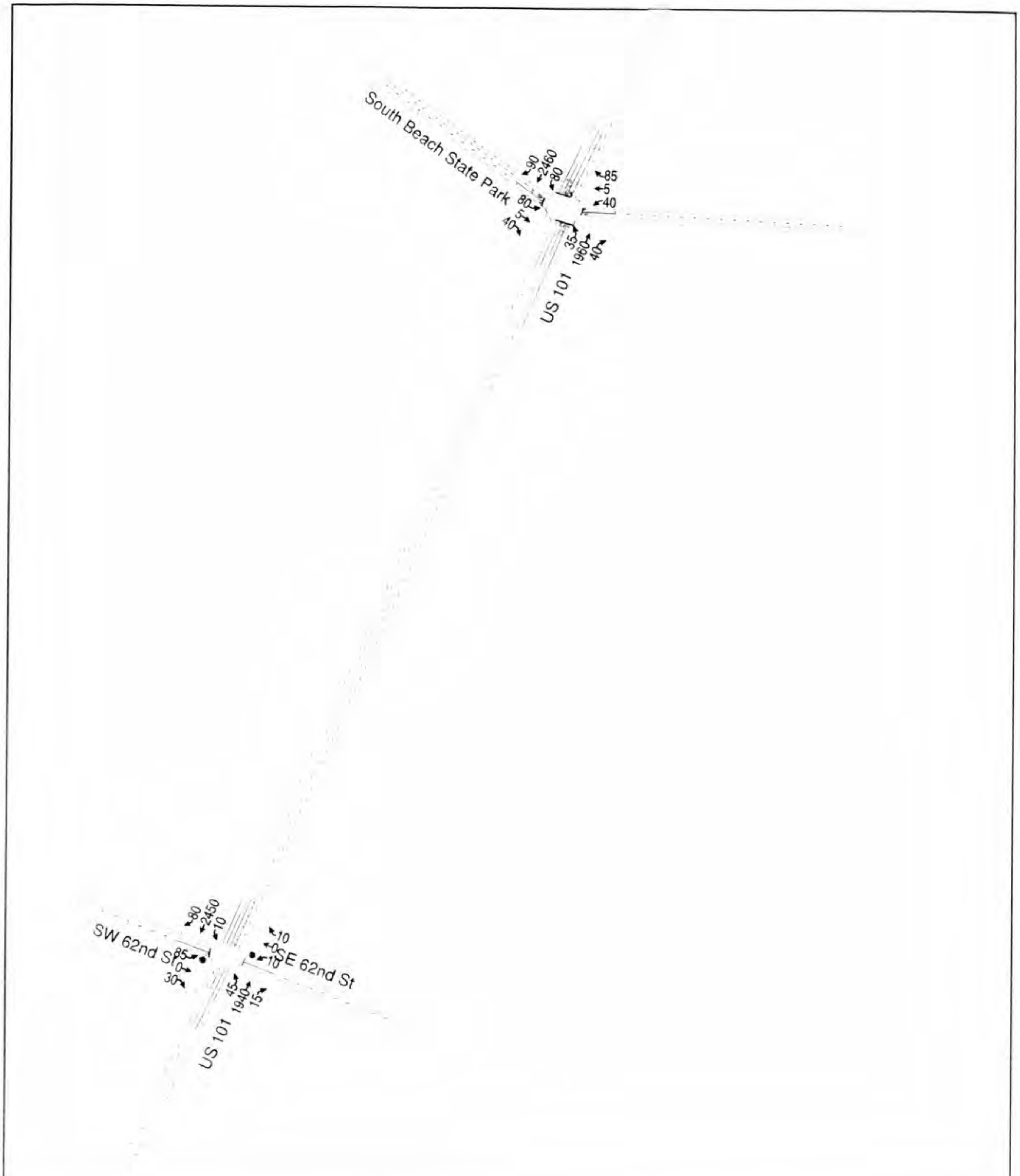
APPENDIX D

2030 Volumes and Traffic Operations Analysis for 30 HV Conditions and Land Use Scenario #2

2030 Scenario2-30 HV



2030 Scenario2-30 HV



Preliminary Signal Warrant Calculation					
Project:	Newport Alternate Mobility Standard				
Year:	2030				
Alternative	Scenario 1 & Scenario 2				
Percentage of Standard:	70%				

Intersection:	62nd / US 101 – Scen 1 30 HV				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	47500	Yes
	Minor	1	1850	850	No
Case B	Major	2	1100	47500	Yes
	Minor	1	950	850	NO

Intersection:	62nd / US 101 – Scen 1 AAvg				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	39400	Yes
	Minor	1	1850	700	NO
Case B	Major	2	11,100	39400	Yes
	Minor	1	950	700	No

Intersection:	62nd / US 101 – Scen 1 Off-Season				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	35000	Yes
	Minor	1	[illegible]	650	NO
Case B	Major	2	[illegible]	35,200	Yes
	Minor	1	950	650	NO

Intersection:	62nd / US 101 – Scen 2 30 HV				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	45750	Yes
	Minor	1	1850	1050	No
Case B	Major	2	11100	45750	Yes
	Minor	1	950	850	No

Intersection:	62nd / US 101 – Scen 2 AAvg				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	38000	Yes
	Minor	1	1850	700	No
Case B	Major	2	11100	38000	Yes
	Minor	1	950	700	No

Intersection:	62nd / US 101 – Scen 2 Off-Season				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	33900	Yes
	Minor	1	1850	550	No
Case B	Major	2	11100	33900	Yes
	Minor	1	950	650	No

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	100	20	40	135	25	180	70	2285	60	245	2790	90
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1748	1733	1448	1714	1699	1420	1722	3228	1404	1722	3228	1404
Flt Permitted	0.74	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1358	1733	1448	1338	1699	1420	1722	3228	1404	1722	3228	1404
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	118	24	47	159	29	212	74	2405	63	258	2937	95
RTOR Reduction (vph)	0	0	34	0	0	157	0	0	10	0	0	12
Lane Group Flow (vph)	118	24	13	159	29	55	74	2405	53	258	2937	83
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	19.0	19.0	19.0	19.0	19.0	19.0	4.0	100.0	100.0	18.0	114.0	114.0
Effective Green, g (s)	18.5	18.5	18.5	18.5	18.5	18.5	4.5	100.5	100.5	18.5	114.5	115.0
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.03	0.67	0.67	0.12	0.76	0.77
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	167	214	179	165	210	175	52	2163	941	212	2464	1076
v/s Ratio Prot		0.01			0.02		0.04	c0.75		0.15	c0.91	
v/s Ratio Perm	0.09		0.01	c0.12		0.04			0.04			0.06
v/c Ratio	0.71	0.11	0.07	0.96	0.14	0.31	1.42	1.11	0.06	1.22	1.19	0.08
Uniform Delay, d1	63.1	58.4	58.2	65.4	58.6	60.0	72.8	24.8	8.5	65.8	17.8	4.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.73	0.23	0.15	1.00	1.00	1.00
Incremental Delay, d2	13.6	0.3	0.2	59.1	0.4	1.4	200.3	51.1	0.0	132.7	90.7	0.1
Delay (s)	76.8	58.8	58.4	124.6	59.1	61.4	253.5	56.7	1.3	198.4	108.5	4.5
Level of Service	E	E	E	F	E	E	F	E	A	F	F	A
Approach Delay (s)		69.9			86.3			61.1			112.5	
Approach LOS		E			F			E			F	

Intersection Summary			
HCM Average Control Delay	89.3	**HCM Level of Service**	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	150.0	**Sum of lost time (s)**	9.0
Intersection Capacity Utilization	113.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	60	10	30	215	10	485	15	1870	240	515	2385	65
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1712	1716	1420	1739	3228	1420	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1372	1716	1458	1351	1716	1420	1739	3228	1420	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	12	35	253	12	571	16	1968	253	542	2511	68
RTOR Reduction (vph)	0	0	27	0	0	173	0	0	58	0	0	9
Lane Group Flow (vph)	71	12	8	253	12	398	16	1968	195	542	2511	59
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	33.0	33.0	33.0	32.5	32.5	32.5	1.6	82.1	82.1	22.4	102.9	102.9
Effective Green, g (s)	33.0	33.0	33.0	32.0	32.0	32.0	2.1	82.6	82.6	22.9	103.4	103.4
Actuated g/C Ratio	0.22	0.22	0.22	0.21	0.21	0.21	0.01	0.55	0.55	0.15	0.69	0.69
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	302	378	321	288	366	303	24	1778	782	510	2225	1005
v/s Ratio Prot		0.01			0.01		0.01	c0.61		0.16	c0.78	
v/s Ratio Perm	0.05		0.01	0.19		c0.28			0.14			0.04
v/c Ratio	0.24	0.03	0.02	0.88	0.03	1.31	0.67	1.11	0.25	1.06	1.13	0.06
Uniform Delay, d1	48.1	46.0	45.9	57.1	46.7	59.0	73.6	33.7	17.5	63.6	23.3	7.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.10	0.68	0.36	0.88	0.65	0.97
Incremental Delay, d2	0.4	0.0	0.0	25.3	0.1	162.6	29.8	52.9	0.4	32.9	58.5	0.0
Delay (s)	48.5	46.0	45.9	82.4	46.8	221.6	110.9	75.8	6.6	88.8	73.6	7.3
Level of Service	D	D	D	F	D	F	F	E	A	F	E	A
Approach Delay (s)		47.5			177.0			68.3			74.8	
Approach LOS		D			F			E			E	

Intersection Summary			
HCM Average Control Delay	85.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	105.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	80	5	40	40	5	85	35	1960	40	80	2460	90
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1607	1452		1630	1473		1614	3228	1458	1630	3228	1402
Flt Permitted	0.52	1.00		0.72	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	881	1452		1237	1473		1614	3228	1458	1630	3228	1402
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.85	0.85	0.95	0.95
Adj. Flow (vph)	94	6	47	47	6	100	37	2063	47	94	2589	95
RTOR Reduction (vph)	0	42	0	0	89	0	0	0	13	0	0	12
Lane Group Flow (vph)	94	11	0	47	17	0	37	2063	34	94	2589	83
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	17.2	17.2		17.2	17.2		3.2	109.4	109.4	11.4	117.6	117.6
Effective Green, g (s)	17.7	17.2		17.2	17.2		3.7	109.9	109.4	11.4	118.1	118.1
Actuated g/C Ratio	0.12	0.11		0.11	0.11		0.02	0.73	0.73	0.08	0.79	0.79
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	104	166		142	169		40	2365	1063	124	2542	1104
v/s Ratio Prot		0.01			0.01		0.02	c0.64		0.06	c0.80	
v/s Ratio Perm	c0.11			0.04					0.02			0.06
v/c Ratio	0.90	0.07		0.33	0.10		0.92	0.87	0.03	0.76	1.02	0.08
Uniform Delay, d1	65.3	59.3		61.1	59.5		73.0	14.9	5.6	67.9	16.0	3.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.21	0.41	0.05
Incremental Delay, d2	58.2	0.2		1.4	0.3		112.0	4.8	0.1	2.4	11.0	0.0
Delay (s)	123.6	59.4		62.5	59.8		185.0	19.7	5.7	84.7	17.5	0.2
Level of Service	F	E		E	E		F	B	A	F	B	A
Approach Delay (s)		100.4			60.6			22.2			19.2	
Approach LOS		F			E			C			B	

Intersection Summary

HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	3220	135	0	3175
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	3389	142	0	3342
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	6736	3393			3534	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	6736	3393			3534	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	10			69	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	3389	142	3342
Volume Left	0	0	0
Volume Right	0	142	0
cSH	1700	1700	1700
Volume to Capacity	1.99	0.08	1.97
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	194.6%	**ICU Level of Service**	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	200	0	3355	2915	260
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	235	0	3532	3068	274
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.36					
vC, conflicting volume	4838	3072	3344			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	8137	3072	3344			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	9	80			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	235	1766	1766	3068	274
Volume Left	0	0	0	0	0
Volume Right	235	0	0	0	274
cSH	9	1700	1700	1700	1700
Volume to Capacity	27.49	1.04	1.04	1.80	0.16
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	330.9		
Intersection Capacity Utilization	186.9%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	55	0	0	870	0	2485	80	0	3070	45
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	65	0	0	1024	0	2616	84	0	3232	47
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.35	0.35		0.35	0.35	0.35				0.35		
vC, conflicting volume	5591	5959	1643	4300	5899	1312	3281			2702		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	10481	11545	1643	6755	11370	0	3281			2140		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	27	100	100	0	100			100		
cM capacity (veh/h)	0	0	89	0	0	374	85			85		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	65	1024	1308	1308	84	2154	1125
Volume Left	0	0	0	0	0	0	0
Volume Right	65	1024	0	0	84	0	47
cSH	89	374	1700	1700	1700	1700	1700
Volume to Capacity	0.73	2.73	0.77	0.77	0.05	1.27	0.66
Queue Length 95th (ft)	91	2141	0	0	0	0	0
Control Delay (s)	113.8	810.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F					
Approach Delay (s)	113.8	810.1	0.0			0.0	
Approach LOS	F	F					

Intersection Summary			
Average Delay	118.4		
Intersection Capacity Utilization	140.0%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	85	0	30	10	0	10	45	1940	15	10	2450	80
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	100	0	35	12	0	12	47	2042	16	11	2579	84
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3732	4757	1293	3495	4833	1033	2665			2060		
vC1, stage 1 conf vol	2602	2602		2147	2147							
vC2, stage 2 conf vol	1130	2155		1348	2686							
vCu, unblocked vol	3732	4757	1293	3495	4833	1033	2665			2060		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	77	60	100	95	69			96		
cM capacity (veh/h)	23	32	154	29	1	231	151			264		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	100	35	12	12	47	1361	696	11	1289	1289	84
Volume Left	100	0	12	0	47	0	0	11	0	0	0
Volume Right	0	35	0	12	0	0	16	0	0	0	84
cSH	23	154	29	231	151	1700	1700	264	1700	1700	1700
Volume to Capacity	4.32	0.23	0.40	0.05	0.31	0.80	0.41	0.04	0.76	0.76	0.05
Queue Length 95th (ft)	Err	21	32	4	31	0	0	3	0	0	0
Control Delay (s)	Err	35.1	193.7	21.5	39.3	0.0	0.0	19.2	0.0	0.0	0.0
Lane LOS	F	E	F	C	E			C			
Approach Delay (s)	7399.7		107.6		0.9			0.1			
Approach LOS	F		F								

Intersection Summary			
Average Delay	203.7		
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

2030 US 101 Segment V/C Analysis

Volumes

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3515	3225	2960	2700	2640	2400
35th to 50th	2245	3065	1870	2565	1665	2285
50th to 62nd	2145	2610	1790	2185	1590	1950

V/C

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.70	2.48	2.28	2.08	2.03	1.85
35th to 50th	0.64	0.88	0.53	0.73	0.48	0.65
50th to 62nd	0.61	0.75	0.51	0.62	0.45	0.56

Volumes

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3355	3125	2830	2615	2525	2330
35th to 50th	2125	2965	1770	2480	1585	2215
50th to 62nd	2035	2540	1700	2135	1515	1900

V/C

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.58	2.40	2.18	2.01	1.94	1.79
35th to 50th	0.61	0.85	0.51	0.71	0.45	0.63
50th to 62nd	0.58	0.73	0.49	0.61	0.43	0.54

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	94	53	47	106	37	2063	47	94	2589	95
v/c Ratio	0.80	0.23	0.29	0.41	0.61	0.91	0.04	0.63	1.05	0.09
Control Delay	92.3	18.1	52.4	20.8	95.1	22.8	1.8	49.1	30.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.3	18.1	52.4	20.8	95.1	22.8	1.8	49.1	30.9	0.2
Queue Length 50th (ft)	71	4	33	18	29	638	0	76	~1178	0
Queue Length 95th (ft)	#142	38	68	64	#85	800	10	m69	m106	m0
Internal Link Dist (ft)		573		801		2367			3870	
Turn Bay Length (ft)					150		320	215		150
Base Capacity (vph)	132	251	179	282	61	2262	1117	149	2470	1088
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.21	0.26	0.38	0.61	0.91	0.04	0.63	1.05	0.09

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	12	35	253	12	571	16	1968	253	542	2511	68
v/c Ratio	0.24	0.03	0.10	0.90	0.03	1.20	0.25	1.11	0.30	1.18	1.13	0.07
Control Delay	41.4	37.6	12.8	79.8	38.4	135.4	68.5	72.6	1.6	125.3	75.4	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.4	37.6	12.8	79.8	38.4	135.4	68.5	72.6	1.6	125.3	75.4	5.4
Queue Length 50th (ft)	46	7	0	192	7	~391	12	~920	13	~257	~1139	9
Queue Length 95th (ft)	84	23	25	#316	23	#550	m14	#1050	m14	m172	m357	m7
Internal Link Dist (ft)		558			386			3870			1419	
Turn Bay Length (ft)	120		155	120		155	215		215	130		175
Base Capacity (vph)	297	372	343	282	358	475	65	1775	852	459	2227	1017
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.03	0.10	0.90	0.03	1.20	0.25	1.11	0.30	1.18	1.13	0.07

Intersection Summary

~ **Volume exceeds capacity, queue is theoretically infinite.**
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m **Volume for 95th percentile queue is metered by upstream signal.**

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	118	24	47	159	29	212	74	2405	63	258	2937	95
v/c Ratio	0.61	0.10	0.19	0.83	0.12	0.62	1.14	1.17	0.07	1.30	1.27	0.09
Control Delay	61.6	44.8	14.4	82.2	45.2	21.6	119.7	87.8	0.7	180.0	142.1	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.6	44.8	14.4	82.2	45.2	21.6	119.7	87.8	0.7	180.0	142.1	4.3
Queue Length 50th (ft)	86	16	0	120	20	34	~66	~1155	2	~278	~1525	15
Queue Length 95th (ft)	141	40	32	#208	46	100	m#55	m#932	m2	m125	m279	m6
Internal Link Dist (ft)		441			300			1419			620	
Turn Bay Length (ft)	120		155	120		155	130		175	130		175
Base Capacity (vph)	210	267	263	207	262	356	65	2058	908	198	2309	1026
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.09	0.18	0.77	0.11	0.60	1.14	1.17	0.07	1.30	1.27	0.09

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	55	44.9	22.8	67.7	0.69	36.5	A
40th Street	II	45	59.8	72.6	132.4	0.75	20.3	D
35th St.	II	35	31.2	87.8	119.0	0.28	8.6	F
Hurbert St	II	31	200.2	794.6	994.8	1.73	6.2	F
Total	II		336.1	977.8	1313.9	3.44	9.4	F

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	769.8	791.7	0.16	0.7	F
35th St	III	31	200.2	142.1	342.3	1.73	18.1	C
40th Street	III	35	34.1	75.4	109.5	0.28	9.3	F
South Beach State Pa	III	55	49.0	30.9	79.9	0.75	33.7	A
Total	III		305.2	1018.2	1323.4	2.92	7.9	F

Measures of Effectiveness

2030 Scenario2-30 HV

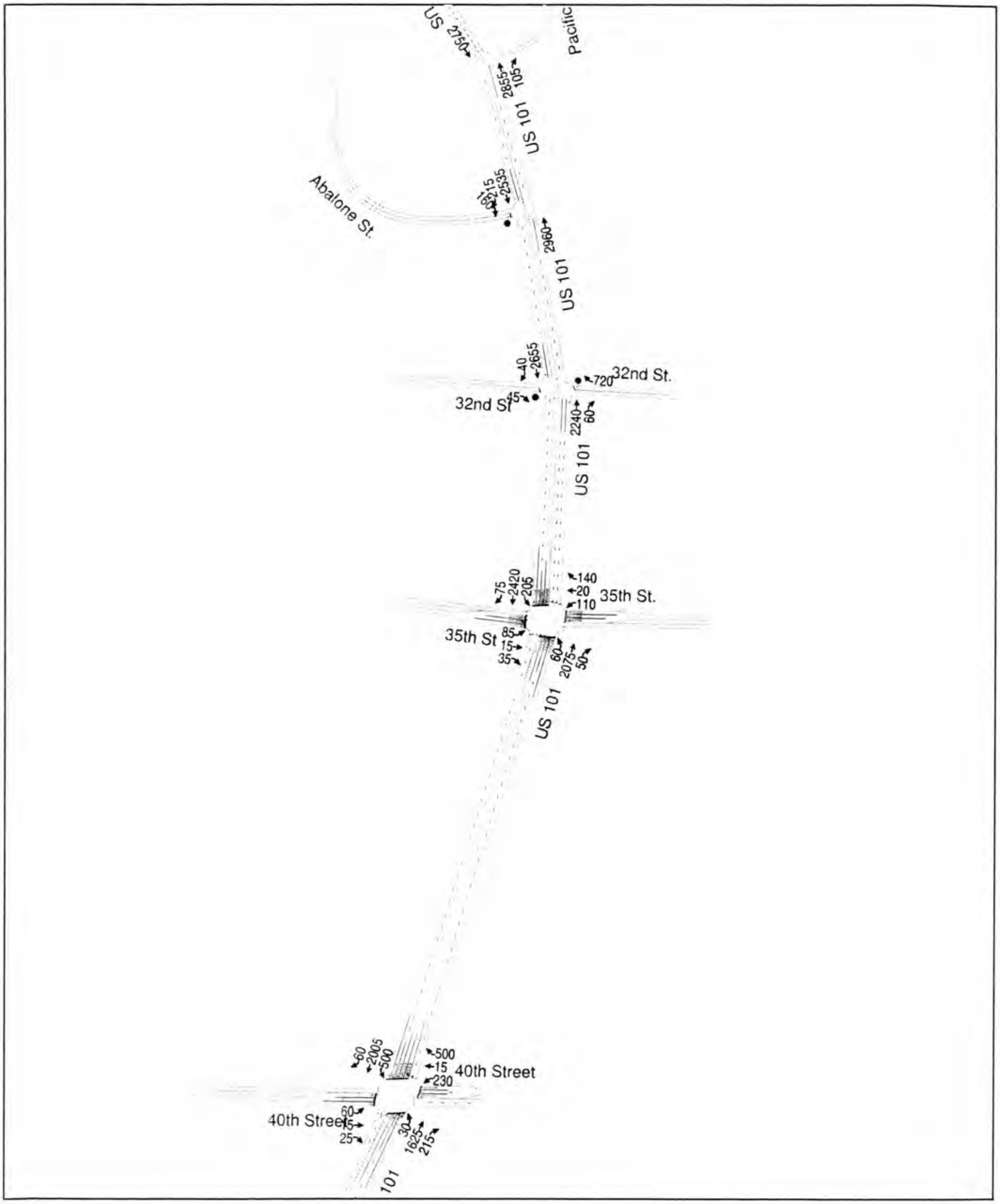
US 101

Direction	NB	SB	All
Average Speed (mph)	8	8	8
Total Travel Time (hr)	**1141**	**1210**	**2351**
Distance Traveled (mi)	9276	10034	19310
Unserved Vehicles (#)	**2666**	**3188**	**5854**
Performance Index	942.8	973.8	1916.7

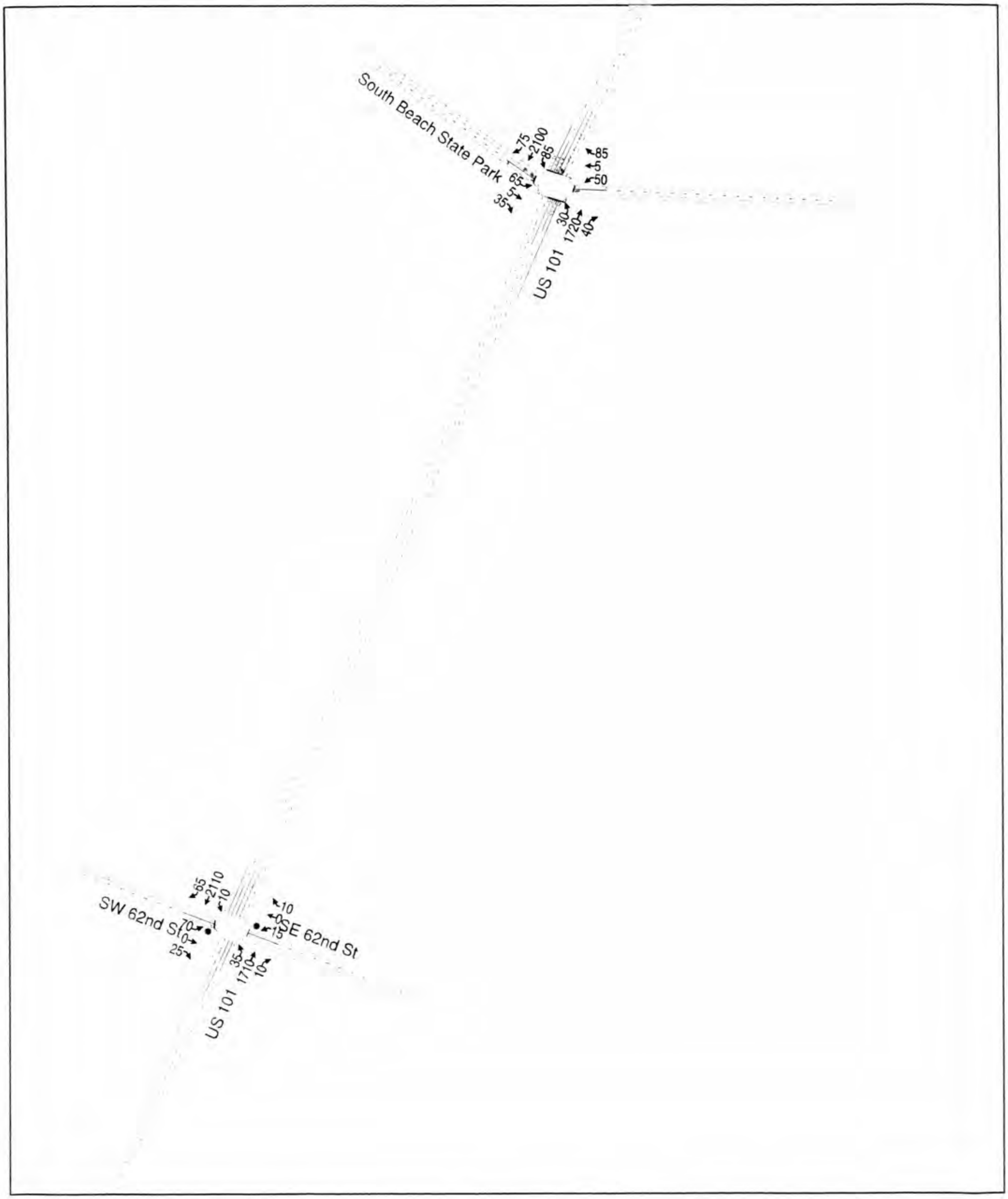
APPENDIX E

2030 Volumes and Traffic Operations Analysis for Average Annual Conditions and Land Use Scenario #1

2030 Scenario 1-Annual Average



2030 Scenario 1-Annual Average



Preliminary Signal Warrant Calculation

Project:	Newport Alternate Mobility Standard
Year:	2030
Alternative	Scenario 1 & Scenario 2
Percentage of Standard:	70%

Intersection: 62nd / US 101 – Scen 1 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	47500	Yes
	Minor	1	1850	850	No
Case B	Major	2	[illegible]	47500	Yes
	Minor	1	950	850	NO

Intersection: 62nd / US 101 – Scen 1 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	39,400	Yes
	Minor	1	1850	700	NO
Case B	Major	2	11,100	39400	Yes
	Minor	1	950	700	No

Intersection: 62nd / US 101 – Scen 1 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	35200	Yes
	Minor	1	[illegible]	650	NO
Case B	Major	2	11100	35,200	Yes
	Minor	1	950	650	NO

Intersection: 62nd / US 101 – Scen 2 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	45750	Yes
	Minor	1	1850	1850	NO
Case B	Major	2	11100	45750	Yes
	Minor	1	950	850	NO

Intersection: 62nd / US 101 – Scen 2 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	38000	Yes
	Minor	1	1850	700	No
Case B	Major	2	11100	38000	Yes
	Minor	1	950	700	No

Intersection: 62nd / US 101 – Scen 2 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	33900	Yes
	Minor	1	1850	650	No
Case B	Major	2	11100	33900	Yes
	Minor	1	950	650	No

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	85	15	35	110	20	140	60	2075	50	205	2420	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1748	1733	1448	1714	1699	1420	1722	3228	1404	1722	3228	1404
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1364	1733	1448	1345	1699	1420	1722	3228	1404	1722	3228	1404
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	18	41	129	24	165	63	2184	53	216	2547	79
RTOR Reduction (vph)	0	0	36	0	0	146	0	0	9	0	0	11
Lane Group Flow (vph)	100	18	5	129	24	19	63	2184	44	216	2547	68
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	17.8	17.8	17.8	17.8	17.8	17.8	5.0	100.0	100.0	19.2	114.2	114.2
Effective Green, g (s)	17.3	17.3	17.3	17.3	17.3	17.3	5.5	100.5	100.5	19.7	114.7	115.2
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.04	0.67	0.67	0.13	0.76	0.77
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	157	200	167	155	196	164	63	2163	941	226	2468	1078
v/s Ratio Prot		0.01			0.01		0.04	c0.68		0.13	c0.79	
v/s Ratio Perm	0.07		0.00	c0.10		0.01			0.03			0.05
v/c Ratio	0.64	0.09	0.03	0.83	0.12	0.12	1.00	1.01	0.05	0.96	1.03	0.06
Uniform Delay, d1	63.4	59.3	58.9	64.9	59.5	59.5	72.2	24.8	8.4	64.7	17.6	4.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.72	0.17	0.15	1.00	1.00	1.00
Incremental Delay, d2	9.2	0.3	0.1	31.1	0.4	0.4	34.0	8.4	0.0	47.1	27.0	0.1
Delay (s)	72.5	59.6	59.0	96.0	59.9	59.9	86.0	12.7	1.3	111.8	44.6	4.4
Level of Service	E	E	E	F	E	E	F	B	A	F	D	A
Approach Delay (s)		67.6			74.6			14.5			48.6	
Approach LOS		E			E			B			D	

Intersection Summary			
HCM Average Control Delay	36.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	**60**	**15**	**25**	**230**	**15**	**500**	**30**	**1625**	**215**	**500**	**2005**	**60**
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.95**	**1.00**	**0.97**	**0.95**	**1.00**
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	**1.00**	**1.00**	**1.00**	**0.99**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (prot)	1739	1716	1458	1712	1716	1420	1739	3228	1420	3340	3228	1458
Flt Permitted	**0.75**	**1.00**	**1.00**	**0.75**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (perm)	1365	1716	1458	1344	1716	1420	1739	3228	1420	3340	3228	1458
Peak-hour factor, PHF	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**
Adj. Flow (vph)	71	18	29	271	18	588	32	1711	226	526	2111	63
RTOR Reduction (vph)	**0**	**0**	**22**	**0**	**0**	**185**	**0**	**0**	**58**	**0**	**0**	**11**
Lane Group Flow (vph)	71	18	7	271	18	403	32	1711	168	526	2111	52
Confl. Peds. (#/hr)				**2**		**2**			**2**	**2**		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	**Perm**		**Perm**	**Perm**		**Perm**	**Prot**		**Perm**	**Prot**		**Perm**
Protected Phases		4			8		5	2		1	6	
Permitted Phases	**4**		**4**	**8**		**8**			**2**			**6**
Actuated Green, G (s)	38.0	38.0	38.0	37.5	37.5	37.5	3.2	77.7	77.7	21.8	96.3	96.3
Effective Green, g (s)	**38.0**	**38.0**	**38.0**	**37.0**	**37.0**	**37.0**	**3.7**	**78.2**	**78.2**	**22.3**	**96.8**	**96.8**
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.02	0.52	0.52	0.15	0.65	0.65
Clearance Time (s)	**4.0**	**4.0**	**4.0**	**4.5**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	**346**	**435**	**369**	**332**	**423**	**350**	**43**	**1683**	**740**	**497**	**2083**	**941**
v/s Ratio Prot		0.01			0.01		0.02	c0.53		0.16	c0.65	
v/s Ratio Perm	**0.05**		**0.01**	**0.20**		**c0.28**			**0.12**			**0.04**
v/c Ratio	0.21	0.04	0.02	0.82	0.04	1.15	0.74	1.02	0.23	1.06	1.01	0.06
Uniform Delay, d1	**44.1**	**42.3**	**42.0**	**53.3**	**43.0**	**56.5**	**72.7**	**35.9**	**19.5**	**63.8**	**26.6**	**9.8**
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.87	0.66	0.84
Incremental Delay, d2	**0.3**	**0.0**	**0.0**	**15.0**	**0.1**	**96.4**	**50.5**	**26.2**	**0.7**	**31.2**	**9.7**	**0.0**
Delay (s)	44.4	42.3	42.0	68.3	43.1	152.9	123.1	62.1	20.2	86.6	27.3	8.2
Level of Service	**D**	**D**	**D**	**E**	**D**	**F**	**F**	**E**	**C**	**F**	**C**	**A**
Approach Delay (s)		43.5			124.5			58.3			38.4	
Approach LOS		**D**			**F**			**E**			**D**	

Intersection Summary			
HCM Average Control Delay	**58.8**	**HCM Level of Service**	**E**
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	**150.0**	**Sum of lost time (s)**	**9.0**
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	**15**		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: South Beach State Park & US 101

2030 Scenario 1-Annual Average

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	65	5	35	50	5	85	30	1720	40	85	2100	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	1459		1630	1473		1614	3228	1458	1630	3228	1408
Flt Permitted	0.64	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1081	1459		1246	1473		1614	3228	1458	1630	3228	1408
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.85	0.85	0.95	0.95
Adj. Flow (vph)	76	6	41	59	6	100	32	1811	47	100	2211	79
RTOR Reduction (vph)	0	36	0	0	89	0	0	0	16	0	0	15
Lane Group Flow (vph)	76	11	0	59	17	0	32	1811	31	100	2211	64
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	9.6	9.6		9.6	9.6		2.3	56.8	56.8	7.0	61.5	61.5
Effective Green, g (s)	10.1	9.6		9.6	9.6		2.8	57.3	56.8	7.0	62.0	62.0
Actuated g/C Ratio	0.12	0.11		0.11	0.11		0.03	0.67	0.67	0.08	0.73	0.73
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	128	164		140	166		53	2166	970	134	2344	1022
v/s Ratio Prot		0.01			0.01		0.02	c0.56		0.06	c0.68	
v/s Ratio Perm	c0.07			0.05					0.02			0.05
v/c Ratio	0.59	0.06		0.42	0.10		0.60	0.84	0.03	0.75	0.94	0.06
Uniform Delay, d1	35.7	33.9		35.3	34.0		40.8	10.5	4.9	38.3	10.2	3.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.2	0.2		2.0	0.3		17.9	3.0	0.0	20.0	8.6	0.0
Delay (s)	42.9	34.1		37.4	34.3		58.6	13.5	4.9	58.4	18.8	3.4
Level of Service	D	C		D	C		E	B	A	E	B	A
Approach Delay (s)		39.5			35.4			14.0			19.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	85.4	Sum of lost time (s)	7.0
Intersection Capacity Utilization	87.1%	**ICU Level of Service**	E
Analysis Period (min)	15		

c **Critical Lane Group**

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2855	105	0	2750
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	3005	111	0	2895
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5904	3009			3118	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5904	3009			3118	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	17			102	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	3005	111	2895
Volume Left	0	0	0
Volume Right	0	111	0
cSH	1700	1700	1700
Volume to Capacity	1.77	0.07	1.70
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	173.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	160	0	2960	2535	215
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	188	0	3116	2668	226
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.37					
vC, conflicting volume	4230	2672	2897			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	6355	2672	2897			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	17	122			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	188	1558	1558	2668	226
Volume Left	0	0	0	0	0
Volume Right	188	0	0	0	226
cSH	17	1700	1700	1700	1700
Volume to Capacity	11.34	0.92	0.92	1.57	0.13
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	303.6		
Intersection Capacity Utilization	162.7%	ICU Level of Service	H
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: 32nd St & US 101

2030 Scenario 1-Annual Average

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	45	0	0	720	0	2240	60	0	2655	40
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	53	0	0	847	0	2358	63	0	2795	42
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.35	0.35		0.35	0.35	0.35				0.35		
vC, conflicting volume	4846	5241	1422	3812	5199	1183	2839			2423		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	8291	9424	1422	5328	9303	0	2839			1346		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	58	100	100	0	100			100		
cM capacity (veh/h)	0	0	126	0	0	377	129			175		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	53	847	1179	1179	63	1863	974
Volume Left	0	0	0	0	0	0	0
Volume Right	53	847	0	0	63	0	42
cSH	126	377	1700	1700	1700	1700	1700
Volume to Capacity	0.42	2.25	0.69	0.69	0.04	1.10	0.57
Queue Length 95th (ft)	45	1594	0	0	0	0	0
Control Delay (s)	52.7	592.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F					
Approach Delay (s)	52.7	592.3	0.0			0.0	
Approach LOS	F	F					

Intersection Summary			
Average Delay	81.9		
Intersection Capacity Utilization	122.5%	ICU Level of Service	H
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: SW 62nd St & US 101

2030 Scenario 1-Annual Average

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	70	0	25	15	0	10	35	1710	10	10	2110	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	82	0	29	18	0	12	37	1800	11	11	2221	68
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3232	4130	1115	3044	4193	909	2291			1813		
vC1, stage 1 conf vol	2244	2244		1881	1881							
vC2, stage 2 conf vol	987	1886		1163	2313							
vCu, unblocked vol	3232	4130	1115	3044	4193	909	2291			1813		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	86	67	100	96	83			97		
cM capacity (veh/h)	40	53	203	53	30	279	214			330		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	82	29	18	12	37	1200	611	11	1111	1111	68
Volume Left	82	0	18	0	37	0	0	11	0	0	0
Volume Right	0	29	0	12	0	0	11	0	0	0	68
cSH	40	203	53	279	214	1700	1700	330	1700	1700	1700
Volume to Capacity	2.07	0.14	0.33	0.04	0.17	0.71	0.36	0.03	0.65	0.65	0.04
Queue Length 95th (ft)	221	12	29	3	15	0	0	2	0	0	0
Control Delay (s)	713.5	25.7	102.8	18.5	25.3	0.0	0.0	16.3	0.0	0.0	0.0
Lane LOS	F	D	F	C	D			C			
Approach Delay (s)	532.5		69.1		0.5			0.1			
Approach LOS	F		F								

Intersection Summary			
Average Delay	14.6		
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

2030 US 101 Segment V/C Analysis

Volumes

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3515	3225	2960	2700	2640	2400
35th to 50th	2245	3065	1870	2565	1665	2285
50th to 62nd	2145	2610	1790	2185	1590	1950

V/C

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.70	2.48	2.28	2.08	2.03	1.85
35th to 50th	0.64	0.88	0.53	0.73	0.48	0.65
50th to 62nd	0.61	0.75	0.51	0.62	0.45	0.56

Volumes

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3355	3125	2830	2615	2525	2330
35th to 50th	2125	2965	1770	2480	1585	2215
50th to 62nd	2035	2540	1700	2135	1515	1900

V/C

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.58	2.40	2.18	2.01	1.94	1.79
35th to 50th	0.61	0.85	0.51	0.71	0.45	0.63
50th to 62nd	0.58	0.73	0.49	0.61	0.43	0.54

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	76	47	59	106	32	1811	47	100	2211	79
v/c Ratio	0.72	0.22	0.40	0.40	0.44	0.78	0.04	0.71	0.87	0.07
Control Delay	85.1	19.4	56.9	15.2	75.2	14.8	1.8	63.5	6.0	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.1	19.4	56.9	15.2	75.2	14.8	1.8	63.5	6.0	0.2
Queue Length 50th (ft)	57	4	43	4	25	460	0	83	117	0
Queue Length 95th (ft)	#109	37	81	49	#72	567	10	m83	m113	m0
Internal Link Dist (ft)		573		801		2367			3870	
Turn Bay Length (ft)					150		320	215		150
Base Capacity (vph)	129	246	180	300	73	2311	1140	143	2546	1119
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.19	0.33	0.35	0.44	0.78	0.04	0.70	0.87	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	18	29	271	18	588	32	1711	226	526	2111	63
v/c Ratio	0.20	0.04	0.07	0.78	0.04	1.09	0.49	1.04	0.28	1.22	1.04	0.07
Control Delay	35.8	33.1	11.7	58.1	33.9	92.7	83.3	56.4	3.6	142.5	41.6	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.8	33.1	11.7	58.1	33.9	92.7	83.3	56.4	3.6	142.5	41.6	6.8
Queue Length 50th (ft)	43	10	0	196	11	~372	24	~757	5	~256	~962	9
Queue Length 95th (ft)	78	28	22	#294	28	#531	m32	#886	m11	m#231	m#684	m8
Internal Link Dist (ft)		558			172			3870			1419	
Turn Bay Length (ft)	120		155	120		155	215		215	130		175
Base Capacity (vph)	364	458	410	348	443	538	65	1641	795	431	2023	926
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.04	0.07	0.78	0.04	1.09	0.49	1.04	0.28	1.22	1.04	0.07

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	100	18	41	129	24	165	63	2184	53	216	2547	79
v/c Ratio	0.56	0.08	0.18	0.73	0.11	0.50	0.97	1.08	0.06	0.92	1.08	0.08
Control Delay	60.4	44.9	15.1	73.1	45.5	12.4	72.0	44.3	0.8	57.7	56.2	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	44.9	15.1	73.1	45.5	12.4	72.0	44.3	0.8	57.7	56.2	3.9
Queue Length 50th (ft)	73	12	0	96	16	0	48	~976	2	~179	~1174	11
Queue Length 95th (ft)	122	33	29	152	40	52	m48	m#237	m2	m117	m274	m5
Internal Link Dist (ft)		441			300			1419			620	
Turn Bay Length (ft)	120		155	120		155	130		175	130		175
Base Capacity (vph)	211	267	258	208	262	359	65	2031	896	234	2348	1041
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.07	0.16	0.62	0.09	0.46	0.97	1.08	0.06	0.92	1.08	0.08

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	55	44.9	14.8	59.7	0.69	41.4	A
40th Street	II	45	59.8	56.4	116.2	0.75	23.2	C
35th St.	II	35	31.2	44.3	75.5	0.28	13.5	E
Hurbert St	II	31	200.2	561.1	761.3	1.73	8.2	F
Total	II		336.1	676.6	1012.7	3.44	12.2	F

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	542.6	564.5	0.16	1.0	F
35th St	III	31	200.2	56.2	256.4	1.73	24.2	B
40th Street	III	35	34.1	41.6	75.7	0.28	13.5	E
South Beach State Pa	III	55	49.0	6.0	55.0	0.75	49.0	A
Total	III		305.2	646.4	951.6	2.92	11.1	E

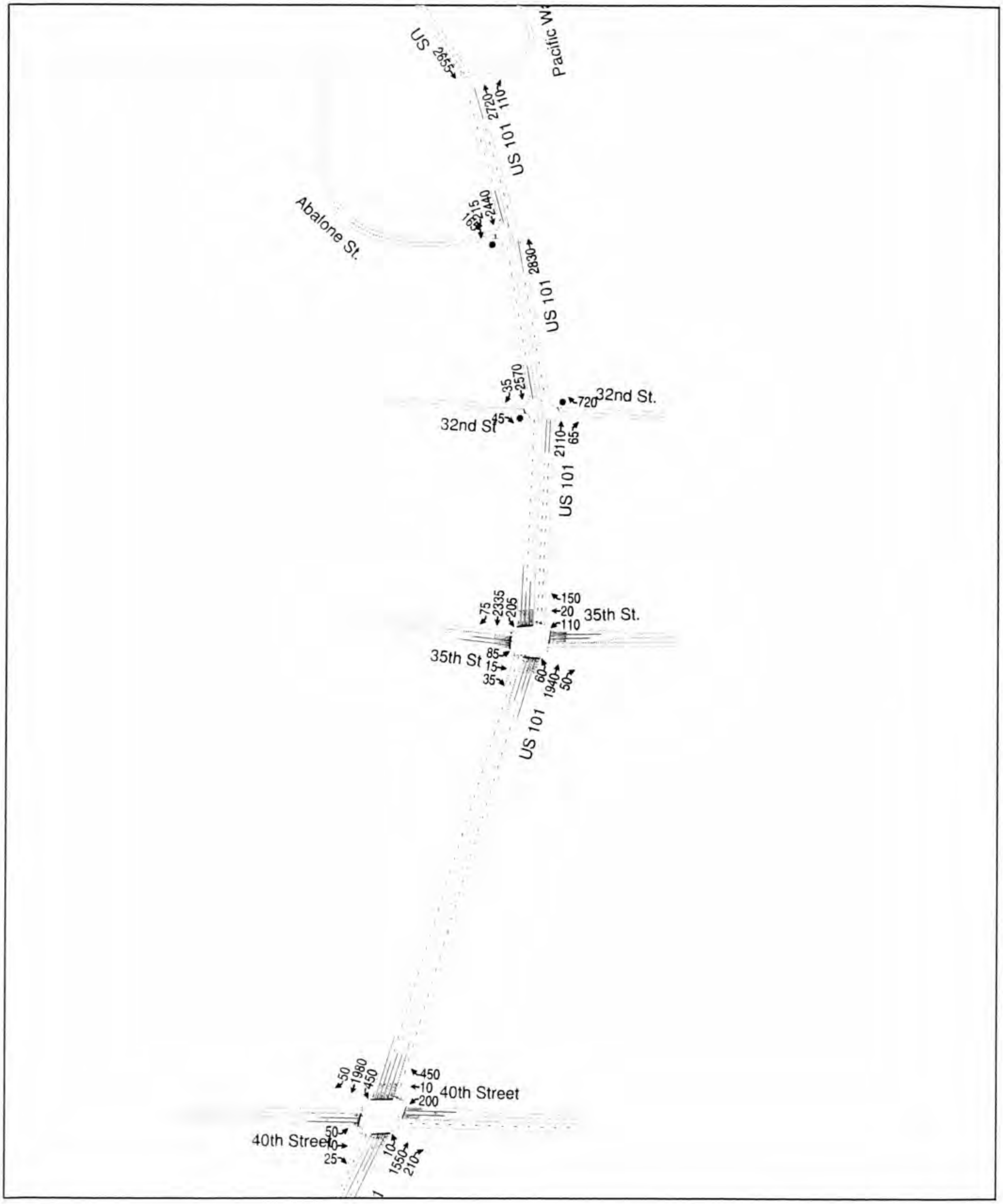
US 101

Direction	NB	SB	All
Average Speed (mph)	11	12	11
Total Travel Time (hr)	**728**	**745**	**1472**
Distance Traveled (mi)	8089	8623	16713
Unserved Vehicles (#)	**1748**	**1842**	**3590**
Performance Index	516.0	527.0	1043.0

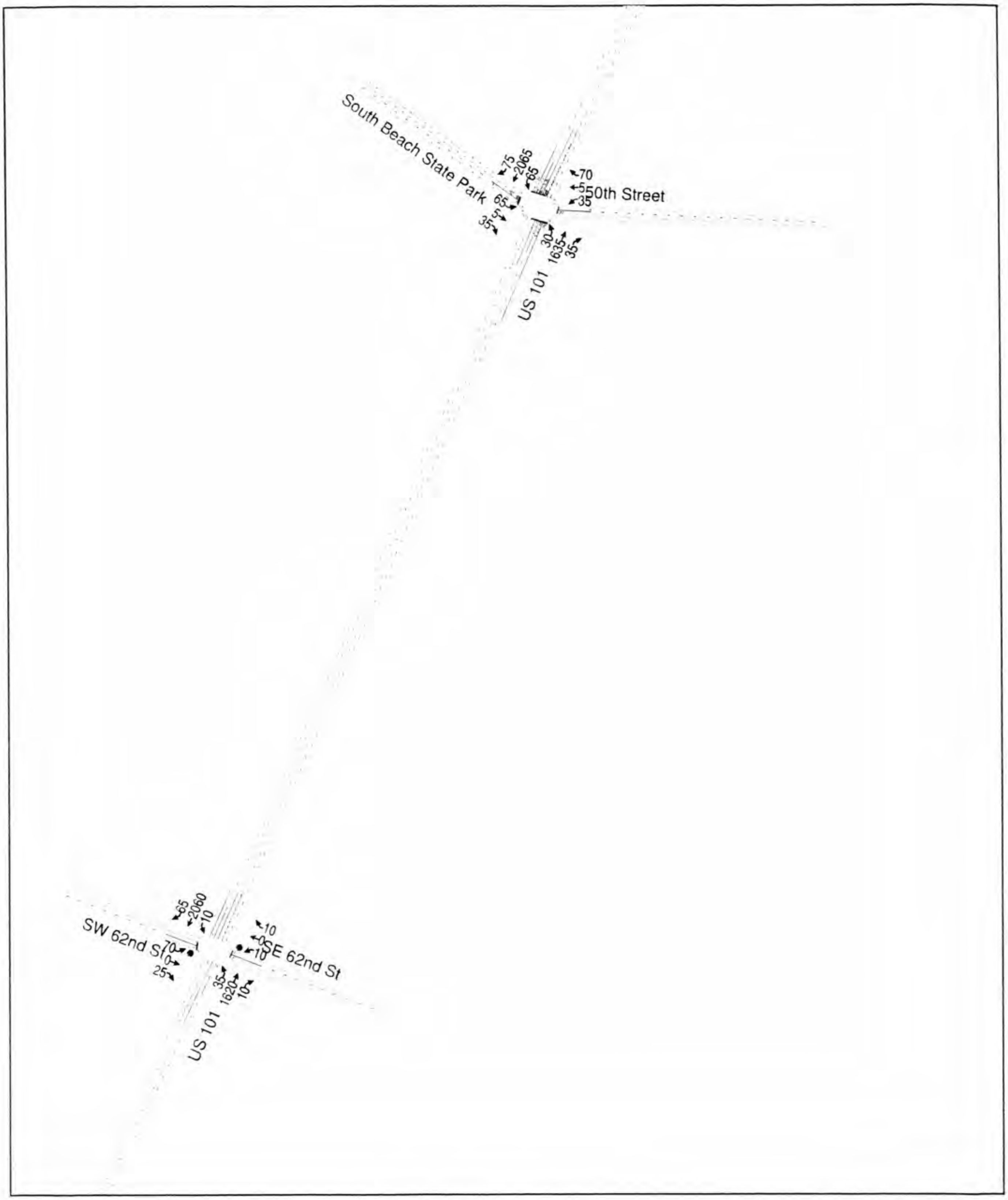
APPENDIX F

2030 Volumes and Traffic Operations Analysis for Average Annual Conditions and Land Use Scenario #2

2030 Scenario2-Annual Average



2030 Scenario2-Annual Average



Preliminary Signal Warrant Calculation					
Project:	Newport Alternate Mobility Standard				
Year:	2030				
Alternative	Scenario 1 & Scenario 2				
Percentage of Standard:	70%				
Intersection:	62nd / US 101 - Scen 1 30 HV				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	47500	Yes
	Minor	1	1850	850	No
Case B	Major	2	[illegible]	47500	Yes
	Minor	1	950	850	No
Intersection:	62nd / US 101 - Scen 1 AAvg				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	39100	Yes
	Minor	1	1850	700	No
Case B	Major	2	11,100	39100	Yes
	Minor	1	[illegible]	700	No
Intersection:	62nd / US 101 - Scen 1 Off-Season				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	35200	Yes
	Minor	1	[illegible]	650	No
Case B	Major	2	[illegible]	35,200	Yes
	Minor	1	[illegible]	650	No
Intersection:	62nd / US 101 - Scen 2 30 HV				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	45750	Yes
	Minor	1	1850	850	No
Case B	Major	2	11100	45750	Yes
	Minor	1	950	850	No
Intersection:	62nd / US 101 - Scen 2 AAvg				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	38000	Yes
	Minor	1	1850	700	No
Case B	Major	2	11100	38000	Yes
	Minor	1	950	700	No
Intersection:	62nd / US 101 - Scen 2 Off-Season				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	33900	Yes
	Minor	1	1850	650	No
Case B	Major	2	11100	33900	Yes
	Minor	1	950	650	No

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	**85**	**15**	**35**	**110**	**20**	**150**	**60**	**1940**	**50**	**205**	**2335**	**75**
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (prot)	1749	1733	1449	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	**0.74**	**1.00**	**1.00**	**0.75**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (perm)	1365	1733	1449	1346	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**
Adj. Flow (vph)	100	18	41	129	24	176	63	2042	53	216	2458	79
RTOR Reduction (vph)	**0**	**0**	**36**	**0**	**0**	**154**	**0**	**0**	**11**	**0**	**0**	**13**
Lane Group Flow (vph)	100	18	5	129	24	22	63	2042	42	216	2458	66
Confl. Peds. (#/hr)	**2**		**2**	**2**		**2**	**2**		**2**	**2**		**2**
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	**Perm**		**Perm**	**Perm**		**Perm**	**Prot**		**Perm**	**Prot**		**Perm**
Protected Phases		4			8		5	2		1	6	
Permitted Phases	**4**		**4**	**8**		**8**			**2**			**6**
Actuated Green, G (s)	16.9	16.9	16.9	16.9	16.9	16.9	4.0	82.6	82.6	17.5	96.1	96.1
Effective Green, g (s)	**16.4**	**16.4**	**16.4**	**16.4**	**16.4**	**16.4**	**4.5**	**83.1**	**83.1**	**18.0**	**96.6**	**97.1**
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.03	0.64	0.64	0.14	0.74	0.75
Clearance Time (s)	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	**172**	**219**	**183**	**170**	**214**	**179**	**60**	**2063**	**899**	**238**	**2399**	**1050**
v/s Ratio Prot		0.01			0.01		0.04	c0.63		0.13	c0.76	
v/s Ratio Perm	**0.07**		**0.00**	**c0.10**		**0.02**			**0.03**			**0.05**
v/c Ratio	0.58	0.08	0.03	0.76	0.11	0.12	1.05	0.99	0.05	0.91	1.02	0.06
Uniform Delay, d1	**53.6**	**50.2**	**49.8**	**54.9**	**50.3**	**50.4**	**62.8**	**23.0**	**8.7**	**55.2**	**16.7**	**4.4**
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.74	0.31	0.30	1.12	0.35	0.01
Incremental Delay, d2	**5.8**	**0.2**	**0.1**	**18.5**	**0.3**	**0.4**	**80.6**	**9.3**	**0.0**	**5.0**	**13.4**	**0.0**
Delay (s)	59.4	50.4	49.9	73.4	50.7	50.9	127.2	16.4	2.7	67.0	19.3	0.1
Level of Service	**E**	**D**	**D**	**E**	**D**	**D**	**F**	**B**	**A**	**E**	**B**	**A**
Approach Delay (s)		55.9			59.7			19.3			22.5	
Approach LOS		**E**			**E**			**B**			**C**	

Intersection Summary			
HCM Average Control Delay	**24.5**	**HCM Level of Service**	**C**
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	**130.0**	**Sum of lost time (s)**	**9.0**
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
Analysis Period (min)	**15**		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	50	10	25	200	10	450	10	1550	210	450	1980	50
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1713	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1372	1716	1458	1352	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	59	12	29	235	12	529	11	1632	221	474	2084	53
RTOR Reduction (vph)	0	0	22	0	0	189	0	0	71	0	0	10
Lane Group Flow (vph)	59	12	7	235	12	340	11	1632	150	474	2084	43
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	30.4	30.4	30.4	29.9	29.9	29.9	1.6	66.3	66.3	20.8	85.5	85.5
Effective Green, g (s)	30.4	30.4	30.4	29.4	29.4	29.4	2.1	66.8	66.8	21.3	86.0	86.0
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23	0.23	0.02	0.51	0.51	0.16	0.66	0.66
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	321	401	341	306	388	321	28	1659	730	547	2135	965
v/s Ratio Prot		0.01			0.01		0.01	c0.51		0.14	c0.65	
v/s Ratio Perm	0.04		0.00	0.17		c0.24			0.11			0.03
v/c Ratio	0.18	0.03	0.02	0.77	0.03	1.06	0.39	0.98	0.20	0.87	0.98	0.04
Uniform Delay, d1	39.9	38.4	38.3	47.1	39.2	50.3	63.3	31.1	17.2	53.0	21.0	7.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.63	0.93
Incremental Delay, d2	0.3	0.0	0.0	11.6	0.0	66.9	8.9	18.6	0.6	3.7	5.4	0.0
Delay (s)	40.1	38.5	38.4	58.7	39.2	117.2	72.2	49.6	17.8	49.2	18.7	7.2
Level of Service	D	D	D	E	D	F	E	D	B	D	B	A
Approach Delay (s)		39.4			98.3			46.0			24.0	
Approach LOS		D			F			D			C	

Intersection Summary

HCM Average Control Delay	42.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: South Beach State Park & US 101

2030 Scenario2-Annual Average

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	65	5	35	35	5	70	30	1635	35	65	2065	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	1459		1630	1476		1614	3228	1458	1630	3228	1408
Flt Permitted	0.70	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1186	1459		1246	1476		1614	3228	1458	1630	3228	1408
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.85	0.85	0.95	0.95
Adj. Flow (vph)	76	6	41	41	6	82	32	1721	41	76	2174	79
RTOR Reduction (vph)	0	37	0	0	73	0	0	0	15	0	0	15
Lane Group Flow (vph)	76	10	0	41	15	0	32	1721	26	76	2174	64
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	9.3	9.3		9.3	9.3		2.3	54.8	54.8	9.0	61.5	61.5
Effective Green, g (s)	9.8	9.3		9.3	9.3		2.8	55.3	54.8	9.0	62.0	62.0
Actuated g/C Ratio	0.12	0.11		0.11	0.11		0.03	0.65	0.64	0.11	0.73	0.73
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	137	159		136	161		53	2098	939	172	2352	1026
v/s Ratio Prot		0.01			0.01		0.02	0.53		c0.05	c0.67	
v/s Ratio Perm	c0.06			0.03					0.02			0.05
v/c Ratio	0.55	0.07		0.30	0.09		0.60	0.82	0.03	0.44	0.92	0.06
Uniform Delay, d1	35.6	34.0		34.9	34.1		40.6	11.2	5.5	35.7	9.6	3.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	0.2		1.3	0.3		17.9	2.7	0.0	1.8	6.8	0.0
Delay (s)	40.4	34.2		36.2	34.4		58.5	13.9	5.5	37.5	16.4	3.3
Level of Service	D	C		D	C		E	B	A	D	B	A
Approach Delay (s)		38.0			34.9			14.5			16.6	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	85.1	Sum of lost time (s)	7.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2720	110	0	2655
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	2863	116	0	2795
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5662	2867			2981	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5662	2867			2981	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	21			116	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	2863	116	2795
Volume Left	0	0	0
Volume Right	0	116	0
cSH	1700	1700	1700
Volume to Capacity	1.68	0.07	1.64
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	166.1%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	165	0	2830	2440	215
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	194	0	2979	2568	226
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.41					
vC, conflicting volume	4062	2572	2797			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5576	2572	2797			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	20	134			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	194	1489	1489	2568	226
Volume Left	0	0	0	0	0
Volume Right	194	0	0	0	226
cSH	20	1700	1700	1700	1700
Volume to Capacity	9.93	0.88	0.88	1.51	0.13
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	325.2		
Intersection Capacity Utilization	157.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	45	0	0	720	0	2110	65	0	2570	35
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	53	0	0	847	0	2221	68	0	2705	37
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.39	0.39		0.39	0.39	0.39				0.39		
vC, conflicting volume	4685	5017	1375	3631	4967	1115	2744			2291		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	7323	8175	1375	4618	8047	0	2744			1182		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	61	100	100	0	100			100		
cM capacity (veh/h)	0	0	136	0	0	421	141			226		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	53	847	1111	1111	68	1804	939
Volume Left	0	0	0	0	0	0	0
Volume Right	53	847	0	0	68	0	37
cSH	136	421	1700	1700	1700	1700	1700
Volume to Capacity	0.39	2.01	0.65	0.65	0.04	1.06	0.55
Queue Length 95th (ft)	41	1466	0	0	0	0	0
Control Delay (s)	47.5	484.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	F					
Approach Delay (s)	47.5	484.8	0.0			0.0	
Approach LOS	E	F					

Intersection Summary			
Average Delay	69.7		
Intersection Capacity Utilization	118.6%	ICU Level of Service	H
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: SW 62nd St & US 101

2030 Scenario2-Annual Average

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	70	0	25	10	0	10	35	1620	10	10	2060	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	82	0	29	12	0	12	37	1705	11	11	2168	68
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3132	3983	1088	2923	4046	862	2239			1718		
vC1, stage 1 conf vol	2191	2191		1786	1786							
vC2, stage 2 conf vol	940	1791		1137	2260							
vCu, unblocked vol	3132	3983	1088	2923	4046	862	2239			1718		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	86	81	100	96	84			97		
cM capacity (veh/h)	43	59	212	61	34	299	224			360		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	82	29	12	12	37	1137	579	11	1084	1084	68
Volume Left	82	0	12	0	37	0	0	11	0	0	0
Volume Right	0	29	0	12	0	0	11	0	0	0	68
cSH	43	212	61	299	224	1700	1700	360	1700	1700	1700
Volume to Capacity	1.91	0.14	0.19	0.04	0.16	0.67	0.34	0.03	0.64	0.64	0.04
Queue Length 95th (ft)	213	12	16	3	14	0	0	2	0	0	0
Control Delay (s)	629.2	24.7	77.8	17.5	24.2	0.0	0.0	15.3	0.0	0.0	0.0
Lane LOS	F	C	F	C	C			C			
Approach Delay (s)	470.1		47.7		0.5			0.1			
Approach LOS	F		E								

Intersection Summary			
Average Delay	13.2		
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		

2030 US 101 Segment V/C Analysis

Volumes

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3515	3225	2960	2700	2640	2400
35th to 50th	2245	3065	1870	2565	1665	2285
50th to 62nd	2145	2610	1790	2185	1590	1950

V/C

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.70	2.48	2.28	2.08	2.03	1.85
35th to 50th	0.64	0.88	0.53	0.73	0.48	0.65
50th to 62nd	0.61	0.75	0.51	0.62	0.45	0.56

Volumes

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3355	3125	2830	2615	2525	2330
35th to 50th	2125	2965	1770	2480	1585	2215
50th to 62nd	2035	2540	1700	2135	1515	1900

V/C

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.58	2.40	2.18	2.01	1.94	1.79
35th to 50th	0.61	0.85	0.51	0.71	0.45	0.63
50th to 62nd	0.58	0.73	0.49	0.61	0.43	0.54

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	76	47	41	88	32	1721	41	76	2174	79
v/c Ratio	0.66	0.23	0.29	0.36	0.42	0.72	0.04	0.54	0.85	0.07
Control Delay	76.5	19.6	53.1	16.0	73.0	12.9	2.0	52.9	6.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.5	19.6	53.1	16.0	73.0	12.9	2.0	52.9	6.2	0.2
Queue Length 50th (ft)	57	4	29	4	25	405	0	60	98	0
Queue Length 95th (ft)	102	37	61	46	#72	539	10	m66	m110	m0
Internal Link Dist (ft)		573		801		2367			3870	
Turn Bay Length (ft)					150		320	215		150
Base Capacity (vph)	144	246	180	285	76	2375	1169	162	2548	1121
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.19	0.23	0.31	0.42	0.72	0.04	0.47	0.85	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	59	12	29	235	12	529	11	1632	221	474	2084	53
v/c Ratio	0.19	0.03	0.08	0.78	0.03	1.05	0.17	0.95	0.27	1.01	0.94	0.05
Control Delay	38.9	36.1	12.9	62.6	36.9	80.4	68.1	31.4	2.7	60.6	13.4	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.9	36.1	12.9	62.6	36.9	80.4	68.1	31.4	2.7	60.6	13.4	4.2
Queue Length 50th (ft)	37	7	0	172	7	~295	7	610	19	~201	282	5
Queue Length 95th (ft)	71	23	23	#267	23	#454	m12	#793	m20	m#184	m444	m5
Internal Link Dist (ft)		558			522			3870			1419	
Turn Bay Length (ft)	120		155	120		155	215		215	130		175
Base Capacity (vph)	318	398	360	302	383	502	65	1727	834	470	2222	1014
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.03	0.08	0.78	0.03	1.05	0.17	0.94	0.26	1.01	0.94	0.05

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	100	18	41	129	24	176	63	2042	53	216	2458	79
v/c Ratio	0.56	0.08	0.18	0.73	0.11	0.52	0.97	1.02	0.06	0.87	1.05	0.08
Control Delay	60.4	44.9	15.1	73.1	45.5	12.4	102.4	26.2	1.6	59.2	37.4	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	44.9	15.1	73.1	45.5	12.4	102.4	26.2	1.6	59.2	37.4	3.4
Queue Length 50th (ft)	73	12	0	96	16	0	48	~242	1	177	~1097	8
Queue Length 95th (ft)	122	33	29	152	40	53	m#52	m#926	m1	m118	m217	m4
Internal Link Dist (ft)		441			300			1419			620	
Turn Bay Length (ft)	120		155	120		155	130		175	130		175
Base Capacity (vph)	211	267	258	208	262	368	65	2004	885	248	2348	1042
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.07	0.16	0.62	0.09	0.48	0.97	1.02	0.06	0.87	1.05	0.08

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
50th Street	**II**	**55**	**44.9**	**12.9**	**57.8**	**0.69**	**42.7**	**A**
40th Street	II	45	59.8	31.4	91.2	0.75	29.5	B
35th St.	**II**	**35**	**31.2**	**26.2**	**57.4**	**0.28**	**17.8**	**D**
Hurbert St	II	31	200.2	561.9	762.1	1.73	8.2	F
Total	**II**		**336.1**	**632.4**	**968.5**	**3.44**	**12.8**	**F**

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	**III**	**30**	**21.9**	**542.6**	**564.5**	**0.16**	**1.0**	**F**
35th St	III	31	200.2	37.4	237.6	1.73	26.1	B
40th Street	**III**	**35**	**34.1**	**13.4**	**47.5**	**0.28**	**21.5**	**C**
South Beach State Pa	III	55	49.0	6.2	55.2	0.75	48.8	A
Total	**III**		**305.2**	**599.6**	**904.8**	**2.92**	**11.6**	**E**

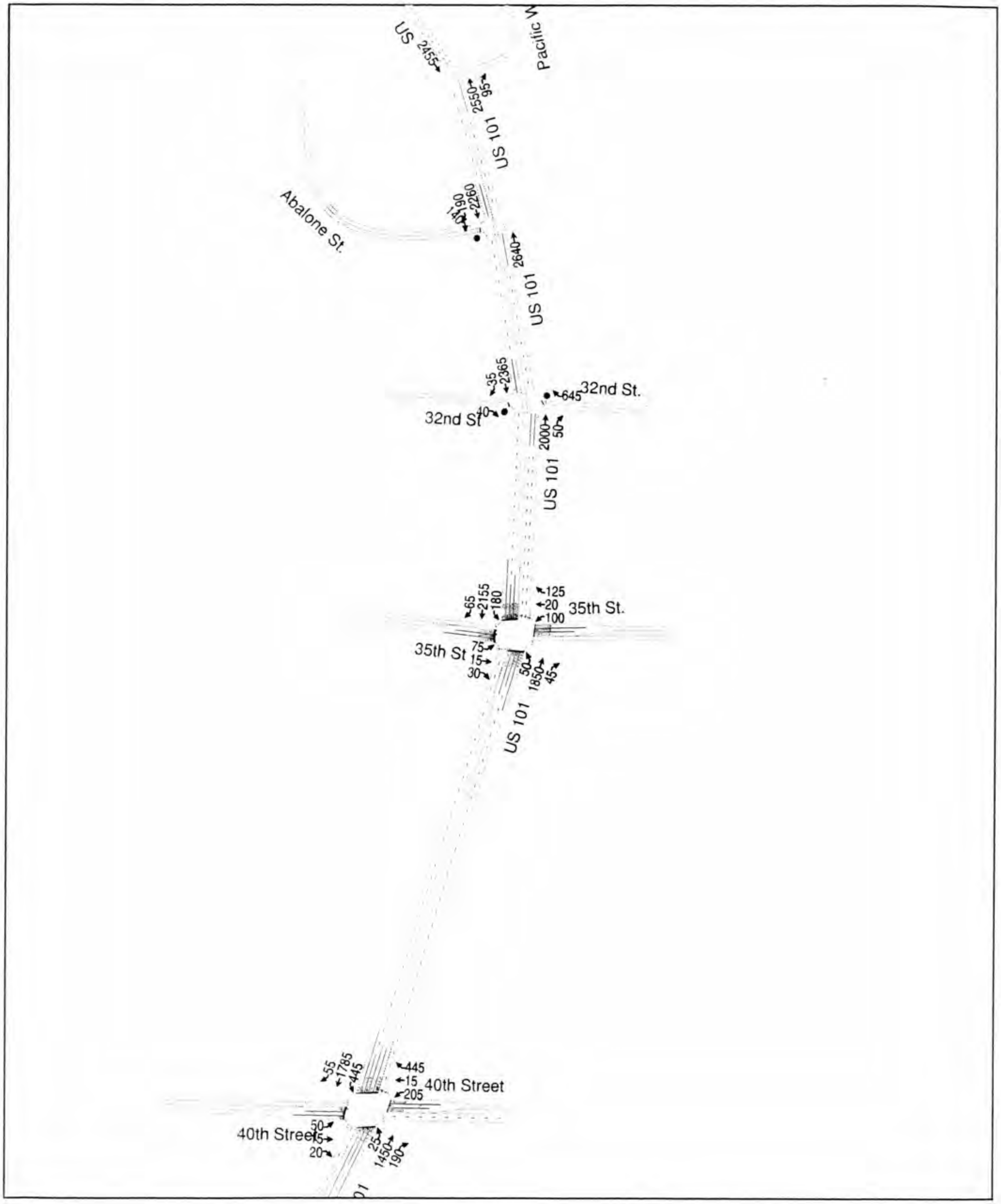
US 101

Direction	NB	SB	All
Average Speed (mph)	11	12	12
Total Travel Time (hr)	**695**	**696**	**1392**
Distance Traveled (mi)	7773	8393	16166
Unserved Vehicles (#)	**1572**	**1587**	**3160**
Performance Index	491.7	484.0	975.6

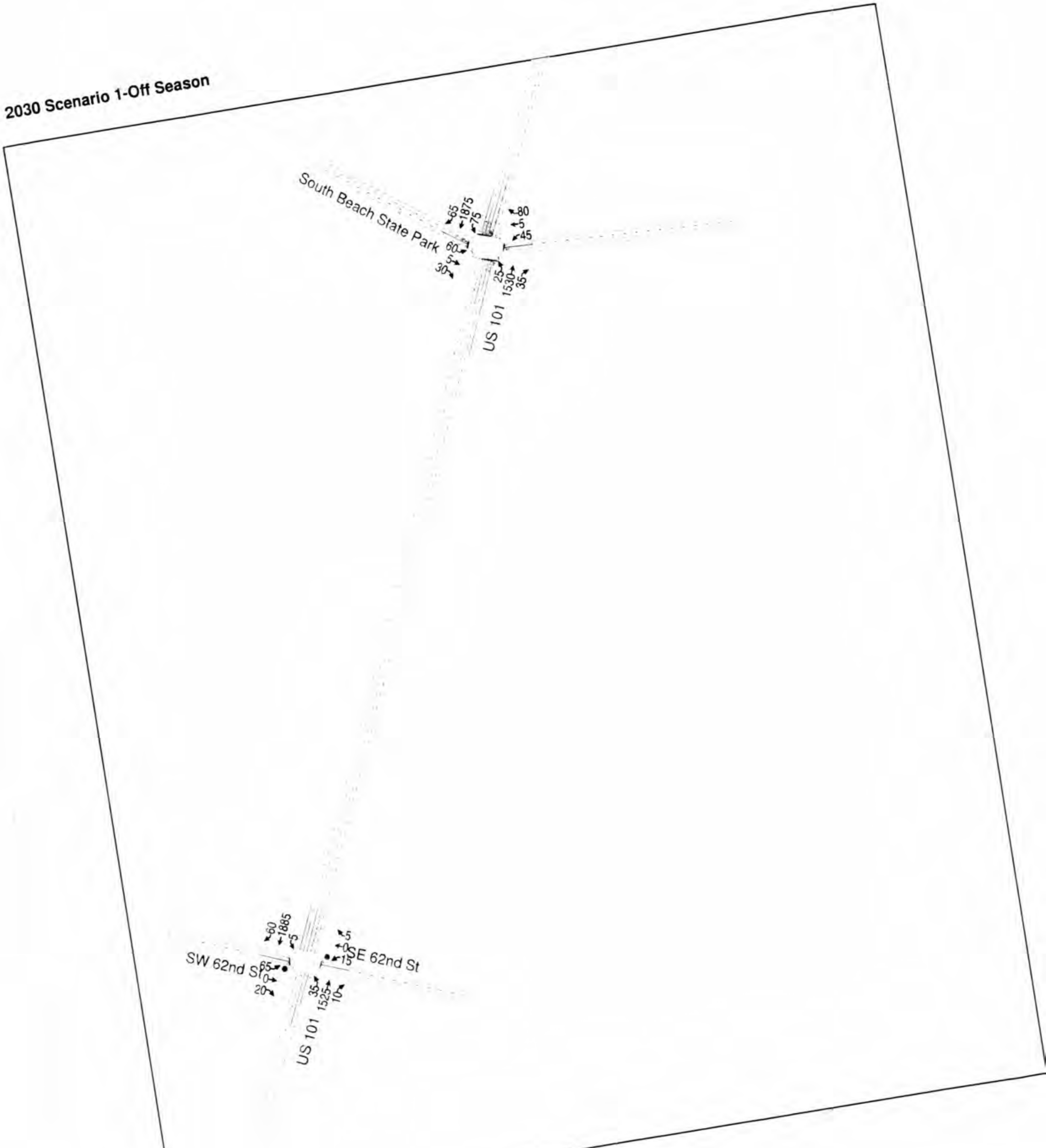
APPENDIX G

2030 Volumes and Traffic Operations Analysis for Off-Season Conditions and Land Use Scenario #1

2030 Scenario 1-Off Season



2030 Scenario 1-Off Season



Preliminary Signal Warrant Calculation					
Project:	Newport Alternate Mobility Standard				
Year:	2030				
Alternative	Scenario 1 & Scenario 2				
Percentage of Standard:	70%				

Intersection:	62nd / US 101 — Scen 1 30 HV				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	47500	Yes
	Minor	1	1850	850	No
Case B	Major	2	11100	47500	Yes
	Minor	1	950	850	NO

Intersection:	62nd / US 101 — Scen 1 AAvg				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	39100	Yes
	Minor	1	1850	700	NO
Case B	Major	2	11,100	39100	Yes
	Minor	1	950	700	No

Intersection:	62nd / US 101 — Scen 1 Off-Season				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	35200	Yes
	Minor	1	1850	650	NO
Case B	Major	2	11100	35,200	Yes
	Minor	1	950	650	NO

Intersection:	62nd / US 101 — Scen 2 30 HV				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	45750	Yes
	Minor	1	1850	1850	No
Case B	Major	2	11100	45750	Yes
	Minor	1	950	850	No

Intersection:	62nd / US 101 — Scen 2 AAvg				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	38000	Yes
	Minor	1	1850	700	No
Case B	Major	2	11100	38000	Yes
	Minor	1	950	700	No

Intersection:	62nd / US 101 — Scen 2 Off-Season				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	33900	Yes
	Minor	1	1850	650	No
Case B	Major	2	11100	33900	Yes
	Minor	1	950	650	No

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	75	15	30	100	20	125	50	1850	45	180	2155	65
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1749	1733	1450	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1366	1733	1450	1346	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	88	18	35	118	24	147	53	1947	47	189	2268	68
RTOR Reduction (vph)	0	0	31	0	0	128	0	0	11	0	0	12
Lane Group Flow (vph)	88	18	4	118	24	19	53	1947	36	189	2268	56
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	15.7	15.7	15.7	15.7	15.7	15.7	3.2	76.0	76.0	15.3	88.1	88.1
Effective Green, g (s)	15.2	15.2	15.2	15.2	15.2	15.2	3.7	76.5	76.5	15.8	88.6	89.1
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.03	0.64	0.64	0.13	0.74	0.74
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	173	220	184	170	215	180	53	2058	896	227	2383	1044
v/s Ratio Prot		0.01			0.01		0.03	c0.60		0.11	c0.70	
v/s Ratio Perm	0.06		0.00	c0.09		0.01			0.03			0.04
v/c Ratio	0.51	0.08	0.02	0.69	0.11	0.10	1.00	0.95	0.04	0.83	0.95	0.05
Uniform Delay, d1	48.9	46.2	45.9	50.2	46.4	46.4	58.2	19.9	8.1	50.8	13.8	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.72	0.26	0.17	1.16	0.64	1.12
Incremental Delay, d2	3.2	0.2	0.1	12.5	0.3	0.3	76.4	4.9	0.0	2.5	1.3	0.0
Delay (s)	52.1	46.5	46.0	62.6	46.7	46.7	118.1	10.0	1.4	61.2	10.1	4.6
Level of Service	D	D	D	E	D	D	F	B	A	E	B	A
Approach Delay (s)		49.9			53.2			12.6			13.8	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	50	15	20	205	15	445	25	1450	190	445	1785	55
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1714	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1365	1716	1458	1345	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	59	18	24	241	18	524	26	1526	200	468	1879	58
RTOR Reduction (vph)	0	0	18	0	0	199	0	0	74	0	0	14
Lane Group Flow (vph)	59	18	6	241	18	325	26	1526	126	468	1879	44
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	29.5	29.5	29.5	29.0	29.0	29.0	2.4	58.9	58.9	19.1	75.6	75.6
Effective Green, g (s)	29.5	29.5	29.5	28.5	28.5	28.5	2.9	59.4	59.4	19.6	76.1	76.1
Actuated g/C Ratio	0.25	0.25	0.25	0.24	0.24	0.24	0.02	0.50	0.50	0.16	0.63	0.63
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	336	422	358	319	408	337	42	1598	703	546	2047	925
v/s Ratio Prot		0.01			0.01		0.01	c0.47		0.14	c0.58	
v/s Ratio Perm	0.04		0.00	0.18		c0.23			0.09			0.03
v/c Ratio	0.18	0.04	0.02	0.76	0.04	0.96	0.62	0.95	0.18	0.86	0.92	0.05
Uniform Delay, d1	35.7	34.5	34.3	42.5	35.3	45.2	58.0	29.0	16.8	48.8	19.2	8.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.77	1.14
Incremental Delay, d2	0.3	0.0	0.0	10.4	0.1	39.4	24.2	14.1	0.6	5.4	3.5	0.0
Delay (s)	35.9	34.5	34.3	52.9	35.3	84.7	82.2	43.1	17.4	49.2	18.3	9.5
Level of Service	D	C	C	D	D	F	F	D	B	D	B	A
Approach Delay (s)		35.3			73.8			40.7			24.1	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM Average Control Delay	37.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: South Beach State Park & US 101

2030 Scenario 1-Off Season

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	60	5	30	45	5	80	25	1530	35	75	1875	65
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	1465		1630	1474		1614	3228	1458	1630	3228	1409
Flt Permitted	0.69	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1173	1465		1253	1474		1614	3228	1458	1630	3228	1409
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.85	0.85	0.95	0.95
Adj. Flow (vph)	71	6	35	53	6	94	26	1611	41	88	1974	68
RTOR Reduction (vph)	0	31	0	0	83	0	0	0	15	0	0	15
Lane Group Flow (vph)	71	10	0	53	17	0	26	1611	26	88	1974	53
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	8.4	8.4		8.4	8.4		1.3	47.2	47.2	7.3	53.2	53.2
Effective Green, g (s)	8.9	8.4		8.4	8.4		1.8	47.7	47.2	7.3	53.7	53.7
Actuated g/C Ratio	0.12	0.11		0.11	0.11		0.02	0.64	0.63	0.10	0.72	0.72
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	139	164		141	165		39	2056	919	159	2314	1010
v/s Ratio Prot		0.01			0.01		0.02	0.50		c0.05	c0.61	
v/s Ratio Perm	c0.06			0.04					0.02			0.04
v/c Ratio	0.51	0.06		0.38	0.10		0.67	0.78	0.03	0.55	0.85	0.05
Uniform Delay, d1	31.0	29.7		30.8	29.9		36.3	9.9	5.2	32.2	7.7	3.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.2		1.7	0.3		35.5	2.0	0.0	4.1	3.3	0.0
Delay (s)	34.1	29.9		32.5	30.1		71.8	11.9	5.2	36.4	11.0	3.1
Level of Service	C	C		C	C		E	B	A	D	B	A
Approach Delay (s)		32.6			30.9			12.6			11.8	
Approach LOS		C			C			B			B	

Intersection Summary				
HCM Average Control Delay	13.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	74.9	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	80.1%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2550	95	0	2455
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	2684	100	0	2584
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5272	2688			2786	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5272	2688			2786	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	27			139	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	2684	100	2584
Volume Left	0	0	0
Volume Right	0	100	0
cSH	1700	1700	1700
Volume to Capacity	1.58	0.06	1.52
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	156.4%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	140	0	2640	2260	190
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	165	0	2779	2379	200
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.43					
vC, conflicting volume	3772	2383	2581			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4781	2383	2581			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	27	164			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	165	1389	1389	2379	200
Volume Left	0	0	0	0	0
Volume Right	165	0	0	0	200
cSH	27	1700	1700	1700	1700
Volume to Capacity	6.18	0.82	0.82	1.40	0.12
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	298.2		
Intersection Capacity Utilization	145.7%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	40	0	0	645	0	2000	50	0	2365	35
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	47	0	0	759	0	2105	53	0	2489	37
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.40	0.40		0.40	0.40	0.40				0.40		
vC, conflicting volume	4323	4670	1267	3401	4636	1057	2528			2160		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6269	7125	1267	3991	7041	0	2528			924		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	71	100	100	0	100			100		
cM capacity (veh/h)	0	0	161	0	0	437	172			294		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	47	759	1053	1053	53	1660	867
Volume Left	0	0	0	0	0	0	0
Volume Right	47	759	0	0	53	0	37
cSH	161	437	1700	1700	1700	1700	1700
Volume to Capacity	0.29	1.73	0.62	0.62	0.03	0.98	0.51
Queue Length 95th (ft)	29	1158	0	0	0	0	0
Control Delay (s)	36.4	362.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	F					
Approach Delay (s)	36.4	362.3	0.0			0.0	
Approach LOS	E	F					

Intersection Summary			
Average Delay	50.4		
Intersection Capacity Utilization	110.3%	ICU Level of Service	H
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: SW 62nd St & US 101

2030 Scenario 1-Off Season

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	65	0	20	15	0	5	35	1525	10	5	1885	60
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	76	0	24	18	0	6	37	1605	11	5	1984	63
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2881	3688	996	2714	3746	812	2049			1618		
vC1, stage 1 conf vol	1997	1997		1686	1686							
vC2, stage 2 conf vol	884	1691		1028	2060							
vCu, unblocked vol	2881	3688	996	2714	3746	812	2049			1618		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	90	76	100	98	86			99		
cM capacity (veh/h)	58	74	244	74	51	323	266			394		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	76	24	18	6	37	1070	546	5	992	992	63
Volume Left	76	0	18	0	37	0	0	5	0	0	0
Volume Right	0	24	0	6	0	0	11	0	0	0	63
cSH	58	244	74	323	266	1700	1700	394	1700	1700	1700
Volume to Capacity	1.32	0.10	0.24	0.02	0.14	0.63	0.32	0.01	0.58	0.58	0.04
Queue Length 95th (ft)	166	8	21	1	12	0	0	1	0	0	0
Control Delay (s)	342.3	21.3	67.9	16.3	20.7	0.0	0.0	14.3	0.0	0.0	0.0
Lane LOS	F	C	F	C	C			B			
Approach Delay (s)	266.7		55.0		0.5			0.0			
Approach LOS	F		F								

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

2030 US 101 Segment V/C Analysis

Volumes

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3515	3225	2960	2700	2640	2400
35th to 50th	2245	3065	1870	2565	1665	2285
50th to 62nd	2145	2610	1790	2185	1590	1950

V/C

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.70	2.48	2.28	2.08	2.03	1.85
35th to 50th	0.64	0.88	0.53	0.73	0.48	0.65
50th to 62nd	0.61	0.75	0.51	0.62	0.45	0.56

Volumes

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3355	3125	2830	2615	2525	2330
35th to 50th	2125	2965	1770	2480	1585	2215
50th to 62nd	2035	2540	1700	2135	1515	1900

V/C

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.58	2.40	2.18	2.01	1.94	1.79
35th to 50th	0.61	0.85	0.51	0.71	0.45	0.63
50th to 62nd	0.58	0.73	0.49	0.61	0.43	0.54

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	41	53	100	26	1611	41	88	1974	68
v/c Ratio	0.67	0.21	0.37	0.40	0.31	0.71	0.04	0.55	0.78	0.06
Control Delay	79.9	20.3	56.0	15.6	64.8	13.3	2.1	54.2	5.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.9	20.3	56.0	15.6	64.8	13.3	2.1	54.2	5.9	0.1
Queue Length 50th (ft)	53	4	39	4	20	392	0	67	116	0
Queue Length 95th (ft)	97	34	74	48	51	484	10	m80	323	m1
Internal Link Dist (ft)		573		801		2367			3870	
Turn Bay Length (ft)					150		320	215		150
Base Capacity (vph)	133	242	181	295	85	2285	1126	183	2529	1112
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.17	0.29	0.34	0.31	0.71	0.04	0.48	0.78	0.06

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	59	18	24	241	18	524	26	1526	200	468	1879	58
v/c Ratio	0.18	0.04	0.06	0.75	0.04	0.98	0.38	0.93	0.25	0.94	0.90	0.06
Control Delay	37.1	34.6	13.0	58.4	35.4	56.8	79.0	32.3	3.1	60.0	18.2	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	34.6	13.0	58.4	35.4	56.8	79.0	32.3	3.1	60.0	18.2	5.1
Queue Length 50th (ft)	36	11	0	173	11	229	18	568	24	182	390	5
Queue Length 95th (ft)	69	29	20	252	29	#402	m29	#739	m11	m#212	m#560	m7
Internal Link Dist (ft)		558			357			3870			1419	
Turn Bay Length (ft)	120		155	120		155	215		215	130		175
Base Capacity (vph)	341	429	383	325	415	541	69	1641	794	500	2089	956
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.04	0.06	0.74	0.04	0.97	0.38	0.93	0.25	0.94	0.90	0.06

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	88	18	35	118	24	147	53	1947	47	189	2268	68
v/c Ratio	0.51	0.08	0.16	0.69	0.11	0.48	0.73	0.95	0.05	0.83	0.94	0.06
Control Delay	58.4	45.1	15.9	70.0	45.8	12.6	65.9	12.0	0.8	62.2	11.8	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	45.1	15.9	70.0	45.8	12.6	65.9	12.0	0.8	62.2	11.8	2.5
Queue Length 50th (ft)	64	12	0	88	17	0	42	191	1	154	275	4
Queue Length 95th (ft)	109	33	27	141	40	50	m44	m#250	m1	m93	m131	m1
Internal Link Dist (ft)		441			300			1419			620	
Turn Bay Length (ft)	120		155	120		155	130		175	130		175
Base Capacity (vph)	211	267	253	208	262	343	73	2057	907	227	2404	1065
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.07	0.14	0.57	0.09	0.43	0.73	0.95	0.05	0.83	0.94	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	55	44.9	13.3	58.2	0.69	42.4	A
40th Street	II	45	59.8	32.3	92.1	0.75	29.2	B
35th St.	II	35	31.2	12.0	43.2	0.28	23.7	C
Hurbert St	II	31	200.2	795.4	995.6	1.73	6.2	F
Total	II		336.1	853.0	1189.1	3.44	10.4	F

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	769.8	791.7	0.16	0.7	F
35th St	III	31	200.2	11.8	212.0	1.73	29.3	B
40th Street	III	35	34.1	18.2	52.3	0.28	19.5	C
South Beach State Pa	III	55	49.0	5.9	54.9	0.75	49.1	A
Total	III		305.2	805.7	1110.9	2.92	9.5	F

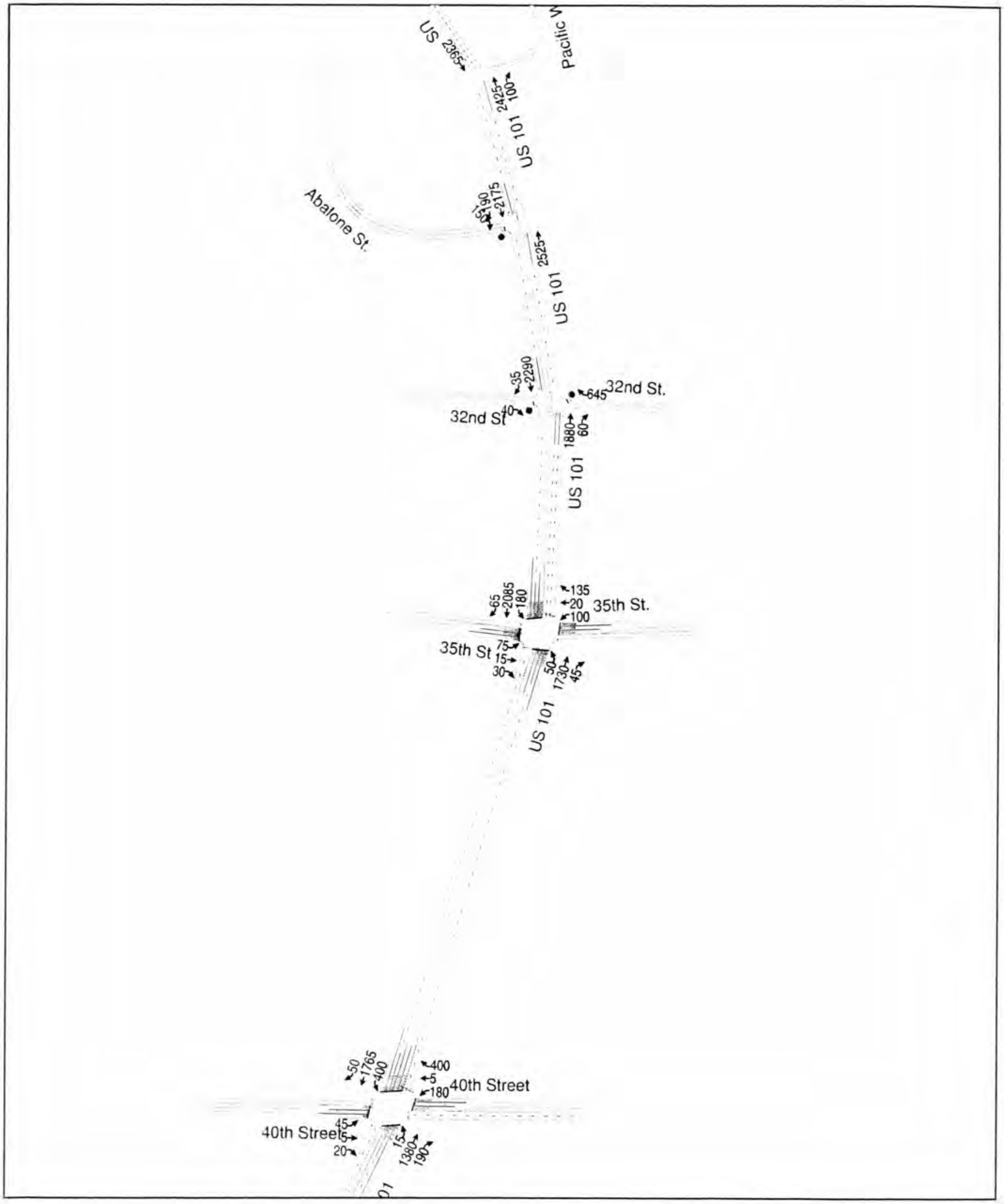
US 101

Direction	NB	SB	All
Average Speed (mph)	8	9	8
Total Travel Time (hr)	**1042**	**987**	**2029**
Distance Traveled (mi)	8456	8403	16859
Unserved Vehicles (#)	**2144**	**2073**	**4217**
Performance Index	856.0	790.2	1646.2

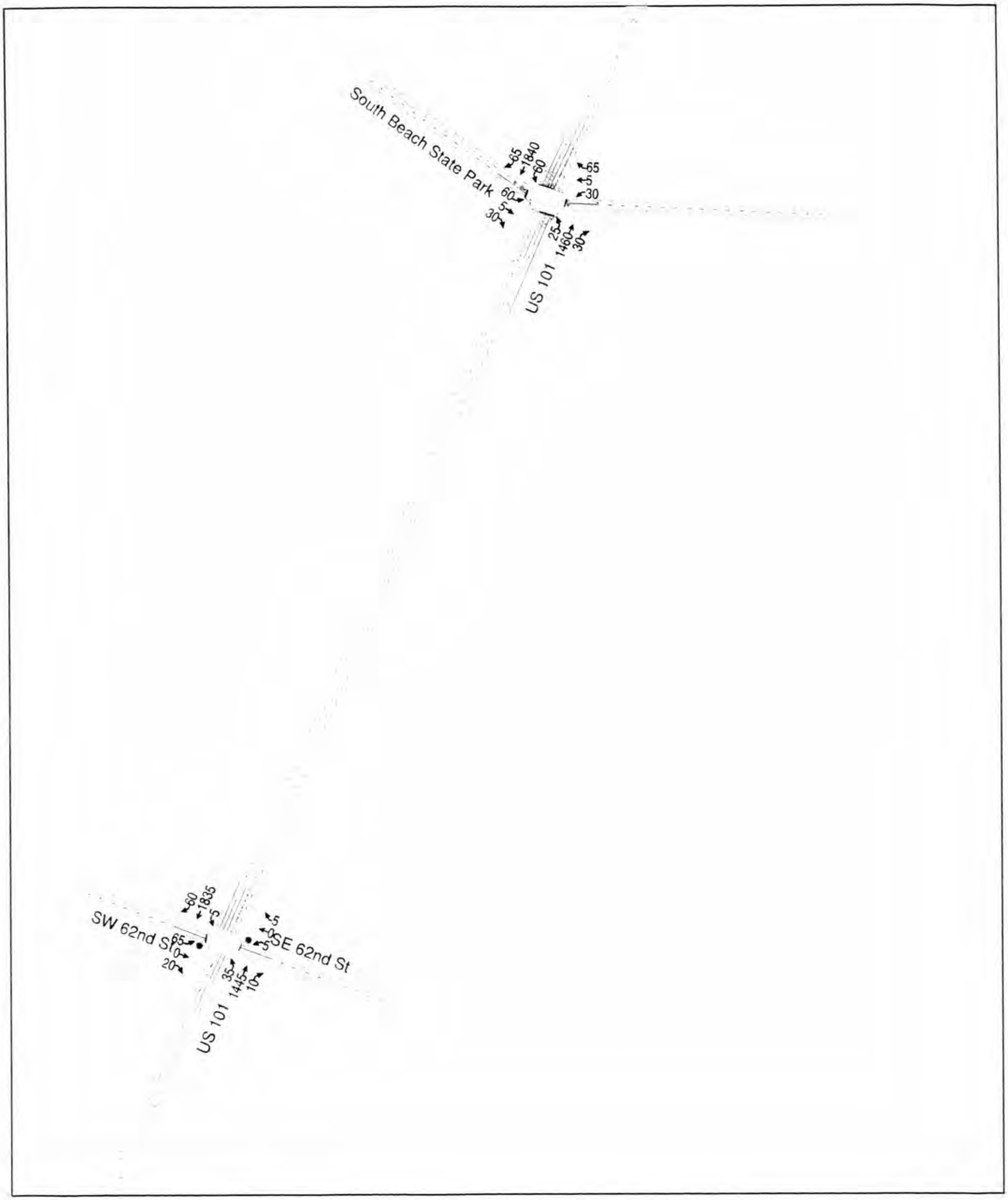
APPENDIX H

2030 Volumes and Traffic Operations Analysis for Off-Season Conditions and Land Use Scenario #2

2030 Scenario2-Off Season



2030 Scenario2-Off Season



Preliminary Signal Warrant Calculation

Project:	Newport Alternate Mobility Standard
Year:	2030
Alternative	Scenario 1 & Scenario 2
Percentage of Standard:	70%

Intersection: 62nd / US 101 – Scen 1 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	47500	Yes
	Minor	1	1850	850	NO
Case B	Major	2	[illegible]	47500	Yes
	Minor	1	950	850	NO

Intersection: 62nd / US 101 – Scen 1 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	39400	Yes
	Minor	1	1850	700	NO
Case B	Major	2	11,100	39400	Yes
	Minor	1	[illegible]	700	NO

Intersection: 62nd / US 101 – Scen 1 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	35200	Yes
	Minor	1	[illegible]	650	NO
Case B	Major	2	[illegible]	35,200	Yes
	Minor	1	[illegible]	650	NO

Intersection: 62nd / US 101 – Scen 2 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	45750	Yes
	Minor	1	1850	1850	NO
Case B	Major	2	11100	45750	Yes
	Minor	1	950	850	NO

Intersection: 62nd / US 101 – Scen 2 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	38000	Yes
	Minor	1	1850	700	No
Case B	Major	2	11100	38000	Yes
	Minor	1	950	700	No

Intersection: 62nd / US 101 – Scen 2 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	33900	Yes
	Minor	1	1850	650	No
Case B	Major	2	11100	33900	Yes
	Minor	1	950	650	No

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	75	15	30	100	20	135	50	1730	45	180	2085	65
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1749	1733	1449	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1365	1733	1449	1346	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	88	18	35	118	24	159	53	1821	47	189	2195	68
RTOR Reduction (vph)	0	0	31	0	0	140	0	0	10	0	0	13
Lane Group Flow (vph)	88	18	4	118	24	19	53	1821	37	189	2195	55
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	16.2	16.2	16.2	16.2	16.2	16.2	5.9	84.4	84.4	16.4	94.9	94.9
Effective Green, g (s)	15.7	15.7	15.7	15.7	15.7	15.7	6.4	84.9	84.9	16.9	95.4	95.9
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.05	0.65	0.65	0.13	0.73	0.74
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	165	209	175	163	205	172	85	2108	918	224	2369	1037
v/s Ratio Prot		0.01			0.01		0.03	c0.56		0.11	c0.68	
v/s Ratio Perm	0.06		0.00	c0.09		0.01			0.03			0.04
v/c Ratio	0.53	0.09	0.02	0.72	0.12	0.11	0.62	0.86	0.04	0.84	0.93	0.05
Uniform Delay, d1	53.7	50.8	50.4	55.1	51.0	50.9	60.6	17.9	8.0	55.3	14.4	4.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.40	0.59	1.00	1.00	1.00
Incremental Delay, d2	4.2	0.2	0.1	15.6	0.3	0.4	7.5	2.8	0.0	24.1	7.8	0.1
Delay (s)	57.9	51.0	50.5	70.7	51.3	51.3	53.1	9.9	4.8	79.3	22.1	4.8
Level of Service	E	D	D	E	D	D	D	A	A	E	C	A
Approach Delay (s)		55.2			58.9			11.0			26.1	
Approach LOS		E			E			B			C	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	45	5	20	180	5	400	15	1380	190	400	1765	50
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1713	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1380	1716	1458	1360	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	6	24	212	6	471	16	1453	200	421	1858	53
RTOR Reduction (vph)	0	0	19	0	0	201	0	0	69	0	0	11
Lane Group Flow (vph)	53	6	5	212	6	270	16	1453	131	421	1858	42
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	28.7	28.7	28.7	28.2	28.2	28.2	1.6	68.0	68.0	20.8	87.2	87.2
Effective Green, g (s)	28.7	28.7	28.7	27.7	27.7	27.7	2.1	68.5	68.5	21.3	87.7	87.7
Actuated g/C Ratio	0.22	0.22	0.22	0.21	0.21	0.21	0.02	0.53	0.53	0.16	0.67	0.67
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	305	379	322	290	366	303	28	1701	749	547	2178	984
v/s Ratio Prot		0.00			0.00		0.01	c0.45		0.13	c0.58	
v/s Ratio Perm	0.04		0.00	0.16		c0.19			0.09			0.03
v/c Ratio	0.17	0.02	0.02	0.73	0.02	0.89	0.57	0.85	0.17	0.77	0.85	0.04
Uniform Delay, d1	41.0	39.6	39.6	47.7	40.4	49.7	63.5	26.5	16.0	52.0	16.2	7.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.22	0.81	0.69	0.81	0.49	0.47
Incremental Delay, d2	0.3	0.0	0.0	9.7	0.0	26.8	20.3	4.6	0.4	2.8	2.0	0.0
Delay (s)	41.3	39.6	39.6	57.4	40.4	76.5	97.6	26.1	11.4	44.8	9.9	3.4
Level of Service	D	D	D	E	D	E	F	C	B	D	A	A
Approach Delay (s)		40.7			70.3			25.0			16.0	
Approach LOS		D			E			C			B	

Intersection Summary			
HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	60	5	30	30	5	65	25	1460	30	60	1840	65
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1607	1462		1630	1477		1614	3228	1458	1630	3228	1404
Flt Permitted	0.62	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1051	1462		1253	1477		1614	3228	1458	1630	3228	1404
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.85	0.85	0.95	0.95
Adj. Flow (vph)	71	6	35	35	6	76	26	1537	35	71	1937	68
RTOR Reduction (vph)	0	32	0	0	68	0	0	0	9	0	0	11
Lane Group Flow (vph)	71	10	0	35	14	0	26	1537	26	71	1937	57
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	13.0	13.0		13.0	13.0		4.4	96.0	96.0	9.0	100.6	100.6
Effective Green, g (s)	13.5	13.0		13.0	13.0		4.9	96.5	96.0	9.0	101.1	101.1
Actuated g/C Ratio	0.10	0.10		0.10	0.10		0.04	0.74	0.74	0.07	0.78	0.78
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	109	146		125	148		61	2396	1077	113	2510	1092
v/s Ratio Prot		0.01			0.01		0.02	c0.48		0.04	c0.60	
v/s Ratio Perm	c0.07			0.03					0.02			0.04
v/c Ratio	0.65	0.07		0.28	0.09		0.43	0.64	0.02	0.63	0.77	0.05
Uniform Delay, d1	56.0	53.0		54.2	53.1		61.2	8.2	4.5	58.9	8.0	3.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.17	0.43	0.05
Incremental Delay, d2	13.1	0.2		1.2	0.3		4.7	1.3	0.0	6.1	1.4	0.1
Delay (s)	69.1	53.2		55.4	53.4		65.9	9.6	4.6	75.0	4.8	0.2
Level of Service	E	D		E	D		E	A	A	E	A	A
Approach Delay (s)		63.3			54.0			10.4			7.0	
Approach LOS		E			D			B			A	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2425	100	0	2365
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	2553	105	0	2489
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5046	2557			2660	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5046	2557			2660	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1	33			156	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	2553	105	2489
Volume Left	0	0	0
Volume Right	0	105	0
cSH	1700	1700	1700
Volume to Capacity	1.50	0.06	1.46
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	149.2%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	150	0	2525	2175	190
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	176	0	2658	2289	200
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.53					
vC, conflicting volume	3622	2293	2491			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4178	2293	2491			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	1	31	178			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	176	1329	1329	2289	200
Volume Left	0	0	0	0	0
Volume Right	176	0	0	0	200
cSH	31	1700	1700	1700	1700
Volume to Capacity	5.73	0.78	0.78	1.35	0.12
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	331.4		
Intersection Capacity Utilization	141.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	40	0	0	645	0	1880	60	0	2290	35
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	47	0	0	759	0	1979	63	0	2411	37
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.53	0.53		0.53	0.53	0.53				0.53		
vC, conflicting volume	4181	4475	1228	3235	4430	993	2449			2044		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	5240	5797	1228	3446	5712	0	2449			1187		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	72	100	100	0	100			100		
cM capacity (veh/h)	0	0	171	1	0	570	185			304		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	47	759	989	989	63	1607	840
Volume Left	0	0	0	0	0	0	0
Volume Right	47	759	0	0	63	0	37
cSH	171	570	1700	1700	1700	1700	1700
Volume to Capacity	0.28	1.33	0.58	0.58	0.04	0.95	0.49
Queue Length 95th (ft)	27	810	0	0	0	0	0
Control Delay (s)	33.9	182.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	F					
Approach Delay (s)	33.9	182.6	0.0			0.0	
Approach LOS	D	F					

Intersection Summary			
Average Delay	26.5		
Intersection Capacity Utilization	106.7%	ICU Level of Service	G
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: SW 62nd St & US 101

2030 Scenario2-Off Season

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	65	0	20	5	0	5	35	1445	10	5	1835	60
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	76	0	24	6	0	6	37	1521	11	5	1932	63
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2786	3551	970	2604	3609	770	1997			1534		
vC1, stage 1 conf vol	1944	1944		1602	1602							
vC2, stage 2 conf vol	842	1607		1002	2007							
vCu, unblocked vol	2786	3551	970	2604	3609	770	1997			1534		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	91	93	100	98	87			99		
cM capacity (veh/h)	63	81	254	83	57	344	280			424		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	76	24	6	6	37	1014	518	5	966	966	63
Volume Left	76	0	6	0	37	0	0	5	0	0	0
Volume Right	0	24	0	6	0	0	11	0	0	0	63
cSH	63	254	83	344	280	1700	1700	424	1700	1700	1700
Volume to Capacity	1.22	0.09	0.07	0.02	0.13	0.60	0.30	0.01	0.57	0.57	0.04
Queue Length 95th (ft)	157	8	6	1	11	0	0	1	0	0	0
Control Delay (s)	294.4	20.6	51.4	15.6	19.8	0.0	0.0	13.6	0.0	0.0	0.0
Lane LOS	F	C	F	C	C			B			
Approach Delay (s)	230.0		33.5		0.5			0.0			
Approach LOS	F		D								

Intersection Summary				
Average Delay	6.6			
Intersection Capacity Utilization	72.5%	ICU Level of Service		C
Analysis Period (min)	15			

2030 US 101 Segment V/C Analysis

Volumes

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3515	3225	2960	2700	2640	2400
35th to 50th	2245	3065	1870	2565	1665	2285
50th to 62nd	2145	2610	1790	2185	1590	1950

V/C

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.70	2.48	2.28	2.08	2.03	1.85
35th to 50th	0.64	0.88	0.53	0.73	0.48	0.65
50th to 62nd	0.61	0.75	0.51	0.62	0.45	0.56

Volumes

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3355	3125	2830	2615	2525	2330
35th to 50th	2125	2965	1770	2480	1585	2215
50th to 62nd	2035	2540	1700	2135	1515	1900

V/C

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.58	2.40	2.18	2.01	1.94	1.79
35th to 50th	0.61	0.85	0.51	0.71	0.45	0.63
50th to 62nd	0.58	0.73	0.49	0.61	0.43	0.54

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	41	35	82	26	1537	35	71	1937	68
v/c Ratio	0.63	0.21	0.26	0.36	0.28	0.62	0.03	0.53	0.75	0.06
Control Delay	74.0	20.5	52.7	16.7	61.9	10.1	2.0	71.6	4.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.0	20.5	52.7	16.7	61.9	10.1	2.0	71.6	4.3	0.2
Queue Length 50th (ft)	53	4	25	4	20	305	0	58	194	1
Queue Length 95th (ft)	96	34	54	45	51	414	9	m70	85	m0
Internal Link Dist (ft)		573		801		2367			3870	
Turn Bay Length (ft)					150		320	215		150
Base Capacity (vph)	146	242	181	280	94	2475	1217	150	2611	1147
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.17	0.19	0.29	0.28	0.62	0.03	0.47	0.74	0.06

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	53	6	24	212	6	471	16	1453	200	421	1858	53
v/c Ratio	0.19	0.02	0.08	0.79	0.02	0.98	0.20	0.82	0.23	0.85	0.82	0.05
Control Delay	39.0	35.2	13.4	65.9	36.0	58.9	75.9	21.2	2.9	55.0	14.3	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	35.2	13.4	65.9	36.0	58.9	75.9	21.2	2.9	55.0	14.3	4.9
Queue Length 50th (ft)	33	4	0	154	4	188	11	506	15	159	264	4
Queue Length 95th (ft)	64	14	21	222	15	#335	m0	448	17	m#188	#550	m7
Internal Link Dist (ft)		558			505			3870			1419	
Turn Bay Length (ft)	120		155	120		155	215		215	130		175
Base Capacity (vph)	334	415	371	317	400	522	81	1777	854	495	2262	1032
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.01	0.06	0.67	0.02	0.90	0.20	0.82	0.23	0.85	0.82	0.05

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	88	18	35	118	24	159	53	1821	47	189	2195	68
v/c Ratio	0.51	0.08	0.16	0.69	0.11	0.50	0.73	0.89	0.05	0.83	0.91	0.06
Control Delay	58.4	45.1	15.9	70.0	45.8	12.6	75.3	9.9	0.7	53.1	14.5	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	45.1	15.9	70.0	45.8	12.6	75.3	9.9	0.7	53.1	14.5	3.5
Queue Length 50th (ft)	64	12	0	88	17	0	42	156	1	154	425	7
Queue Length 95th (ft)	109	33	27	141	40	51	m#50	210	m2	m114	m260	m5
Internal Link Dist (ft)		441			300			1419			620	
Turn Bay Length (ft)	120		155	120		155	130		175	130		175
Base Capacity (vph)	211	267	253	208	262	354	73	2057	907	227	2404	1065
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.07	0.14	0.57	0.09	0.45	0.73	0.89	0.05	0.83	0.91	0.06

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	55	44.9	10.1	55.0	0.69	44.9	A
40th Street	II	45	59.8	21.2	81.0	0.75	33.2	B
35th St.	II	35	31.2	9.9	41.1	0.28	24.9	C
Hurbert St	II	31	200.2	427.9	628.1	1.73	9.9	F
Total	II		336.1	469.1	805.2	3.44	15.4	E

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	412.9	434.8	0.16	1.4	F
35th St	III	31	200.2	14.5	214.7	1.73	28.9	B
40th Street	III	35	34.1	14.3	48.4	0.28	21.1	C
South Beach State Pa	III	55	49.0	4.3	53.3	0.75	50.5	A
Total	III		305.2	446.0	751.2	2.92	14.0	E

US 101

Direction	NB	SB	All
Average Speed (mph)	14	14	14
Total Travel Time (hr)	**513**	**516**	**1029**
Distance Traveled (mi)	6933	7477	14410
Unserved Vehicles (#)	**1191**	**1141**	**2332**
Performance Index	328.6	324.0	652.6

APPENDIX I

Duration of Congestion Analysis with Average Annual Volumes - Land Use Scenario #1

2009 Counts - Two-way Roadway Segment Volues

	N of Ferry Slip		S of Ferry Slip		S of Pacific Way				
	Mp 142.4	% of Peak	MP 142.51	% of Peak	MP142.16	NB	SB	Total	% of Peak
9/15/2009 5:00 AM	137	10%	139	11%	9/22/2009 5:00 AM	106	41	147	9%
9/15/2009 6:00 AM	369	27%	364	28%	9/22/2009 6:00 AM	256	149	405	25%
9/15/2009 7:00 AM	871	63%	829	63%	9/22/2009 7:00 AM	529	310	839	52%
9/15/2009 8:00 AM	962	70%	933	71%	9/22/2009 8:00 AM	667	465	1132	70%
9/15/2009 9:00 AM	1063	77%	1021	77%	9/22/2009 9:00 AM	611	485	1096	68%
9/15/2009 10:00 AM	1204	87%	1168	88%	9/22/2009 10:00 AM	675	619	1294	80%
9/15/2009 11:00 AM	1338	97%	1269	96%	9/22/2009 11:00 AM	732	698	1430	88%
9/15/2009 12:00 PM	1359	98%	1313	99%	9/22/2009 12:00 PM	728	747	1475	91%
9/15/2009 1:00 PM	1279	92%	1225	93%	9/22/2009 1:00 PM	762	821	1583	98%
9/15/2009 2:00 PM	1252	91%	1211	92%	9/22/2009 2:00 PM	745	799	1544	95%
9/15/2009 3:00 PM	1375	99%	1309	99%	9/22/2009 3:00 PM	752	865	**1617**	**100%**
9/15/2009 4:00 PM	**1383**	**100%**	**1323**	**100%**	9/22/2009 4:00 PM	690	862	1552	96%
9/15/2009 5:00 PM	1282	93%	1253	95%	9/22/2009 5:00 PM	610	844	1454	90%
9/15/2009 6:00 PM	839	61%	813	61%	9/22/2009 6:00 PM	393	536	929	57%
9/15/2009 7:00 PM	539	39%	513	39%	9/22/2009 7:00 PM	251	394	645	40%
9/15/2009 8:00 PM	397	29%	389	29%	9/22/2009 8:00 PM	168	219	387	24%
9/15/2009 9:00 PM	210	15%	208	16%	9/22/2009 9:00 PM	91	127	218	13%

2005 Counts - Total Intersection Approach Volumes

US 101 @ 32nd Street		
	TOTAL	% of Peak
4/5/2005 5:00 AM Tues		
4/5/2005 6:00 AM Tues	392	27%
4/5/2005 7:00 AM Tues	1,005	69%
4/5/2005 8:00 AM Tues	1,052	72%
4/5/2005 9:00 AM Tues	1,053	72%
4/5/2005 10:00 AM Tues	1,038	82%
4/5/2005 11:00 AM Tues	1,280	87%
4/5/2005 12:00 PM Tues	1,383	94%
4/5/2005 1:00 PM Tues	1,264	86%
4/5/2005 2:00 PM Tues	1,317	90%
4/5/2005 3:00 PM Tues	1,326	91%
4/5/2005 4:00 PM Tues	**1,464**	**100%**
4/5/2005 5:00 PM Tues	1,271	87%
4/5/2005 6:00 PM Tues	806	55%
4/5/20059 7:00 PM Tues	710	48%
4/5/2005 8:00 PM Tues	282	19%
4/5/20059 9:00 PM Tues		

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction
Land Use Scenario 1

	US 101 & 32nd Raw Count (April 2005)		US 101 & 35th Street		
				2030 AA-Scen1 Full Development	2030 AA-Scen1 19% Reduction
Hour	**Total Volume**	**% of Peak**	**V/C ~ 0.85 Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**4,670**	1,414	1,145
7:00-8:00	1005	68.5%	**4,670**	3,624	2,936
8:00-9:00	1052	71.7%	**4,670**	3,794	3,073
9:00-10:00	1053	71.8%	**4,670**	3,797	3,076
10:00-11:00	1038	70.8%	**4,670**	3,743	3,032
11:00-12:00	1280	87.3%	**4,670**	4,616	3,739
12:00-1:00	1383	94.3%	**4,670**	**4,987**	4,040
1:00-2:00	1264	86.2%	**4,670**	4,558	3,692
2:00-3:00	1317	89.8%	**4,670**	**4,749**	3,847
3:00-4:00	1326	90.4%	**4,670**	**4,782**	3,873
4:00-5:00	1467	100.0%	**4,670**	**5,290**	4,285
5:00-6:00	1271	86.6%	**4,670**	4,583	3,712
6:00-7:00	806	54.9%	**4,670**	2,906	2,354
7:00-8:00	710	48.4%	**4,670**	2,560	2,074
8:00-9:00	282	19.2%	**4,670**	1,017	824
Hours of Congestion				**4**	**0**

	US 101 & 32nd Raw Count (April 2005)		US 101 & 40th Street		
				2030 AA-Scen1 Full Development	2030 AA-Scen1 19% Reduction
Hour	**Total Volume**	**% of Peak**	**V/C ~ 0.75 Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**4,330**	1,411	1,143
7:00-8:00	1005	68.5%	**4,330**	3,617	2,929
8:00-9:00	1052	71.7%	**4,330**	3,786	3,066
9:00-10:00	1053	71.8%	**4,330**	3,790	3,069
10:00-11:00	1038	70.8%	**4,330**	3,736	3,026
11:00-12:00	1280	87.3%	**4,330**	**4,607**	3,731
12:00-1:00	1383	94.3%	**4,330**	**4,978**	4,031
1:00-2:00	1264	86.2%	**4,330**	**4,549**	3,684
2:00-3:00	1317	89.8%	**4,330**	**4,740**	3,839
3:00-4:00	1326	90.4%	**4,330**	**4,773**	3,865
4:00-5:00	1467	100.0%	**4,330**	**5,280**	4,276
5:00-6:00	1271	86.6%	**4,330**	**4,575**	3,705
6:00-7:00	806	54.9%	**4,330**	2,901	2,349
7:00-8:00	710	48.4%	**4,330**	2,555	2,070
8:00-9:00	282	19.2%	**4,330**	1,015	822
Hours of Congestion				**7**	**0**

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction
Land Use Scenario 1

	US 101 & 32nd Raw Count (April 2005)		US 101 & 50th Street/South Beach State Park Entrance		
			V/C ~ 0.75	2030 AA-Scen1 Full Development	2030 AA-Scen1 19% Reduction
Hour	**Total Volume**	**% of Peak**	**Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**4,010**	1,148	930
7:00-8:00	1005	68.5%	**4,010**	2,942	2,383
8:00-9:00	1052	71.7%	**4,010**	3,080	2,495
9:00-10:00	1053	71.8%	**4,010**	3,083	2,497
10:00-11:00	1038	70.8%	**4,010**	3,039	2,462
11:00-12:00	1280	87.3%	**4,010**	3,748	3,036
12:00-1:00	1383	94.3%	**4,010**	**4,049**	3,280
1:00-2:00	1264	86.2%	**4,010**	3,701	2,998
2:00-3:00	1317	89.8%	**4,010**	3,856	3,123
3:00-4:00	1326	90.4%	**4,010**	3,882	3,145
4:00-5:00	1467	100.0%	**4,010**	**4,295**	3,479
5:00-6:00	1271	86.6%	**4,010**	3,721	3,014
6:00-7:00	806	54.9%	**4,010**	2,360	1,911
7:00-8:00	710	48.4%	**4,010**	2,079	1,684
8:00-9:00	282	19.2%	**4,010**	826	669
Hours of Congestion				**2**	**0**

	US 101 & 32nd Raw Count (April 2005)		US 101 & Pacific Way		
			V/C ~ 0.85	2030 AA-Scen1 Full Development	2030 AA-Scen1 19% Reduction
Hour	**Total Volume**	**% of Peak**	**Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**2,890**	1,526	1,236
7:00-8:00	1005	68.5%	**2,890**	**3,912**	**3,169**
8:00-9:00	1052	71.7%	**2,890**	**4,095**	**3,317**
9:00-10:00	1053	71.8%	**2,890**	**4,099**	**3,321**
10:00-11:00	1038	70.8%	**2,890**	**4,040**	**3,273**
11:00-12:00	1280	87.3%	**2,890**	**4,982**	**4,036**
12:00-1:00	1383	94.3%	**2,890**	**5,383**	**4,361**
1:00-2:00	1264	86.2%	**2,890**	**4,920**	**3,986**
2:00-3:00	1317	89.8%	**2,890**	**5,126**	**4,153**
3:00-4:00	1326	90.4%	**2,890**	**5,161**	**4,181**
4:00-5:00	1467	100.0%	**2,890**	**5,710**	**4,626**
5:00-6:00	1271	86.6%	**2,890**	**4,947**	**4,008**
6:00-7:00	806	54.9%	**2,890**	3,137	2,542
7:00-8:00	710	48.4%	**2,890**	2,764	2,239
8:00-9:00	282	19.2%	**2,890**	1,098	889
Hours of Congestion				**11**	**11**

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction
Land Use Scenario 1

	US 101 & 32nd Raw Count (April 2005)		US 101 & Abalone Street		
Hour	**Total Volume**	**% of Peak**	**V/C ~ 0.90 Capacity**	**2030 AA-Scen1 Full Development Total Volume**	**2030 AA-Scen1 19% Reduction Total Volume**
6:00-7:00	392	26.7%	**2,950**	1,569	1,271
7:00-8:00	1005	68.5%	**2,950**	**4,021**	**3,258**
8:00-9:00	1052	71.7%	**2,950**	**4,209**	**3,410**
9:00-10:00	1053	71.8%	**2,950**	**4,213**	**3,413**
10:00-11:00	1038	70.8%	**2,950**	**4,153**	**3,364**
11:00-12:00	1280	87.3%	**2,950**	**5,122**	**4,149**
12:00-1:00	1383	94.3%	**2,950**	**5,534**	**4,483**
1:00-2:00	1264	86.2%	**2,950**	**5,058**	**4,097**
2:00-3:00	1317	89.8%	**2,950**	**5,270**	**4,269**
3:00-4:00	1326	90.4%	**2,950**	**5,306**	**4,298**
4:00-5:00	1467	100.0%	**2,950**	**5,870**	**4,755**
5:00-6:00	1271	86.6%	**2,950**	**5,086**	**4,120**
6:00-7:00	806	54.9%	**2,950**	**3,225**	2,612
7:00-8:00	710	48.4%	**2,950**	2,841	2,301
8:00-9:00	282	19.2%	**2,950**	1,128	914
Hours of Congestion				**12**	**11**

	US 101 & 32nd Raw Count (April 2005)		US 101 & 32nd Street		
Hour	**Total Volume**	**% of Peak**	**V/C ~ 0.90 Capacity**	**2030 AA-Scen1 Full Development Total Volume**	**2030 AA-Scen1 19% Reduction Total Volume**
6:00-7:00	392	26.7%	**4,670**	1,539	1,247
7:00-8:00	1005	68.5%	**4,670**	3,946	3,196
8:00-9:00	1052	71.7%	**4,670**	4,131	3,345
9:00-10:00	1053	71.8%	**4,670**	4,134	3,348
10:00-11:00	1038	70.8%	**4,670**	4,076	3,301
11:00-12:00	1280	87.3%	**4,670**	**5,026**	4,070
12:00-1:00	1383	94.3%	**4,670**	**5,430**	4,398
1:00-2:00	1264	86.2%	**4,670**	**4,963**	4,019
2:00-3:00	1317	89.8%	**4,670**	**5,171**	4,188
3:00-4:00	1326	90.4%	**4,670**	**5,206**	4,217
4:00-5:00	1467	100.0%	**4,670**	**5,760**	4,665
5:00-6:00	1271	86.6%	**4,670**	**4,990**	4,042
6:00-7:00	806	54.9%	**4,670**	3,165	2,563
7:00-8:00	710	48.4%	**4,670**	2,788	2,258
8:00-9:00	282	19.2%	**4,670**	1,107	897
Hours of Congestion				**7**	**0**

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction
Land Use Scenario 1

	US 101 & 32nd Raw Count (April 2005)		US 101 & 62nd Street		
			V/C ~ 0.80	2030 AA-Scen1 Full Development	2030 AA-Scen1 19% Reduction
Hour	**Total Volume**	**% of Peak**	**Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**3,490**	1,085	898
7:00-8:00	1005	68.5%	**3,490**	2,781	2,302
8:00-9:00	1052	71.7%	**3,490**	2,911	2,409
9:00-10:00	1053	71.8%	**3,490**	2,914	2,412
10:00-11:00	1038	70.8%	**3,490**	2,873	2,377
11:00-12:00	1280	87.3%	**3,490**	**3,542**	2,932
12:00-1:00	1383	94.3%	**3,490**	**3,828**	3,168
1:00-2:00	1264	86.2%	**3,490**	**3,498**	2,895
2:00-3:00	1317	89.8%	**3,490**	**3,645**	3,016
3:00-4:00	1326	90.4%	**3,490**	**3,670**	3,037
4:00-5:00	1467	100.0%	**3,490**	**4,060**	3,360
5:00-6:00	1271	86.6%	**3,490**	**3,518**	2,911
6:00-7:00	806	54.9%	**3,490**	2,231	1,846
7:00-8:00	710	48.4%	**3,490**	1,965	1,626
8:00-9:00	282	19.2%	**3,490**	780	646
Hours of Congestion				**7**	**0**

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	**85**	**15**	**35**	**110**	**20**	**140**	**60**	**2075**	**50**	**205**	**2420**	**75**
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (prot)	1749	1733	1450	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	**0.74**	**1.00**	**1.00**	**0.75**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (perm)	1371	1733	1450	1350	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Adj. Flow (vph)	85	15	35	110	20	140	60	2075	50	205	2420	75
RTOR Reduction (vph)	**0**	**0**	**31**	**0**	**0**	**123**	**0**	**0**	**11**	**0**	**0**	**12**
Lane Group Flow (vph)	85	15	4	110	20	17	60	2075	39	205	2420	63
Confl. Peds. (#/hr)	**2**		**2**	**2**		**2**	**2**		**2**	**2**		**2**
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	**Perm**		**Perm**	**Perm**		**Perm**	**Prot**		**Perm**	**Prot**		**Perm**
Protected Phases		4			8		5	2		1	6	
Permitted Phases	**4**		**4**	**8**		**8**			**2**			**6**
Actuated Green, G (s)	15.2	15.2	15.2	15.2	15.2	15.2	4.0	75.0	75.0	16.8	87.8	87.8
Effective Green, g (s)	**14.7**	**14.7**	**14.7**	**14.7**	**14.7**	**14.7**	**4.5**	**75.5**	**75.5**	**17.3**	**88.3**	**88.8**
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.04	0.63	0.63	0.14	0.74	0.74
Clearance Time (s)	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	**168**	**212**	**178**	**165**	**208**	**174**	**65**	**2031**	**885**	**248**	**2375**	**1040**
v/s Ratio Prot		0.01			0.01		0.03	c0.64		0.12	c0.75	
v/s Ratio Perm	**0.06**		**0.00**	**c0.08**		**0.01**			**0.03**			**0.04**
v/c Ratio	0.51	0.07	0.02	0.67	0.10	0.10	0.92	1.02	0.04	0.83	1.02	0.06
Uniform Delay, d1	**49.3**	**46.6**	**46.3**	**50.3**	**46.8**	**46.8**	**57.6**	**22.2**	**8.5**	**49.9**	**15.8**	**4.2**
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.72	0.28	0.23	0.95	0.91	1.59
Incremental Delay, d2	**3.2**	**0.2**	**0.1**	**10.7**	**0.3**	**0.3**	**43.9**	**17.7**	**0.0**	**2.2**	**11.3**	**0.0**
Delay (s)	52.5	46.8	46.4	61.0	47.0	47.1	85.2	23.9	2.0	49.8	25.6	6.8
Level of Service	**D**	**D**	**D**	**E**	**D**	**D**	**F**	**C**	**A**	**D**	**C**	**A**
Approach Delay (s)		50.3			52.8			25.1			27.0	
Approach LOS		**D**			**D**			**C**			**C**	

Intersection Summary			
HCM Average Control Delay	**28.1**	**HCM Level of Service**	**C**
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	**120.0**	**Sum of lost time (s)**	**9.0**
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	**15**		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	60	15	25	230	15	500	30	1625	215	500	2005	60
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1714	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1368	1716	1458	1349	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	15	25	230	15	500	30	1625	215	500	2005	60
RTOR Reduction (vph)	0	0	19	0	0	207	0	0	75	0	0	13
Lane Group Flow (vph)	60	15	6	230	15	293	30	1625	140	500	2005	47
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	26.7	26.7	26.7	26.2	26.2	26.2	2.4	60.9	60.9	19.9	78.4	78.4
Effective Green, g (s)	26.7	26.7	26.7	25.7	25.7	25.7	2.9	61.4	61.4	20.4	78.9	78.9
Actuated g/C Ratio	0.22	0.22	0.22	0.21	0.21	0.21	0.02	0.51	0.51	0.17	0.66	0.66
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	304	382	324	289	368	304	42	1652	727	568	2122	959
v/s Ratio Prot		0.01			0.01		0.02	c0.50		0.15	c0.62	
v/s Ratio Perm	0.04		0.00	0.17		c0.21			0.10			0.03
v/c Ratio	0.20	0.04	0.02	0.80	0.04	0.96	0.71	0.98	0.19	0.88	0.94	0.05
Uniform Delay, d1	37.9	36.6	36.4	44.7	37.4	46.7	58.1	28.8	15.9	48.6	18.6	7.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88	0.70	1.13
Incremental Delay, d2	0.3	0.0	0.0	14.8	0.1	42.0	44.2	18.6	0.6	4.4	3.2	0.0
Delay (s)	38.3	36.6	36.4	59.4	37.4	88.7	102.3	47.4	16.5	47.0	16.2	8.2
Level of Service	D	D	D	E	D	F	F	D	B	D	B	A
Approach Delay (s)		37.6			78.6			44.7			22.0	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM Average Control Delay	38.3	**HCM Level of Service**	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	**Sum of lost time (s)**	9.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	65	5	35	50	5	85	30	1720	40	85	2100	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	1458		1630	1473		1614	3228	1458	1630	3228	1408
Flt Permitted	0.70	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1184	1458		1254	1473		1614	3228	1458	1630	3228	1408
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	65	5	35	50	5	85	30	1720	40	85	2100	75
RTOR Reduction (vph)	0	31	0	0	76	0	0	0	13	0	0	14
Lane Group Flow (vph)	65	9	0	50	14	0	30	1720	27	85	2100	61
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	8.4	8.4		8.4	8.4		1.4	55.2	55.2	5.4	59.2	59.2
Effective Green, g (s)	8.9	8.4		8.4	8.4		1.9	55.7	55.2	5.4	59.7	59.7
Actuated g/C Ratio	0.11	0.10		0.10	0.10		0.02	0.69	0.68	0.07	0.74	0.74
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	130	151		130	153		38	2220	994	109	2379	1038
v/s Ratio Prot		0.01			0.01		0.02	c0.53		0.05	c0.65	
v/s Ratio Perm	c0.05			0.04					0.02			0.04
v/c Ratio	0.50	0.06		0.38	0.09		0.79	0.77	0.03	0.78	0.88	0.06
Uniform Delay, d1	34.0	32.7		33.9	32.8		39.4	8.5	4.2	37.2	8.0	2.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.0	0.2		1.9	0.3		67.6	1.7	0.0	28.9	4.3	0.0
Delay (s)	37.0	32.9		35.8	33.1		106.9	10.2	4.2	66.1	12.3	3.0
Level of Service	D	C		D	C		F	B	A	E	B	A
Approach Delay (s)		35.4			34.1			11.7			14.0	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	81.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2855	105	0	2750
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	2855	105	0	2750
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5609	2859			2962	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5609	2859			2962	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	21			118	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	2855	105	2750
Volume Left	0	0	0
Volume Right	0	105	0
cSH	1700	1700	1700
Volume to Capacity	1.68	0.06	1.62
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	173.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	160	0	2960	2535	215
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	160	0	2960	2535	215
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.41					
vC, conflicting volume	4019	2539	2752			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5507	2539	2752			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	21	140			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	160	1480	1480	2535	215
Volume Left	0	0	0	0	0
Volume Right	160	0	0	0	215
cSH	21	1700	1700	1700	1700
Volume to Capacity	7.75	0.87	0.87	1.49	0.13
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	272.5		
Intersection Capacity Utilization	162.7%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	45	0	0	720	0	2240	60	0	2655	40
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	45	0	0	720	0	2240	60	0	2655	40
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.39	0.39		0.39	0.39	0.39				0.39		
vC, conflicting volume	4519	4979	1352	3616	4939	1124	2697			2302		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6877	8051	1352	4574	7949	0	2697			1218		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	68	100	100	0	100			100		
cM capacity (veh/h)	0	0	141	0	0	423	147			220		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	45	720	1120	1120	60	1770	925
Volume Left	0	0	0	0	0	0	0
Volume Right	45	720	0	0	60	0	40
cSH	141	423	1700	1700	1700	1700	1700
Volume to Capacity	0.32	1.70	0.66	0.66	0.04	1.04	0.54
Queue Length 95th (ft)	32	1083	0	0	0	0	0
Control Delay (s)	42.1	348.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	F					
Approach Delay (s)	42.1	348.2	0.0			0.0	
Approach LOS	E	F					

Intersection Summary			
Average Delay	43.9		
Intersection Capacity Utilization	122.5%	ICU Level of Service	H
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: SW 62nd St & US 101

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑↱		↰	↑↑	↱
Volume (veh/h)	70	0	25	15	0	10	35	1710	10	10	2110	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	70	0	25	15	0	10	35	1710	10	10	2110	65
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3069	3924	1059	2889	3984	864	2177			1722		
vC1, stage 1 conf vol	2132	2132		1787	1787							
vC2, stage 2 conf vol	937	1792		1102	2197							
vCu, unblocked vol	3069	3924	1059	2889	3984	864	2177			1722		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	89	76	100	97	85			97		
cM capacity (veh/h)	47	62	221	63	40	298	237			358		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	70	25	15	10	35	1140	580	10	1055	1055	65
Volume Left	70	0	15	0	35	0	0	10	0	0	0
Volume Right	0	25	0	10	0	0	10	0	0	0	65
cSH	47	221	63	298	237	1700	1700	358	1700	1700	1700
Volume to Capacity	1.49	0.11	0.24	0.03	0.15	0.67	0.34	0.03	0.62	0.62	0.04
Queue Length 95th (ft)	169	9	21	3	13	0	0	2	0	0	0
Control Delay (s)	442.2	23.3	78.8	17.5	22.8	0.0	0.0	15.3	0.0	0.0	0.0
Lane LOS	F	C	F	C	C			C			
Approach Delay (s)	332.0		54.3		0.5			0.1			
Approach LOS	F		F								

Intersection Summary			
Average Delay	8.3		
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	**69**	**12**	**28**	**89**	**16**	**113**	**49**	**1681**	**41**	**166**	**1960**	**61**
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (prot)	1749	1733	1450	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	**0.75**	**1.00**	**1.00**	**0.75**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (perm)	1376	1733	1450	1354	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Adj. Flow (vph)	69	12	28	89	16	113	49	1681	41	166	1960	61
RTOR Reduction (vph)	**0**	**0**	**25**	**0**	**0**	**100**	**0**	**0**	**10**	**0**	**0**	**12**
Lane Group Flow (vph)	69	12	3	89	16	13	49	1681	31	166	1960	49
Confl. Peds. (#/hr)	**2**		**2**	**2**		**2**	**2**		**2**	**2**		**2**
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	**Perm**		**Perm**	**Perm**		**Perm**	**Prot**		**Perm**	**Prot**		**Perm**
Protected Phases		4			8		5	2		1	6	
Permitted Phases	**4**		**4**	**8**		**8**			**2**			**6**
Actuated Green, G (s)	13.9	13.9	13.9	13.9	13.9	13.9	5.4	77.6	77.6	15.5	87.7	87.7
Effective Green, g (s)	**13.4**	**13.4**	**13.4**	**13.4**	**13.4**	**13.4**	**5.9**	**78.1**	**78.1**	**16.0**	**88.2**	**88.7**
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11	0.11	0.05	0.65	0.65	0.13	0.74	0.74
Clearance Time (s)	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	**154**	**194**	**162**	**151**	**190**	**159**	**85**	**2101**	**915**	**230**	**2373**	**1039**
v/s Ratio Prot		0.01			0.01		0.03	c0.52		0.10	c0.61	
v/s Ratio Perm	**0.05**		**0.00**	**c0.07**		**0.01**			**0.02**			**0.03**
v/c Ratio	0.45	0.06	0.02	0.59	0.08	0.08	0.58	0.80	0.03	0.72	0.83	0.05
Uniform Delay, d1	**49.8**	**47.7**	**47.5**	**50.7**	**47.8**	**47.8**	**55.8**	**15.3**	**7.5**	**49.9**	**10.7**	**4.2**
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.25	0.14	1.05	0.90	1.44
Incremental Delay, d2	**2.8**	**0.2**	**0.1**	**6.8**	**0.3**	**0.3**	**6.3**	**2.3**	**0.0**	**1.0**	**0.3**	**0.0**
Delay (s)	52.7	47.9	47.5	57.5	48.1	48.1	46.0	6.2	1.1	53.2	10.0	6.1
Level of Service	**D**	**D**	**D**	**E**	**D**	**D**	**D**	**A**	**A**	**D**	**A**	**A**
Approach Delay (s)		50.8			51.9			7.2			13.1	
Approach LOS		**D**			**D**			**A**			**B**	

Intersection Summary			
HCM Average Control Delay	**13.6**	**HCM Level of Service**	**B**
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	**120.0**	**Sum of lost time (s)**	**9.0**
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	**15**		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: 40th Street & US 101

2030 Scenario 1 AAV - 19% Reduction

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	49	12	20	186	12	405	24	1316	174	405	1624	49
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1714	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1372	1716	1458	1353	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	49	12	20	186	12	405	24	1316	174	405	1624	49
RTOR Reduction (vph)	0	0	16	0	0	241	0	0	66	0	0	12
Lane Group Flow (vph)	49	12	4	186	12	164	24	1316	108	405	1624	37
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	23.2	23.2	23.2	22.7	22.7	22.7	3.2	64.7	64.7	19.6	81.1	81.1
Effective Green, g (s)	23.2	23.2	23.2	22.2	22.2	22.2	3.7	65.2	65.2	20.1	81.6	81.6
Actuated g/C Ratio	0.19	0.19	0.19	0.18	0.18	0.18	0.03	0.54	0.54	0.17	0.68	0.68
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	265	332	282	250	317	263	54	1754	772	559	2195	991
v/s Ratio Prot		0.01			0.01		0.01	c0.41		0.12	c0.50	
v/s Ratio Perm	0.04		0.00	c0.14		0.12			0.08			0.03
v/c Ratio	0.18	0.04	0.01	0.74	0.04	0.62	0.44	0.75	0.14	0.72	0.74	0.04
Uniform Delay, d1	40.5	39.3	39.1	46.2	40.1	45.0	57.1	21.1	13.5	47.3	12.4	6.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.12	0.74	0.71	0.89	0.69	0.97
Incremental Delay, d2	0.3	0.0	0.0	12.0	0.1	5.1	4.9	2.6	0.3	2.7	1.3	0.0
Delay (s)	40.8	39.4	39.2	58.3	40.2	50.2	68.8	18.1	9.9	45.0	9.9	6.1
Level of Service	D	D	D	E	D	D	E	B	A	D	A	A
Approach Delay (s)		40.2			52.5			18.0			16.7	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	53	4	28	41	4	69	24	1393	32	69	1701	61
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1608	1457		1630	1472		1614	3228	1458	1630	3228	1405
Flt Permitted	0.66	1.00		0.74	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1123	1457		1263	1472		1614	3228	1458	1630	3228	1405
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	53	4	28	41	4	69	24	1393	32	69	1701	61
RTOR Reduction (vph)	0	26	0	0	63	0	0	0	8	0	0	12
Lane Group Flow (vph)	53	6	0	41	10	0	24	1393	24	69	1701	49
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	9.7	9.7		9.7	9.7		5.0	89.4	89.4	8.9	93.3	93.3
Effective Green, g (s)	10.2	9.7		9.7	9.7		5.5	89.9	89.4	8.9	93.8	93.8
Actuated g/C Ratio	0.08	0.08		0.08	0.08		0.05	0.75	0.74	0.07	0.78	0.78
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	95	118		102	119		74	2418	1086	121	2523	1098
v/s Ratio Prot		0.00			0.01		0.01	c0.43		0.04	c0.53	
v/s Ratio Perm	c0.05			0.03					0.02			0.04
v/c Ratio	0.56	0.05		0.40	0.08		0.32	0.58	0.02	0.57	0.67	0.05
Uniform Delay, d1	52.7	50.9		52.4	51.0		55.5	6.6	4.0	53.7	6.0	3.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.10	0.49	0.36
Incremental Delay, d2	6.9	0.2		2.6	0.3		2.5	1.0	0.0	4.5	1.0	0.1
Delay (s)	59.7	51.1		55.0	51.3		58.0	7.6	4.0	63.6	4.0	1.1
Level of Service	E	D		D	D		E	A	A	E	A	A
Approach Delay (s)		56.4			52.6			8.4			6.2	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2313	85	0	2228
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	2313	85	0	2228
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	4545	2317			2400	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4545	2317			2400	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1	46			198	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	2313	85	2228
Volume Left	0	0	0
Volume Right	0	85	0
cSH	1700	1700	1700
Volume to Capacity	1.36	0.05	1.31
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	142.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	130	0	2398	2053	174
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	130	0	2398	2053	174
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.59					
vC, conflicting volume	3256	2057	2229			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3432	2057	2229			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	3	45	226			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	130	1199	1199	2053	174
Volume Left	0	0	0	0	0
Volume Right	130	0	0	0	174
cSH	45	1700	1700	1700	1700
Volume to Capacity	2.88	0.71	0.71	1.21	0.10
Queue Length 95th (ft)	352	0	0	0	0
Control Delay (s)	1038.2	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	1038.2	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	28.4		
Intersection Capacity Utilization	133.2%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	36	0	0	583	0	1814	49	0	2151	32
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	36	0	0	583	0	1814	49	0	2151	32
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.60	0.60		0.60	0.60	0.60				0.60		
vC, conflicting volume	3661	4034	1096	2930	4001	911	2185			1865		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4095	4714	1096	2883	4659	0	2185			1119		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	83	100	100	11	100			100		
cM capacity (veh/h)	0	1	209	4	1	652	235			370		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	36	583	907	907	49	1434	749
Volume Left	0	0	0	0	0	0	0
Volume Right	36	583	0	0	49	0	32
cSH	209	652	1700	1700	1700	1700	1700
Volume to Capacity	0.17	0.89	0.53	0.53	0.03	0.84	0.44
Queue Length 95th (ft)	15	277	0	0	0	0	0
Control Delay (s)	25.7	39.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	E					
Approach Delay (s)	25.7	39.5	0.0			0.0	
Approach LOS	D	E					

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	57	0	20	12	0	8	28	1385	8	8	1709	53
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	57	0	20	12	0	8	28	1385	8	8	1709	53
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2486	3178	858	2340	3227	700	1764			1395		
vC1, stage 1 conf vol	1727	1727		1447	1447							
vC2, stage 2 conf vol	758	1451		892	1780							
vCu, unblocked vol	2486	3178	858	2340	3227	700	1764			1395		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	33	100	93	89	100	98	92			98		
cM capacity (veh/h)	85	103	301	110	86	382	345			480		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	57	20	12	8	28	923	470	8	854	854	53
Volume Left	57	0	12	0	28	0	0	8	0	0	0
Volume Right	0	20	0	8	0	0	8	0	0	0	53
cSH	85	301	110	382	345	1700	1700	480	1700	1700	1700
Volume to Capacity	0.67	0.07	0.11	0.02	0.08	0.54	0.28	0.02	0.50	0.50	0.03
Queue Length 95th (ft)	79	5	9	2	7	0	0	1	0	0	0
Control Delay (s)	107.4	17.8	41.5	14.6	16.4	0.0	0.0	12.6	0.0	0.0	0.0
Lane LOS	F	C	E	B	C			B			
Approach Delay (s)	84.2		30.8		0.3			0.1			
Approach LOS	F		D								

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	55	44.9	9.2	54.1	0.69	45.6	A
40th Street	II	45	59.8	21.9	81.7	0.75	33.0	B
35th St.	II	35	31.2	18.8	50.0	0.28	20.4	D
Hurbert St	II	31	200.2	562.5	762.7	1.73	8.1	F
Total	II		336.1	612.4	948.5	3.44	13.1	E

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	542.6	564.5	0.16	1.0	F
35th St	III	31	200.2	13.7	213.9	1.73	29.0	B
40th Street	III	35	34.1	13.4	47.5	0.28	21.5	C
South Beach State Pa	III	55	49.0	8.5	57.5	0.75	46.8	A
Total	III		305.2	578.2	883.4	2.92	11.9	E

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	55	44.9	9.2	54.1	0.69	45.6	A
40th Street	II	45	59.8	18.3	78.1	0.75	34.5	B
35th St.	II	35	31.2	6.7	37.9	0.28	27.0	C
Hurbert St	II	31	200.2	562.2	762.4	1.73	8.1	F
Total	II		336.1	596.4	932.5	3.44	13.3	E

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	542.6	564.5	0.16	1.0	F
35th St	III	31	200.2	11.3	211.5	1.73	29.4	B
40th Street	III	35	34.1	10.7	44.8	0.28	22.8	C
South Beach State Pa	III	55	49.0	4.6	53.6	0.75	50.2	A
Total	III		305.2	569.2	874.4	2.92	12.0	E

Measures of Effectiveness

US 101

Direction	NB	SB	All
Average Speed (mph)	11	12	12
Total Travel Time (hr)	**677**	**669**	**1346**
Distance Traveled (mi)	7520	8068	15588
Unserved Vehicles (#)	**1536**	**1479**	**3015**
Performance Index	478.1	462.6	940.6

Detailed Measures of Effectiveness

US 101

Direction	NB	SB	All
Average Speed (mph)	11	11	11
Total Travel Time (hr)	**665**	**647**	**1312**
Distance Traveled (mi)	7306	7418	14725
Unserved Vehicles (#)	**1536**	**1479**	**3015**
Performance Index	468.0	456.8	924.7

APPENDIX J

Duration of Congestion Analysis for Average Annual Conditions - Land Use Scenario #2

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction
Land Use Scenario 2

	US 101 & 32nd Raw Count (April 2005)		US 101 & 35th Street		
				2030 AA-Scen2	2030 AA-Scen2
			V/C ~ 0.85	Full Development	14% Reduction
Hour	**Total Volume**	**% of Peak**	**Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**4,670**	1,357	1,167
7:00-8:00	1005	68.5%	**4,670**	3,480	2,993
8:00-9:00	1052	71.7%	**4,670**	3,643	3,133
9:00-10:00	1053	71.8%	**4,670**	3,646	3,136
10:00-11:00	1038	70.8%	**4,670**	3,594	3,091
11:00-12:00	1280	87.3%	**4,670**	4,432	3,812
12:00-1:00	1383	94.3%	**4,670**	**4,789**	4,119
1:00-2:00	1264	86.2%	**4,670**	4,377	3,764
2:00-3:00	1317	89.8%	**4,670**	**4,561**	3,922
3:00-4:00	1326	90.4%	**4,670**	**4,592**	3,949
4:00-5:00	1467	100.0%	**4,670**	**5,080**	4,369
5:00-6:00	1271	86.6%	**4,670**	4,401	3,785
6:00-7:00	806	54.9%	**4,670**	2,791	2,400
7:00-8:00	710	48.4%	**4,670**	2,459	2,115
8:00-9:00	282	19.2%	**4,670**	977	840
Hours of Congestion				**4**	**0**

	US 101 & 32nd Raw Count (April 2005)		US 101 & 40th Street		
				2030 AA-Scen2	2030 AA-Scen2
			V/C ~ 0.75	Full Development	14% Reduction
Hour	**Total Volume**	**% of Peak**	**Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**4,330**	1,335	1,148
7:00-8:00	1005	68.5%	**4,330**	3,422	2,943
8:00-9:00	1052	71.7%	**4,330**	3,582	3,081
9:00-10:00	1053	71.8%	**4,330**	3,585	3,084
10:00-11:00	1038	70.8%	**4,330**	3,534	3,040
11:00-12:00	1280	87.3%	**4,330**	**4,358**	3,748
12:00-1:00	1383	94.3%	**4,330**	**4,709**	4,050
1:00-2:00	1264	86.2%	**4,330**	**4,304**	3,702
2:00-3:00	1317	89.8%	**4,330**	**4,484**	3,857
3:00-4:00	1326	90.4%	**4,330**	**4,515**	3,883
4:00-5:00	1467	100.0%	**4,330**	**4,995**	4,296
5:00-6:00	1271	86.6%	**4,330**	4,328	3,722
6:00-7:00	806	54.9%	**4,330**	2,744	2,360
7:00-8:00	710	48.4%	**4,330**	2,417	2,079
8:00-9:00	282	19.2%	**4,330**	960	826
Hours of Congestion				**6**	**0**

	US 101 & 32nd Raw Count (April 2005)		US 101 & 50th Street/South Beach State Park Entrance		
Hour	Total Volume	% of Peak	V/C ~ 0.75 Capacity	2030 AA-Scen2 Full Development Total Volume	2030 AA-Scen2 14% Reduction Total Volume
6:00-7:00	392	26.7%	**4,010**	1,101	947
7:00-8:00	1005	68.5%	**4,010**	2,822	2,427
8:00-9:00	1052	71.7%	**4,010**	2,954	2,541
9:00-10:00	1053	71.8%	**4,010**	2,957	2,543
10:00-11:00	1038	70.8%	**4,010**	2,915	2,507
11:00-12:00	1280	87.3%	**4,010**	3,595	3,091
12:00-1:00	1383	94.3%	**4,010**	3,884	3,340
1:00-2:00	1264	86.2%	**4,010**	3,550	3,053
2:00-3:00	1317	89.8%	**4,010**	3,699	3,181
3:00-4:00	1326	90.4%	**4,010**	3,724	3,202
4:00-5:00	1467	100.0%	**4,010**	**4,120**	3,543
5:00-6:00	1271	86.6%	**4,010**	3,570	3,070
6:00-7:00	806	54.9%	**4,010**	2,264	1,947
7:00-8:00	710	48.4%	**4,010**	1,994	1,715
8:00-9:00	282	19.2%	**4,010**	792	681
Hours of Congestion				**1**	**0**

	US 101 & 32nd Raw Count (April 2005)		US 101 & Pacific Way		
Hour	Total Volume	% of Peak	V/C ~ 0.85 Capacity	2030 AA-Scen2 Full Development Total Volume	2030 AA-Scen2 14% Reduction Total Volume
6:00-7:00	392	26.7%	**2,890**	1,466	1,260
7:00-8:00	1005	68.5%	**2,890**	**3,758**	**3,231**
8:00-9:00	1052	71.7%	**2,890**	**3,933**	**3,383**
9:00-10:00	1053	71.8%	**2,890**	**3,937**	**3,386**
10:00-11:00	1038	70.8%	**2,890**	**3,881**	**3,338**
11:00-12:00	1280	87.3%	**2,890**	**4,786**	**4,116**
12:00-1:00	1383	94.3%	**2,890**	**5,171**	**4,447**
1:00-2:00	1264	86.2%	**2,890**	**4,726**	**4,064**
2:00-3:00	1317	89.8%	**2,890**	**4,924**	**4,235**
3:00-4:00	1326	90.4%	**2,890**	**4,958**	**4,264**
4:00-5:00	1467	100.0%	**2,890**	**5,485**	**4,717**
5:00-6:00	1271	86.6%	**2,890**	**4,752**	**4,087**
6:00-7:00	806	54.9%	**2,890**	**3,014**	2,592
7:00-8:00	710	48.4%	**2,890**	2,655	2,283
8:00-9:00	282	19.2%	**2,890**	1,054	907
Hours of Congestion				**12**	**11**

	US 101 & 32nd Raw Count (April 2005)		US 101 & Abalone Street		
Hour	Total Volume	% of Peak	V/C ~ 0.90 Capacity	2030 AA-Scen2 Full Development Total Volume	2030 AA-Scen2 14% Reduction Total Volume
6:00-7:00	392	26.7%	**2,950**	1,510	1,297
7:00-8:00	1005	68.5%	**2,950**	**3,871**	**3,326**
8:00-9:00	1052	71.7%	**2,950**	**4,052**	**3,482**
9:00-10:00	1053	71.8%	**2,950**	**4,056**	**3,485**
10:00-11:00	1038	70.8%	**2,950**	**3,998**	**3,435**
11:00-12:00	1280	87.3%	**2,950**	**4,930**	**4,236**
12:00-1:00	1383	94.3%	**2,950**	**5,326**	**4,577**
1:00-2:00	1264	86.2%	**2,950**	**4,868**	**4,183**
2:00-3:00	1317	89.8%	**2,950**	**5,072**	**4,359**
3:00-4:00	1326	90.4%	**2,950**	**5,107**	**4,388**
4:00-5:00	1467	100.0%	**2,950**	**5,650**	**4,855**
5:00-6:00	1271	86.6%	**2,950**	**4,895**	**4,206**
6:00-7:00	806	54.9%	**2,950**	**3,104**	2,667
7:00-8:00	710	48.4%	**2,950**	2,734	2,350
8:00-9:00	282	19.2%	**2,950**	1,086	933
Hours of Congestion				**12**	**11**

	US 101 & 32nd Raw Count (April 2005)		US 101 & 32nd Street		
Hour	Total Volume	% of Peak	V/C ~ 0.90 Capacity	2030 AA-Scen2 Full Development Total Volume	2030 AA-Scen2 14% Reduction Total Volume
6:00-7:00	392	26.7%	**4,670**	1,482	1,275
7:00-8:00	1005	68.5%	**4,670**	3,799	3,268
8:00-9:00	1052	71.7%	**4,670**	3,976	3,421
9:00-10:00	1053	71.8%	**4,670**	3,980	3,424
10:00-11:00	1038	70.8%	**4,670**	3,923	3,375
11:00-12:00	1280	87.3%	**4,670**	**4,838**	4,162
12:00-1:00	1383	94.3%	**4,670**	**5,227**	4,497
1:00-2:00	1264	86.2%	**4,670**	**4,778**	4,110
2:00-3:00	1317	89.8%	**4,670**	**4,978**	4,282
3:00-4:00	1326	90.4%	**4,670**	**5,012**	4,312
4:00-5:00	1467	100.0%	**4,670**	**5,545**	**4,770**
5:00-6:00	1271	86.6%	**4,670**	**4,804**	4,133
6:00-7:00	806	54.9%	**4,670**	3,047	2,621
7:00-8:00	710	48.4%	**4,670**	2,684	2,309
8:00-9:00	282	19.2%	**4,670**	1,066	917
Hours of Congestion				**7**	**1**

Hour	US 101 & 32nd Raw Count (April 2005) Total Volume	% of Peak	US 101 & 62nd Street V/C ~ 0.80 Capacity	2030 AA-Scen2 Full Development Total Volume	2030 AA-Scen2 14% Reduction Total Volume
6:00-7:00	392	26.7%	**3,490**	1,046	900
7:00-8:00	1005	68.5%	**3,490**	2,682	2,308
8:00-9:00	1052	71.7%	**3,490**	2,807	2,416
9:00-10:00	1053	71.8%	**3,490**	2,810	2,418
10:00-11:00	1038	70.8%	**3,490**	2,770	2,384
11:00-12:00	1280	87.3%	**3,490**	3,416	2,940
12:00-1:00	1383	94.3%	**3,490**	**3,691**	3,176
1:00-2:00	1264	86.2%	**3,490**	3,373	2,903
2:00-3:00	1317	89.8%	**3,490**	**3,515**	3,025
3:00-4:00	1326	90.4%	**3,490**	**3,539**	3,045
4:00-5:00	1467	100.0%	**3,490**	**3,915**	3,369
5:00-6:00	1271	86.6%	**3,490**	3,392	2,919
6:00-7:00	806	54.9%	**3,490**	2,151	1,851
7:00-8:00	710	48.4%	**3,490**	1,895	1,631
8:00-9:00	282	19.2%	**3,490**	753	648
Hours of Congestion				**4**	**0**

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	85	15	35	110	20	150	60	1940	50	205	2335	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1749	1733	1449	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1370	1733	1449	1350	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	15	35	110	20	150	60	1940	50	205	2335	75
RTOR Reduction (vph)	0	0	31	0	0	132	0	0	11	0	0	12
Lane Group Flow (vph)	85	15	4	110	20	18	60	1940	39	205	2335	63
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	15.8	15.8	15.8	15.8	15.8	15.8	4.1	83.5	83.5	17.7	97.1	97.1
Effective Green, g (s)	15.3	15.3	15.3	15.3	15.3	15.3	4.6	84.0	84.0	18.2	97.6	98.1
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.04	0.65	0.65	0.14	0.75	0.75
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	161	204	171	159	200	167	61	2086	908	241	2423	1061
v/s Ratio Prot		0.01			0.01		0.03	c0.60		0.12	c0.72	
v/s Ratio Perm	0.06		0.00	c0.08		0.01			0.03			0.04
v/c Ratio	0.53	0.07	0.02	0.69	0.10	0.11	0.98	0.93	0.04	0.85	0.96	0.06
Uniform Delay, d1	54.0	51.0	50.7	55.1	51.2	51.2	62.7	20.4	8.4	54.6	14.6	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.74	0.36	0.19	1.13	0.33	0.01
Incremental Delay, d2	4.0	0.2	0.1	13.1	0.3	0.4	75.9	4.9	0.0	2.8	1.6	0.0
Delay (s)	58.0	51.3	50.8	68.2	51.5	51.6	122.1	12.3	1.6	64.3	6.4	0.1
Level of Service	E	D	D	E	D	D	F	B	A	E	A	A
Approach Delay (s)		55.4			58.1			15.3			10.7	
Approach LOS		E			E			B			B	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	50	10	25	200	10	450	10	1550	210	450	1980	50
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1713	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1375	1716	1458	1355	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	10	25	200	10	450	10	1550	210	450	1980	50
RTOR Reduction (vph)	0	0	20	0	0	205	0	0	71	0	0	9
Lane Group Flow (vph)	50	10	5	200	10	245	10	1550	139	450	1980	41
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	26.3	26.3	26.3	25.8	25.8	25.8	0.8	68.6	68.6	22.6	90.4	90.4
Effective Green, g (s)	26.3	26.3	26.3	25.3	25.3	25.3	1.3	69.1	69.1	23.1	90.9	90.9
Actuated g/C Ratio	0.20	0.20	0.20	0.19	0.19	0.19	0.01	0.53	0.53	0.18	0.70	0.70
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	278	347	295	264	334	277	17	1716	755	593	2257	1019
v/s Ratio Prot		0.01			0.01		0.01	c0.48		0.13	c0.61	
v/s Ratio Perm	0.04		0.00	0.15		c0.17			0.10			0.03
v/c Ratio	0.18	0.03	0.02	0.76	0.03	0.88	0.59	0.90	0.18	0.76	0.88	0.04
Uniform Delay, d1	42.9	41.6	41.5	49.5	42.4	50.9	64.1	27.4	15.8	50.8	15.2	6.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.87	0.67	1.06
Incremental Delay, d2	0.3	0.0	0.0	12.4	0.0	27.0	42.8	8.2	0.5	2.0	2.0	0.0
Delay (s)	43.2	41.6	41.5	61.9	42.5	77.9	106.9	35.7	16.4	46.4	12.1	6.4
Level of Service	D	D	D	E	D	E	F	D	B	D	B	A
Approach Delay (s)		42.5			72.5			33.8			18.2	
Approach LOS		D			E			C			B	

Intersection Summary			
HCM Average Control Delay	31.3	**HCM Level of Service**	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	130.0	**Sum of lost time (s)**	9.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	65	5	35	35	5	70	30	1635	35	65	2065	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	1459		1630	1475		1614	3228	1458	1630	3228	1408
Flt Permitted	0.71	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1200	1459		1254	1475		1614	3228	1458	1630	3228	1408
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	65	5	35	35	5	70	30	1635	35	65	2065	75
RTOR Reduction (vph)	0	31	0	0	63	0	0	0	12	0	0	15
Lane Group Flow (vph)	65	9	0	35	12	0	30	1635	23	65	2065	60
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	8.1	8.1		8.1	8.1		1.4	51.1	51.1	7.9	57.6	57.6
Effective Green, g (s)	8.6	8.1		8.1	8.1		1.9	51.6	51.1	7.9	58.1	58.1
Actuated g/C Ratio	0.11	0.10		0.10	0.10		0.02	0.65	0.65	0.10	0.73	0.73
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	130	149		128	151		39	2106	942	163	2371	1034
v/s Ratio Prot		0.01			0.01		0.02	0.51		c0.04	c0.64	
v/s Ratio Perm	c0.05			0.03					0.02			0.04
v/c Ratio	0.50	0.06		0.27	0.08		0.77	0.78	0.02	0.40	0.87	0.06
Uniform Delay, d1	33.2	32.1		32.8	32.1		38.4	9.7	5.0	33.4	7.7	2.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.0	0.2		1.2	0.2		60.6	1.9	0.0	1.6	3.8	0.0
Delay (s)	36.2	32.2		33.9	32.4		99.0	11.5	5.0	35.0	11.5	2.9
Level of Service	D	C		C	C		F	B	A	C	B	A
Approach Delay (s)		34.7			32.9			13.0			11.9	
Approach LOS		C			C			B			B	

Intersection Summary				
HCM Average Control Delay	13.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	79.1	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	79.4%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2720	110	0	2655
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	2720	110	0	2655
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5379	2724			2832	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5379	2724			2832	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	26			133	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	2720	110	2655
Volume Left	0	0	0
Volume Right	0	110	0
cSH	1700	1700	1700
Volume to Capacity	1.60	0.06	1.56
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	166.1%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	165	0	2830	2440	215
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	165	0	2830	2440	215
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.42					
vC, conflicting volume	3859	2444	2657			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5058	2444	2657			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	24	153			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	165	1415	1415	2440	215
Volume Left	0	0	0	0	0
Volume Right	165	0	0	0	215
cSH	24	1700	1700	1700	1700
Volume to Capacity	6.84	0.83	0.83	1.44	0.13
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	292.0		
Intersection Capacity Utilization	157.5%	ICU Level of Service	H
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: 32nd St & US 101

2030 AAV Scenario 2 Full Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	45	0	0	720	0	2110	65	0	2570	35
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	45	0	0	720	0	2110	65	0	2570	35
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.42	0.42		0.42	0.42	0.42				0.42		
vC, conflicting volume	4366	4766	1306	3444	4719	1059	2607			2177		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6291	7255	1306	4069	7140	0	2607			1018		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	70	100	100	0	100			100		
cM capacity (veh/h)	0	0	151	0	0	449	160			278		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	45	720	1055	1055	65	1713	892
Volume Left	0	0	0	0	0	0	0
Volume Right	45	720	0	0	65	0	35
cSH	151	449	1700	1700	1700	1700	1700
Volume to Capacity	0.30	1.60	0.62	0.62	0.04	1.01	0.52
Queue Length 95th (ft)	29	1014	0	0	0	0	0
Control Delay (s)	38.6	304.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	F					
Approach Delay (s)	38.6	304.9	0.0			0.0	
Approach LOS	E	F					

Intersection Summary			
Average Delay	39.9		
Intersection Capacity Utilization	118.6%	ICU Level of Service	H
Analysis Period (min)	15		

PCL XL error

Subsystem: TEXT

Error: InternalError 0x50

Operator: EndFontHeader

Position: 1626532

Exhibit B5
Newport TSP Amendments
File No. 2-CP-11

Newport Transportation System Plan Update - Alternate Mobility Standards Final Technical Memorandum #13 Summary of Measures of Effectiveness

Prepared for

Oregon Department of Transportation
Region 2 Office
45 Airport Road SE
Salem, OR 97301

City of Newport
169 SW Coast Highway
Newport, OR 97365

CITATION

Parametrix. 2012. Newport Transportation System Plan Update - Alternate Mobility Standards Final Technical Memorandum #13 Summary of Measures of Effectiveness. Prepared by Parametrix, Portland, Oregon. April 2012.

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ACRONYMS

30 HV	30th Highest Hourly Traffic Volumes (experienced during the summertime weekday peak hour)
AAV	Average Annual Volume (average of PM peak hours over the entire year)
ATR	Automatic Traffic Recorder
HCM	Highway Capacity Manual
ODOT	Oregon Department of Transportation
Off-Season	Refers to traffic volumes and operations typically experienced during the weekday PM peak hour from September through May, excluding the summertime peak season, Fridays, holidays and Spring Break week.
OHP	Oregon Highway Plan
PHF	Peak Hour Factor
Summertime	Refers to traffic volumes and operations typically experienced during the weekday PM peak hour from June through August excluding Fridays and holidays.
Synchro	HCM compatible traffic analysis software for intersections
TAZ	Transportation Analysis Zone
TPAU	Transportation Planning and Analysis Unit
TSP	Transportation System Plan
UGB	Urban Growth Boundary
V/C	Volume-to-Capacity (ratio)
VPHPL	Vehicles per Hour per Lane

1. INTRODUCTION AND EXECUTIVE SUMMARY

1.1 REPORT PURPOSE

This technical memorandum informs the development of alternate mobility standards for US 101 in the South Beach study area. The development of these standards is based on the findings of technical memoranda #5, #10, #11 and #12 prepared for the Newport Transportation System Plan (TSP) Update. These memoranda indicate that the existing Oregon Highway Plan's (OHP) mobility standards or "targets" would not be met along US 101 for the 2030 planning horizon. This condition results from the combination of background traffic growth (e.g., through traffic) and anticipated development within the South Beach area. Substantial highway improvements in South Beach would not be sufficient to respond to the additional travel demand because no additional bridge capacity across the Yaquina Bay Bridge is expected before 2030.

The purpose of this report is to document the analysis of 2030 peak period traffic volumes on a roadway network for South Beach that includes a variety of improvements that were identified through earlier analyses. As discussed in Section 2.1, this analysis is focused on two land use scenarios for three time periods including: 30 HV (30th highest hourly volume which occurs during the weekday PM peak for the summer months from June through August), AAV (Average Annual Volumes which reflect an average weekday PM peak hour volumes over the entire year), and Off-Season (which reflects average weekday PM peak volumes for the months from September through May). Analysis results are presented in a series of mobility measures one or more of which can contribute to the discussion of establishing alternate mobility standards for the South Beach area.

1.2 REPORT CONTENT AND ORGANIZATION

This report is divided into three chapters, the first of which is this Introduction.

Chapter 2 presents a discussion of anticipated community growth and its implications for traffic volumes during the 2030 peak period planning horizon. Included is a short summary of existing and historical population levels in Newport, anticipated population growth expectations, and land use development assumptions for the South Beach Area. The chapter also summarizes prior analysis of traffic congestion associated with this growth, and identifies a series of key findings and conclusions.

Chapter 3 presents a short summary of potential management actions that could address the anticipated levels of congestion expected by 2030.

1.3 SUMMARY OF KEY FINDINGS AND CONCLUSIONS

Community Growth in South Beach

Population growth and tourism significantly influence future transportation conditions in the South Beach area. Newport is located at the intersection of two major state highways, the Oregon Coast Highway (US-101) and the Corvallis-Newport Highway (US-20). US-101 is the only continuous north-south highway on the Oregon Coast. US-20 connects Newport to Corvallis and I-5. The analysis described in this report includes many of the known or pending development activities in the area such as: expansion of the Newport Community College and the Hatfield Marine Science Center, and development of the proposed mixed use plan for South Beach Village. Growth projections reflect the recent addition of National

Oceanic and Atmospheric Administration (NOAA) activities at the Port of Newport, potential urban renewal activities planned by the City, and other privately-funded land development projects consistent with the existing zoning of the area

Various population forecasts developed for South Beach identify a likely range of new residential construction that could be expected over the 20-year planning period. On the low side, these projections indicate that a range of approximately 360 to 450 new dwelling units could be anticipated by 2030. On the high end, a range of 700 to 875 new dwelling units could be built. For purposes of this study, the addition of 638 new dwelling units has been assumed by 2030, which generally falls within the range of reasonable future population estimates.

Table 1-1 presents a summary of the land development activity that has been assumed for South Beach including the residential development and other public land uses as described above. Additional development includes hotel(s), retail commercial, industrial, office, and park-related uses. Table 1-1 also summarized the weekday PM peak hourly traffic volume estimates associated with this development.

Table 1-1. Assumed Growth and Resulting Peak Hour Trips for Land Use Scenarios

Land Use Type	Units	Scenario 1: Population Growth	Scenario 2: Environmentally Constrained
Single Family Residential	Dwelling Unit	257	257
Condominium / Townhouse	Dwelling Unit	381	381
Hotel	Rooms	215	215
Retail Commercial	Square Feet	535,350	460,500
Industrial Park	Square Feet	202,350	142,500
Research and Development	Square Feet	250,000	220,000
General Office	Employees	42	42
Community College	Students	1,000	1,000
Campground / RV Park	Sites	55	55
County Park	Acres	78.1	78.1
Total Weekday Peak Hour Trips Added to the System		**4,317**	**3,901**

Transportation Effects of Community Growth

A combination of anticipated 2030 levels of land development in South Beach and increasing background traffic volumes along US 101 will result in greater congestion levels, particularly during the summertime peak. However, traffic growth is likely to be high enough that other times of the year will also experience significant congestion.

Key Findings

Key findings of the transportation analysis of South Beach are as follows:

- Major roadway improvements would be needed along US 101 including such elements as widening of US 101 south of Abalone Street to provide four through lanes and development of signalized intersections at 35th, 40th and 50th Streets.
- Even with these improvements, a significant increase in congestion along US 101 is anticipated over current conditions. No intersection would operate without one or more significantly congested movements and delays are anticipated along the length

of the highway through South Beach, particularly approaching the Yaquina Bay Bridge with its limited two-lane capacity.

- Traffic congestion will be at its most severe during the Summertime Peak Season. All three signalized intersections (35th, 40th, and 50th) would operate with congestion levels that exceed the applicable ODOT mobility targets. Many of the side street movements at the unsignalized intersections would experience significant delays with demand in some locations estimated at more than twice available capacity. Northbound and southbound left turns from US 101 would also be significantly congested.
- Annual Average (AAV) traffic volumes reflect an average level of activity over the course of an entire year (to reflect traffic levels during both peak and off-peak seasons). With AAV traffic, congestion levels would exceed their ODOT mobility target at all locations for both Land Use Scenarios.
- When considering only Off-Season traffic levels (September through May) the signalized intersections are expected to meet (with Scenario #2) or be close to meeting (with Scenario #1) their ODOT targets. Side street movements at unsignalized intersections would still operate significantly over capacity.
- The two-lane Yaquina Bay Bridge is expected to become a major constraint to the movement of traffic between South Beach and the rest of Newport. Even during the Off-Season, the traffic demand on the bridge is estimated to be nearly twice its capacity. No improvements to the bridge are currently planned or are "reasonably likely" to result by 2030.

Conclusions

Based on the analysis and findings described above, future 2030 peak period traffic conditions in the South Beach area could be characterized as follows:

- Travel speeds would be very low ranging between less than 10 mph over significant portions of a typical summertime day, to approximately 15 mph during the off-season weekday PM peak hour.
- Major delays are expected at all intersections during the summertime over much of the day. Signalized intersections along US 101 (35th, 40th, and 50th) would see major improvements but OHP mobility thresholds will still be exceeded. Delay to side street traffic operations at unsignalized intersections would significantly exceed OHP targets. Delays during the Off-Season would be less significant but would still occur during peak hours, primarily at the unsignalized intersections.
- Slow travel speeds and long delays at intersections may result in many trips not being made between midday and early evening. Where a choice exists, trip-making would be likely shift to less congested times or trips will not occur. This has consequences for community economic development opportunities and general livability.
- High levels of congestion would likely contribute to potential safety problems along US 101 through the South Beach area.

Potential Solutions

A range of potential options could be considered to address and/or resolve the anticipated 2030 congestion problems associated with the development of South Beach. These include:

- *Policy Options* focus on making a conscious decision to accept a higher level of delay before either roadway improvements are made or restrictions are placed on land development applications. Policy options could include:
    - Adoption of higher mobility standards or "targets" at intersections. Subsequent to the analysis in this report, new mobility targets were adopted by the Oregon Transportation Commission which are reflected in this document.
    - Adoption of a mobility target based on average annual weekday peak traffic, or off-season peak traffic conditions rather than Summertime Peak.
    - Adoption of mobility targets that focus on specifying the number of hours each day when targets are exceeded.
- *Land Use Options* focus on managing development activity that generates traffic rather than directly addressing various levels of traffic congestion through policy. Land use options could include:
    - Managing the level and timing of land development in South Beach consistent with the availability of adequate infrastructure.
    - When all identified and reasonably available roadway improvements have been constructed, preclude any additional land development in South Beach. In effect, the option establishes a "trip budget" so that land development activity occurs at a level that can be accommodated by all "reasonably likely" road and highway improvement projects.
    - Encourage a mixed use development model that could reduce the need to travel over the Yaquina Bay Bridge by providing shopping and employment uses at a scale that is responsive to the extent of residential use in South Beach.
- *Physical or Operational Improvement Options* focus on improvements beyond the level of identified in Chapter 2. Improvements listed in Chapter 2 include roadway widening, widened intersections including signalization at three locations, and development of local roads that parallel the highway to reduce the need to use US 101. Additionally, a range of traffic operational improvements would be considered and used as appropriate including, but not limited to, signal timing enhancements and "real time" traffic management to maximize traffic flow along US 101, and access management along the highway to minimize traffic conflicts, The ability to make additional improvements beyond this list is very limited due to lack of available right-of-way, potential wetlands impacts, and cost, and they would likely need to focus on providing either grade-separated interchanges (which are not considered to be feasible along US 101 in South Beach) or providing added capacity for trips crossing Yaquina Bay.

  Three options for physical or operational improvements that could be considered for implementation beyond the 20-year planning period are:
    - Develop a new crossing of Yaquina Bay, separate from the exiting bridge, which directly links US 101 and Oregon Highway 20. An earlier study of adding alternative Yaquina Bay crossings concluded that the only reasonable option would focus on enhancing the existing crossing. Such an improvement is not currently proposed or even under study. Its implementation could not be reasonably expected within the 20-year planning horizon.

- Explore providing additional capacity on US 101 across Yaquina Bay.
- Provide ferry service between the South Beach area and central Newport.

- *Options for Instituting Tolling* should be explored to raise revenue for bridge construction in the US 101 corridor, to encourage the use of alternative travel modes along the corridor, and/or to manage the amount of future growth in traffic volumes.

Selected Direction

Based on extensive consultation with ODOT and the City of Newport, a specific direction has been identified to address the land use development potential and related transportation needs in South Beach. This direction includes the following actions:

- **Transportation System Plan and Comprehensive Plan Amendment** - Complete documentation and adopt an amendment to the City's Transportation System Plan to establish policy direction and to incorporate the land development assumptions and recommended system improvements into the City's Comprehensive Plan. The Comprehensive Plan amendment will compile all of the technical memoranda prepared for the TSP Update. The TSP amendment will provide the necessary documentation to support an roadway implementation strategy over the 20-year planning horizon, and will provide guidance for issues that may need to be addressed beyond the planning horizon (such as adding capacity to the Yaquina Bay Bridge).
- **Trip Budget** - Prepare and adopt an overlay zone for South Beach that identifies and establishes an implementation mechanism for a "trip budget" to manage land development in the study area. This development would be generally consistent with the assumptions identified in this document, and with the recommended transportation system improvements.
- **Amend the Oregon Highway Plan** - The Oregon Highway Plan target for US 101 cannot be met, so alternate mobility standards are needed through South Beach. An amendment to the OHP will be necessary.
- **Address coordination with the Lincoln County Comprehensive Plan** – As Lincoln County currently has jurisdiction over some of the land in South Beach, coordination of TSP recommendations, City Code amendments and the adoption of alternate mobility standards needs to be coordinated with the County. Resolution of issues related to County concurrence with the City's TSP and the proposed overlay zone is needed. County recognition of the proposed OHP alternate mobility standards must also be addressed.

2. COMMUNITY GROWTH AND ITS EFFECTS

This chapter presents a discussion of community growth forecasts for the South Beach study area and the likely transportation impacts associated with this growth. Analysis focuses on US 101 and includes many of the known or pending development activities in the area such as: expansion of the Newport Community College and the Hatfield Marine Science Center, and development of the proposed mixed use plan for South Beach Village. Growth projections would also reflect the recent addition of National Oceanic and Atmospheric Administration (NOAA) activities at the Port of Newport, and potential urban renewal activities planned by the City.

2.1 COMMUNITY GROWTH IN SOUTH BEACH

Population growth and tourism significantly influence future transportation conditions in the South Beach area. Newport is located at the intersection of two major state highways, the Oregon Coast Highway (US 101) and the Corvallis-Newport Highway (US 20). US 101 is the only continuous north-south highway on the Oregon Coast. US 20 connects Newport to Corvallis and I-5. The analysis described in this report includes many of the known or pending development activities in the area such as: expansion of the Newport Community College and the Hatfield Marine Science Center, and development of the proposed mixed use plan for South Beach Village. Growth projections reflect the recent addition of National Oceanic and Atmospheric Administration (NOAA) activities at the Port of Newport, potential urban renewal activities planned by the City, and other privately-funded land development projects consistent with the existing zoning of the area

This section summarizes existing and historic population growth for Newport including South Beach, and provides a discussion of future development expectations for South Beach to the planning horizon year of 2030.

Existing and Historic Population Levels

The U.S. Census Bureau's population for Newport in 1970 was 5,188 persons; 7,519 in 1980, 8,437 in 1990 and 9,532 in 2000. According to the 2010 US Census, Newport's population in 2010 was 9,989. From 1970 to 2010, the annualized population growth rate was 1.65 percent. Between 1980 and 2010, the annualized growth rate was 0.95 percent. The decade of the 1970's saw significant growth in the community with the annualized growth rate slowing after 1980.

During the same period of time annual population growth in Lincoln County increased from 25,755 in 1970 to an estimated 46,034 in 2010 with an annualized growth rate of 1.46 percent. Between 1980 and 2010, the annualized growth rate was 0.89 percent While the annualized population growth rate for the County as a whole was less than the rate experienced by the City of Newport, both show similarities in that growth was rapid during the 1970's, and has been slowing ever since.

Historic population data is summarized in Table 2-1 for the City of Newport and Lincoln County.

Table 2-1. Historic Population Data

Year	City of Newport		Lincoln County		City as Percent of County
	Persons	Annual Growth Rate [1]	Persons	Annual Growth Rate [1]	
1970	5,188	--	25,755	--	20.1%
1980	7,519	3.78%	35,264	3.19%	21.3%
1990	8,437	1.16%	38,889	0.98%	21.7%
2000	9,532	1.23%	44,479	1.35%	21.4%
2010	9,989	0.47%	46,034	0.34%	21.7%
1970-2010	+4,801	1.65%	+20,279	1.46%	--
1980-2010	+2,470	0.95%	+10,770	0.89%	--

Source: US Census for 1970, 1980, 1990, 2000, and 2010.
[1] Data represents annualized growth rates from the preceding population estimate except as noted otherwise.

Growth in housing units has mirrored population growth with a significant spurt during the 1970's with a lower annualized rate of growth in the years since. The annualized growth rate for housing units between 1970 and 2010 is estimated at 2.44 percent, while the annualized growth rate between 1980 and 2010 was 2.00 percent. Both of these growth rates are higher than the annualized population growth rate. This phenomenon could be attributable to both smaller household sizes (dropping from 2.44 persons per dwelling unit in 1970 to 1.79 persons per dwelling unit in 2010). It could also be attributed to the high vacancy rate of dwelling units in Newport associated with growth in vacation or weekend housing where no resident was counted on April 1, 2010 as a part of the U.S. Census.

Table 2-2. Historic Dwelling Unit Data in Newport

Year	Dwelling Units	Annual Growth Rate [1]	Persons per Dwelling Unit
1970	2,130	--	2.44
1980	3,089	3.79%	2.43
1990	4,105	2.88%	2.06
2000	5,019	2.03%	1.90
2010	5,591	1.56%	1.79
1970-2010	+3,461	2.44%	--
1980-2010	+2,502	2.00%	--

Source: City of Newport and "Newport. Housing Needs Analysis, 2011 to 2031", ECO Northwest, February 2011.
[1] Data represents annualized growth rates from the preceding population estimate except as otherwise noted.

Population Forecasts

At the time the Newport TSP Update was prepared (2008-2010), there were no official population projections available from either the State of Oregon or Lincoln County for the City of Newport. Accordingly, the transportation analysis was prepared based on anticipated land development by location and type for the planning period to 2030. Land use growth expectations were compared with a potential range of future population estimates to ascertain the general reasonableness of these expectations. The development of future population forecasts for the City of Newport also considered growth expectations for Lincoln County as a whole, as identified in the County's TSP.

As indicated in the Lincoln County TSP, there has been a slowing of regional population growth over the last decade resulting from relatively stagnant economic growth. Accordingly, a modest growth in population was forecasted between 2005 and 2027 (the planning horizon year for the County's TSP). Population growth is expected to occur at a slower rate than the State of Oregon as a whole.

Table 2-3 illustrates the annualized population growth forecasted for the County in five year increments to 2030. These estimates were developed by the State of Oregon's Office of Economic Development in 2004. The forecasted population for Lincoln County in 2030 is 52,039, corresponding to an annual average growth rate of 0.65 percent between 2005 and 2025. This forecasted growth rate is lower than the average annual growth rate experienced in Lincoln County between 1980 and 2006 (1.02 percent) or in the City of Newport (1.2 percent). The forecasted annual growth rate for Lincoln County is less than the State of Oregon's annual growth rate between 2005 and 2025.

Table 2-3. Forecasted Average Annual Growth Rates for Lincoln County, 2005 to 2030

	2005	2010	2015	2020	2025	2030
Lincoln County Annual Growth Rate [1]	0.34%	0.69%	0.77%	0.65%	0.65%	0.63%
Lincoln County Population	45,365	46,945 [2]	48,776	50,379	52,039	53,710
State of Oregon Annual Growth Rate	1.03%	1.22%	1.28%	1.26%	1.19%	1.12%

Source: Office of Economic Development (OED), State of Oregon, 2005

[1] Annual growth rates are calculated from the population estimate of the preceding five-year data point.

[2] Population is an estimate developed by State of Oregon and does not reflect results of the 2010 US Census. According to the Census, the County's population as of April 1, 2010 was 46,034 persons or approximately 900 persons less than the projections identified in this table.

The estimated addition of 8,345 new residents for Lincoln County between the 2010 Census and the OED 2030 forecast includes growth in unincorporated portions of the county as well as within cities. Currently, the present-day population distribution includes 21.7 percent of residents living in Newport. If the same relationship for the 2030 population forecast is assumed, the result is an expected city population of 11,655 persons or an increase of 1,666 residents. With an average persons-per-household of 1.79, this translates to 931 new residences within the planning period.

In consultation with City staff, it has further been assumed that of this citywide estimate of population and household growth, approximately 50 percent would occur within the South Beach study area. Thus, while the transportation study for South Beach is based on anticipated land development activity, a comparison with a reasonable of population growth over the planning horizon indicates that about 466 new dwelling units could be anticipated by 2030.

Another approach to identifying a reasonable population forecast for the City of Newport is to use an assumed annual average growth rate from the 2010 base population of 9,989 persons. Assuming the historic annualized growth rate of 0.95 percent from 1980 to 2010, a 2030 population of 12,068 can be estimated, resulting in an increase of 2,079 persons. At 1.79 persons-per-household, this translates into an increase of 1,161 new residences by 2030. A 50 percent share of this citywide growth could result in approximately 581 new dwelling units in the South Beach study area. The land development assumptions discussed below estimate the addition of 638 new dwelling units in South Beach by 2030. This estimate is approximately 10 percent higher than the estimate developed by trending population and dwelling unit growth forward based on 30-year historic rates. It should be noted that the housing estimates used in this analysis were developed prior to the availability of the 2010 US Census. Population estimates for Newport and Lincoln County that were available prior to the Census were markedly higher, resulting in this higher estimate of housing in the South Beach area.

In late 2010 and early 2011, the City of Newport conducted an analysis of 20-year population growth expectations and associated demand for housing.[1] This report also uses State of Oregon demographic forecasts for Lincoln County as a starting point for estimating the City's potential population growth, but uses a 2011 population estimate of 11,243 as a starting point (based on annual estimates prepared by the PSU Population Research Center which is higher than actual measured population with the 2010 Census). The report identifies a 2031 population forecast of 12,846. Adjusting for anticipated vacancy rates, this population forecast would generate a need for 846 new dwelling units in the City. South Beach's 50 percent share would be 423 units.

Land Development Assumptions

The South Beach study area includes existing development and vacant properties that lie in the area generally bounded by the Pacific Ocean on the west, Yaquina Bay on the east, Abbey Street on the north, and South 62nd Street on the south.

For the purpose of forecasting future growth, this study area was divided into ten sub-areas that represented unique geographical districts with individual development and roadway access expectations. These sub-areas (Transportation Analysis Zones or TAZs) were established based on information provided by the City of Newport and from other transportation studies that had previously been conducted for development in the South Beach area to support an urban growth boundary (UGB) adjustment. Local plans for economic and community development were also considered. These studies included the Newport South Beach Transportation Analysis prepared for the City by Lancaster Engineering (February 2005), the South Beach Properties/40th Street Traffic Impact Analysis prepared by David Evans and Associates (DEA) for Double E Northwest (October 2006), and the South Beach Neighborhood Plan (2005). See Appendix A for the land use areas designated in these studies. While not specifically included in a TAZ, trips generated by the South Beach State Park have also been included in the analysis.

See Figure 2-1 for a map of the South Beach study area and the analysis sub-area boundaries.

Two land use scenarios were developed and evaluated for the South Beach Study area including:

- Land Use Scenario #1: based on anticipated population growth within the study area
- Land Use Scenario #2: similar to Scenario 1 but constrained by existing wetlands and other natural features.

A summary of the growth assumptions for these two scenarios is presented below.

Land Use Scenario 1 – Newport Population Growth

The variety of the land uses assumed in each of the sub-areas illustrated in Figure 2-1 are consistent with zoning designations and permitted uses, and were based on an agreed reasonable scenario that is tied to the projected population growth of the City of Newport. This scenario assumes that 50 percent of the population growth anticipated in Newport by 2030 would occur in South Beach with the remainder occurring generally north of the Yaquina Bay Bridge.

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[1] "Newport Housing Needs Analysis, 2011 to 2031", ECO Northwest, February 2011.

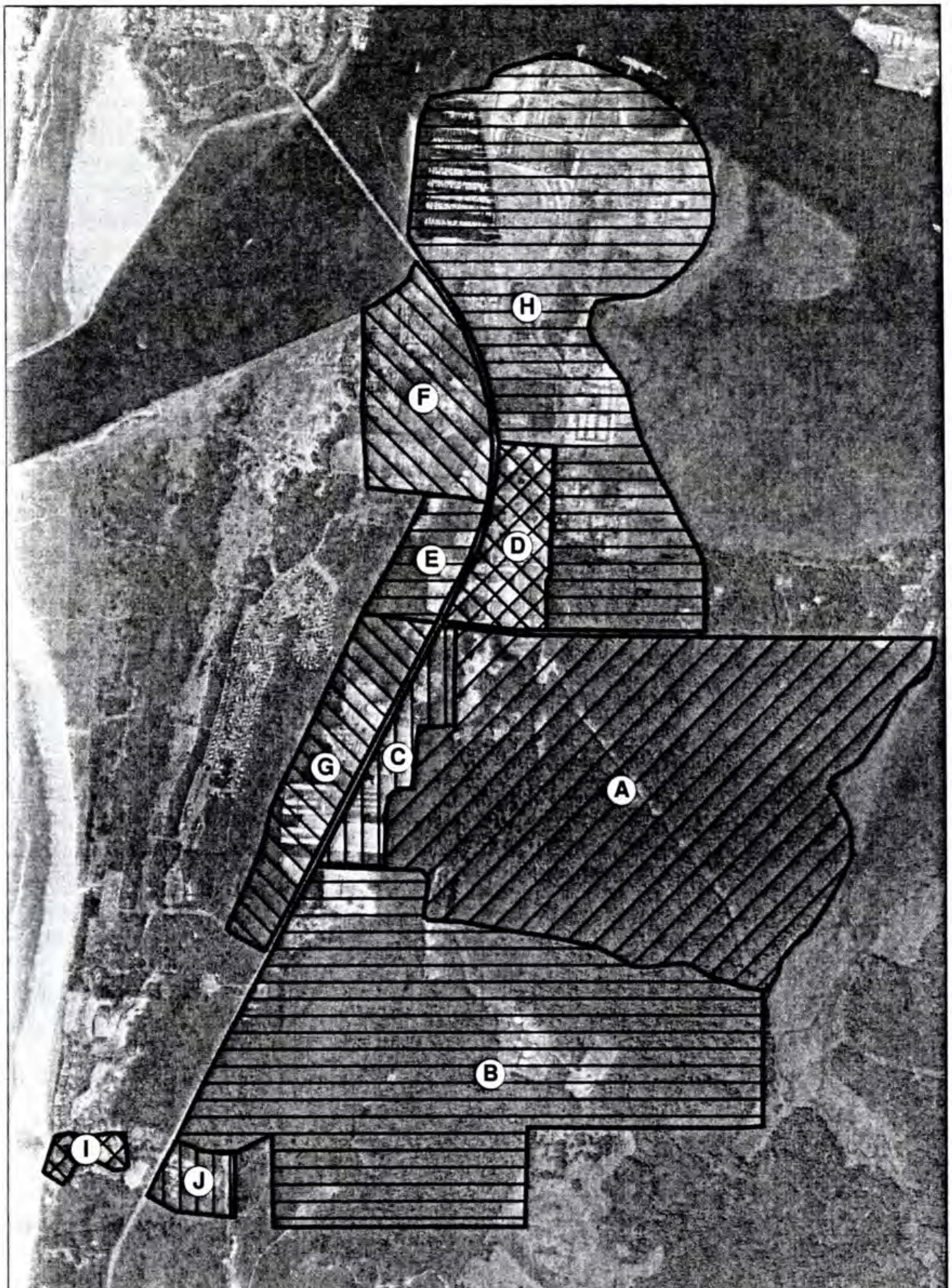
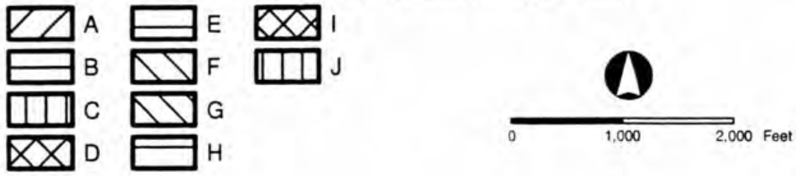


Figure 2-1: South Beach Future Transportation Analysis Zones



Geographic Data Standards:
Projected Coordinate System:
Oregon State Plane South

Data Source(s):
USDA, ESRI, Parametrix

Contact Information:
Parametrix
700 NE Multnomah
Suite 1000
Portland, OR 97232-2131
(503) 233-2400

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The types of development assumed for South Beach include single family residential, condominiums/townhouses, industrial park, retail, research and development, community college and a park. See TSP Technical Memorandum #12 for a detailed discussion of the land use assumptions.

Additionally, while the average Saturday afternoon may actually be the highest traffic generating period during a typical summer season, trip generation and traffic operations analysis is based on typical weekday. This was done to facilitate trip generation estimation (which is difficult to assess for some proposed uses in the study area) and to facilitate comparison between the peak summer season and other times of the year when peak traffic activity would likely occur on a weekday in the late afternoon. Table 2-4 summarizes the land use assumptions inherent in Scenario #1.

Table 2-4. Land Use Assumptions for Scenario #1

Land Use Type	Units	Total Size
Single Family Residential	Dwelling Unit	257
Condominium / Townhouse	Dwelling Unit	381
Hotel	Rooms	215
Retail Commercial	Square Feet	535,350
Industrial Park	Square Feet	202,350
Research and Development	Square Feet	250,000
General Office	Employees	42
Community College	Students	1,000
Campground / RV Park	Sites	55
County Park	Acres	78.1

Table 2-5 presents a summary of the South Beach estimated weekday PM peak hour trips associated with the development proposed under this scenario. As noted in the table, Land Use Scenario #1 is expected to generate a total of just over 4,300 PM peak hour trip ends, with 1,923 inbound and 2,394 outbound. Over 1,100 PM peak hour trip ends are expected to be generated by the South Beach Campus Village development which includes a large residential component and a community college. Development in TAZs B and C including anticipated redevelopment along US 101 to increase development density would generate nearly 1,000 PM peak hour trips. Other TAZs with significant traffic-generating development would include TAZ D (including hotel and retail uses) and TAZ F (with retail and condominium/townhouse development). Trip generation estimates in this table also account for a 20 percent pass-by reduction in retail commercial trips, and for varying rates of internal trip-making within each TAZ planned for mixed use development.

Table 2-5. Trip Generation Summary for Land Use Scenario #1

TAZ	Description	PM Peak Trips		
		In	Out	Total
Area A	South Beach Village	560	608	1,168
Areas B / C	East side of US 101 Frontage south of 40th Street	438	559	997
Area D	East side of US 101 Frontage north of 40th Street	235	249	485
Area E	West side of US 101 Frontage between 32nd and 40th Streets	63	96	159
Area F	West side of US 101 Frontage north of 32nd Street	279	278	557
Area G	West side of US 101 Frontage between 40th Street and entrance to South Beach State Park	157	203	360

Table 2-5 Continued. Trip Generation Summary for Land Use Scenario #1

TAZ	Description	PM Peak Trips		
		In	Out	Total
Area H [1]	East of US 101 from Yaquina Bay to 40th Street (excluding highway frontage but including Hatfield Marine Science Center and Oregon Coast Aquarium)	103	308	410
Area I	West of US 101 in vicinity of 62nd Street (Southshore PD)	88	93	181
Area J [2]	East side of US 101 in vicinity of 62nd Street (land uses to be removed to accommodate airport clear zone)	(96)	(104)	(200)
Total Trips		**1,923**	**2,394**	**4,317**

Notes:
1 This is primarily laboratory and classroom use related to Hatfield Marine Science Center (HMSC) and the Oregon Coast Aquarium. Includes 45, 000 sq ft for NOAA, 45, 000 sq ft for Port of Newport, and 160,000 for HMSC.
2 As documented in the Newport Airport Master Plan, the Airport intends to acquire this area and abandon the existing uses to increase air safety.

Land Use Scenario – Environmentally Constrained Growth

Land Use Scenario #2 is built upon the development assumptions prepared for Scenario #1 but also incorporates potential development constraints associated with wetland resources in the study area. The variety of the land uses are assumed in each of the sub-areas are still consistent with zoning designations and permitted uses. Development includes single family residential, condominiums/townhouses, industrial park, retail, research and development, community college and a park. Table 2-6 summarizes the land use assumptions inherent in Scenario #2.

Table 2-6. Land Use Assumptions for Scenario #2

Land Use Type	Units	Total Size
Single Family Residential	Dwelling Unit	257
Condominium / Townhouse	Dwelling Unit	381
Hotel	Rooms	215
Retail Commercial	Square Feet	460,500
Industrial Park	Square Feet	142,500
Research and Development	Square Feet	220,000
General Office	Employees	42
Community College	Students	1,000
Campground / RV Park	Sites	55
County Park	Acres	78.1

Table 2-7 presents a summary of estimated weekday PM peak hour trip generation for Scenario #2. As noted in the table, Scenario #2 is expected to generate a total of approximately 3,900 PM peak hour trip ends, with 1,755 inbound and 2,150 outbound. Over 1,100 PM peak hour trip ends are expected by the South Beach Campus Village development consisting of a large residential component and the community college. Development in TAZs B and C including anticipated redevelopment along US 101 to increase development density would generate nearly 800 PM peak hour trips. Other TAZs with significant traffic-generating development would include TAZ D (including hotel and retail uses) and TAZ F (with retail and condominium/townhouse development).

Table 2-7. Trip Generation Summary for Land Use Scenario #2

TAZ	Description	PM Peak Trips In	PM Peak Trips Out	PM Peak Trips Total
Area A	South Beach Village	560	608	1,168
Areas B / C	East side of US 101 Frontage south of 40th Street	344	439	783
Area D	East side of US 101 Frontage north of 40th Street	235	249	484
Area E	West side of US 101 Frontage between 32nd and 40th Streets	63	96	159
Area F	West side of US 101 Frontage north of 32nd Street	279	278	557
Area G	West side of US 101 Frontage between 40th Street and entrance to South Beach State Park	90	123	213
Area H [1]	East of US 101 from Yaquina Bay to 40th Street (excluding highway frontage but including Hatfield Marine Science Center and Oregon Coast Aquarium)	94	262	356
Area I	West of US 101 in vicinity of 62nd Street (Southshore PD)	88	93	181
Area J [2]	East side of US 101 in vicinity of 62nd Street (land uses to be removed to accommodate airport clear zone)	(96)	(104)	(200)
Total Trips		**1,753**	**2,148**	**3,901**

Notes:
1 This is primarily laboratory and classroom use related to Hatfield Marine Science Center (HMSC) and the Oregon Coast Aquarium. Includes 45, 000 sq ft for NOAA, 45, 000 sq ft for Port of Newport, and 160,000 for HMSC.
2 As documented in the Newport Airport Master Plan, the Airport intends to acquire this area and abandon the existing uses to increase air safety.

2.2 NEED FOR TRANSPORTATION SYSTEM IMPROVEMENTS

This section presents a brief summary on the need for transportation system improvements to accommodate the expected growth in traffic volumes along US 101 through the South Beach area between the present and 2030. Analysis conducted for the Newport Transportation System Plan (TSP) indicated that without improvements to the highway, significant congestion problems would be experienced even with minimal growth in traffic from the South Beach area. The extent and the type of development anticipated in South Beach (and described in the preceding section), calls for additional transportation system improvements on US 101 to accommodate through traffic demand and movements entering and exiting the highway.

Included in the discussion below are the following:

- A discussion of 2030 traffic volume estimates.
- A list of the performance measures used to quantify the implications of traffic volume growth.
- Identification of adopted traffic operational targets used by ODOT to determine when traffic congestion levels are unacceptable and management actions need to be taken.
- A summary of transportation system improvements that are assumed to be in place. Earlier analysis conducted as part of the Newport Transportation System Plan development process concluded that without these basic improvements, traffic operations along US 101 through South Beach would be unsustainable.
- A summary of 2030 peak period traffic operational findings.
- Duration of congestion beyond a single peak hour. This evaluation was conducted to determine whether the worst impacts were limited to the PM peak hour and/or a few

hours on either shoulder of the peak, or whether the congestion would be more pervasive.

2030 Traffic Volumes

Future traffic volume estimates for US 101 in the South Beach area were prepared using a multi-step process. The first step involved developing estimates of future levels of traffic without any new development in the South Beach area beyond what exists today. Under this condition, traffic levels on US 101 are expected to grow as a result of increases in through traffic traveling between Newport and destinations to the south. This increase in traffic is unrelated to traffic levels that would be generated by new land development activity in South Beach. For purposes of this study, it has been assumed that through traffic volumes would grow by 1.7 percent per year from 2008 through 2030. This element of the US 101 traffic volume estimates is referred to as "future background" traffic.

The second step involved adding the generated trips discussed above for Land Use Scenarios #1 and #2 to the future background traffic, and assigning the resulting traffic to specific streets and intersections. 2030 traffic forecasts focus on the weekday PM peak hour for three separate time periods during the year:

- **30 HV** (Summertime Weekday PM Peak Hour). This traffic condition is considered the design hour for highway projects on most state highways including the Oregon Coast. Summertime weekend hours often see higher congestion levels than summertime weekday PM peak hours, but the highway would not be designed for these higher volumes.
- **AAV** (Average Annual Weekday PM Peak Hour). Includes the average of varying levels of traffic over the course of a typical year including summertime highs, winter lows, and levels in the spring and the autumn that generally fall between the highs and lows..
- **Off-Season** (Weekday PM Peak Hour). This refers to traffic volumes and operations typically experienced during the weekday PM peak hour from September through May, excluding the summertime peak season, Fridays, holidays and Spring Break week.

The identification of 30 HV, AAV and Off-Season was based on the 2007 summary trend data from the automatic traffic recorder (ATR) located in north Newport (# 21-009). This data was the latest available at the time the traffic forecasting analysis was conducted and represents conditions prior to the recent economic slowdown. The development of 2030 traffic volumes and the baseline roadway network is discussed in Appendix A and in Technical Memorandum #12.

Performance Measures

A variety of performance measures have been identified to provide a more complete understanding of the extent and nature of future traffic congestion through South Beach and to offer useful comparisons among land use and network alternatives. These have been calculated to determine the nature, type, location and duration of congestion for each scenario and time period analyzed and include the following:

- Volume-to-capacity ratios at intersections developed using the Synchro analysis software.
- 95^{th} percentile traffic queues using Synchro output for signalized and unsignalized intersections. Traffic queue estimates are not based on simulations and, as a result,

they reflect the treatment of each signal as if it was in an isolated location rather than part of a system of traffic signals. The interactions between signals and their effects on traffic queuing are not reflected in the results presented in this report.

- Signal progression assessment focusing on green band width during peak hours.
- Travel time on US 101 in northbound and southbound directions for three roadway segments – Hurbert Street to 35th Street, 35th Street to 50th Street, and 50th Street to 62nd Street.
- Average travel speeds on US 101 in northbound and southbound directions for three roadway segments – Hurbert Street to 35th Street, 35th Street to 50th Street, and 50th Street to 62nd Street.
- Unserved vehicles (that cannot enter the Synchro network due to extensive congestion and, thus, are not included in the analysis).
- Duration of congestion – This performance measure addresses the number of hours over the course of a typical weekday where the OHP mobility target would be exceeded. This measure was assessed for the projected 2030 AAV and Off-Season weekdays and was developed from the PM Peak Hour forecast using intersection operational assumptions consistent with those used for the other performance measures. The analysis reflects the normal tendency of traffic to experience a peak 15 minutes during a peak hour (e.g., using a Peak Hour Factor of 0.95 for the US 101 mainline and 0.85 for side streets). An alternate evaluation was also conducted which reflects a more even spreading of traffic over the peak hour (e.g., using a Peak Hour Factor of 1.00). The methodology used to calculate duration of congestion along US 101 in South Beach is more fully described later in this chapter.

Operational Standards or Targets

Within the state of Oregon, traffic operations are evaluated based on two sets of standards or targets by which traffic performance may be judged. The target for state highways, adopted in the 1999 Oregon Highway Plan (OHP), is the volume-to-capacity (v/c) ratio. This ratio is expressed in terms of the relationship between traffic volumes and the roadway or intersection's theoretical capacity. Various v/c thresholds are applied to all state highways based on functional classification of these facilities.

US 101 in the South Beach area is classified as a Statewide Highway. Based on the December 2011 revisions to OHP Policy 1F (adoption effective in January of 2012), the peak hour, maximum v/c targets for US 101 signalized intersections inside the UGB boundary are:

- 0.90 with speed limit of ≤ 35 mph (Yaquina Bay Bridge to just north of 40th Street)
- 0.80 with speed limit of ≥ 45 mph (north of 40th Street south to the City Limits)

At unsignalized intersections, the v/c target is different for the highway and for an intersecting street or private approach road. The targets listed above apply to the highway movement. The targets for streets intersecting with US 101 are:

- 0.95 with speed limit of ≤ 35 mph (Yaquina Bay Bridge to just north of40th Street)
- 0.90 with speed limit of ≥ 45 mph (north of 40th Street south to the City Limits)

The City of Newport does not have a currently adopted roadway or intersection performance standard, but many local communities use the concept of intersection or roadway levels of service (LOS) to describe desired operating conditions. Levels of Service are based on average delay at intersections, and have been included in the analysis documented in this memorandum to provide a comparison with ODOT's v/c targets. A description of these two performance measures is included in Appendix B.

Assumed Roadway Improvements Included in the Analysis

In order to evaluate highway operations, a study area focusing on US 101 in Newport was identified and a traffic operations micro-simulation model using the Synchro software was created. The analysis area extends north of the Yaquina Bay Bridge to the first signalized intersection, US-101/Hurbert Street. All of the highway/public street intersections in South Beach extending south to 62nd Street are part of the study area. Analysis of traffic operations for the land use scenarios and seasonal time periods was conducted using the traffic operations model. Improvement needs were evaluated for the study area south of the bridge.

Early in the planning process, analysis was conducted to assess the impact of future South Beach and background traffic growth on US 101 as it exists today. This analysis found that traffic conditions would be so severe that most South Beach development could not reasonably occur. Thus, the focus of the analysis changed to incorporate a broad series of street and highway improvements that would be both necessary to accommodate community growth and reasonable to build. All analyses presented in this report include the following specific network features:

- The Yaquina Bay Bridge would remain two lanes.
- Additional travel lanes would be added to US 101 from Abalone Street and Pacific Way south to 62nd Street to result in two through lanes in each direction. US 101 from the Yaquina Bay Bridge to 40th Street would be built as an urban roadway section, with curbs and gutters a sidewalk on the east side and a multi-use path on the west side.
- The intersection of US 101 with Pacific Way would accommodate only northbound right turns for vehicles leaving the highway. If a connection is retained, only emergency and transit vehicles would be allowed to enter US 101.
- The intersection of US 101 with Ferry Slip Road would be closed.
- The intersection of US 101 with 32nd Street would be converted from serving all-way traffic to serving only right-in/right-out traffic. The existing signal would be relocated to the intersection of US 101 and 35th Street.
- The intersection of US 101 with 35th Street would be built and signalized. The intersection would have four approach legs, each with separate left, right, and through lanes.
- The intersection of US 101 with 40th Street would be signalized with four approach legs, each with separate left, right, and through lanes. A second southbound left-turn lane would be necessary to accommodate the estimated 500+peak hour vehicles making southbound left turns.
- The intersection of US 101 with 50th Street would be realigned to serve as the fourth, eastern leg of the existing intersection with the entrance to South Beach State Park. This intersection would have a signal and include separate left, right, and thru lanes on the north/south legs. Separate left and through/right lanes are assumed for the side streets.
- The intersection of US 101 with 62nd Avenue would include separate left, right and through lanes in the southbound direction of US 101 and include separate left and

through lanes in the northbound direction. Left turn and through/right approaches are assumed for the side streets which are stop-controlled.

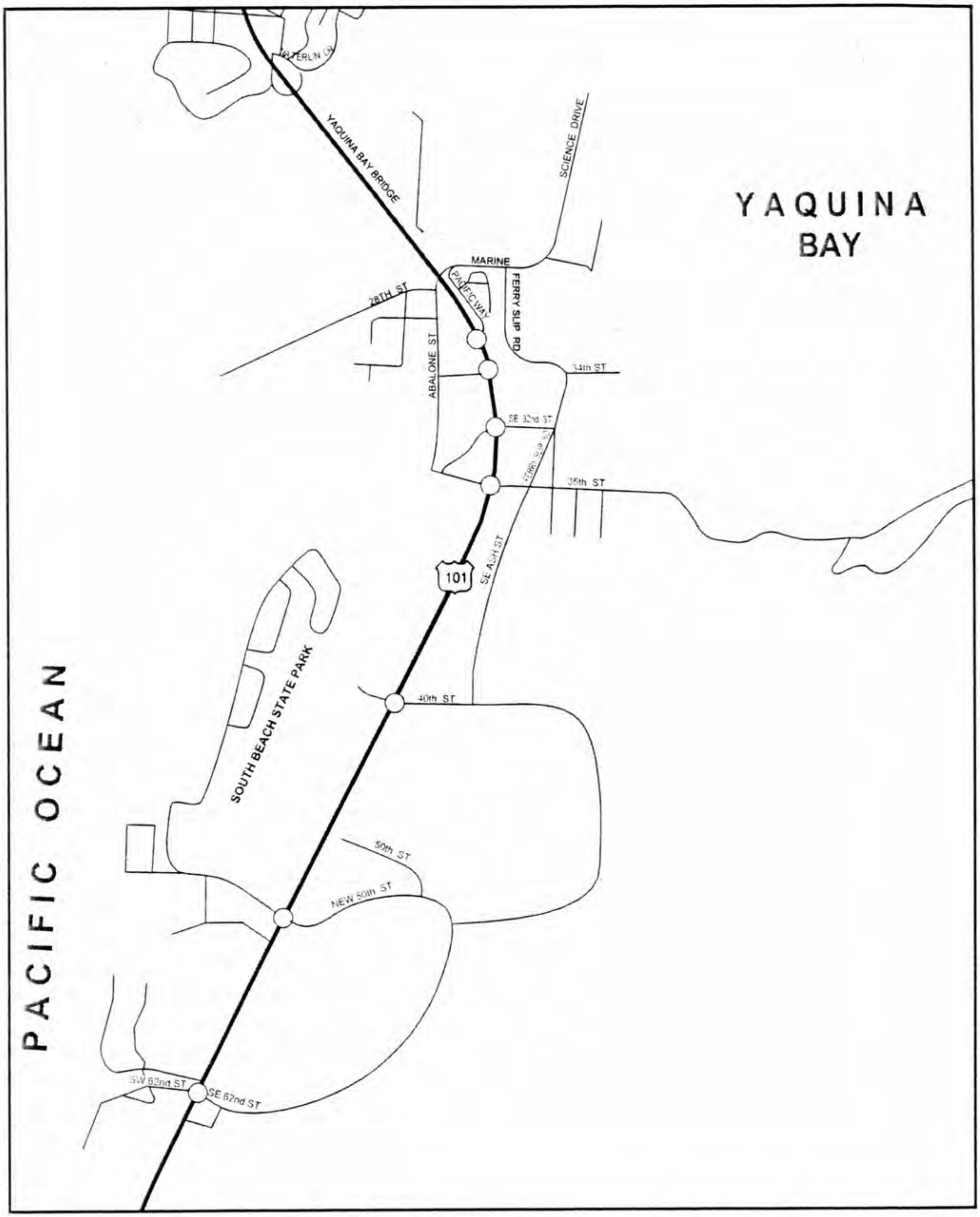
- A north /south internal street between 50th and 62nd Streets would be constructed east of the highway.

Figure 2-2 presents the baseline roadway network and study area intersections for South Beach study area.

Characteristics of the Peak Hour Transportation Problem

The most basic finding of the transportation analysis is that the South Beach area and US 101 Newport in general would experience a significant increase in congestion, particularly during the summertime peak activity months. The results of analysis for each performance measure, land use scenario and time period are presented in detail in Technical Memorandum #12. For ease of reference copies of the intersection operational worksheets are included in both Technical Memorandum #12 and this document (see Appendices C through H). Analysis results are presented in Tables 2-8 and 2-9 for Land Use Scenarios #1 and #2, respectively, and are summarized below for the performance measures described earlier in this chapter.

- Even with the improvements called for in the preceding section, a significant increase in congestion along US 101 is anticipated over current conditions with either Land Use Scenario. No intersection would operate without one or more significantly congested movements and delays are anticipated along the length of the highway through South Beach, particularly approaching the Yaquina Bay Bridge with its limited two-lane capacity.
- Traffic congestion would be at its most severe during the 30 HV (Summertime Seasonal Weekday Peak). With Scenario #1 all three signalized intersections would operate at v/c > 1.00, while with Scenario #2, two intersections would operate at v/c > 1.00. Many of the side street movements at the unsignalized intersections would experience significant delays with a v/c of 2.00 or greater in many locations. The section between the Yaquina Bay Bridge and 35th Street would be significantly congested in both northbound and southbound directions. Travel speeds through the South Beach area would be very low, averaging approximately 9 mph in the northbound direction and 7 mph in the southbound direction.
- With AAV (Average Annual) traffic, significant congestion would also be experienced, although at slightly lower than the levels than are anticipated in the summertime. Travel speeds through the South Beach area would be very low, averaging approximately 12 mph in the northbound direction and 11 mph in the southbound direction.
- Traffic congestion during the Off-Season peak period (typically from September through May) would be less than the 30 HV or Average Annual, but significant congestion problems would still be experienced, primarily for side street traffic at the unsignalized intersections. Travel speeds through the South Beach area would continue to be low, averaging 15 mph in the northbound direction and 14 mph in the southbound direction



NOT TO SCALE

LEGEND

○ STUDY INTERSECTIONS

Figure 2-2
2030 Base Network
and Study Intersections

Table 2-8. 2030 Land Use Scenario 1 – Traffic Operations Comparison with Standard Peak Hour Factors

			2030 30 HV		2030 AA		2030 Off-Season	
		OHP Target	V/C Ratio	Delay (sec/veh)	V/C Ratio	Delay (sec/veh)	V/C Ratio	Delay (sec/veh)
Signalized Intersections								
US 101 & 35th Street		0.90	**1.19**	116.1	**1.00**	36.6	0.90	16.6
US 101 & 40th Street		0.80	**1.24**	126.6	**1.04**	58.8	**0.94**	37.8
US 101 & 50th Street		0.80	**1.04**	31.9	**0.88**	18.6	0.77	13.4
Unsignalized Intersections	***Critical Movement/Control***							
US 101 & Pacific Way	*Northbound Through*	0.90	**2.10**	0	**1.77**	0	**1.58**	0
	Northbound Right	0.90	0.08	0	0.07	0	0.06	0
	Southbound Through	0.90	**2.04**	0	**1.70**	0	**1.52**	0
US 101 & Abalone Street	*Northbound Through*	0.90	**1.09**	0	**0.92**	0	0.82	0
	Southbound Through	0.90	**1.88**	0	**1.57**	0	**1.40**	0
	Southbound Right	0.90	0.16	0	0.13	0	0.12	0
	Eastbound Right	0.95	**31.96**	N/A	**11.34**	N/A	**6.18**	N/A
US 101 & 32nd Street	*Northbound Through*	0.90	0.82	0	0.69	0	0.62	0
	Northbound Right	0.90	0.04	0	0.04	0	0.03	0
	Southbound Through-Right	0.90	**1.31**	0	**1.10**	0	**0.98**	0
	Eastbound Right	0.95	0.79	135.7	0.42	52.7	0.29	36.4
	Westbound Right	0.95	**2.71**	>200.0	**2.25**	>200.0	**1.73**	>200.0
US 101 & 62nd Street	*Northbound Left*	0.80	0.34	42.8	0.17	25.3	0.14	20.7
	Northbound Through-Right	0.80	**0.85**	0	0.71	0	0.63	0
	Southbound Left	0.80	0.04	20.9	0.03	16.3	0.01	14.3
	Southbound Through	0.80	0.78	0	0.65	0	0.58	0
	Southbound Right	0.80	0.05	0	0.04	0	0.04	0
	Eastbound Left	0.90	**4.86**	N/A	**2.07**	>200.0	**1.32**	>200.0
	Eastbound Through-Right	0.90	0.24	37.4	0.14	25.7	0.10	21.3
	Westbound Left	0.90	**0.97**	>200.0	0.33	102.8	0.24	67.9
	Westbound Through-Right	0.90	0.06	23.1	0.04	18.5	0.02	16.3

Note: N/A indicates that projected volumes sufficiently exceed capacity such that Synchro cannot calculate a value.

Bold Entire intersection or a specific movement that would operate at an over-capacity condition.

Bold Entire intersection or a specific movement that would exceed the OHP target but that would operate at less than capacity conditions.

Table 2-9. 2030 Land Use Scenario 2 – Traffic Operations Comparison with Standard Peak Hour Factors

			2030 30 HV		2030 AA		2030 Off-Season	
		OHP Target	**V/C Ratio**	**Delay (sec/veh)**	**V/C Ratio**	**Delay (sec/veh)**	**V/C Ratio**	**Delay (sec/veh)**
Signalized Intersections								
US 101 & 35th Street		0.90	**1.15**	89.3	**0.97**	24.5	0.88	23.0
US 101 & 40th Street		0.80	**1.18**	85.5	**0.99**	42.7	**0.85**	27.4
US 101 & 50th Street		0.80	**0.99**	23.9	**0.83**	16.9	0.74	11.4
Unsignalized Intersections	***Critical Movement/Control***							
US 101 & Pacific Way	*Northbound Through*	0.90	**1.99**	0	**1.68**	0	**1.50**	0
	Northbound Right	0.90	0.08	0	0.07	0	0.06	0
	Southbound Through	0.90	**1.97**	0	**1.64**	0	**1.46**	0
US 101 & Abalone Street	*Northbound Through*	0.90	**1.04**	0	0.88	0	0.78	0
	Southbound Through	0.90	**1.80**	0	**1.51**	0	**1.35**	0
	Southbound Right	0.90	0.16	0	0.13	0	0.12	0
	Eastbound Right	0.95	**27.49**	N/A	**9.93**	N/A	**5.73**	N/A
US 101 & 32nd Street	*Northbound Through*	0.90	0.77	0	0.65	0	0.58	0
	Northbound Right	0.90	0.05	0	0.04	0	0.04	0
	Southbound Through-Right	0.90	**1.27**	0	**1.06**	0	**0.95**	0
	Eastbound Right	0.95	0.73	113.8	0.39	47.5	0.28	33.9
	Westbound Right	0.95	**2.73**	>200.0	**2.01**	>200.0	**1.33**	182.6
US 101 & 62nd Street	*Northbound Left*	0.80	0.31	39.3	0.16	24.2	0.13	19.8
	Northbound Through-Right	0.80	0.80	0	0.67	0	0.60	0
	Southbound Left	0.80	0.04	19.2	0.03	15.3	0.01	13.6
	Southbound Through	0.80	0.76	0	0.64	0	0.57	0
	Southbound Right	0.80	0.05	0	0.04	0	0.04	0
	Eastbound Left	0.90	**4.32**	N/A	**1.91**	>200.0	**1.22**	>200.0
	Eastbound Through-Right	0.90	0.23	35.1	0.14	24.7	0.09	20.6
	Westbound Left	0.90	0.40	193.7	0.19	77.8	0.07	51.4
	Westbound Through-Right	0.90	0.05	21.5	0.04	17.5	0.02	15.6

Note: N/A indicates that projected volumes sufficiently exceed capacity such that Synchro cannot calculate a value.

Bold Entire intersection or a specific movement that would operate at an over-capacity condition.

Bold Entire intersection or a specific movement that would exceed the OHP target but that would operate at less than capacity conditions.

Details of the traffic operations analyses are presented in Chapters 3, 4 and 5 of Technical Memorandum #12.

Duration of Congestion Beyond the Peak Hour

The analysis of duration of congestion attempts to identify the length of time over a 16-hour period on a typical average annual or off-season weekday when the study area highway and intersections would exceed the applicable OHP mobility targets for each location. An evaluation was conducted to determine whether the worst impacts were limited to the PM peak hour and/or a few hours on either shoulder of the peak, or whether the congestion would be more pervasive. As noted previously in the discussion of performance measures, two alternative approaches were used to conduct this analysis. One assumes that traffic in a typical peak hour will experience a shorter 15-minute peak with lesser volumes during the remainder of the hour. This effect is represented by the use of Peak Hour Factors of 0.85 and 0.95 for side street and US 101 mainline traffic, respectively. The alternate approach assumes that traffic volumes will be relatively consistent throughout the hour and not experience a shorter "peak within the peak". For this analysis a Peak Hour Factor of 1.00 was assumed.

The methodology used to calculate duration of congestion for the study area intersections included a multi-step process as described below:

1. *Identify the peak analysis hour for 2030 average annual or off-season conditions.* Review of recent traffic counts taken over the past few years at several locations along US 101 in South Beach indicates that the PM peak hour (which is also the peak hour of a typical weekday) occurs between 4 and 5 PM. It is assumed that this time period continues to represent the weekday peak under average annual or off-season conditions in 2030.
2. *Identify hourly traffic volumes over the course of the 16-hour analysis period for a typical average annual or off-season weekday in 2030.* Using the PM peak hour as a starting point (and assuming that it represents the 100% hour), the percentage of the PM peak that could be experienced in all other hours is based on recent hourly traffic count data. Counts that were reviewed to obtain information on hourly traffic distribution included roadway tube counts taken in April 2009 along US 101 north and south of Ferry Slip Road and south of Pacific Way, and a turning movement count taken in April 2005 at the intersection of US 101 and 32nd Street (see Appendix I for a summary table of this data). While the distribution of traffic by hour varies over the time periods covered by each of these counts, a general pattern emerges that can be best represented by the 16-hour turning movement count taken in April 2005 at the intersection of US 101 at 32nd Street. This count was chosen as the basis for estimating 2030 hourly traffic distribution patterns because it represents conditions that might be more prevalent through the signalized intersections proposed along US 101 (e.g., from 35th to 50th) and it is located farther from the Yaquina Bay Bridge influence area than the other counts.
3. *Identify reductions in total approach volumes that would be needed to meet applicable OHP mobility targets.* The 2030 PM peak hour projections for AAV and/or Off-Season conditions at each intersection with both land use scenarios were evaluated to determine the percent reduction in overall approach volumes that would be needed to meet the OHP targets. As noted previously, two analysis alternates were evaluated.
    - **<u>Alternate 1</u>** – includes an assessment of 2030 conditions for both Land Use Scenarios #1 and #2 under AAV traffic conditions, and assumes the same analysis parameters as were used to evaluate all other performance measures documented in this chapter. In particular, intersection Peak Hour Factors were assumed to be 0.95 along US 101 and 0.85 for the cross-streets intersecting the state highway.

- **Alternate 2** – includes an assessment of 2030 conditions for both Land Use Scenarios #1 and #2, as well as for AAV and Off-Season traffic conditions. Peak Hour Factors were assumed to be 1.00, representing a more uniform spreading of traffic over the course of the peak hour than under Alternate 1.

4. *Identify intersection capacities at each intersection for both time periods and land use scenarios.* These theoretical capacities were assumed to represent the total approach volumes at an intersection when it achieved operations approximating the OHP mobility targets. Total capacity for each intersection at a v/c ratio of 1.00 was also estimated.

5. *Identify the total number of hours that each intersection would exceed the OHP target and/or equal or exceed a v/c ratio of 1.00 for the relevant time periods and land use scenario. Necessary reductions in total approach traffic volumes were estimated to identify the point at which either the OHP target of the v/c ≥ 1.00 threshold could be attained.* To accomplish this calculation, the estimated capacity value associated with the target for each intersection was compared with the estimated 2030 traffic volume during each hour of the 16-hour day for the two alternates described above and various trip reduction assumptions. Based on this comparison, an estimate was prepared of the number of hours during each weekday when traffic operations could be expected to exceed the OHP mobility target or a v/c threshold of ≥ 1.00 for the signalized and unsignalized intersections along US 101 in South Beach.

Key findings from this analysis are presented in Tables 2-10, 2-11, 2-12 and 2-13, and are summarized below. Appendices I through N include intersection analysis worksheets for each land use scenario and analysis condition.

Alternate 1 – Standard Peak Hour Factors

Average Annual Weekday Conditions

Land Use Scenario #1 – Achieving Relevant OHP Mobility Targets

Signalized Intersections

- With full build-out of this scenario, the signalized intersections of US 101 with 35th, 40th and 50th Streets are all expected to operate above the applicable OHP mobility targets (v/c = 0.90 at the first intersection and 0.80 at the second two).

- The intersection of 35th Street would operate with a v/c of 1.02 for the AAV peak hour and exceed its target for four hours each weekday, typically around midday and in the late afternoon.

- The intersection of US 101 with 40th Street would operate with a v/c of 1.07 for the AAV peak hour and exceed its applicable target for approximately seven hours each weekday, typically from midday to early evening.

- The intersection of US 101 with 50th Street would operate with a v/c of 0.88 for the AAV peak hour and exceed its target for approximately four hours during each weekday, typically one during midday and one in the late afternoon.

- A 21 percent reduction in the total trips generated by this scenario would be necessary for the signalized intersections to function within applicable v/c targets. This would result from a lower level of land development in the South Beach area than discussed in Section 2.1

- Even with the reduction in trips due to the lower level of development, traffic demand for crossing the Yaquina Bay Bridge would significantly exceed available capacity. This would result in a spill-back of traffic that could adversely affect each of the signalized intersections.

Unsignalized Intersections

- At the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the narrow roadway section of the highway leading to/from the Yaquina Bay Bridge would result in operations exceeding the OHP mobility target (v/c = 0.90 for the mainline and 0.95 for the side street) for 12 or 13 hours, respectively, out of each typical 2030 AAV weekday. US 101 would be extremely congested for most of the working day from morning to early evening. As operations at the signalized intersections were identified as a priority for resolution, no further reductions in traffic volumes were evaluated beyond assessing the benefits of the 21 percent reduction discussed above. With the 21 percent reductions, traffic conditions at these intersections would exceed the OHP mobility target for 11 hours each weekday.
- For the unsignalized intersection of US 101 with 32nd Street, operations would exceed the applicable mobility target (v/c = 0.90 for the mainline and 0.95 for the side street) for 11 hours out of each typical 2030 AAV weekday. With the 21 percent reduction, traffic conditions would exceed the OHP mobility target for seven hours each weekday.
- For the unsignalized intersection of US 101 with 62nd Street, operations would exceed applicable mobility targets for an estimated seven hours out of each weekday, typically from midday to early evening. With a 21 percent reduction in approach volumes, this intersection is expected to exceed its relevant mobility target (v/c = 0.80 for the mainline and 0.90 for the side streets) for one hour each weekday – the PM peak.

Land Use Scenario #1 – Achieving Less than V/C = 1.00 but More than the OHP Target

Signalized Intersections

- An eight percent reduction in approach traffic volumes from Full Development would be needed for each of the signalized intersections to achieve v/c ratios of less than 1.00.

Unsignalized Intersections

- Even with this eight percent reduction in traffic, all of the unsignalized intersections along US 101 would continue to experience congestion exceeding v/c = 1.00 for many hours over a typical weekday. The intersections of US 101 with Pacific Way and Abalone Street exceed v/c = 1.00 for 11 hours, the intersection at 32nd Street for seven hours, and the intersection with 62nd Street for three hours.

Land Use Scenario #2 – Achieving Relevant OHP Mobility Targets

Signalized Intersections

- The intersection of US 101 with 35th Street is expected to operate with a v/c of 0.97 during the AAV peak hour in comparison to the target of 0.90. It is expected to exceed this target for an estimated two hours out of each weekday, typically around midday and in the late afternoon.
- The intersection of US 101 with 40th Street is expected to operate with a v/c of 0.99 during the AAV peak hour in comparison to its mobility target of 0.80. It is expected

to exceed this target for seven hours each weekday, typically from midday to late afternoon.

- The intersection of US 101 with 50th Street is expected to operate at a v/c of 0.83 during the AAV peak hour in comparison to its mobility target of 0.80. This intersection is expected to exceed the target for two hours each weekday.
- A 16 percent reduction in the total trips generated by this scenario would be necessary for the signalized intersections to function within applicable v/c targets. This would result from a lower level of land development in the South Beach area than discussed in Section 2.1.

Unsignalized Intersections

- At the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the narrow roadway section of the highway leading to/from the Yaquina Bay Bridge would result in operations exceeding the OHP mobility target (v/c = 0.90 for the mainline and 0.95 for the side street) for 12 or 13 hours, respectively, out of each typical 2030 AAV weekday. US 101 would be extremely congested for most of the working day from morning to early evening. As operations at the signalized intersections were identified as a priority for resolution, no further reductions in traffic volumes were evaluated beyond assessing the benefits of the 16 percent reduction discussed above. With the 16 percent reductions, traffic conditions at these intersections would exceed the OHP mobility target for 11 hours each weekday.
- For the unsignalized intersection of US 101 with 32nd Street, operations would exceed the applicable mobility target (v/c = 0.90 for the mainline and 0.95 for the side streets) for 11 hours out of each typical 2030 AAV weekday. With the 16 percent reduction, traffic conditions would exceed the OHP mobility target for seven hours each weekday.
- For the unsignalized intersection of US 101 with 62nd Streets, operations would exceed the applicable mobility target for an estimated seven hours out of each weekday, typically from midday to early evening. With a 16 percent reduction in approach volumes, this intersection is expected to exceed its relevant mobility target (v/c = 0.80 for the mainline and 0.90 for the side streets) for two hours each weekday.

Land Use Scenario #2 – Achieving Less than V/C = 1.00 but More than the OHP Target

Signalized Intersections

- As the signalized intersections are all expected to operate with a v/c of less than 1.00 with Full Development, no reduction in the traffic volumes approaching these intersections was evaluated.

Unsignalized Intersections

- With Full Development of Scenario #2, all of the unsignalized intersections would exceed v/c 1.00 for many hours each weekday. The intersections of US 101 with Pacific Way and Abalone Street exceed v/c = 1.00 for 11 hours, the intersection at 32nd Street for 10 hours and the intersection with 62nd Street for seven hours.

Alternate 2 – Adjusted Peak Hour Factors

Average Annual Weekday Conditions

Land Use Scenario #1

Signalized Intersections

- With full build-out of this scenario, the signalized intersections of US 101 with 35th, 40th and 50th Streets are all expected to operate above the applicable OHP mobility targets (v/c = 0.90 at the first intersection and 0.80 at the second two).
- The intersection of 35th Street would operate with a v/c of 0.96 for the AAV peak hour and exceed its target for four hours each weekday, typically around midday and in the late afternoon.
- The intersection of US 101 with 40th Street would operate with a v/c of 0.96 for the AAV peak hour and exceed its applicable target for approximately seven hours each weekday, typically from midday to early evening.
- The intersection of US 101 with 50th Street would operate with a v/c of 0.82 for the AAV peak hour and exceed its target for approximately two hours during each weekday, typically one during midday and one in the late afternoon.
- A 19 percent reduction in the total trips generated by this scenario would be necessary for the signalized intersections to function within applicable OHP targets. This would result from a lower level of land development in the South Beach area than discussed in Section 2.1
- Even with the reduction in trips due to the lower level of development, traffic demand for crossing the Yaquina Bay Bridge would significantly exceed available capacity. This would result in a spill-back of traffic that could adversely affect each of the signalized intersections.

Unsignalized Intersections

- At the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the narrow roadway section of the highway leading to/from the Yaquina Bay Bridge would result in operations exceeding the OHP mobility target (v/c=0.90 for the mainline and 0.95 for the side street) for 11 or 12 hours, respectively, out of each typical 2030 AAV weekday. US 101 would be extremely congested for most of the working day from morning to early evening. As operations at the signalized intersections were identified as a priority for resolution, no further reductions in traffic volumes were evaluated beyond assessing the benefits of the 19 percent reduction discussed above. With the 19 percent reductions traffic conditions at these intersections would exceed the OHP mobility target for 11 hours each weekday.
- For the unsignalized intersections of US 101 with 32nd and 62nd Streets, operations would exceed applicable mobility targets for an estimated seven hours out of each weekday, typically from midday to early evening. With a 19 percent reduction in approach volumes, these intersections are expected to meet their relevant mobility targets.

Land Use Scenario #2

Signalized Intersections

- The intersection of US 101 with 35th Street is expected to operate with a v/c of 0.92 during the AAV peak hour in comparison to the target of 0.90. This intersection would exceed its target for an estimated four hours out of each weekday, typically around midday and in the late afternoon.

- The intersection of US 101 with 40th Street is expected to operate with a v/c of 0.88 during the AAV peak hour in comparison to its mobility target of 0.80. This intersection would exceed its target for six hours each weekday, typically from midday to late afternoon.
- The intersection of US 101 with 50th Street is expected to operate at a v/c of 0.78 during the AAV peak hour and to meet its mobility target of 0.80.
- A 14 percent reduction in the total trips generated by this scenario would be necessary for the signalized intersections to function within applicable OHP targets. This would result from a lower level of land development in the South Beach area than discussed in Section 2.1.

Unsignalized Intersections

- For the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the two-lane section of the highway leading to/from the Yaquina Bay Bridge would exceed their applicable mobility targets for 12 hours out of each typical 2030 AAV weekday. As operations at the signalized intersections were identified as a priority for resolution, no further reductions in traffic volumes were evaluated beyond assessing the benefits of the 14 percent reduction discussed above. With a 14 percent reduction in total approach traffic, the targets would still be exceeded for up to 11 hours in each typical weekday.
- For the unsignalized intersection of US 101 with 32nd Street, traffic operations would exceed the applicable mobility target of v/c = 0.95 (for side street movements) for up to seven hours each day typically from midday to early evening. With the 14 percent reduction in approach volumes derived for signalized intersection analysis, some improvement would be seen at this intersection. However, the applicable mobility target would still be exceeded for an estimated one hour during each typical 2030 AAV weekday. A reduction closer to 19 percent as discussed above under Scenario #1 would be necessary.
- At the unsignalized intersection with 62nd Street, the applicable target for side streets of v/c = 0.90 would be exceeded for four hours each weekday, typically during midday and the late afternoon. With a 14 percent reduction in approach volume, this intersection is expected to meet its mobility target.

Off-Season Conditions

Land Use Scenario #1

Signalized Intersections

- With full build-out of this scenario under Off-Season weekday conditions, the signalized intersections of US 101 with 35th and 50th Streets are both expected to operate at or below their applicable OHP mobility targets.
- The intersection of US 101 with 40th Street is expected to operate at v/c = 0.82 during the Off-Season PM peak in comparison with its OHP target of 0.80. This intersection is expected to exceed its target for up to three hours each weekday, typically midday and mid-afternoon.

- An eight percent reduction in the total trips generated by this scenario would be necessary for the signalized intersection of US 101 with 40th Street to function within its applicable OHP target. This would result from a lower level of land development in the South Beach area than discussed in Section 2.1.

Unsignalized Intersections

- At the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the narrow roadway section of the highway leading to/from the Yaquina Bay Bridge would result in operations exceeding the OHP mobility target (v/c=0.90 for the mainline and 0.95 for the side street) for 11 hours out of each typical 2030 AAV weekday. US 101 would be extremely congested for most of the working day from morning to early evening. As operations at the signalized intersections were identified as a priority for resolution, no further reductions in traffic volumes were evaluated beyond assessing the benefits of the eight percent reduction discussed above. With the eight percent reductions traffic conditions at these intersections would continue to exceed the OHP mobility target for 11 hours each weekday.
- The unsignalized intersection of US 101 with 32nd Street is expected to operate at v/c = 1.24 for westbound side street traffic, significantly exceeding its target of 0.95. This movement is expected to exceed its target for an estimated two hours out of each weekday, midday and late afternoon.
- At the intersection of US 101 with 62nd Street, the applicable OHP mobility target would be exceeded by only one hour out of a typical weekday – the PM peak.
- With an eight percent reduction in approach volumes, the intersection of US 101 with 32nd Street would exceed its target for only one hour each weekday, while the intersection of US 101 with 62nd Street would meet its applicable target.

Land Use Scenario #2

Signalized Intersections

- The signalized intersections of US 101 with 35th, 40th and 50th Streets are all expected to operate at or below their applicable OHP mobility target (v/c = 0.90 for the intersection with 35th Street and v/c = 0.80 for the intersections with 40th and 50th Street), with full build-out of this scenario under off-season weekday conditions.

Unsignalized Intersections

- At the unsignalized intersections of US 101 with Pacific Way and Abalone Street, the narrow roadway section of the highway leading to/from the Yaquina Bay Bridge would result in operations exceeding the OHP mobility target (v/c=0.90 for the mainline and 0.95 for the side street) for 11 hours out of each typical 2030 AAV weekday. As operations at the signalized intersections were identified as a priority for resolution, no further reductions in traffic volumes were evaluated.
- The unsignalized intersection of US 101 with 32nd Street is expected to operate at v/c = 1.01 for westbound side street traffic, significantly exceeding its target of 0.95. This movement is expected to exceed its target for an estimated one hour out of each weekday – the PM peak.
- At the intersection of US 101 with 62nd Street, the applicable OHP mobility target would be met.

Table 2-10. Summary of Duration of Congestion – Average Annual Conditions with Standard Peak Hour Factors

Intersection	Critical Movement	OHP Target	Land Use Scenario #1			Land Use Scenario #2		
			Peak V/C	Hours at or Exceeding OHP Target	Hours at or Exceeding V/C of 1.00	Peak V/C	Hours at or Exceeding OHP Target	Hours at or Exceeding V/C of 1.00
Signalized Intersections								
US 101 & 35th Street	All	0.90	**1.02**	4 hours	1 hours	**0.97**	2 hours	0 hours
US 101 & 40th Street	All	0.80	**1.07**	7 hours	1 hours	**0.99**	7 hours	0 hours
US 101 & 50th Street	All	0.80	**0.88**	4 hours	0 hours	**0.83**	2 hours	0 hours
Unsignalized Intersections (1)								
US 101 & Pacific Way	NB Through	0.90	**1.77**	12 hours	12 hours	**1.68**	12 hours	11 hours
	NB Right	0.90	0.07			0.07		
	SB Through	0.90	**1.70**			**1.64**		
US 101 & Abalone Street	NB Through	0.90	**0.92**(2)	13 hours	11 hours	0.88(2)	13 hours	11 hours
	SB Through	0.90	**1.57**			**1.51**		
	SB Right	0.90	0.13			0.13		
	EB Right	0.95	**11.34**			**6.93**		
US 101 & 32nd Street	NB Through	0.90	0.69	11 hours	11 hours	0.65	11 hours	10 hours
	NB Right	0.90	0.04			0.04		
	SB Through/Right	0.90	**1.10**			**1.06**		
	EB Right	0.95	0.42			0.39		
	WB Right	0.95	**2.00**			**2.01**		
US 101 & 62nd Street	NB Left	0.80	0.17	7 hours	7 hours	0.16	7 hours	7 hours
	NB Through/Right	0.80	0.71			0.67		
	SB Left	0.80	0.03			0.03		
	SB Through	0.80	0.65			0.85		
	EB Left	0.90	**2.07**			**2.00**		
	EB Through/Right	0.90	0.14			0.15		
	WB Left	0.90	0.33			0.20		
	WB Through/Right	0.90	0.04			0.04		

Bold Over-capacity operations.
Bold Operations exceed OHP target but are less than capacity.

Note 1: Intersection performance is measured at the relevant v/c target. For stop-controlled intersections, the side street target was used as the basis for estimating when an intersection would exceed its performance target.

(1) Congested hours for stop-controlled intersections refers to worst side street movement. "Congested Hours" refers to the number of hours that an intersection would exceed the OHP v/c performance target or V/C ≥ 1.00 as indicated.

(2) Northbound through traffic on US 101 at Abalone Street is expected to meet or nearly meet the OHP target as two through lanes are provided. Northbound through traffic at Pacific Way has only a single lane.

Table 2-11. Change in Duration of Congestion with Reduction in Future Traffic Volumes – Average Annual Conditions with Standard Peak Hour Factors

			Land Use Scenario #1				Land Use Scenario #2			
			Full Development		Congested Hours with Reduction in Traffic (3)		Full Development		Congested Hours with Reduction in Traffic (3)	
Intersection	**Critical Movement**	**OHP Target**	**Peak V/C**	**Congested Hours (2)**	**21% to Meet OHP Target**	**8% for V/C< 1.00**	**Peak V/C**	**Congested Hours (2)**	**16% to Meet OHP Target**	**0% for V/C< 1.00**
Signalized Intersections										
US 101 & 35th Street	All	0.90	**1.02**	4 hours	0 hours	0 hours	**0.97**	2 hours	0 hours	0 hours
US 101 & 40th Street	All	0.80	**1.07**	7 hours	0 hours	0 hours	**0.99**	7 hours	0 hours	0 hours
US 101 & 50th Street	All	0.80	**0.88**	4 hours	0 hours	0 hours	**0.83**	2 hours	0 hours	0 hours
Unsignalized Intersections (1)										
US 101 & Pacific Way	NB Through	0.90	**1.77**				**1.68**			
	NB Right	0.90	0.07	12 hours	11 hours	11 hours	0.07	12 hours	11 hours	11 hours
	SB Through	0.90	**1.70**				**1.64**			
US 101 & Abalone Street	NB Through	0.90	**0.92(4)**				0.88(4)			
	SB Through	0.90	**1.57**	13 hours	11 hours	11 hours	**1.51**	13 hours	11 hours	11 hours
	SB Right	0.90	0.13				0.13			
	EB Right	0.95	**11.34**				**6.93**			
US 101 & 32nd Street	NB Through	0.90	0.69				0.65			
	NB Right	0.90	0.04				0.04			
	SB Thru/Right	0.90	**1.10**	11 hours	7 hours	7 hours	**1.06**	11 hours	7 hours	10 hours
	EB Right	0.95	0.42				0.39			
	WB Right	0.95	**2.00**				**2.01**			
US 101 & 62nd Street	NB Left	0.80	0.17				0.16			
	NB Thru/Right	0.80	0.71				0.67			
	SB Left	0.80	0.03				0.03			
	SB Through	0.80	0.65				0.85			
	EB Left	0.90	**2.07**	7 hours	1 hour	3 hours	**2.00**	7 hours	2 hours	7 hours
	EB Thru/Right	0.90	0.14				0.15			
	WB Left	0.90	0.33				0.20			
	WB Thru/Right	0.90	0.04				0.04			

Bold Over-capacity operations.

Bold Operations exceed OHP target but are less than capacity.

Note 1: Intersection performance is measured at the relevant v/c target. For stop-controlled intersections, the side street target was used as the basis for estimating when an intersection would exceed its performance target.

(1) Congested hours for stop-controlled intersections refers to worst side street movement.

(2) "Congested Hours" refers to the number of hours that an intersection would exceed the OHP v/c performance target.

(3) Assumes reduction in intersection approach traffic volumes from Full Development by the indicated percentage to meet either OHP performance target or to achieve v/c < 1.00.

(4) Northbound through traffic on US 101 at Abalone Street is expected to meet or nearly meet the OHP target as two through lanes are provided. Northbound through traffic at Pacific Way has only a single lane.

Table 2-12. Change in Duration of Congestion with Reduction in Future Traffic Volumes –Average Annual Conditions with Adjusted Peak Hour Factors

			Land Use Scenario #1			Land Use Scenario #2		
			Full Development		With 19% Reduction in Traffic (1)	Full Development)		With 14% Reduction in Traffic (2)
Intersection	Critical Movement	OHP Target	Peak V/C	Congested Hours (4)	Congested Hours (4)	Peak V/C	Congested Hours (4)	Congested Hours (4)
Signalized Intersections								
US 101 & 35th Street	All	0.90	0.96	4 hours	0 hours	0.92	4 hours	0 hours
US 101 & 40th Street	All	0.80	0.96	7 hours	0 hours	0.88	6 hours	0 hours
US 101 & 50th Street	All	0.80	0.82	2 hours	0 hours	0.78	0 hours	0 hours
Unsignalized Intersections (3)								
US 101 & Pacific Way	NB Through	0.90	**1.68**			**1.60**		
	NB Right	0.90	0.06	11 hours	11 hours	0.06	12 hours	11 hours
	SB Through	0.90	**1.62**			**1.56**		
US 101 & Abalone Street	NB Through	0.90	0.87(5)			0.83(5)		
	SB Through	0.90	**1.49**	12 hours	11 hours	**1.44**	12 hours	11 hours
	SB Right	0.90	0.13			0.13		
	EB Right	0.95	**7.75**			**6.84**		
US 101 & 32nd Street	NB Through	0.90	0.66			0.62		
	NB Right	0.90	0.04			0.04		
	SB Thru/Right	0.90	**1.04**	7 hours	0 hours	**1.01**	7 hours	1 hour
	EB Right	0.95	0.32			0.30		
	WB Right	0.95	**1.70**			**1.60**		
US 101 & 62nd Street	NB Left	0.80	0.15			0.14		
	NB Thru/Right	0.80	0.67			0.64		
	SB Left	0.80	0.03			0.03		
	SB Through	0.80	0.62			0.61		
	SB Right	0.80	0.04			0.04		
	EB Left	0.90	**1.49**	7 hours	0 hours	**1.38**	4 hours	0 hours
	EB Thru/Right	0.90	0.11			0.11		
	WB Left	0.90	0.24			0.14		
	WB Thru/Right	0.90	0.03			0.03		

Bold Over-capacity operations.
Bold Operations exceed OHP target but are less than capacity.

Note 1: The results of this table are based on different peak hour factor assumptions (PHF=1.00) than the results reported in Tables 2-8 and 2-9 (e.g., PHF=0.85 and 0.95).
Note 2: Intersection performance is measured at the relevant v/c target. For stop-controlled intersections, the side street target was used as the basis for estimating when an intersection would exceed its performance target.

(1) 19% reduction from Full Development to meet OHP targets.
(2) 14% reduction from Full Development to meet OHP targets.
(3) Congested hours for stop-controlled intersections refers to worst side street movement.
(4) "Congested Hours" refers to the number of hours that an intersection would exceed the OHP v/c target.
(5) Northbound through traffic on US 101 at Abalone Street is expected to meet the OHP target as two through lanes are provided. Northbound through traffic at Pacific Way has only a single lane.

Table 2-13. Summary of Duration of Congestion Evaluation – Off-Season Conditions with Adjusted Peak Hour Factors

Intersection	Critical Movement	OHP Target	Land Use Scenario #1			Land Use Scenario #2	
			Full Development		With 8% Reduction in Traffic (1)	Full Development	
			Peak V/C	Congested Hours (3)	Congested Hours (3)	Peak V/C	Congested Hours (3)
Signalized Intersections							
US 101 & 35th Street	All	0.90	0.85	0 hours	0 hours	0.83	0 hours
US 101 & 40th Street	All	0.80	**0.82**	3 hours	0 hours	0.75	0 hours
US 101 & 50th Street	All	0.80	0.72	0 hours	0 hours	0.70	0 hours
Unsignalized Intersections (2)							
US 101 & Pacific Way	NB Through	0.90	**1.50**	11 hours	11 hours	**1.43**	11 hours
	NB Right	0.90	0.06			006	
	SB Through	0.90	**1.44**			**1.39**	
US 101 & Abalone Street	NB Through	0.90	**0.78**	11 hours	11 hours	0.74	11 hours
	SB Through	0.90	**1.33**			**1.28**	
	SB Right	0.90	0.11			0.11	
	EB Right	0.95	**>2.00**			**>2.00**	
US 101 & 32nd Street	NB Through	0.90	0.59	2 hours	1 hour	0.55	1 hour
	NB Right	0.90	0.03			0.04	
	SB Thru/Right	0.90	**0.93**			0.90	
	EB Right	0.95	0.23			0.21	
	WB Right	0.95	**1.24**			**1.01**	
US 101 & 62nd Street	NB Left	0.80	0.12	1 hour	0 hours	0.11	0 hours
	NB Thru/Right	0.80	0.60			0.57	
	SB Left	0.80	0.01			0.01	
	SB Through	0.80	0.55			0.54	
	SB Right	0.80	0.04			0.04	
	EB Left	0.90	**0.97**			0.90	
	EB Thru/Right	0.90	0.08			0.07	
	WB Left	0.90	0.17			0.05	
	WB Thru/Right	0.90	0.01			0.030.01	

Bold Over-capacity operations.
Bold Operations exceed OHP target but are less than capacity.

Note 1: The results of this table are based on different peak hour factors (e.g., PHF=1.00) than the results reported in the tables in Tables 2-8 and 2-9 (e.g., PHF=0.85 and 0.95).
Note 2: Intersection performance is measured at the relevant v/c target. For stop-controlled intersections, the side street target was used as the basis for estimating when an intersection would exceed its performance target.
(1) 8% reduction from Full Development to meet OHP targets.
(2) Congested hours for stop-controlled intersections refers to worst side street movement.
(3) "Congested Hours" refers to the number of hours that an intersection would exceed the OHP v/c target.
(4) Northbound through traffic on US 101 at Abalone Street is expected to meet the OHP target as two through lanes are provided. Northbound through traffic at Pacific Way has only a single lane.

2.3 KEY FINDINGS AND CONCLUSIONS

Key Findings and Conclusions about projected 2030 traffic congestion along US 101 through the South Beach area are presented below.

1. ***The assumed development in South Beach does not represent full build-out of the area.***
   - The analysis presented in this report is based on a level of land development in South Beach that represents generally consistent with the anticipated level of population growth expected by 2030.
   - The analysis's assumptions about future South Beach development are presented in Tables 2-4 through 2-7. The amount of development is significantly more than what is currently being developed and proposed at the Hatfield Marine Science Center, the community college, and the National Oceanic and Atmospheric Administration (NOAA) facilities.
   - Full build-out of the South Beach study area would include significantly more residential, commercial and other development than considered in this analysis. This development is not anticipated to occur prior to 2030.
2. ***Significant road and highway improvements would need to be built over the 20-year planning period to 2030. These include:***
   - Adding travel lanes to US 101 to provide two through lanes in each direction. Left-turn and right-turn lanes would be provided at signalized intersections and where needed and appropriate. The traffic flow near the bridge would be improved by relocating the traffic signal at 32nd Street southward to 35th Street.
   - Improving local roads to better serve development and traffic circulation in South Beach. These improvements are listed in (provide the section reference in this tech memo) These improvements are consistent with the Urban Renewal Plan for the area
3. ***The most significant constraint that would affect highway operations in the future is the existing Yaquina Bay Bridge.***
   - Additional capacity across the Yaquina Bay is not expected to be provided by 2030. Travel demand to cross the bridge is expected to be substantially higher than the existing capacity. This is expected to result in very slow travel speeds on the highway and long traffic queues.
   - Traffic queues on both sides of this bridge currently affect the operation of highway intersections on both sides. This effect would worsen as volumes grow.
4. ***Even with the planned road improvements, significant traffic congestion is to be anticipated over the 20-year planning period along US 101 through South Beach.***
   - The improvements proposed in earlier in this Chapter would result in substantially better system operation than would be possible under a no-build condition.
   - System operation in 2030 is expected to operate at, or over capacity. Desirable system operation is not expected to occur in 2030 because traffic volumes from

the development in South Beach and from through traffic would be too high. Construction of all the highway improvements would not be able to provide a desirable level of transportation system operation sufficient to meet applicable OHP mobility targets. The growth of traffic volumes associated with South Beach development, along with expected growth in through traffic volumes along the Coast, could not be accommodated by full build-out of the full range of reasonable highway improvements.

- Anticipated traffic congestion levels were studied for three time periods and two levels of development in South Beach. While the summertime Saturday afternoon time period might actually experience the highest levels of congestion, analysis focused on the weekday PM peak hour due to limitations in data availability. The time periods studied included:
  - Summertime peak (while weekend afternoons often seen higher congestion levels than weekday PM peak hours, the analysis was constrained to evaluating weekday conditions only. The summertime peak is also described as 30th Highest Hourly Volumes or 30 HV).
  - Average Annual peak (which represents the averaging of varying levels of traffic over the course of a typical year including summertime highs, winter lows, and levels in the spring and the autumn that generally fall between the highs and lows. Average Annual traffic volumes are also described as AAV).
  - Off-Season peak (which includes most of the year outside of the summertime months).

5. *The 2030 Summertime peak would see the highest levels of congestion along US 101 in South Beach.*
   - All US 101 intersections studied in South Beach would significantly exceed their mobility targets as adopted in the Oregon Highway Plan (OHP). For signalized intersections, the levels of congestion would be high. Traffic movements at unsignalized side streets would be extremely limited for vehicles entering the highway.
   - Depending on the land use scenario, travel speeds through the area would typically average between 7 and 9 mph, with congestion spread over much of the day.
6. *The 2030 Average Annual peak would see levels of congestion only slightly less than the summertime peak.*
   - All US 101 intersections studied in South Beach would exceed their mobility targets as adopted in the Oregon Highway Plan (OHP). For signalized intersections, the levels of congestion would be high. Traffic movements at unsignalized side streets would be extremely limited for vehicles entering the highway.
   - Depending on the land use scenario, travel speeds through the area would typically average between 11 and 13 mph, with congestion ranging from a low of four hours to a high of twelve hours.
7. *The 2030 Off-Season peak would see lower levels of congestion than the other two time periods.*

- The signalized intersection at 40th Street and US 101 would slightly exceed its mobility target as adopted in the Oregon Highway Plan (OHP). The other two intersections (35th and 50th Streets) would meet their mobility targets.
- Significant congestion would be experienced for side street traffic at unsignalized intersections under either land use scenario
- Depending on the land use scenario, travel speeds through the area would typically average between 13 and 16 mph, with congestion ranging from a low of one hour to a high of eleven hours.

8. *Traffic spilling back from the constrained Yaquina Bay Bridge would affect traffic operations at most intersections along US 101.*
   - Even during the off-season peak, the level of traffic desiring to cross the Yaquina Bay Bridge is nearly twice its estimated capacity.
   - This level of demand means that congestion levels around the bridge would be high, extending over many hours of the day. Because of the very slow speeds anticipated and the duration of delay, trips that otherwise would occur, are likely to be postponed to the evening hours or not made at all.

9. *An assessment was conducted to compare the number of hours each intersection would meet or exceed either OHP mobility targets or a v/c ratio of 1.00 under AAV conditions.*
   - As summarized in Table 2-10, with Land Use Scenario #1, the signalized intersections would see traffic operations that exceed the OHP target for 4 to 7 hours per weekday, depending on location. The intersections of US 101 with both 35th and 40th Streets would exceed a v/c ratio of 1.00 for one hour each day, the PM peak, while US 101 at 50th Street would operate below a v/c of 1.00.
   - With Land Use Scenario #2, the signalized intersections would operate in excess of the OHP target for between 2 and 7 hours each weekday, depending on location. All three intersections would operate at less than v/c of 1.00.
   - Unsignalized intersections would see delay over many hours in excess of the OHP target and/or a v/c ratio of 1.00 for one or more critical movements.

10. *Anticipated traffic operations for AAV conditions were evaluated to determine the level of reduction from assumed development that would be needed to meet either OHP mobility targets or to not exceed a v/c ratio of 1.00.*
    - As summarized in Table 2-11, a 21 percent reduction in trip generation from the level assumed under Scenario #1 would be needed to meet applicable mobility targets at the signalized intersections. This reduction would also benefit the unsignalized intersections although significant delay would still be experienced, primarily at the north end of the study area. An eight percent reduction in traffic levels would be needed to ensure that traffic operations at the signalized intersections would be less than v/c = 1.00.
    - As also summarized in Table 2-11, a 16 percent reduction in trip generation would be needed under Scenario #2 to meet applicable mobility targets at the signalized intersection. Benefits would also be realized at the unsignalized intersections. All signalized intersections are expected to operate at less than v/c = 1.00.

3. TRANSPORTATION MANAGEMENT CONSIDERATIONS

This chapter highlights a range of potential solutions that could be considered in addressing the traffic congestion problems anticipated along US 101 in South Beach over the planning horizon to 2030.

3.1 RANGE OF POTENTIAL SOLUTIONS

A range of potential options could be considered to address and/or resolve the anticipated 2030 congestion problems associated with the development of South Beach. These include:

- Policy Options
- Land Use Options
- Physical Improvement Options

Each of these courses of action is briefly discussed below.

Transportation Policy Options

1. *Adoption of higher mobility standards at intersections.* This would involve adjusting the OHP volume/capacity (v/c) mobility target to allow a higher level of delay during the peak hour. Mobility targets for US 101 are currently identified in the Oregon Highway Plan (OHP) and are used by ODOT to determine when roadway improvements are needed to address the impacts of traffic volume growth on the highway. This growth could include either growth in background traffic volumes (unrelated to South Beach), or could result specifically from development activity in South Beach. Existing mobility targets typically focus on the 30th highest hourly volume at an intersection which, for Newport, occurs during the summertime peak season. By default, if targets are met during the 30th highest hour, they would be met for the remainder of the year. It should be noted that, effective in January 2012, the OHP was significantly amended to change the context for the mobility targets in Table 6 under Policy 1F. Where the targets can be met, they are treated as the standard. Where they cannot be met, alternate mobility standards are supported. In South Beach, the Table 6 targets cannot be met under any of the alternatives, so alternate standards would need to be developed.
2. *Adoption of a mobility standard based upon average annual weekday peak traffic, or off-season peak traffic conditions rather than Summertime Peak.* These other time periods have lower traffic volumes. The higher congestion occurring during Summertime conditions would not be measured for the standard.
3. *Adoption of mobility standards that focus on specifying the number of hours each day when standards are exceeded.* This means that traffic congestion levels would be allowed to exceed the standard during certain hours over most or even all months of the year, but that congestion would be limited to a set number of hours each day.

Land Use Options

Land use options differ from transportation policy options in that they would focus on managing development activity that generates traffic rather than directly addressing various levels of traffic congestion. Options to consider could include, but not be limited, to:

1. *Manage the level and timing of land development* that could occur in South Beach to be generally consistent with the development of the roadway infrastructure improvements identified in Chapter 2.

2. *When all identified and reasonably available roadway improvements have been constructed, preclude any additional land development in South Beach.* In effect, this option establishes a "trip budget" that can be used over time to permit individual developments and/or to encourage or accommodate certain types of development (perhaps focused on governmental or public uses such as the Marine Science Center the NOAA facility, the Oregon Aquarium, etc.).

3. *Encourage a mixed use development model that could reduce the need to travel* over the Yaquina Bay Bridge by providing shopping and employment uses at a scale that is responsive to the extent of residential use in South Beach. Coupled with the mixed use development would be an emphasis on local street connectivity to reduce trips on the state highway, development of attractive and functional non-motorized facilities, and on-going provision of public transportation to reduce the vehicular demand on US 101, particularly over the bridge.

Physical or Operational Improvement Options

These options would rely on improving the transportation system beyond the improvements identified in Chapter 2. The ability to improve the highway beyond the level assumed in the traffic operations analysis is very limited. Factors which make further improvements along US 101 improbable include the cost of additional right-of-way, the presence of wetlands adjacent to the highway in many locations, and the high cost of potential improvements.

The two-lane Yaquina Bay Bridge constrains the practicality of highway widening. Any improvements beyond the four through lanes assumed in the traffic operations analysis are not considered to be reasonable due to cost, potential environmental impacts and community scale.. The level of improvements evaluated in the future system already include the maximum practical number of through and turning lanes. Further improvements would likely require development of grade-separated interchanges. These are not considered to be feasible given the scale of development in South Beach, costs and other limitations.

Three options for physical or operational improvements that could be considered for implementation beyond the 20-year planning period are:

1. *Develop a new crossing of Yaquina Bay*, separate from the existing bridge, which directly links US 101 and Oregon Highway 20. Several years ago, a study was conducted that explored a variety of options for adding highway capacity across Yaquina Bay, including options for developing a new highway corridor which would bypass the heart of Newport and provide a more direct connection between US 101 south of the city and US 20. None of the options considered attracted high enough traffic volumes to warrant the level of investment that such a bypass would require, nor would such a facility reduce traffic in the US 101 corridor enough to avoid another bridge for that highway. However, this concept could be revisited over time as the South Beach area grows and traffic volumes increase.

2. *Explore providing additional capacity on US 101 across Yaquina Bay*. The type of bridge and its historic and iconic significance suggest that the most likely approach would be to construct a new bridge parallel to the existing one. This would also require modifications along US 101 to the bridge approaches on either end of the bridge.

3. *Provide ferry service between the South Beach area and central Newport.* This option would need to contend with limited parking availability along the existing bay front and would likely require the addition of major structures within limited right-of-way to accommodate ferries and passengers.

4. *Explore options for instituting tolls on an improved Yaquina Bay crossing* to raise revenue for bridge and/or highway improvements, encourage the use of alternative travel modes along the corridor, and/or manage the amount of future growth in traffic volumes.

3.2 SELECTED DIRECTION

Based on extensive consultation with ODOT and the City of Newport, a specific direction has been identified to address the land use development potential and related transportation needs in South Beach. This direction includes the following actions:

- **Transportation System Plan and Comprehensive Plan Amendment** - Complete documentation and adopt an amendment to the City's Transportation System Plan to establish policy direction and to incorporate the land development assumptions and recommended system improvements into the City's Comprehensive Plan. The Comprehensive Plan amendment will compile all of the technical memoranda prepared for the TSP Update. The TSP amendment will provide the necessary documentation to support an roadway implementation strategy over the 20-year planning horizon, and will provide guidance for issues that may need to be addressed beyond the planning horizon (such as adding capacity to the Yaquina Bay Bridge).

- **Trip Budget** - Prepare and adopt an overlay zone for South Beach that identifies and establishes an implementation mechanism for a "trip budget" to manage land development in the study area. This development would be generally consistent with the assumptions identified in this document, and with the recommended transportation system improvements.

- **Amend the Oregon Highway Plan** - The Oregon Highway Plan target for US 101 cannot be met, so alternate mobility standards are needed through South Beach. An amendment to the OHP will be necessary.

- **Address coordination with the Lincoln County Comprehensive Plan** – As Lincoln County currently has jurisdiction over some of the land in South Beach, coordination of TSP recommendations, City Code amendments and the adoption of alternate mobility standards needs to be coordinated with the County. Resolution of issues related to County concurrence with the City's TSP and the proposed overlay zone is needed. County recognition of the proposed OHP alternate mobility standards must also be addressed.

APPENDIX A

2030 Traffic Volume and Baseline Network Development

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TECHNICAL MEMORANDUM

Date:	July 31, 2009
To:	John DeTar, Doug Norval, Dorothy Upton
From:	Shelley Oylear
Subject:	Task 9 -Base System Network, Volumes and Modeling Assumptions
Project Number:	274-2395-51-Ph 04
Project Name:	Newport TSP Update - Alternative Mobility Standards

The following assumptions were used to develop the Base System Network and Volumes for Synchro Modeling. Please review the assumptions and the attached modeling files and volumes in preparation for our conference call on Friday at 10:30 AM.

Volumes

- Starting with Assumes 1.7% annual thru traffic growth on US 101
- Assumes South Beach land use trip generation used in the original TSP update work. See attached table.
- 30 HV represents the seasonal weekday peak hour.
- Annual Average Weekday volumes were obtained by reducing 30 HV by 13% per Final ATR Memo.

Base System Network Assumptions

- Model begins just north of Hurbert Street and extends to just south of SE 62nd Street.
- Hurbert Street intersection added to model. Using volumes from previous modeling and balanced to calibrate with S. Beach model.
- Fall Street intersection added to model. Using volumes from previous modeling and balanced to calibrate with S. Beach model.
- US-101/Ferry Slip Road intersection is closed.
- US-101 at 32nd Street is a right-in/right-out intersection. This intersection is currently signalized, but the signal will be relocated to the 35th Street/US101 intersection.
- US-101 at 35th Street intersection is added and considered as signalized. The signal is being relocated from the 32nd Street/US 101 intersection. Signal assumed to function as actuated and coordinated. Intersection assumed with 4 approaches, each with separate left, right, and thru lanes.
- US-101 at 40th Street is assumed to be a signalized intersection with 4 approaches each with separate left, right, and thru lanes. Signal assumed to function as actuated and coordinated

- US-101 at 50th Street is assumed to be an unsignalized 'T' intersection with separate left, right, and thru lanes on each approach.
- The South Beach State Park access is modeled as it currently exists.
- SE 62nd Avenue intersection added to model with existing lane geometry.

Existing turn lane lengths are used except where at new intersections. New turn lanes lengths and tapers are based on the Oregon Highway Design Manual (OHDM) and summarized the table below.

	Left Turn Channelization		Right Turn Channelization	
Design Speed	Minimum Storage Length (ft)	Minimum Taper (14' lane)	Minimum Storage Length (ft)	Minimum Taper (12' lane)
25	120	100	155	100
35	130	110	175	110
45	215	135	215	135
55	320	160	320	160

Note: Taper lengths are rounded up to closest 5 feet. Per figures 9-6 and 9-7 of OHDM (2003).

The functional classification for US 101 from mp 136.25 to 146.5 is Urban Principal Arterial. The OHDM design standard assumed for US 101 is the ODOT 4R/New Urban Standards for Urban Fringe/Suburban Area. US 101 is assumed to remain the same as the existing cross section from Pacific Way north, and a three lane section south of 35th Street.

Speeds on US 101 segments designated as follows:

- Hubert to 40th =35 mph
- 40th to 50th = 45 mph
- 50th to 62nd = 55 mph

Modeling Assumptions

Synchro model previously developed including assumptions that may deviate from ODOT's current Analysis Procedures Manual (APM).

- Truck percentages were calculated from count data and applied to the approaches. Percentages for new intersections were developed by review adjacent intersection data.
- A PHF of 0.95 was used for US 101 approaches and 0.85 for minor street approaches.
- A saturation flow rate of 1750 pcphgl is used.
- ODOT provided signal timing for existing intersections was utilized and optimized. New signalized intersections were coded as actuated and uncoordinated. All intersection timing was optimized.

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TECHNICAL MEMORANDUM

Date:	July 31, 2009
To:	John DeTar, Derrick Tokos, Doug Norval, Dorothy Upton, Matt Spangler
From:	Shelley Oylear
Subject:	Task 9 -ATR Data Findings for 30 HV and Average Traffic Conditions-Final
Project Number:	274-2395-051-Ph 04
Project Name:	Newport TSP Update - Alternative Mobility Standards

Task 9 of the Newport TSP Update requires that traffic volume data and projections be evaluated for two time periods: the 30th highest hour of traffic (30 HV), and average weekday peak hour traffic. This memorandum attempts to identify when these time periods occur so that they can be used as a basis for further traffic analysis and the development of alternative mobility standards. Data from an ODOT Automatic Traffic Recorder (ATR) located to the north of Newport was reviewed to assist in identifying the days and times when these volumes occur. The following data summary and findings have been compiled for your review.

The 2007 ATR Trend Summary for ATR 21-009, located at on US 101 at the intersection of 25th Street north of most of the City of Newport, was consulted to assess existing traffic conditions. This data indicates that traffic volumes during the months of June through September range from 9 to 25 percent higher than the Annual Average Daily Traffic (AADT). June through September volumes represent a seasonal traffic condition, while the remaining months of October through May represents an off-season traffic condition. From here forward the traffic periods that will be used in developing alternative mobility standards will be referred to as Seasonal Traffic (June-September), and Off-Season Traffic (October-May). Data will also be summarized for Annual (January – December) traffic conditions. The 2007 ATR Trend summaries were used for this assessment as 2008 Trend summaries are not yet available.

To determine the day and time period that is represented by the 30 HV and the average peak hour, data from ATR 21-009 was provided by TPAU for 2008. This data included traffic volume counts by hour for a total of 342 days during that year.

The 30 HV for the Seasonal, Off-Season and Annual time periods are included in Table 1 below. The 50th highest hourly volume (50 HV) was added to the table as an additional reference point for unusual variations in the data. The full lists of data are included in the attached tables following this memorandum.

Table 1: 30 HV and 50 HV Summary

Period	Month	Day of Week	Hour	Total Volume
Annual-30 HV	July	Saturday	15	1994
Annual-50 HV	August	Sunday	14	1966
Seasonal 30 HV	August	Tuesday	16	1993
Seasonal 50 HV	August	Tuesday	19	1958
Off-Season 30 HV	March	Friday	16	1782
Off-Season 50 HV	May	Friday	17	1742

Note: Time based on a 24 hour clock.

Both the Seasonal and Off-Season 30 HV occur on a weekday at 16.00 hours or 4 pm, while the Annual 30 HV occurs on a weekend day during the mid-afternoon.

The 2007 ATR Trend summary data for the Newport ATR indicates that the Seasonal average as percent of ADT is 117 percent, while the Annual average is 100 percent of ADT. Therefore the Seasonal average is 1.17 times the Annual average or 17 percent higher. The Off-Season 30 HV is approximately 9 percent lower than the Annual and Seasonal 30 HV or 26% lower than the Seasonal average.

Because the occurrence of 30 HV and 50 HV as individual hours does not allow the ready identification of a specific time period to be used for transportation analysis, consideration was give to the aggregated top 30 and top 50 highest hourly volumes. The data is summarized in Table 2 which illustrates the number and percentages of times when the aggregated top 30 and 50 HVs occur on a weekday (Monday thru Thursday) versus a weekend (Friday thru Sunday) day.

Table 2: Day of Week Occurrences –Includes Top 30 HV and 50 HV

Time Period	Weekday Peak Hour Occurrences	Weekday Peak Hour Occurrences as Percent of Total	Weekend (Fri-Sun) Peak Hour Occurrences	Weekend (Fri-Sun) Peak Hour Occurrences as Percent of Total
Annual-1st thru 30th HV	6	20%	24	80%
Annual-1st thru 50th HV	20	40%	30	60%
Seasonal 1st thru 30th HV	8	26%	22	74%
Seasonal 1st thru 50th HV	22	44%	28	56%
Off-Season 1st thru 30th HV	11	36%	19	64%
Off-Season 1st thru 50th HV	11	22%	39	78%

Note: Includes all time hours during a typical day. Annual period excludes nationally observed holidays that fall on Monday thru Friday and if it occurs on a Friday, then also excludes the preceding Thursday.

For all the time periods, the peak hour commonly occurred on a weekend day.

Table 3 summarizes occurrences of the top 30 HVs over the course of the year by hour of the day and weekday versus weekend day.

Table 3: Peak Hour Occurrences for Annual Period-Includes Top 30 HV

Hour	Weekday (Mon-Thur)		Weekend (Fri- Sun)	
	Number of Occurrences	Occurrences as Percent of Total	Number of Occurrences	Occurrences as Percent of Total
14	2	7%	2	7%
15	1	3%	6	20%
16	0	0%	4	13%
17	0	0%	6	20%
18	3	10%	5	17%
19	0	0%	1	3%
Total	6	20%	24	80%

Note: Time based on a 24 hour clock. 16 and 17 represent the two hour PM peak period. Annual period excludes nationally observed holidays that fall on Mon-Fri and if it occurs on a Friday, then also excludes the preceding Thursday.

Table 4 summarizes occurrences of the top 30 HVs during the period from June to September by hour of the day and weekday versus weekend day.

Table 4: Peak Hour Occurrences for Seasonal Period-Includes Top 30 HV

Hour	Weekday (Mon-Thur)		Weekend (Fri- Sun)	
	Number of Occurrences	Occurrences as Percent of Total	Number of Occurrences	Occurrences as Percent of Total
14	2	7%	2	7%
15	1	3%	5	17%
16	**1**	**3%**	**3**	**10%**
17	**0**	**0%**	**6**	**20%**
18	4	13%	5	17%
19	0	0%	1	3%
Total	8	26%	22	74%

Note: Time based on a 24 hour clock. 16 and 17 represent the two hour PM peak period.

Table 5 summarizes occurrences of the top 30 HVs during the period from October to May by hour of the day and weekday versus weekend day.

Table 5: Peak Hour Occurrences for Off-Season Period-Includes Top 30 HV

Hour	Weekday (Mon-Thur)		Weekend (Fri- Sun)	
	Number of Occurrences	Occurrences as Percent of Total	Number of Occurrences	Occurrences as Percent of Total
14	1	3%	3	10%
15	3	10%	5	17%
16	**1**	**3%**	**6**	**20%**
17	**2**	**7%**	**3**	**10%**
18	4	13%	2	7%
19	0	0%	0	0%
Total	11	36%	19	64%

Note: Time based on a 24 hour clock. 16 and 17 represent the two hour PM peak period.

Conclusions:

1. Review of the top 30 highest hourly volumes at ATR 21-009 in 2008 indicates that there are many instances when high volumes occur both on weekdays and on weekends. Table 1 under Annual 30 HV identifies Saturday at 3 PM as the 30^{th} HV; however the volumes during this time period are very close to the 30^{th} HV volumes for the Seasonal period which occur on a weekday in the pm peak. Thus, consistent with this data, and with the prior TSP traffic analysis that focused on a weekday PM peak, it was determined that the 30^{th} highest hourly volume (30 HV) will represent a summertime weekday PM peak hour (typically occurring between 5 and 6 PM).
2. Based on the ATR summary data the Seasonal period volumes are 17 percent higher than the Annual volumes. We propose that the Annual Average Peak Hour volume be determined by reducing the Seasonal volumes by 13 percent.

APPENDIX B

Traffic Operational Targets and Standards

APPENDIX B
TRAFFIC OPERATIONAL STANDARDS

Volume-to-Capacity Standard

The volume-to-capacity ratio is also used as a measure of effectiveness for intersection operation. It compares the amount of traffic volume entering an intersection to the available capacity of the intersection over a specific time period. Table 1 outlines the volume-to-capacity ranges provided in the Highway Capacity Manual, Transportation Research Board, Washington D.C., 2000.

Table 1 – Volume to Capacity Ratio Definitions

Volume to Capacity Ratio	Description of Condition
0.00-0.60	**Free Flow/Insignificant Delays**: No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Most vehicles do not stop at all. Progression is extremely favorable and most vehicles arrive during the green phase.
0.61-0.70	**Stable Operation/Minimal Delays**: An occasional approach phase is fully utilized. Many drivers begin to feel somewhat restricted within platoons of vehicles. This level generally occurs with good progression, short cycle lengths, or both.
0.71-0.80	**Stable Operation/Acceptable Delays**: Major approach phases fully utilized. Most drivers feel somewhat restricted. Higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, and the number of vehicles stopping is significant.
0.81-0.90	**Approaching Unstable/Tolerable Delays**: The influence of congestion becomes more noticeable. Drivers may have to wait through more than one red signal indication. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. The proportion of vehicles not stopping declines, and individual cycle failures are noticeable.
0.91-1.0	**Unstable Operation/Significant Delays**: Volumes at or near capacity. Vehicles may wait though several signal cycles. Long queues form upstream from intersection. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are a frequent occurrence.
>1.00	**Forced Flow/Excessive Delays**: Represents jammed conditions. Queues may block upstream intersections. This level occurs when arrival flow rates exceed intersection capacity, and is considered to be unacceptable to most drivers. Poor progression, long cycle lengths, and v/c ratios approaching 1.0 may contribute to these high delay levels.

Intersection Levels of Service

Another measure of intersection operating performance during peak travel periods is based on average control delay per vehicle entering the intersection. This delay is calculated using equations that take into account turning movement volumes, intersection lane geometry and traffic signal features, as well as characteristics of the traffic stream passing through the intersection, including time required to slow, stop, wait, and accelerate to move through the intersection. Various levels of delay are then expressed in terms of level of service (LOS) for either signalized or unsignalized intersections. The various LOS range from LOS A (free-flow conditions) through LOS F (operational breakdown). Between LOS A and LOS F, progressively higher LOS grades reflect increasingly worse intersection performance, with higher levels of control delay and increased congestion and traffic queues. Characteristics of each LOS are briefly described below in Table 2.

Table 2 - Level of Service Definitions

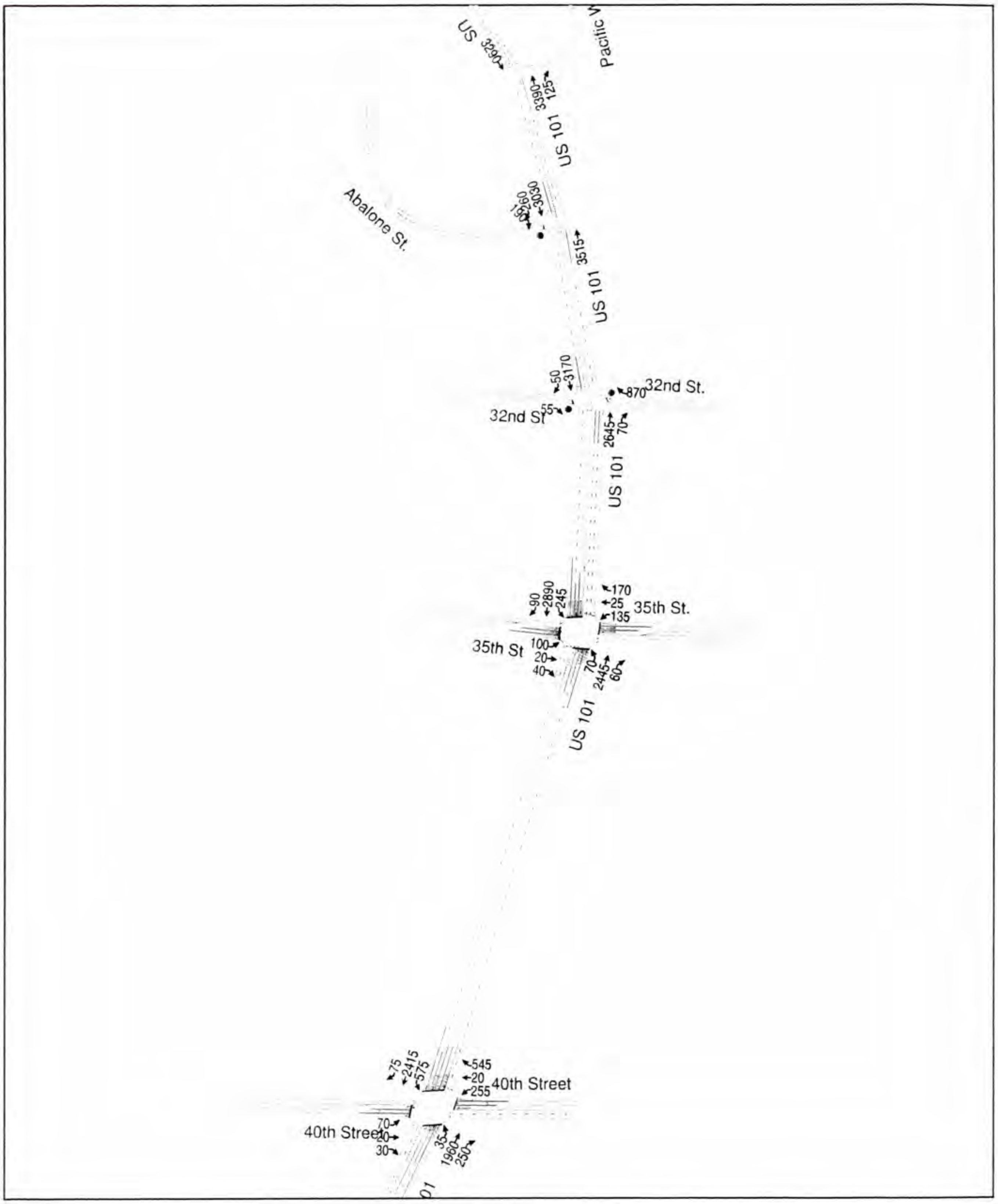
Level of Service	Average Delay/Vehicle (sec.) Signalized	Unsignalized	Description
A (Desirable)	<10 seconds	<10 seconds	Very low delay; most vehicles do not stop.
B (Desirable)	>10 and <20 seconds	>10 and <15 seconds	Low delay resulting from good progression, short cycle lengths, or both.
C (Desirable)	>20 and <35 seconds	>15 and <25 seconds	Higher delays with fair progression, longer cycle lengths, or both.
D (Acceptable)	>35 and <55 seconds	>25 and <35 seconds	Noticeable congestion with many vehicles stopping. Individual cycle failures occur.
E (Unsatisfactory)	>55 and <80 seconds	>35 and <50 seconds	High delay with poor progression, long cycle lengths, high V/C ratios, and frequent cycle failures.
F (unsatisfactory)	>80 seconds	>50 seconds	Very long delays, considered unacceptable by most drivers. Often results from oversaturated conditions or poor signal timing.

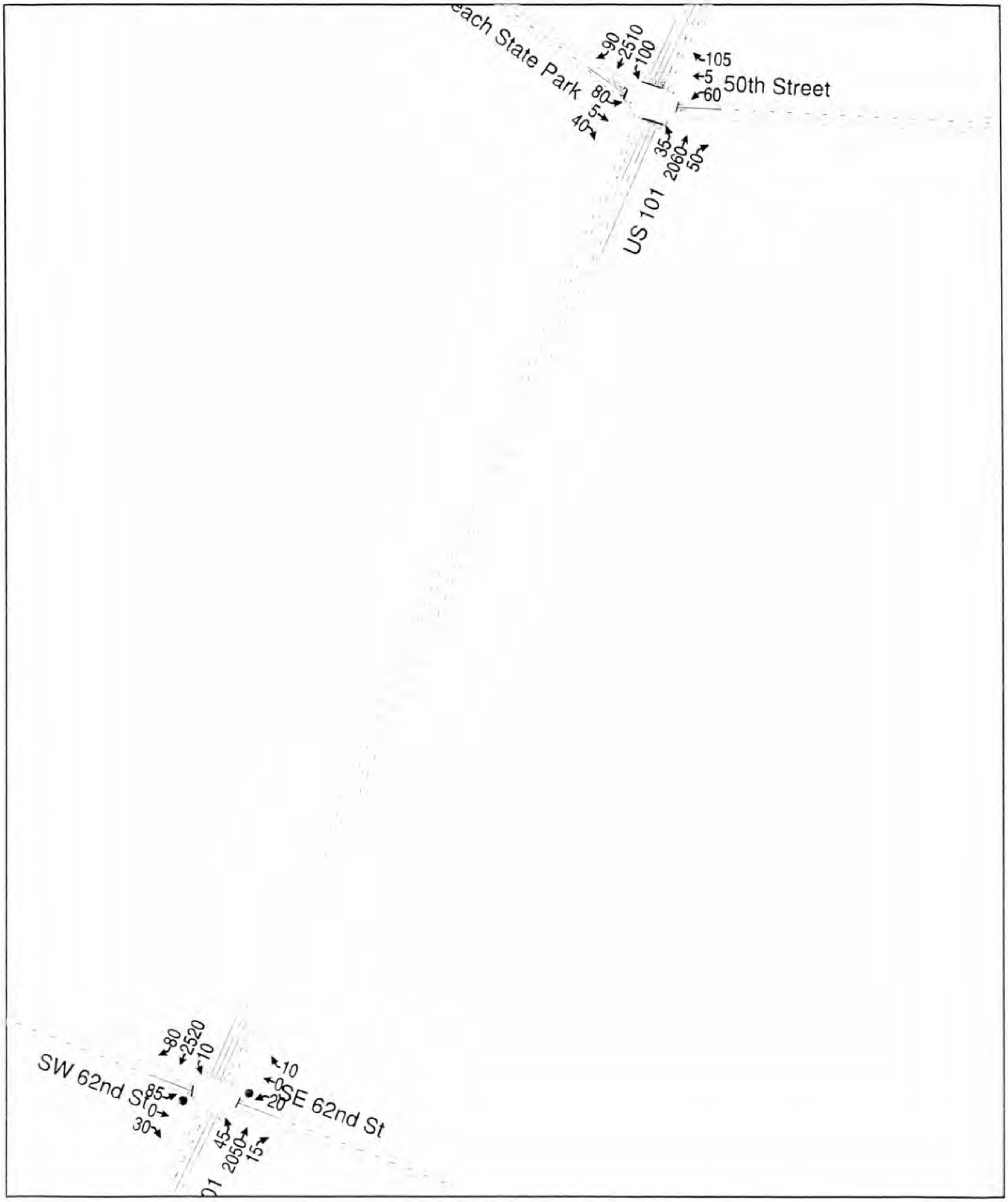
Source: 2000 Highway Capacity Manual, Transportation Research Board.

APPENDIX C

2030 Traffic Volumes and Traffic Operations Analysis for 30 HV Conditions and Land Use Scenario #1

2030 Scenario 1-30 HV




each State Park
50th Street
US 101
90
2510
100
105
5
60
80
5
40
35
2060
50
SW 62nd St
SE 62nd St
80
2520
10
10
0
20
85
0
30
45
2050
15

Preliminary Signal Warrant Calculation

Project:	Newport Alternate Mobility Standard
Year:	2030
Alternative	Scenario 1 & Scenario 2
Percentage of Standard:	70%

Intersection: 62nd / US 101 – Scen 1 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	47500	Yes
	Minor	1	1850	850	No
Case B	Major	2	11100	47500	Yes
	Minor	1	950	850	NO

Intersection: 62nd / US 101 – Scen 1 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	39100	Yes
	Minor	1	1850	700	NO
Case B	Major	2	11,100	39100	Yes
	Minor	1	950	700	No

Intersection: 62nd / US 101 – Scen 1 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	35200	Yes
	Minor	1	[illegible]	650	NO
Case B	Major	2	[illegible]	35,200	Yes
	Minor	1	950	650	NO

Intersection: 62nd / US 101 – Scen 2 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	45750	Yes
	Minor	1	1850	850	No
Case B	Major	2	11100	45750	Yes
	Minor	1	950	850	No

Intersection: 62nd / US 101 – Scen 2 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	38000	Yes
	Minor	1	1850	700	No
Case B	Major	2	11100	38000	Yes
	Minor	1	950	700	No

Intersection: 62nd / US 101 – Scen 2 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	33900	Yes
	Minor	1	1850	550	No
Case B	Major	2	11100	33900	Yes
	Minor	1	950	650	No

HCM Signalized Intersection Capacity Analysis
5: 35th St & US 101

2030 Scenario 1-30 HV

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	100	20	40	135	25	170	70	2445	60	245	2890	90
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1748	1733	1449	1714	1699	1421	1722	3228	1405	1722	3228	1405
Flt Permitted	0.74	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1359	1733	1449	1338	1699	1421	1722	3228	1405	1722	3228	1405
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	118	24	47	159	29	200	74	2574	63	258	3042	95
RTOR Reduction (vph)	0	0	35	0	0	142	0	0	10	0	0	12
Lane Group Flow (vph)	118	24	12	159	29	58	74	2574	53	258	3042	83
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	18.7	18.7	18.7	18.7	18.7	18.7	4.0	93.0	93.0	15.3	104.3	104.3
Effective Green, g (s)	18.2	18.2	18.2	18.2	18.2	18.2	4.5	93.5	93.5	15.8	104.8	105.3
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.03	0.67	0.67	0.11	0.75	0.75
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	177	225	188	174	221	185	55	2156	938	194	2416	1057
v/s Ratio Prot		0.01			0.02		0.04	c0.80		0.15	c0.94	
v/s Ratio Perm	0.09		0.01	c0.12		0.04			0.04			0.06
v/c Ratio	0.67	0.11	0.06	0.91	0.13	0.31	1.35	1.19	0.06	1.33	1.26	0.08
Uniform Delay, d1	58.0	53.7	53.4	60.1	53.9	55.2	67.8	23.3	8.0	62.1	17.6	4.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.19	0.14	1.00	1.00	1.00
Incremental Delay, d2	10.0	0.3	0.2	44.6	0.4	1.3	166.2	87.7	0.0	179.4	120.1	0.1
Delay (s)	68.0	54.0	53.6	104.7	54.3	56.6	214.3	92.1	1.1	241.5	137.7	4.7
Level of Service	E	D	D	F	D	E	F	F	A	F	F	A
Approach Delay (s)		62.7			76.1			93.4			141.9	
Approach LOS		E			E			F			F	

Intersection Summary			
HCM Average Control Delay	116.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	116.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	70	20	30	255	20	545	35	1960	250	575	2415	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1713	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.74	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1357	1716	1458	1337	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	82	24	35	300	24	641	37	2063	263	605	2542	79
RTOR Reduction (vph)	0	0	26	0	0	176	0	0	61	0	0	12
Lane Group Flow (vph)	82	24	9	300	24	465	37	2063	202	605	2542	67
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	35.0	35.0	35.0	34.5	34.5	34.5	3.2	72.7	72.7	19.8	89.3	89.3
Effective Green, g (s)	35.0	35.0	35.0	34.0	34.0	34.0	3.7	73.2	73.2	20.3	89.8	89.8
Actuated g/C Ratio	0.25	0.25	0.25	0.24	0.24	0.24	0.03	0.52	0.52	0.15	0.64	0.64
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	339	429	365	325	417	345	46	1688	743	484	2071	935
v/s Ratio Prot		0.01			0.01		0.02	c0.64		0.18	c0.79	
v/s Ratio Perm	0.06		0.01	0.22		c0.33			0.14			0.05
v/c Ratio	0.24	0.06	0.02	0.92	0.06	1.35	0.80	1.22	0.27	1.25	1.23	0.07
Uniform Delay, d1	41.9	39.9	39.6	51.7	40.7	53.0	67.8	33.4	18.6	59.8	25.1	9.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.65	0.31	0.88	0.72	0.97
Incremental Delay, d2	0.4	0.1	0.0	31.1	0.1	174.1	32.1	102.3	0.4	114.1	102.8	0.0
Delay (s)	42.3	40.0	39.6	82.8	40.8	227.1	109.0	124.1	6.1	167.0	120.7	9.1
Level of Service	D	D	D	F	D	F	F	F	A	F	F	A
Approach Delay (s)		41.2			177.6			110.7			126.7	
Approach LOS		D			F			F			F	

Intersection Summary			
HCM Average Control Delay	126.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	110.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: South Beach State Park & US 101

2030 Scenario 1-30 HV

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	80	5	40	60	5	105	35	2060	50	100	2510	90
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1608	1452		1630	1470		1614	3228	1458	1630	3228	1403
Flt Permitted	0.44	1.00		0.72	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	750	1452		1239	1470		1614	3228	1458	1630	3228	1403
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.85	0.85	0.95	0.95
Adj. Flow (vph)	94	6	47	71	6	124	37	2168	59	118	2642	95
RTOR Reduction (vph)	0	42	0	0	110	0	0	0	16	0	0	12
Lane Group Flow (vph)	94	11	0	71	20	0	37	2168	43	118	2642	83
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	16.0	16.0		16.0	16.0		3.2	101.0	101.0	11.0	108.8	108.8
Effective Green, g (s)	16.5	16.0		16.0	16.0		3.7	101.5	101.0	11.0	109.3	109.3
Actuated g/C Ratio	0.12	0.11		0.11	0.11		0.03	0.72	0.72	0.08	0.78	0.78
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	88	166		142	168		43	2340	1052	128	2520	1095
v/s Ratio Prot		0.01			0.01		0.02	c0.67		0.07	c0.82	
v/s Ratio Perm	c0.13			0.06					0.03			0.06
v/c Ratio	1.07	0.07		0.50	0.12		0.86	0.93	0.04	0.92	1.05	0.08
Uniform Delay, d1	61.8	55.3		58.2	55.7		67.9	16.1	5.6	64.1	15.4	3.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.27	0.33	0.06
Incremental Delay, d2	115.7	0.2		2.8	0.3		85.1	7.8	0.1	10.1	23.1	0.0
Delay (s)	177.4	55.5		61.0	56.0		153.0	24.0	5.7	91.5	28.2	0.2
Level of Service	F	E		E	E		F	C	A	F	C	A
Approach Delay (s)		133.5			57.8			25.6			29.9	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM Average Control Delay	31.9	HCM Level of Service	C
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	100.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	3390	125	0	3290
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	3568	132	0	3463
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	7036	3572			3702	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	7036	3572			3702	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	7			59	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	3568	132	3463
Volume Left	0	0	0
Volume Right	0	132	0
cSH	1700	1700	1700
Volume to Capacity	2.10	0.08	2.04
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	204.4%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	190	0	3515	3030	260
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	224	0	3700	3189	274
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.36					
vC, conflicting volume	5043	3193	3465			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	8646	3193	3465			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	7	71			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	224	1850	1850	3189	274
Volume Left	0	0	0	0	0
Volume Right	224	0	0	0	274
cSH	7	1700	1700	1700	1700
Volume to Capacity	31.96	1.09	1.09	1.88	0.16
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	302.6		
Intersection Capacity Utilization	192.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	55	0	0	870	0	2645	70	0	3170	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	65	0	0	1024	0	2784	74	0	3337	53
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.35	0.35		0.35	0.35	0.35				0.35		
vC, conflicting volume	5783	6225	1699	4521	6178	1396	3391			2860		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	10959	12224	1699	7351	12089	0	3391			2599		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	21	100	100	0	100			100		
cM capacity (veh/h)	0	0	82	0	0	378	77			56		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	65	1024	1392	1392	74	2225	1165
Volume Left	0	0	0	0	0	0	0
Volume Right	65	1024	0	0	74	0	53
cSH	82	378	1700	1700	1700	1700	1700
Volume to Capacity	0.79	2.71	0.82	0.82	0.04	1.31	0.69
Queue Length 95th (ft)	99	2130	0	0	0	0	0
Control Delay (s)	135.7	798.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F					
Approach Delay (s)	135.7	798.3	0.0			0.0	
Approach LOS	F	F					

Intersection Summary			
Average Delay	112.6		
Intersection Capacity Utilization	144.8%	ICU Level of Service	H
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: SW 62nd St & US 101

2030 Scenario 1-30 HV

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	85	0	30	20	0	10	45	2050	15	10	2520	80
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	100	0	35	24	0	12	47	2158	16	11	2653	84
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3863	4946	1330	3647	5022	1091	2739			2176		
vC1, stage 1 conf vol	2676	2676		2263	2263							
vC2, stage 2 conf vol	1187	2270		1385	2760							
vCu, unblocked vol	3863	4946	1330	3647	5022	1091	2739			2176		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	76	3	100	94	66			96		
cM capacity (veh/h)	21	27	146	24	0	211	141			238		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	100	35	24	12	47	1439	735	11	1326	1326	84
Volume Left	100	0	24	0	47	0	0	11	0	0	0
Volume Right	0	35	0	12	0	0	16	0	0	0	84
cSH	21	146	24	211	141	1700	1700	238	1700	1700	1700
Volume to Capacity	4.86	0.24	0.97	0.06	0.34	0.85	0.43	0.04	0.78	0.78	0.05
Queue Length 95th (ft)	Err	23	73	4	34	0	0	3	0	0	0
Control Delay (s)	Err	37.4	401.2	23.1	42.8	0.0	0.0	20.9	0.0	0.0	0.0
Lane LOS	F	E	F	C	E			C			
Approach Delay (s)	7400.3		275.2		0.9			0.1			
Approach LOS	F		F								

Intersection Summary			
Average Delay	197.2		
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

2030 US 101 Segment V/C Analysis

Volumes

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3515	3225	2960	2700	2640	2400
35th to 50th	2245	3065	1870	2565	1665	2285
50th to 62nd	2145	2610	1790	2185	1590	1950

V/C

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.70	2.48	2.28	2.08	2.03	1.85
35th to 50th	0.64	0.88	0.53	0.73	0.48	0.65
50th to 62nd	0.61	0.75	0.51	0.62	0.45	0.56

Volumes

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3355	3125	2830	2615	2525	2330
35th to 50th	2125	2965	1770	2480	1585	2215
50th to 62nd	2035	2540	1700	2135	1515	1900

V/C

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.58	2.40	2.18	2.01	1.94	1.79
35th to 50th	0.61	0.85	0.51	0.71	0.45	0.63
50th to 62nd	0.58	0.73	0.49	0.61	0.43	0.54

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Group Flow (vph)	118	24	47	159	29	200	74	2574	63	258	3042	95
v/c Ratio	0.61	0.10	0.19	0.83	0.12	0.59	1.14	1.25	0.07	1.30	1.32	0.09
Control Delay	61.6	44.8	14.4	82.2	45.2	19.4	119.1	125.3	0.8	180.7	162.4	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.6	44.8	14.4	82.2	45.2	19.4	119.1	125.3	0.8	180.7	162.4	4.3
Queue Length 50th (ft)	86	16	0	120	20	27	~68	~1307	2	~278	~1615	14
Queue Length 95th (ft)	141	40	32	#208	46	89	m48	m#191	m1	m123	m273	m6
Internal Link Dist (ft)		441			300			1419			620	
Turn Bay Length (ft)	120		155	120		155	130		175	130		175
Base Capacity (vph)	210	267	263	207	262	354	65	2058	908	198	2309	1025
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.09	0.18	0.77	0.11	0.56	1.14	1.25	0.07	1.30	1.32	0.09

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	82	24	35	300	24	641	37	2063	263	605	2542	79
v/c Ratio	0.23	0.05	0.08	0.87	0.05	1.17	0.57	1.28	0.34	1.32	1.28	0.09
Control Delay	36.4	33.2	11.1	67.7	34.0	122.1	77.9	149.2	3.1	183.1	150.2	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.4	33.2	11.1	67.7	34.0	122.1	77.9	149.2	3.1	183.1	150.2	7.7
Queue Length 50th (ft)	50	14	0	223	14	~447	28	~1060	11	~311	~1331	13
Queue Length 95th (ft)	88	34	23	#347	35	#608	m32	m#1153	m13	m#203	m#731	m9
Internal Link Dist (ft)		558			358			3870			1419	
Turn Bay Length (ft)	120		155	120		155	215		215	130		175
Base Capacity (vph)	362	458	414	346	443	546	65	1614	780	459	1980	908
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.05	0.08	0.87	0.05	1.17	0.57	1.28	0.34	1.32	1.28	0.09

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	94	53	71	130	37	2168	59	118	2642	95
v/c Ratio	0.87	0.22	0.42	0.49	0.61	0.95	0.05	0.89	1.08	0.09
Control Delay	108.2	17.9	56.2	27.8	95.1	27.9	1.6	57.8	45.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	108.2	17.9	56.2	27.8	95.1	27.9	1.6	57.8	45.7	0.1
Queue Length 50th (ft)	72	4	51	37	29	737	0	95	~1254	0
Queue Length 95th (ft)	#156	38	94	91	#85	#1023	11	m79	m88	m0
Internal Link Dist (ft)		573		801		2367			3870	
Turn Bay Length (ft)					150		320	215		150
Base Capacity (vph)	115	251	179	280	61	2272	1125	133	2450	1080
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.21	0.40	0.46	0.61	0.95	0.05	0.89	1.08	0.09

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
50th Street	II	55	44.9	27.9	72.8	0.69	33.9	B
40th Street	II	45	59.8	149.2	209.0	0.75	12.9	F
35th St.	II	35	31.2	125.3	156.5	0.28	6.5	F
Hurbert St	II	31	200.2	794.3	994.5	1.73	6.2	F
Total	II		336.1	1096.7	1432.8	3.44	8.7	F

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	769.8	791.7	0.16	0.7	F
35th St	III	31	200.2	162.4	362.6	1.73	17.1	D
40th Street	III	35	34.1	150.2	184.3	0.28	5.5	F
South Beach State Pa	III	55	49.0	45.7	94.7	0.75	28.4	B
Total	III		305.2	1128.1	1433.3	2.92	7.3	F

Measures of Effectiveness

2030 Scenario 1-30 HV

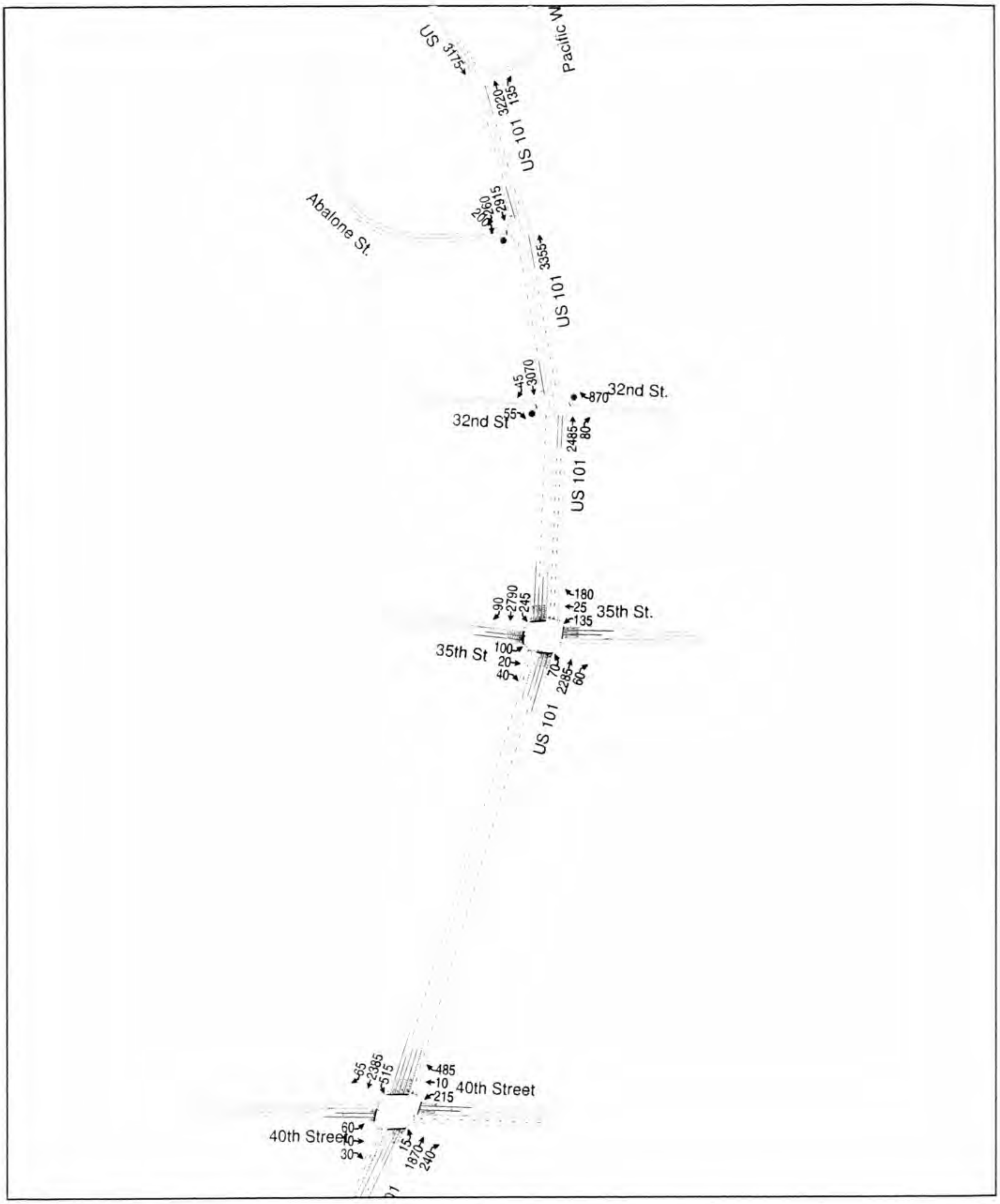
US 101

Direction	NB	SB	All
Average Speed (mph)	8	8	8
Total Travel Time (hr)	**1228**	**1311**	**2540**
Distance Traveled (mi)	9663	10318	19981
Unserved Vehicles (#)	**3069**	**3682**	**6751**
Performance Index	1018.4	1068.0	2086.5

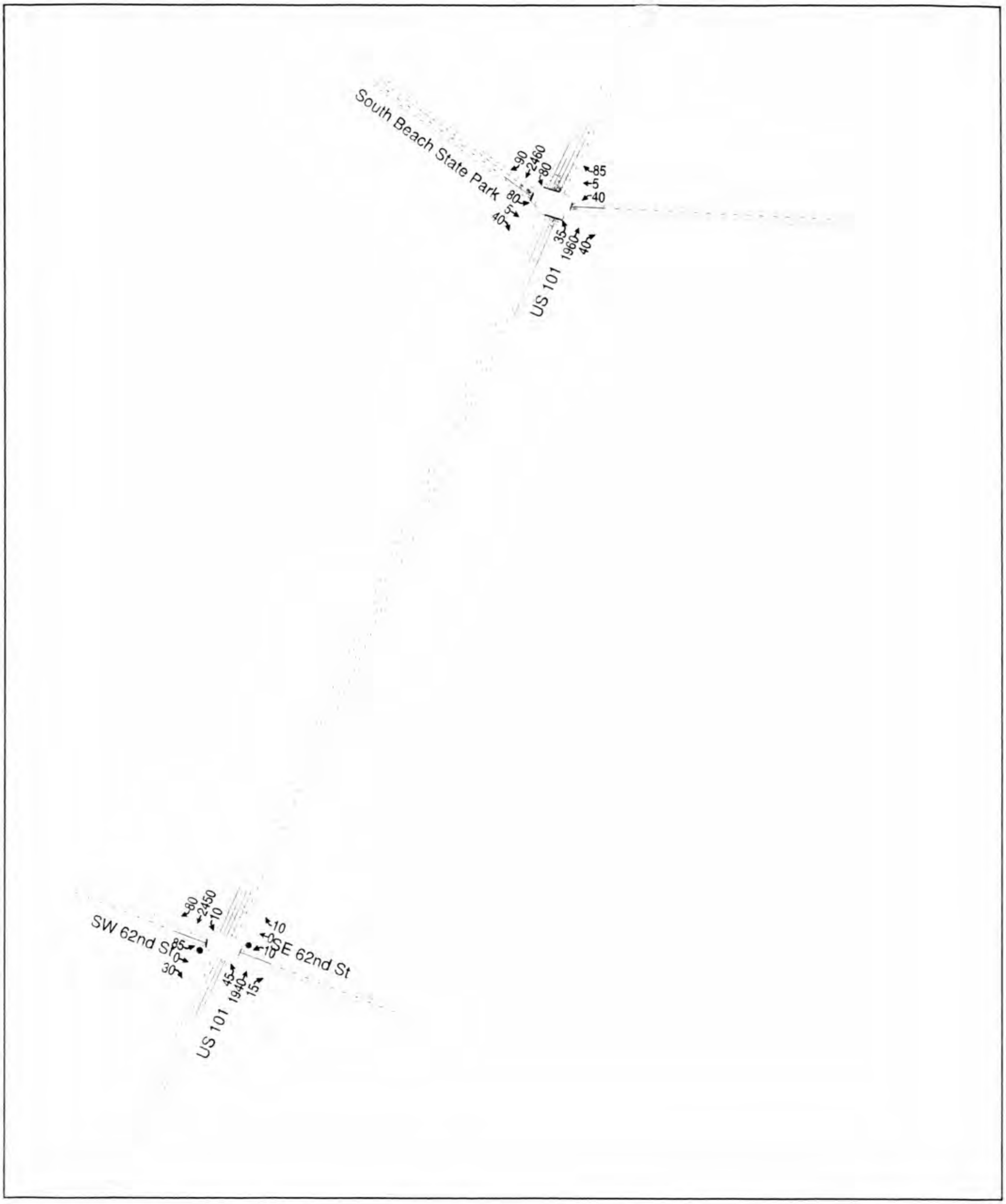
APPENDIX D

2030 Volumes and Traffic Operations Analysis for 30 HV Conditions and Land Use Scenario #2

2030 Scenario2-30 HV



2030 Scenario2-30 HV



Preliminary Signal Warrant Calculation

Project:	Newport Alternate Mobility Standard
Year:	2030
Alternative	Scenario 1 & Scenario 2
Percentage of Standard:	70%

Intersection: 62nd / US 101 – Scen 1 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	47500	Yes
	Minor	1	1850	850	No
Case B	Major	2	[illegible]	47500	Yes
	Minor	1	950	850	NO

Intersection: 62nd / US 101 – Scen 1 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	39100	Yes
	Minor	1	1850	700	NO
Case B	Major	2	11,100	39100	Yes
	Minor	1	[illegible]	700	No

Intersection: 62nd / US 101 – Scen 1 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	35200	Yes
	Minor	1	[illegible]	650	NO
Case B	Major	2	[illegible]	35,200	Yes
	Minor	1	950	650	NO

Intersection: 62nd / US 101 – Scen 2 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	45750	Yes
	Minor	1	1850	1850	No
Case B	Major	2	11100	45750	Yes
	Minor	1	950	850	No

Intersection: 62nd / US 101 – Scen 2 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	38000	Yes
	Minor	1	1850	700	No
Case B	Major	2	11100	38000	Yes
	Minor	1	950	700	No

Intersection: 62nd / US 101 – Scen 2 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	33900	Yes
	Minor	1	1850	650	No
Case B	Major	2	11100	33900	Yes
	Minor	1	950	650	No

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	100	20	40	135	25	180	70	2285	60	245	2790	90
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1748	1733	1448	1714	1699	1420	1722	3228	1404	1722	3228	1404
Flt Permitted	0.74	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1358	1733	1448	1338	1699	1420	1722	3228	1404	1722	3228	1404
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	118	24	47	159	29	212	74	2405	63	258	2937	95
RTOR Reduction (vph)	0	0	34	0	0	157	0	0	10	0	0	12
Lane Group Flow (vph)	118	24	13	159	29	55	74	2405	53	258	2937	83
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	19.0	19.0	19.0	19.0	19.0	19.0	4.0	100.0	100.0	18.0	114.0	114.0
Effective Green, g (s)	18.5	18.5	18.5	18.5	18.5	18.5	4.5	100.5	100.5	18.5	114.5	115.0
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.03	0.67	0.67	0.12	0.76	0.77
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	167	214	179	165	210	175	52	2163	941	212	2464	1076
v/s Ratio Prot		0.01			0.02		0.04	c0.75		0.15	c0.91	
v/s Ratio Perm	0.09		0.01	c0.12		0.04			0.04			0.06
v/c Ratio	0.71	0.11	0.07	0.96	0.14	0.31	1.42	1.11	0.06	1.22	1.19	0.08
Uniform Delay, d1	63.1	58.4	58.2	65.4	58.6	60.0	72.8	24.8	8.5	65.8	17.8	4.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.73	0.23	0.15	1.00	1.00	1.00
Incremental Delay, d2	13.6	0.3	0.2	59.1	0.4	1.4	200.3	51.1	0.0	132.7	90.7	0.1
Delay (s)	76.8	58.8	58.4	124.6	59.1	61.4	253.5	56.7	1.3	198.4	108.5	4.5
Level of Service	E	E	E	F	E	E	F	E	A	F	F	A
Approach Delay (s)		69.9			86.3			61.1			112.5	
Approach LOS		E			F			E			F	

Intersection Summary			
HCM Average Control Delay	89.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	113.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	60	10	30	215	10	485	15	1870	240	515	2385	65
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1712	1716	1420	1739	3228	1420	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1372	1716	1458	1351	1716	1420	1739	3228	1420	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	12	35	253	12	571	16	1968	253	542	2511	68
RTOR Reduction (vph)	0	0	27	0	0	173	0	0	58	0	0	9
Lane Group Flow (vph)	71	12	8	253	12	398	16	1968	195	542	2511	59
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	33.0	33.0	33.0	32.5	32.5	32.5	1.6	82.1	82.1	22.4	102.9	102.9
Effective Green, g (s)	33.0	33.0	33.0	32.0	32.0	32.0	2.1	82.6	82.6	22.9	103.4	103.4
Actuated g/C Ratio	0.22	0.22	0.22	0.21	0.21	0.21	0.01	0.55	0.55	0.15	0.69	0.69
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	302	378	321	288	366	303	24	1778	782	510	2225	1005
v/s Ratio Prot		0.01			0.01		0.01	c0.61		0.16	c0.78	
v/s Ratio Perm	0.05		0.01	0.19		c0.28			0.14			0.04
v/c Ratio	0.24	0.03	0.02	0.88	0.03	1.31	0.67	1.11	0.25	1.06	1.13	0.06
Uniform Delay, d1	48.1	46.0	45.9	57.1	46.7	59.0	73.6	33.7	17.5	63.6	23.3	7.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.10	0.68	0.36	0.88	0.65	0.97
Incremental Delay, d2	0.4	0.0	0.0	25.3	0.1	162.6	29.8	52.9	0.4	32.9	58.5	0.0
Delay (s)	48.5	46.0	45.9	82.4	46.8	221.6	110.9	75.8	6.6	88.8	73.6	7.3
Level of Service	D	D	D	F	D	F	F	E	A	F	E	A
Approach Delay (s)		47.5			177.0			68.3			74.8	
Approach LOS		D			F			E			E	

Intersection Summary			
HCM Average Control Delay	85.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	105.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: South Beach State Park & US 101

2030 Scenario2-30 HV

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	**80**	**5**	**40**	**40**	**5**	**85**	**35**	**1960**	**40**	**80**	**2460**	**90**
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	**3.5**	**4.0**		**4.0**	**4.0**		**3.5**	**3.5**	**4.0**	**4.0**	**3.5**	**3.5**
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	**1.00**	**0.98**		**1.00**	**1.00**		**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.97**
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	**1.00**	**0.87**		**1.00**	**0.86**		**1.00**	**1.00**	**0.85**	**1.00**	**1.00**	**0.85**
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	**1607**	**1452**		**1630**	**1473**		**1614**	**3228**	**1458**	**1630**	**3228**	**1402**
Flt Permitted	0.52	1.00		0.72	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	**881**	**1452**		**1237**	**1473**		**1614**	**3228**	**1458**	**1630**	**3228**	**1402**
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.85	0.85	0.95	0.95
Adj. Flow (vph)	**94**	**6**	**47**	**47**	**6**	**100**	**37**	**2063**	**47**	**94**	**2589**	**95**
RTOR Reduction (vph)	0	42	0	0	89	0	0	0	13	0	0	12
Lane Group Flow (vph)	**94**	**11**	**0**	**47**	**17**	**0**	**37**	**2063**	**34**	**94**	**2589**	**83**
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	**3%**	**2%**	**3%**	**2%**	**2%**	**2%**	**3%**	**3%**	**2%**	**2%**	**3%**	**3%**
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		**4**			**8**		**5**	**2**		**1**	**6**	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	**17.2**	**17.2**		**17.2**	**17.2**		**3.2**	**109.4**	**109.4**	**11.4**	**117.6**	**117.6**
Effective Green, g (s)	17.7	17.2		17.2	17.2		3.7	109.9	109.4	11.4	118.1	118.1
Actuated g/C Ratio	**0.12**	**0.11**		**0.11**	**0.11**		**0.02**	**0.73**	**0.73**	**0.08**	**0.79**	**0.79**
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	**3.0**	**3.0**		**3.0**	**3.0**		**3.0**	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**
Lane Grp Cap (vph)	104	166		142	169		40	2365	1063	124	2542	1104
v/s Ratio Prot		**0.01**			**0.01**		**0.02**	**c0.64**		**0.06**	**c0.80**	
v/s Ratio Perm	c0.11			0.04					0.02			0.06
v/c Ratio	**0.90**	**0.07**		**0.33**	**0.10**		**0.92**	**0.87**	**0.03**	**0.76**	**1.02**	**0.08**
Uniform Delay, d1	65.3	59.3		61.1	59.5		73.0	14.9	5.6	67.9	16.0	3.6
Progression Factor	**1.00**	**1.00**		**1.00**	**1.00**		**1.00**	**1.00**	**1.00**	**1.21**	**0.41**	**0.05**
Incremental Delay, d2	58.2	0.2		1.4	0.3		112.0	4.8	0.1	2.4	11.0	0.0
Delay (s)	**123.6**	**59.4**		**62.5**	**59.8**		**185.0**	**19.7**	**5.7**	**84.7**	**17.5**	**0.2**
Level of Service	F	E		E	E		F	B	A	F	B	A
Approach Delay (s)		**100.4**			**60.6**			**22.2**			**19.2**	
Approach LOS		F			E			C			B	

Intersection Summary			
HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	**0.99**		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	**92.1%**	**ICU Level of Service**	**F**
Analysis Period (min)	15		

c **Critical Lane Group**

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	3220	135	0	3175
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	3389	142	0	3342
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	6736	3393			3534	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	6736	3393			3534	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	10			69	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	3389	142	3342
Volume Left	0	0	0
Volume Right	0	142	0
cSH	1700	1700	1700
Volume to Capacity	1.99	0.08	1.97
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	194.6%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	200	0	3355	2915	260
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	235	0	3532	3068	274
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.36					
vC, conflicting volume	4838	3072	3344			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	8137	3072	3344			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	9	80			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	235	1766	1766	3068	274
Volume Left	0	0	0	0	0
Volume Right	235	0	0	0	274
cSH	9	1700	1700	1700	1700
Volume to Capacity	27.49	1.04	1.04	1.80	0.16
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	330.9		
Intersection Capacity Utilization	186.9%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	55	0	0	870	0	2485	80	0	3070	45
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	65	0	0	1024	0	2616	84	0	3232	47
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.35	0.35		0.35	0.35	0.35				0.35		
vC, conflicting volume	5591	5959	1643	4300	5899	1312	3281			2702		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	10481	11545	1643	6755	11370	0	3281			2140		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	27	100	100	0	100			100		
cM capacity (veh/h)	0	0	89	0	0	374	85			85		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	65	1024	1308	1308	84	2154	1125
Volume Left	0	0	0	0	0	0	0
Volume Right	65	1024	0	0	84	0	47
cSH	89	374	1700	1700	1700	1700	1700
Volume to Capacity	0.73	2.73	0.77	0.77	0.05	1.27	0.66
Queue Length 95th (ft)	91	2141	0	0	0	0	0
Control Delay (s)	113.8	810.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F					
Approach Delay (s)	113.8	810.1	0.0			0.0	
Approach LOS	F	F					

Intersection Summary			
Average Delay	118.4		
Intersection Capacity Utilization	140.0%	ICU Level of Service	H
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: SW 62nd St & US 101

2030 Scenario2-30 HV

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	85	0	30	10	0	10	45	1940	15	10	2450	80
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	100	0	35	12	0	12	47	2042	16	11	2579	84
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3732	4757	1293	3495	4833	1033	2665			2060		
vC1, stage 1 conf vol	2602	2602		2147	2147							
vC2, stage 2 conf vol	1130	2155		1348	2686							
vCu, unblocked vol	3732	4757	1293	3495	4833	1033	2665			2060		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	77	60	100	95	69			96		
cM capacity (veh/h)	23	32	154	29	1	231	151			264		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	100	35	12	12	47	1361	696	11	1289	1289	84
Volume Left	100	0	12	0	47	0	0	11	0	0	0
Volume Right	0	35	0	12	0	0	16	0	0	0	84
cSH	23	154	29	231	151	1700	1700	264	1700	1700	1700
Volume to Capacity	4.32	0.23	0.40	0.05	0.31	0.80	0.41	0.04	0.76	0.76	0.05
Queue Length 95th (ft)	Err	21	32	4	31	0	0	3	0	0	0
Control Delay (s)	Err	35.1	193.7	21.5	39.3	0.0	0.0	19.2	0.0	0.0	0.0
Lane LOS	F	E	F	C	E			C			
Approach Delay (s)	7399.7		107.6		0.9			0.1			
Approach LOS	F		F								

Intersection Summary			
Average Delay	203.7		
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

2030 US 101 Segment V/C Analysis

Volumes

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3515	3225	2960	2700	2640	2400
35th to 50th	2245	3065	1870	2565	1665	2285
50th to 62nd	2145	2610	1790	2185	1590	1950

V/C

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.70	2.48	2.28	2.08	2.03	1.85
35th to 50th	0.64	0.88	0.53	0.73	0.48	0.65
50th to 62nd	0.61	0.75	0.51	0.62	0.45	0.56

Volumes

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3355	3125	2830	2615	2525	2330
35th to 50th	2125	2965	1770	2480	1585	2215
50th to 62nd	2035	2540	1700	2135	1515	1900

V/C

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.58	2.40	2.18	2.01	1.94	1.79
35th to 50th	0.61	0.85	0.51	0.71	0.45	0.63
50th to 62nd	0.58	0.73	0.49	0.61	0.43	0.54

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	94	53	47	106	37	2063	47	94	2589	95
v/c Ratio	0.80	0.23	0.29	0.41	0.61	0.91	0.04	0.63	1.05	0.09
Control Delay	92.3	18.1	52.4	20.8	95.1	22.8	1.8	49.1	30.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.3	18.1	52.4	20.8	95.1	22.8	1.8	49.1	30.9	0.2
Queue Length 50th (ft)	71	4	33	18	29	638	0	76	~1178	0
Queue Length 95th (ft)	#142	38	68	64	#85	800	10	m69	m106	m0
Internal Link Dist (ft)		573		801		2367			3870	
Turn Bay Length (ft)					150		320	215		150
Base Capacity (vph)	132	251	179	282	61	2262	1117	149	2470	1088
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.21	0.26	0.38	0.61	0.91	0.04	0.63	1.05	0.09

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	12	35	253	12	571	16	1968	253	542	2511	68
v/c Ratio	0.24	0.03	0.10	0.90	0.03	1.20	0.25	1.11	0.30	1.18	1.13	0.07
Control Delay	41.4	37.6	12.8	79.8	38.4	135.4	68.5	72.6	1.6	125.3	75.4	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.4	37.6	12.8	79.8	38.4	135.4	68.5	72.6	1.6	125.3	75.4	5.4
Queue Length 50th (ft)	46	7	0	192	7	~391	12	~920	13	~257	~1139	9
Queue Length 95th (ft)	84	23	25	#316	23	#550	m14	#1050	m14	m172	m357	m7
Internal Link Dist (ft)		558			386			3870			1419	
Turn Bay Length (ft)	120		155	120		155	215		215	130		175
Base Capacity (vph)	297	372	343	282	358	475	65	1775	852	459	2227	1017
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.03	0.10	0.90	0.03	1.20	0.25	1.11	0.30	1.18	1.13	0.07

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	118	24	47	159	29	212	74	2405	63	258	2937	95
v/c Ratio	0.61	0.10	0.19	0.83	0.12	0.62	1.14	1.17	0.07	1.30	1.27	0.09
Control Delay	61.6	44.8	14.4	82.2	45.2	21.6	119.7	87.8	0.7	180.0	142.1	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.6	44.8	14.4	82.2	45.2	21.6	119.7	87.8	0.7	180.0	142.1	4.3
Queue Length 50th (ft)	86	16	0	120	20	34	~66	~1155	2	~278	~1525	15
Queue Length 95th (ft)	141	40	32	#208	46	100	m#55	m#932	m2	m125	m279	m6
Internal Link Dist (ft)		441			300			1419			620	
Turn Bay Length (ft)	120		155	120		155	130		175	130		175
Base Capacity (vph)	210	267	263	207	262	356	65	2058	908	198	2309	1026
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.09	0.18	0.77	0.11	0.60	1.14	1.17	0.07	1.30	1.27	0.09

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	55	44.9	22.8	67.7	0.69	36.5	A
40th Street	II	45	59.8	72.6	132.4	0.75	20.3	D
35th St.	II	35	31.2	87.8	119.0	0.28	8.6	F
Hurbert St	II	31	200.2	794.6	994.8	1.73	6.2	F
Total	II		336.1	977.8	1313.9	3.44	9.4	F

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	769.8	791.7	0.16	0.7	F
35th St	III	31	200.2	142.1	342.3	1.73	18.1	C
40th Street	III	35	34.1	75.4	109.5	0.28	9.3	F
South Beach State Pa	III	55	49.0	30.9	79.9	0.75	33.7	A
Total	III		305.2	1018.2	1323.4	2.92	7.9	F

Measures of Effectiveness

2030 Scenario2-30 HV

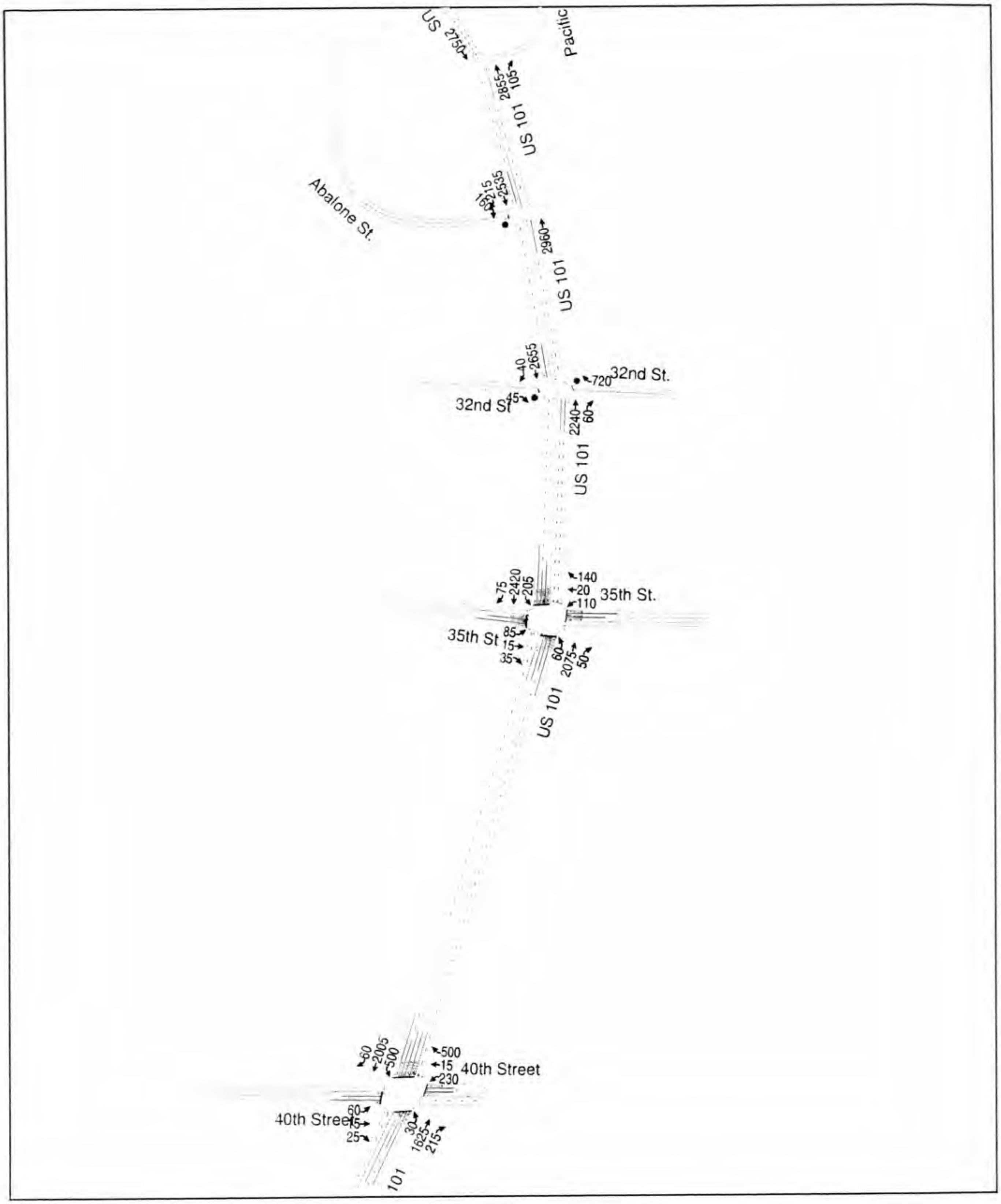
US 101

Direction	NB	SB	All
Average Speed (mph)	8	8	8
Total Travel Time (hr)	**1141**	**1210**	**2351**
Distance Traveled (mi)	9276	10034	19310
Unserved Vehicles (#)	**2666**	**3188**	**5854**
Performance Index	942.8	973.8	1916.7

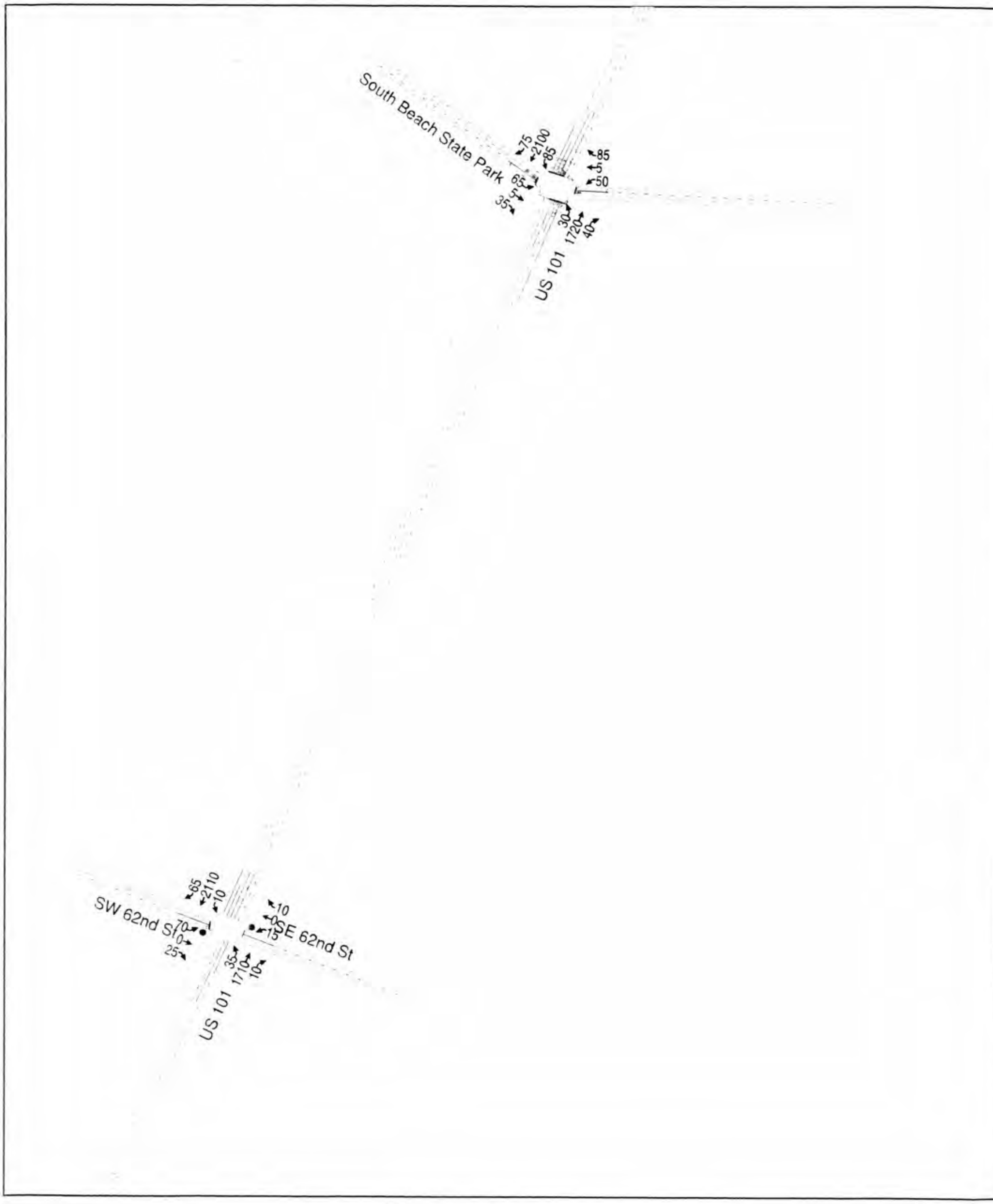
APPENDIX E

2030 Volumes and Traffic Operations Analysis for Average Annual Conditions and Land Use Scenario #1

2030 Scenario 1-Annual Average



2030 Scenario 1-Annual Average



Preliminary Signal Warrant Calculation

Project:	Newport Alternate Mobility Standard
Year:	2030
Alternative	Scenario 1 & Scenario 2
Percentage of Standard:	70%

Intersection: 62nd / US 101 – Scen 1 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	47500	Yes
	Minor	1	1850	850	No
Case B	Major	2	11100	47500	Yes
	Minor	1	950	850	NO

Intersection: 62nd / US 101 – Scen 1 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	39400	Yes
	Minor	1	1850	700	NO
Case B	Major	2	11,100	39400	Yes
	Minor	1	950	700	No

Intersection: 62nd / US 101 – Scen 1 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	35200	Yes
	Minor	1	[illegible]	650	NO
Case B	Major	2	11100	35,200	Yes
	Minor	1	950	650	NO

Intersection: 62nd / US 101 – Scen 2 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	45750	Yes
	Minor	1	1850	850	No
Case B	Major	2	11100	45750	Yes
	Minor	1	950	850	No

Intersection: 62nd / US 101 – Scen 2 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	38000	Yes
	Minor	1	1850	700	No
Case B	Major	2	11100	38000	Yes
	Minor	1	950	700	No

Intersection: 62nd / US 101 – Scen 2 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	33900	Yes
	Minor	1	1850	650	No
Case B	Major	2	11100	33900	Yes
	Minor	1	950	650	No

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	85	15	35	110	20	140	60	2075	50	205	2420	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1748	1733	1448	1714	1699	1420	1722	3228	1404	1722	3228	1404
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1364	1733	1448	1345	1699	1420	1722	3228	1404	1722	3228	1404
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	18	41	129	24	165	63	2184	53	216	2547	79
RTOR Reduction (vph)	0	0	36	0	0	146	0	0	9	0	0	11
Lane Group Flow (vph)	100	18	5	129	24	19	63	2184	44	216	2547	68
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	17.8	17.8	17.8	17.8	17.8	17.8	5.0	100.0	100.0	19.2	114.2	114.2
Effective Green, g (s)	17.3	17.3	17.3	17.3	17.3	17.3	5.5	100.5	100.5	19.7	114.7	115.2
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.04	0.67	0.67	0.13	0.76	0.77
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	157	200	167	155	196	164	63	2163	941	226	2468	1078
v/s Ratio Prot		0.01			0.01		0.04	c0.68		0.13	c0.79	
v/s Ratio Perm	0.07		0.00	c0.10		0.01			0.03			0.05
v/c Ratio	0.64	0.09	0.03	0.83	0.12	0.12	1.00	1.01	0.05	0.96	1.03	0.06
Uniform Delay, d1	63.4	59.3	58.9	64.9	59.5	59.5	72.2	24.8	8.4	64.7	17.6	4.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.72	0.17	0.15	1.00	1.00	1.00
Incremental Delay, d2	9.2	0.3	0.1	31.1	0.4	0.4	34.0	8.4	0.0	47.1	27.0	0.1
Delay (s)	72.5	59.6	59.0	96.0	59.9	59.9	86.0	12.7	1.3	111.8	44.6	4.4
Level of Service	E	E	E	F	E	E	F	B	A	F	D	A
Approach Delay (s)		67.6			74.6			14.5			48.6	
Approach LOS		E			E			B			D	

Intersection Summary			
HCM Average Control Delay	36.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	60	15	25	230	15	500	30	1625	215	500	2005	60
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1712	1716	1420	1739	3228	1420	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1365	1716	1458	1344	1716	1420	1739	3228	1420	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	18	29	271	18	588	32	1711	226	526	2111	63
RTOR Reduction (vph)	0	0	22	0	0	185	0	0	58	0	0	11
Lane Group Flow (vph)	71	18	7	271	18	403	32	1711	168	526	2111	52
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	38.0	38.0	38.0	37.5	37.5	37.5	3.2	77.7	77.7	21.8	96.3	96.3
Effective Green, g (s)	38.0	38.0	38.0	37.0	37.0	37.0	3.7	78.2	78.2	22.3	96.8	96.8
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.02	0.52	0.52	0.15	0.65	0.65
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	346	435	369	332	423	350	43	1683	740	497	2083	941
v/s Ratio Prot		0.01			0.01		0.02	c0.53		0.16	c0.65	
v/s Ratio Perm	0.05		0.01	0.20		c0.28			0.12			0.04
v/c Ratio	0.21	0.04	0.02	0.82	0.04	1.15	0.74	1.02	0.23	1.06	1.01	0.06
Uniform Delay, d1	44.1	42.3	42.0	53.3	43.0	56.5	72.7	35.9	19.5	63.8	26.6	9.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.87	0.66	0.84
Incremental Delay, d2	0.3	0.0	0.0	15.0	0.1	96.4	50.5	26.2	0.7	31.2	9.7	0.0
Delay (s)	44.4	42.3	42.0	68.3	43.1	152.9	123.1	62.1	20.2	86.6	27.3	8.2
Level of Service	D	D	D	E	D	F	F	E	C	F	C	A
Approach Delay (s)		43.5			124.5			58.3			38.4	
Approach LOS		D			F			E			D	

Intersection Summary			
HCM Average Control Delay	58.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	65	5	35	50	5	85	30	1720	40	85	2100	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	1459		1630	1473		1614	3228	1458	1630	3228	1408
Flt Permitted	0.64	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1081	1459		1246	1473		1614	3228	1458	1630	3228	1408
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.85	0.85	0.95	0.95
Adj. Flow (vph)	76	6	41	59	6	100	32	1811	47	100	2211	79
RTOR Reduction (vph)	0	36	0	0	89	0	0	0	16	0	0	15
Lane Group Flow (vph)	76	11	0	59	17	0	32	1811	31	100	2211	64
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	9.6	9.6		9.6	9.6		2.3	56.8	56.8	7.0	61.5	61.5
Effective Green, g (s)	10.1	9.6		9.6	9.6		2.8	57.3	56.8	7.0	62.0	62.0
Actuated g/C Ratio	0.12	0.11		0.11	0.11		0.03	0.67	0.67	0.08	0.73	0.73
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	128	164		140	166		53	2166	970	134	2344	1022
v/s Ratio Prot		0.01			0.01		0.02	c0.56		0.06	c0.68	
v/s Ratio Perm	c0.07			0.05					0.02			0.05
v/c Ratio	0.59	0.06		0.42	0.10		0.60	0.84	0.03	0.75	0.94	0.06
Uniform Delay, d1	35.7	33.9		35.3	34.0		40.8	10.5	4.9	38.3	10.2	3.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.2	0.2		2.0	0.3		17.9	3.0	0.0	20.0	8.6	0.0
Delay (s)	42.9	34.1		37.4	34.3		58.6	13.5	4.9	58.4	18.8	3.4
Level of Service	D	C		D	C		E	B	A	E	B	A
Approach Delay (s)		39.5			35.4			14.0			19.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	85.4	Sum of lost time (s)	7.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2855	105	0	2750
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	3005	111	0	2895
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5904	3009			3118	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5904	3009			3118	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	17			102	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	3005	111	2895
Volume Left	0	0	0
Volume Right	0	111	0
cSH	1700	1700	1700
Volume to Capacity	1.77	0.07	1.70
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	173.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	160	0	2960	2535	215
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	188	0	3116	2668	226
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.37					
vC, conflicting volume	4230	2672	2897			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	6355	2672	2897			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	17	122			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	188	1558	1558	2668	226
Volume Left	0	0	0	0	0
Volume Right	188	0	0	0	226
cSH	17	1700	1700	1700	1700
Volume to Capacity	11.34	0.92	0.92	1.57	0.13
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	303.6		
Intersection Capacity Utilization	162.7%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	45	0	0	720	0	2240	60	0	2655	40
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	53	0	0	847	0	2358	63	0	2795	42
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.35	0.35		0.35	0.35	0.35				0.35		
vC, conflicting volume	4846	5241	1422	3812	5199	1183	2839			2423		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	8291	9424	1422	5328	9303	0	2839			1346		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	58	100	100	0	100			100		
cM capacity (veh/h)	0	0	126	0	0	377	129			175		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	53	847	1179	1179	63	1863	974
Volume Left	0	0	0	0	0	0	0
Volume Right	53	847	0	0	63	0	42
cSH	126	377	1700	1700	1700	1700	1700
Volume to Capacity	0.42	2.25	0.69	0.69	0.04	1.10	0.57
Queue Length 95th (ft)	45	1594	0	0	0	0	0
Control Delay (s)	52.7	592.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F					
Approach Delay (s)	52.7	592.3	0.0			0.0	
Approach LOS	F	F					

Intersection Summary			
Average Delay	81.9		
Intersection Capacity Utilization	122.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	70	0	25	15	0	10	35	1710	10	10	2110	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	82	0	29	18	0	12	37	1800	11	11	2221	68
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3232	4130	1115	3044	4193	909	2291			1813		
vC1, stage 1 conf vol	2244	2244		1881	1881							
vC2, stage 2 conf vol	987	1886		1163	2313							
vCu, unblocked vol	3232	4130	1115	3044	4193	909	2291			1813		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	86	67	100	96	83			97		
cM capacity (veh/h)	40	53	203	53	30	279	214			330		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	82	29	18	12	37	1200	611	11	1111	1111	68
Volume Left	82	0	18	0	37	0	0	11	0	0	0
Volume Right	0	29	0	12	0	0	11	0	0	0	68
cSH	40	203	53	279	214	1700	1700	330	1700	1700	1700
Volume to Capacity	2.07	0.14	0.33	0.04	0.17	0.71	0.36	0.03	0.65	0.65	0.04
Queue Length 95th (ft)	221	12	29	3	15	0	0	2	0	0	0
Control Delay (s)	713.5	25.7	102.8	18.5	25.3	0.0	0.0	16.3	0.0	0.0	0.0
Lane LOS	F	D	F	C	D			C			
Approach Delay (s)	532.5		69.1		0.5			0.1			
Approach LOS	F		F								

Intersection Summary			
Average Delay	14.6		
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

2030 US 101 Segment V/C Analysis

Volumes

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3515	3225	2960	2700	2640	2400
35th to 50th	2245	3065	1870	2565	1665	2285
50th to 62nd	2145	2610	1790	2185	1590	1950

V/C

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.70	2.48	2.28	2.08	2.03	1.85
35th to 50th	0.64	0.88	0.53	0.73	0.48	0.65
50th to 62nd	0.61	0.75	0.51	0.62	0.45	0.56

Volumes

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3355	3125	2830	2615	2525	2330
35th to 50th	2125	2965	1770	2480	1585	2215
50th to 62nd	2035	2540	1700	2135	1515	1900

V/C

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.58	2.40	2.18	2.01	1.94	1.79
35th to 50th	0.61	0.85	0.51	0.71	0.45	0.63
50th to 62nd	0.58	0.73	0.49	0.61	0.43	0.54

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	76	47	59	106	32	1811	47	100	2211	79
v/c Ratio	0.72	0.22	0.40	0.40	0.44	0.78	0.04	0.71	0.87	0.07
Control Delay	85.1	19.4	56.9	15.2	75.2	14.8	1.8	63.5	6.0	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.1	19.4	56.9	15.2	75.2	14.8	1.8	63.5	6.0	0.2
Queue Length 50th (ft)	57	4	43	4	25	460	0	83	117	0
Queue Length 95th (ft)	#109	37	81	49	#72	567	10	m83	m113	m0
Internal Link Dist (ft)		573		801		2367			3870	
Turn Bay Length (ft)					150		320	215		150
Base Capacity (vph)	129	246	180	300	73	2311	1140	143	2546	1119
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.19	0.33	0.35	0.44	0.78	0.04	0.70	0.87	0.07

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	18	29	271	18	588	32	1711	226	526	2111	63
v/c Ratio	0.20	0.04	0.07	0.78	0.04	1.09	0.49	1.04	0.28	1.22	1.04	0.07
Control Delay	35.8	33.1	11.7	58.1	33.9	92.7	83.3	56.4	3.6	142.5	41.6	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.8	33.1	11.7	58.1	33.9	92.7	83.3	56.4	3.6	142.5	41.6	6.8
Queue Length 50th (ft)	43	10	0	196	11	~372	24	~757	5	~256	~962	9
Queue Length 95th (ft)	78	28	22	#294	28	#531	m32	#886	m11	m#231	m#684	m8
Internal Link Dist (ft)		558			172			3870			1419	
Turn Bay Length (ft)	120		155	120		155	215		215	130		175
Base Capacity (vph)	364	458	410	348	443	538	65	1641	795	431	2023	926
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.04	0.07	0.78	0.04	1.09	0.49	1.04	0.28	1.22	1.04	0.07

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	100	18	41	129	24	165	63	2184	53	216	2547	79
v/c Ratio	0.56	0.08	0.18	0.73	0.11	0.50	0.97	1.08	0.06	0.92	1.08	0.08
Control Delay	60.4	44.9	15.1	73.1	45.5	12.4	72.0	44.3	0.8	57.7	56.2	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	44.9	15.1	73.1	45.5	12.4	72.0	44.3	0.8	57.7	56.2	3.9
Queue Length 50th (ft)	73	12	0	96	16	0	48	~976	2	~179	~1174	11
Queue Length 95th (ft)	122	33	29	152	40	52	m48	m#237	m2	m117	m274	m5
Internal Link Dist (ft)		441			300			1419			620	
Turn Bay Length (ft)	120		155	120		155	130		175	130		175
Base Capacity (vph)	211	267	258	208	262	359	65	2031	896	234	2348	1041
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.07	0.16	0.62	0.09	0.46	0.97	1.08	0.06	0.92	1.08	0.08

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	55	44.9	14.8	59.7	0.69	41.4	A
40th Street	II	45	59.8	56.4	116.2	0.75	23.2	C
35th St.	II	35	31.2	44.3	75.5	0.28	13.5	E
Hurbert St	II	31	200.2	561.1	761.3	1.73	8.2	F
Total	II		336.1	676.6	1012.7	3.44	12.2	F

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	542.6	564.5	0.16	1.0	F
35th St	III	31	200.2	56.2	256.4	1.73	24.2	B
40th Street	III	35	34.1	41.6	75.7	0.28	13.5	E
South Beach State Pa	III	55	49.0	6.0	55.0	0.75	49.0	A
Total	III		305.2	646.4	951.6	2.92	11.1	E

Measures of Effectiveness

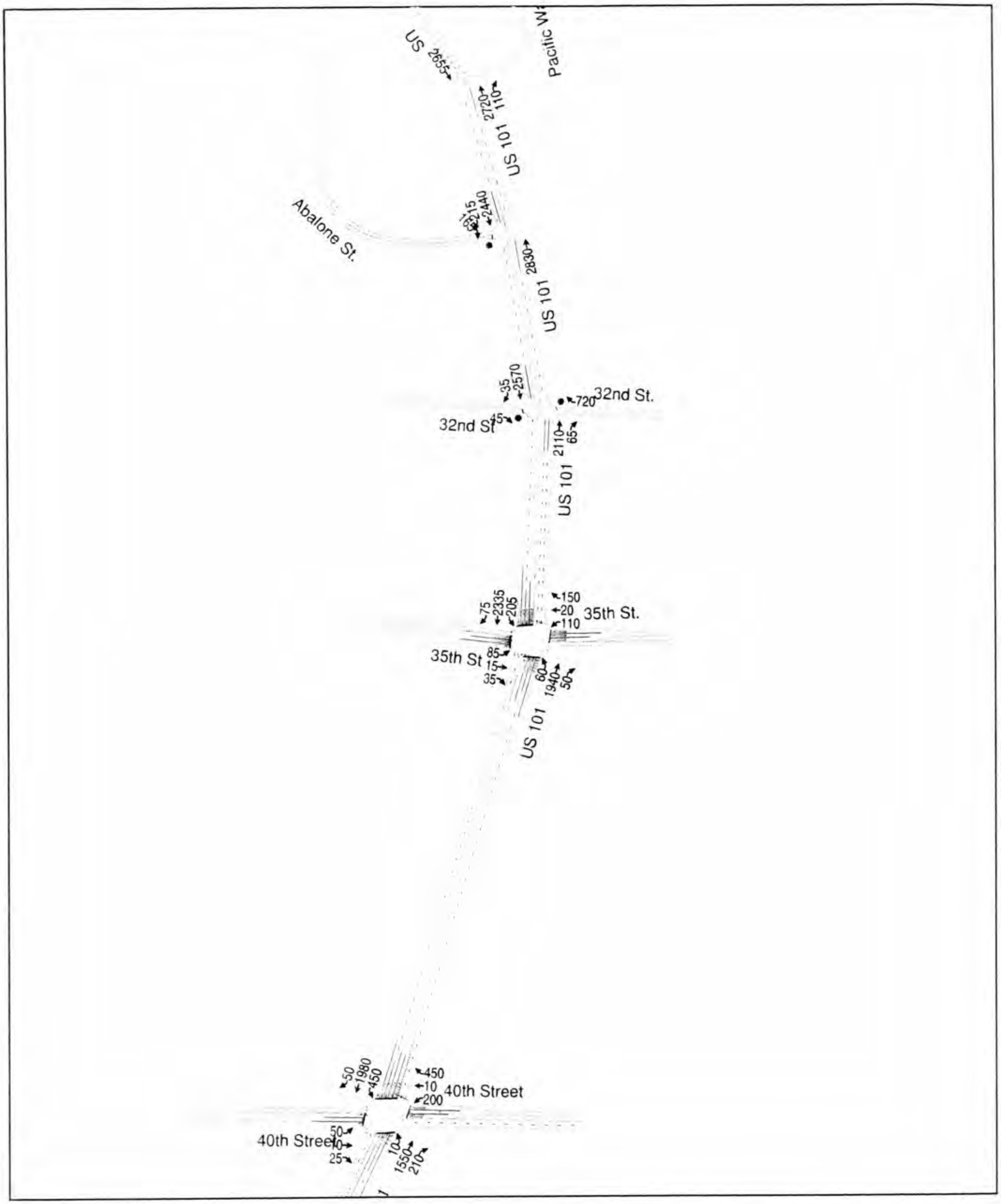
US 101

Direction	NB	SB	All
Average Speed (mph)	11	12	11
Total Travel Time (hr)	**728**	**745**	**1472**
Distance Traveled (mi)	8089	8623	16713
Unserved Vehicles (#)	**1748**	**1842**	**3590**
Performance Index	516.0	527.0	1043.0

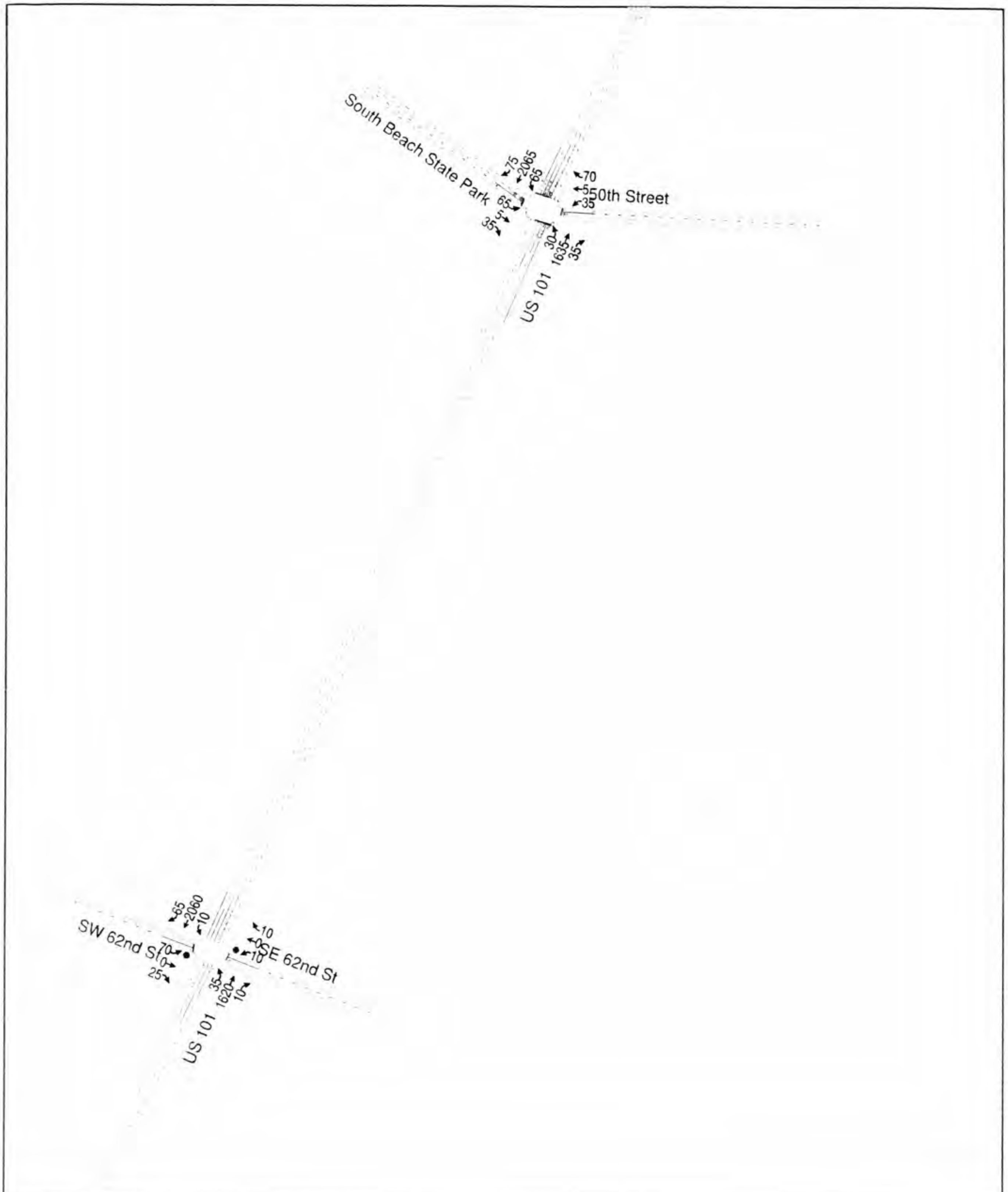
APPENDIX F

2030 Volumes and Traffic Operations Analysis for Average Annual Conditions and Land Use Scenario #2

2030 Scenario2-Annual Average



2030 Scenario2-Annual Average



Preliminary Signal Warrant Calculation					
Project:	Newport Alternate Mobility Standard				
Year:	2030				
Alternative	Scenario 1 & Scenario 2				
Percentage of Standard:	70%				
Intersection:	62nd / US 101 - Scen 1 30 HV				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	47500	Yes
	Minor	1	1850	[illegible]	NO
Case B	Major	2	[illegible]	47500	Yes
	Minor	1	950	850	NO
Intersection:	62nd / US 101 - Scen 1 AAvg				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	[illegible]	Yes
	Minor	1	[illegible]	700	NO
Case B	Major	2	11,100	39100	Yes
	Minor	1	[illegible]	700	No
Intersection:	62nd / US 101 - Scen 1 Off-Season				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	35200	Yes
	Minor	1	[illegible]	650	NO
Case B	Major	2	[illegible]	35,200	Yes
	Minor	1	[illegible]	650	NO
Intersection:	62nd / US 101 - Scen 2 30 HV				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	45750	Yes
	Minor	1	1850	1850	No
Case B	Major	2	11100	45750	Yes
	Minor	1	950	850	No
Intersection:	62nd / US 101 - Scen 2 AAvg				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	38000	Yes
	Minor	1	1850	700	No
Case B	Major	2	11100	38000	Yes
	Minor	1	950	700	No
Intersection:	62nd / US 101 - Scen 2 Off-Season				
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	33900	Yes
	Minor	[illegible]	1850	[illegible]	No
Case B	Major	2	11100	33900	Yes
	Minor	1	950	650	[illegible]

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	85	15	35	110	20	150	60	1940	50	205	2335	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1749	1733	1449	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1365	1733	1449	1346	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	18	41	129	24	176	63	2042	53	216	2458	79
RTOR Reduction (vph)	0	0	36	0	0	154	0	0	11	0	0	13
Lane Group Flow (vph)	100	18	5	129	24	22	63	2042	42	216	2458	66
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	16.9	16.9	16.9	16.9	16.9	16.9	4.0	82.6	82.6	17.5	96.1	96.1
Effective Green, g (s)	16.4	16.4	16.4	16.4	16.4	16.4	4.5	83.1	83.1	18.0	96.6	97.1
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.03	0.64	0.64	0.14	0.74	0.75
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	172	219	183	170	214	179	60	2063	899	238	2399	1050
v/s Ratio Prot		0.01			0.01		0.04	c0.63		0.13	c0.76	
v/s Ratio Perm	0.07		0.00	c0.10		0.02			0.03			0.05
v/c Ratio	0.58	0.08	0.03	0.76	0.11	0.12	1.05	0.99	0.05	0.91	1.02	0.06
Uniform Delay, d1	53.6	50.2	49.8	54.9	50.3	50.4	62.8	23.0	8.7	55.2	16.7	4.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.74	0.31	0.30	1.12	0.35	0.01
Incremental Delay, d2	5.8	0.2	0.1	18.5	0.3	0.4	80.6	9.3	0.0	5.0	13.4	0.0
Delay (s)	59.4	50.4	49.9	73.4	50.7	50.9	127.2	16.4	2.7	67.0	19.3	0.1
Level of Service	E	D	D	E	D	D	F	B	A	E	B	A
Approach Delay (s)		55.9			59.7			19.3			22.5	
Approach LOS		E			E			B			C	

Intersection Summary			
HCM Average Control Delay	24.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	50	10	25	200	10	450	10	1550	210	450	1980	50
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1713	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1372	1716	1458	1352	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	59	12	29	235	12	529	11	1632	221	474	2084	53
RTOR Reduction (vph)	0	0	22	0	0	189	0	0	71	0	0	10
Lane Group Flow (vph)	59	12	7	235	12	340	11	1632	150	474	2084	43
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	30.4	30.4	30.4	29.9	29.9	29.9	1.6	66.3	66.3	20.8	85.5	85.5
Effective Green, g (s)	30.4	30.4	30.4	29.4	29.4	29.4	2.1	66.8	66.8	21.3	86.0	86.0
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23	0.23	0.02	0.51	0.51	0.16	0.66	0.66
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	321	401	341	306	388	321	28	1659	730	547	2135	965
v/s Ratio Prot		0.01			0.01		0.01	c0.51		0.14	c0.65	
v/s Ratio Perm	0.04		0.00	0.17		c0.24			0.11			0.03
v/c Ratio	0.18	0.03	0.02	0.77	0.03	1.06	0.39	0.98	0.20	0.87	0.98	0.04
Uniform Delay, d1	39.9	38.4	38.3	47.1	39.2	50.3	63.3	31.1	17.2	53.0	21.0	7.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.63	0.93
Incremental Delay, d2	0.3	0.0	0.0	11.6	0.0	66.9	8.9	18.6	0.6	3.7	5.4	0.0
Delay (s)	40.1	38.5	38.4	58.7	39.2	117.2	72.2	49.6	17.8	49.2	18.7	7.2
Level of Service	D	D	D	E	D	F	E	D	B	D	B	A
Approach Delay (s)		39.4			98.3			46.0			24.0	
Approach LOS		D			F			D			C	

Intersection Summary			
HCM Average Control Delay	42.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	65	5	35	35	5	70	30	1635	35	65	2065	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	1459		1630	1476		1614	3228	1458	1630	3228	1408
Flt Permitted	0.70	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1186	1459		1246	1476		1614	3228	1458	1630	3228	1408
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.85	0.85	0.95	0.95
Adj. Flow (vph)	76	6	41	41	6	82	32	1721	41	76	2174	79
RTOR Reduction (vph)	0	37	0	0	73	0	0	0	15	0	0	15
Lane Group Flow (vph)	76	10	0	41	15	0	32	1721	26	76	2174	64
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	9.3	9.3		9.3	9.3		2.3	54.8	54.8	9.0	61.5	61.5
Effective Green, g (s)	9.8	9.3		9.3	9.3		2.8	55.3	54.8	9.0	62.0	62.0
Actuated g/C Ratio	0.12	0.11		0.11	0.11		0.03	0.65	0.64	0.11	0.73	0.73
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	137	159		136	161		53	2098	939	172	2352	1026
v/s Ratio Prot		0.01			0.01		0.02	0.53		c0.05	c0.67	
v/s Ratio Perm	c0.06			0.03					0.02			0.05
v/c Ratio	0.55	0.07		0.30	0.09		0.60	0.82	0.03	0.44	0.92	0.06
Uniform Delay, d1	35.6	34.0		34.9	34.1		40.6	11.2	5.5	35.7	9.6	3.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	0.2		1.3	0.3		17.9	2.7	0.0	1.8	6.8	0.0
Delay (s)	40.4	34.2		36.2	34.4		58.5	13.9	5.5	37.5	16.4	3.3
Level of Service	D	C		D	C		E	B	A	D	B	A
Approach Delay (s)		38.0			34.9			14.5			16.6	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	85.1	Sum of lost time (s)	7.0
Intersection Capacity Utilization	79.4%	**ICU Level of Service**	D
Analysis Period (min)	15		

c **Critical Lane Group**

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2720	110	0	2655
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	2863	116	0	2795
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5662	2867			2981	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5662	2867			2981	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	21			116	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	2863	116	2795
Volume Left	0	0	0
Volume Right	0	116	0
cSH	1700	1700	1700
Volume to Capacity	1.68	0.07	1.64
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	166.1%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	165	0	2830	2440	215
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	194	0	2979	2568	226
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.41					
vC, conflicting volume	4062	2572	2797			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5576	2572	2797			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	20	134			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	194	1489	1489	2568	226
Volume Left	0	0	0	0	0
Volume Right	194	0	0	0	226
cSH	20	1700	1700	1700	1700
Volume to Capacity	9.93	0.88	0.88	1.51	0.13
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	325.2		
Intersection Capacity Utilization	157.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	45	0	0	720	0	2110	65	0	2570	35
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	53	0	0	847	0	2221	68	0	2705	37
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.39	0.39		0.39	0.39	0.39				0.39		
vC, conflicting volume	4685	5017	1375	3631	4967	1115	2744			2291		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	7323	8175	1375	4618	8047	0	2744			1182		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	61	100	100	0	100			100		
cM capacity (veh/h)	0	0	136	0	0	421	141			226		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	53	847	1111	1111	68	1804	939
Volume Left	0	0	0	0	0	0	0
Volume Right	53	847	0	0	68	0	37
cSH	136	421	1700	1700	1700	1700	1700
Volume to Capacity	0.39	2.01	0.65	0.65	0.04	1.06	0.55
Queue Length 95th (ft)	41	1466	0	0	0	0	0
Control Delay (s)	47.5	484.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	F					
Approach Delay (s)	47.5	484.8	0.0			0.0	
Approach LOS	E	F					

Intersection Summary			
Average Delay	69.7		
Intersection Capacity Utilization	118.6%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑↱		↰	↑↑	↱
Volume (veh/h)	70	0	25	10	0	10	35	1620	10	10	2060	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	82	0	29	12	0	12	37	1705	11	11	2168	68
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3132	3983	1088	2923	4046	862	2239			1718		
vC1, stage 1 conf vol	2191	2191		1786	1786							
vC2, stage 2 conf vol	940	1791		1137	2260							
vCu, unblocked vol	3132	3983	1088	2923	4046	862	2239			1718		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	86	81	100	96	84			97		
cM capacity (veh/h)	43	59	212	61	34	299	224			360		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	82	29	12	12	37	1137	579	11	1084	1084	68
Volume Left	82	0	12	0	37	0	0	11	0	0	0
Volume Right	0	29	0	12	0	0	11	0	0	0	68
cSH	43	212	61	299	224	1700	1700	360	1700	1700	1700
Volume to Capacity	1.91	0.14	0.19	0.04	0.16	0.67	0.34	0.03	0.64	0.64	0.04
Queue Length 95th (ft)	213	12	16	3	14	0	0	2	0	0	0
Control Delay (s)	629.2	24.7	77.8	17.5	24.2	0.0	0.0	15.3	0.0	0.0	0.0
Lane LOS	F	C	F	C	C			C			
Approach Delay (s)	470.1		47.7		0.5			0.1			
Approach LOS	F		E								

Intersection Summary			
Average Delay	13.2		
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		

2030 US 101 Segment V/C Analysis

Volumes

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3515	3225	2960	2700	2640	2400
35th to 50th	2245	3065	1870	2565	1665	2285
50th to 62nd	2145	2610	1790	2185	1590	1950

V/C

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.70	2.48	2.28	2.08	2.03	1.85
35th to 50th	0.64	0.88	0.53	0.73	0.48	0.65
50th to 62nd	0.61	0.75	0.51	0.62	0.45	0.56

Volumes

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3355	3125	2830	2615	2525	2330
35th to 50th	2125	2965	1770	2480	1585	2215
50th to 62nd	2035	2540	1700	2135	1515	1900

V/C

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.58	2.40	2.18	2.01	1.94	1.79
35th to 50th	0.61	0.85	0.51	0.71	0.45	0.63
50th to 62nd	0.58	0.73	0.49	0.61	0.43	0.54

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	76	47	41	88	32	1721	41	76	2174	79
v/c Ratio	0.66	0.23	0.29	0.36	0.42	0.72	0.04	0.54	0.85	0.07
Control Delay	76.5	19.6	53.1	16.0	73.0	12.9	2.0	52.9	6.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.5	19.6	53.1	16.0	73.0	12.9	2.0	52.9	6.2	0.2
Queue Length 50th (ft)	57	4	29	4	25	405	0	60	98	0
Queue Length 95th (ft)	102	37	61	46	#72	539	10	m66	m110	m0
Internal Link Dist (ft)		573		801		2367			3870	
Turn Bay Length (ft)					150		320	215		150
Base Capacity (vph)	144	246	180	285	76	2375	1169	162	2548	1121
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.19	0.23	0.31	0.42	0.72	0.04	0.47	0.85	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	59	12	29	235	12	529	11	1632	221	474	2084	53
v/c Ratio	0.19	0.03	0.08	0.78	0.03	1.05	0.17	0.95	0.27	1.01	0.94	0.05
Control Delay	38.9	36.1	12.9	62.6	36.9	80.4	68.1	31.4	2.7	60.6	13.4	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.9	36.1	12.9	62.6	36.9	80.4	68.1	31.4	2.7	60.6	13.4	4.2
Queue Length 50th (ft)	37	7	0	172	7	~295	7	610	19	~201	282	5
Queue Length 95th (ft)	71	23	23	#267	23	#454	m12	#793	m20	m#184	m444	m5
Internal Link Dist (ft)		558			522			3870			1419	
Turn Bay Length (ft)	120		155	120		155	215		215	130		175
Base Capacity (vph)	318	398	360	302	383	502	65	1727	834	470	2222	1014
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.03	0.08	0.78	0.03	1.05	0.17	0.94	0.26	1.01	0.94	0.05

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	100	18	41	129	24	176	63	2042	53	216	2458	79
v/c Ratio	0.56	0.08	0.18	0.73	0.11	0.52	0.97	1.02	0.06	0.87	1.05	0.08
Control Delay	60.4	44.9	15.1	73.1	45.5	12.4	102.4	26.2	1.6	59.2	37.4	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	44.9	15.1	73.1	45.5	12.4	102.4	26.2	1.6	59.2	37.4	3.4
Queue Length 50th (ft)	73	12	0	96	16	0	48	~242	1	177	~1097	8
Queue Length 95th (ft)	122	33	29	152	40	53	m#52	m#926	m1	m118	m217	m4
Internal Link Dist (ft)		441			300			1419			620	
Turn Bay Length (ft)	120		155	120		155	130		175	130		175
Base Capacity (vph)	211	267	258	208	262	368	65	2004	885	248	2348	1042
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.07	0.16	0.62	0.09	0.48	0.97	1.02	0.06	0.87	1.05	0.08

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
50th Street	II	55	44.9	12.9	57.8	0.69	42.7	A
40th Street	II	45	59.8	31.4	91.2	0.75	29.5	B
35th St.	II	35	31.2	26.2	57.4	0.28	17.8	D
Hurbert St	II	31	200.2	561.9	762.1	1.73	8.2	F
Total	II		336.1	632.4	968.5	3.44	12.8	F

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	542.6	564.5	0.16	1.0	F
35th St	III	31	200.2	37.4	237.6	1.73	26.1	B
40th Street	III	35	34.1	13.4	47.5	0.28	21.5	C
South Beach State Pa	III	55	49.0	6.2	55.2	0.75	48.8	A
Total	III		305.2	599.6	904.8	2.92	11.6	E

Measures of Effectiveness

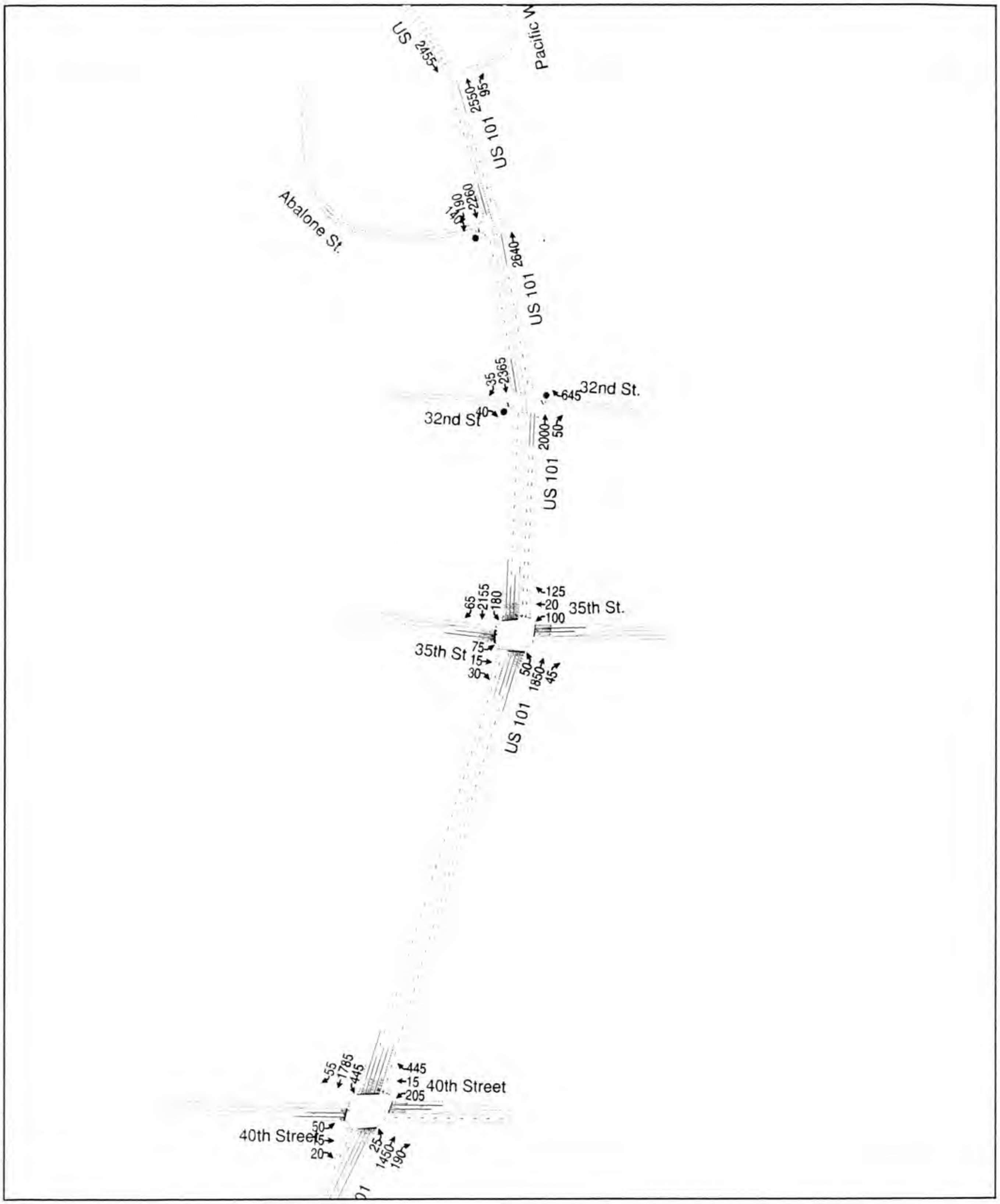
US 101

Direction	NB	SB	All
Average Speed (mph)	11	12	12
Total Travel Time (hr)	**695**	**696**	**1392**
Distance Traveled (mi)	7773	8393	16166
Unserved Vehicles (#)	**1572**	**1587**	**3160**
Performance Index	491.7	484.0	975.6

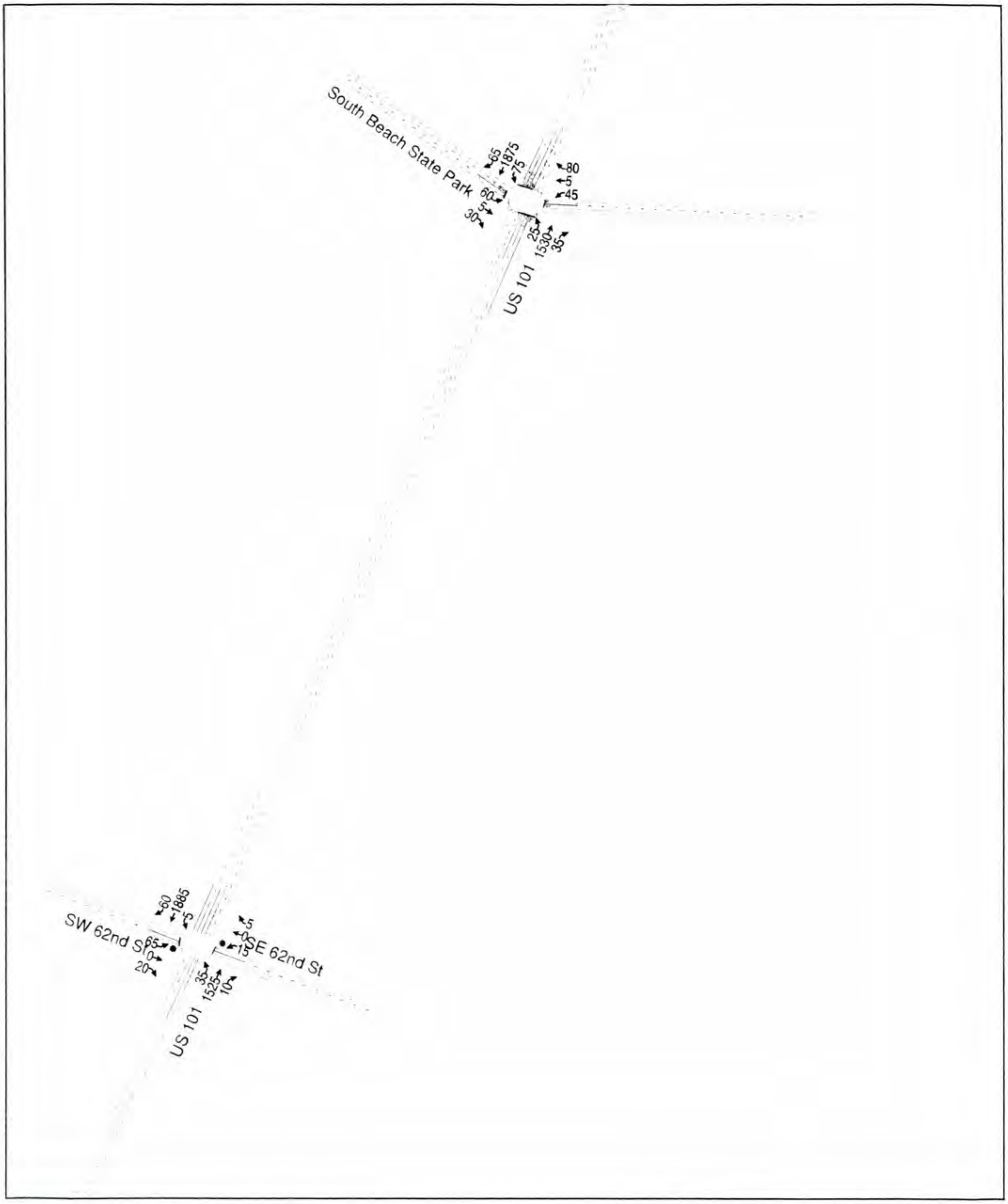
APPENDIX G

2030 Volumes and Traffic Operations Analysis for Off-Season Conditions and Land Use Scenario #1

2030 Scenario 1-Off Season



2030 Scenario 1-Off Season



Preliminary Signal Warrant Calculation

Project: Newport Alternate Mobility Standard
Year: 2030
Alternative: Scenario 1 & Scenario 2
Percentage of Standard: 70%

Intersection: 62nd / US 101 – Scen 1 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	47500	Yes
	Minor	1	1850	850	No
Case B	Major	2	[illegible]	47500	Yes
	Minor	1	950	850	NO

Intersection: 62nd / US 101 – Scen 1 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	39100	Yes
	Minor	1	1850	700	No
Case B	Major	2	11,100	39100	Yes
	Minor	1	[illegible]	700	No

Intersection: 62nd / US 101 – Scen 1 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	35200	Yes
	Minor	1	[illegible]	650	No
Case B	Major	2	[illegible]	35,200	Yes
	Minor	1	[illegible]	650	No

Intersection: 62nd / US 101 – Scen 2 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	45750	Yes
	Minor	1	1850	1850	No
Case B	Major	2	11100	45750	Yes
	Minor	1	950	850	No

Intersection: 62nd / US 101 – Scen 2 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	[illegible]	38000	Yes
	Minor	1	1850	700	No
Case B	Major	2	11100	38000	Yes
	Minor	1	950	700	No

Intersection: 62nd / US 101 – Scen 2 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	33900	Yes
	Minor	1	1850	850	No
Case B	Major	2	11100	33900	Yes
	Minor	1	950	650	No

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	75	15	30	100	20	125	50	1850	45	180	2155	65
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1749	1733	1450	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1366	1733	1450	1346	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	88	18	35	118	24	147	53	1947	47	189	2268	68
RTOR Reduction (vph)	0	0	31	0	0	128	0	0	11	0	0	12
Lane Group Flow (vph)	88	18	4	118	24	19	53	1947	36	189	2268	56
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	15.7	15.7	15.7	15.7	15.7	15.7	3.2	76.0	76.0	15.3	88.1	88.1
Effective Green, g (s)	15.2	15.2	15.2	15.2	15.2	15.2	3.7	76.5	76.5	15.8	88.6	89.1
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.03	0.64	0.64	0.13	0.74	0.74
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	173	220	184	170	215	180	53	2058	896	227	2383	1044
v/s Ratio Prot		0.01			0.01		0.03	c0.60		0.11	c0.70	
v/s Ratio Perm	0.06		0.00	c0.09		0.01			0.03			0.04
v/c Ratio	0.51	0.08	0.02	0.69	0.11	0.10	1.00	0.95	0.04	0.83	0.95	0.05
Uniform Delay, d1	48.9	46.2	45.9	50.2	46.4	46.4	58.2	19.9	8.1	50.8	13.8	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.72	0.26	0.17	1.16	0.64	1.12
Incremental Delay, d2	3.2	0.2	0.1	12.5	0.3	0.3	76.4	4.9	0.0	2.5	1.3	0.0
Delay (s)	52.1	46.5	46.0	62.6	46.7	46.7	118.1	10.0	1.4	61.2	10.1	4.6
Level of Service	D	D	D	E	D	D	F	B	A	E	B	A
Approach Delay (s)		49.9			53.2			12.6			13.8	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	50	15	20	205	15	445	25	1450	190	445	1785	55
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1714	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1365	1716	1458	1345	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	59	18	24	241	18	524	26	1526	200	468	1879	58
RTOR Reduction (vph)	0	0	18	0	0	199	0	0	74	0	0	14
Lane Group Flow (vph)	59	18	6	241	18	325	26	1526	126	468	1879	44
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	29.5	29.5	29.5	29.0	29.0	29.0	2.4	58.9	58.9	19.1	75.6	75.6
Effective Green, g (s)	29.5	29.5	29.5	28.5	28.5	28.5	2.9	59.4	59.4	19.6	76.1	76.1
Actuated g/C Ratio	0.25	0.25	0.25	0.24	0.24	0.24	0.02	0.50	0.50	0.16	0.63	0.63
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	336	422	358	319	408	337	42	1598	703	546	2047	925
v/s Ratio Prot		0.01			0.01		0.01	c0.47		0.14	c0.58	
v/s Ratio Perm	0.04		0.00	0.18		c0.23			0.09			0.03
v/c Ratio	0.18	0.04	0.02	0.76	0.04	0.96	0.62	0.95	0.18	0.86	0.92	0.05
Uniform Delay, d1	35.7	34.5	34.3	42.5	35.3	45.2	58.0	29.0	16.8	48.8	19.2	8.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.77	1.14
Incremental Delay, d2	0.3	0.0	0.0	10.4	0.1	39.4	24.2	14.1	0.6	5.4	3.5	0.0
Delay (s)	35.9	34.5	34.3	52.9	35.3	84.7	82.2	43.1	17.4	49.2	18.3	9.5
Level of Service	D	C	C	D	D	F	F	D	B	D	B	A
Approach Delay (s)		35.3			73.8			40.7			24.1	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM Average Control Delay	37.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: South Beach State Park & US 101

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	60	5	30	45	5	80	25	1530	35	75	1875	65
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	1465		1630	1474		1614	3228	1458	1630	3228	1409
Flt Permitted	0.69	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1173	1465		1253	1474		1614	3228	1458	1630	3228	1409
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.85	0.85	0.95	0.95
Adj. Flow (vph)	71	6	35	53	6	94	26	1611	41	88	1974	68
RTOR Reduction (vph)	0	31	0	0	83	0	0	0	15	0	0	15
Lane Group Flow (vph)	71	10	0	53	17	0	26	1611	26	88	1974	53
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	8.4	8.4		8.4	8.4		1.3	47.2	47.2	7.3	53.2	53.2
Effective Green, g (s)	8.9	8.4		8.4	8.4		1.8	47.7	47.2	7.3	53.7	53.7
Actuated g/C Ratio	0.12	0.11		0.11	0.11		0.02	0.64	0.63	0.10	0.72	0.72
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	139	164		141	165		39	2056	919	159	2314	1010
v/s Ratio Prot		0.01			0.01		0.02	0.50		c0.05	c0.61	
v/s Ratio Perm	c0.06			0.04					0.02			0.04
v/c Ratio	0.51	0.06		0.38	0.10		0.67	0.78	0.03	0.55	0.85	0.05
Uniform Delay, d1	31.0	29.7		30.8	29.9		36.3	9.9	5.2	32.2	7.7	3.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.2		1.7	0.3		35.5	2.0	0.0	4.1	3.3	0.0
Delay (s)	34.1	29.9		32.5	30.1		71.8	11.9	5.2	36.4	11.0	3.1
Level of Service	C	C		C	C		E	B	A	D	B	A
Approach Delay (s)		32.6			30.9			12.6			11.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	74.9	Sum of lost time (s)	7.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2550	95	0	2455
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	2684	100	0	2584
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5272	2688			2786	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5272	2688			2786	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	27			139	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	2684	100	2584
Volume Left	0	0	0
Volume Right	0	100	0
cSH	1700	1700	1700
Volume to Capacity	1.58	0.06	1.52
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	156.4%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	140	0	2640	2260	190
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	165	0	2779	2379	200
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.43					
vC, conflicting volume	3772	2383	2581			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4781	2383	2581			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	27	164			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	165	1389	1389	2379	200
Volume Left	0	0	0	0	0
Volume Right	165	0	0	0	200
cSH	27	1700	1700	1700	1700
Volume to Capacity	6.18	0.82	0.82	1.40	0.12
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	298.2		
Intersection Capacity Utilization	145.7%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	40	0	0	645	0	2000	50	0	2365	35
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	47	0	0	759	0	2105	53	0	2489	37
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.40	0.40		0.40	0.40	0.40				0.40		
vC, conflicting volume	4323	4670	1267	3401	4636	1057	2528			2160		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6269	7125	1267	3991	7041	0	2528			924		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	71	100	100	0	100			100		
cM capacity (veh/h)	0	0	161	0	0	437	172			294		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	47	759	1053	1053	53	1660	867
Volume Left	0	0	0	0	0	0	0
Volume Right	47	759	0	0	53	0	37
cSH	161	437	1700	1700	1700	1700	1700
Volume to Capacity	0.29	1.73	0.62	0.62	0.03	0.98	0.51
Queue Length 95th (ft)	29	1158	0	0	0	0	0
Control Delay (s)	36.4	362.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	F					
Approach Delay (s)	36.4	362.3	0.0			0.0	
Approach LOS	E	F					

Intersection Summary			
Average Delay	50.4		
Intersection Capacity Utilization	110.3%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	65	0	20	15	0	5	35	1525	10	5	1885	60
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	76	0	24	18	0	6	37	1605	11	5	1984	63
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2881	3688	996	2714	3746	812	2049			1618		
vC1, stage 1 conf vol	1997	1997		1686	1686							
vC2, stage 2 conf vol	884	1691		1028	2060							
vCu, unblocked vol	2881	3688	996	2714	3746	812	2049			1618		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	90	76	100	98	86			99		
cM capacity (veh/h)	58	74	244	74	51	323	266			394		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	76	24	18	6	37	1070	546	5	992	992	63
Volume Left	76	0	18	0	37	0	0	5	0	0	0
Volume Right	0	24	0	6	0	0	11	0	0	0	63
cSH	58	244	74	323	266	1700	1700	394	1700	1700	1700
Volume to Capacity	1.32	0.10	0.24	0.02	0.14	0.63	0.32	0.01	0.58	0.58	0.04
Queue Length 95th (ft)	166	8	21	1	12	0	0	1	0	0	0
Control Delay (s)	342.3	21.3	67.9	16.3	20.7	0.0	0.0	14.3	0.0	0.0	0.0
Lane LOS	F	C	F	C	C			B			
Approach Delay (s)	266.7		55.0		0.5			0.0			
Approach LOS	F		F								

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

2030 US 101 Segment V/C Analysis

Volumes

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3515	3225	2960	2700	2640	2400
35th to 50th	2245	3065	1870	2565	1665	2285
50th to 62nd	2145	2610	1790	2185	1590	1950

V/C

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.70	2.48	2.28	2.08	2.03	1.85
35th to 50th	0.64	0.88	0.53	0.73	0.48	0.65
50th to 62nd	0.61	0.75	0.51	0.62	0.45	0.56

Volumes

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3355	3125	2830	2615	2525	2330
35th to 50th	2125	2965	1770	2480	1585	2215
50th to 62nd	2035	2540	1700	2135	1515	1900

V/C

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.58	2.40	2.18	2.01	1.94	1.79
35th to 50th	0.61	0.85	0.51	0.71	0.45	0.63
50th to 62nd	0.58	0.73	0.49	0.61	0.43	0.54

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	41	53	100	26	1611	41	88	1974	68
v/c Ratio	0.67	0.21	0.37	0.40	0.31	0.71	0.04	0.55	0.78	0.06
Control Delay	79.9	20.3	56.0	15.6	64.8	13.3	2.1	54.2	5.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.9	20.3	56.0	15.6	64.8	13.3	2.1	54.2	5.9	0.1
Queue Length 50th (ft)	53	4	39	4	20	392	0	67	116	0
Queue Length 95th (ft)	97	34	74	48	51	484	10	m80	323	m1
Internal Link Dist (ft)		573		801		2367			3870	
Turn Bay Length (ft)					150		320	215		150
Base Capacity (vph)	133	242	181	295	85	2285	1126	183	2529	1112
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.17	0.29	0.34	0.31	0.71	0.04	0.48	0.78	0.06

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	59	18	24	241	18	524	26	1526	200	468	1879	58
v/c Ratio	0.18	0.04	0.06	0.75	0.04	0.98	0.38	0.93	0.25	0.94	0.90	0.06
Control Delay	37.1	34.6	13.0	58.4	35.4	56.8	79.0	32.3	3.1	60.0	18.2	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	34.6	13.0	58.4	35.4	56.8	79.0	32.3	3.1	60.0	18.2	5.1
Queue Length 50th (ft)	36	11	0	173	11	229	18	568	24	182	390	5
Queue Length 95th (ft)	69	29	20	252	29	#402	m29	#739	m11	m#212	m#560	m7
Internal Link Dist (ft)		558			357			3870			1419	
Turn Bay Length (ft)	120		155	120		155	215		215	130		175
Base Capacity (vph)	341	429	383	325	415	541	69	1641	794	500	2089	956
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.04	0.06	0.74	0.04	0.97	0.38	0.93	0.25	0.94	0.90	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	88	18	35	118	24	147	53	1947	47	189	2268	68
v/c Ratio	0.51	0.08	0.16	0.69	0.11	0.48	0.73	0.95	0.05	0.83	0.94	0.06
Control Delay	58.4	45.1	15.9	70.0	45.8	12.6	65.9	12.0	0.8	62.2	11.8	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	45.1	15.9	70.0	45.8	12.6	65.9	12.0	0.8	62.2	11.8	2.5
Queue Length 50th (ft)	64	12	0	88	17	0	42	191	1	154	275	4
Queue Length 95th (ft)	109	33	27	141	40	50	m44	m#250	m1	m93	m131	m1
Internal Link Dist (ft)		441			300			1419			620	
Turn Bay Length (ft)	120		155	120		155	130		175	130		175
Base Capacity (vph)	211	267	253	208	262	343	73	2057	907	227	2404	1065
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.07	0.14	0.57	0.09	0.43	0.73	0.95	0.05	0.83	0.94	0.06

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	55	44.9	13.3	58.2	0.69	42.4	A
40th Street	II	45	59.8	32.3	92.1	0.75	29.2	B
35th St.	II	35	31.2	12.0	43.2	0.28	23.7	C
Hurbert St	II	31	200.2	795.4	995.6	1.73	6.2	F
Total	II		336.1	853.0	1189.1	3.44	10.4	F

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	769.8	791.7	0.16	0.7	F
35th St	III	31	200.2	11.8	212.0	1.73	29.3	B
40th Street	III	35	34.1	18.2	52.3	0.28	19.5	C
South Beach State Pa	III	55	49.0	5.9	54.9	0.75	49.1	A
Total	III		305.2	805.7	1110.9	2.92	9.5	F

Measures of Effectiveness

2030 Scenario 1-Off Season

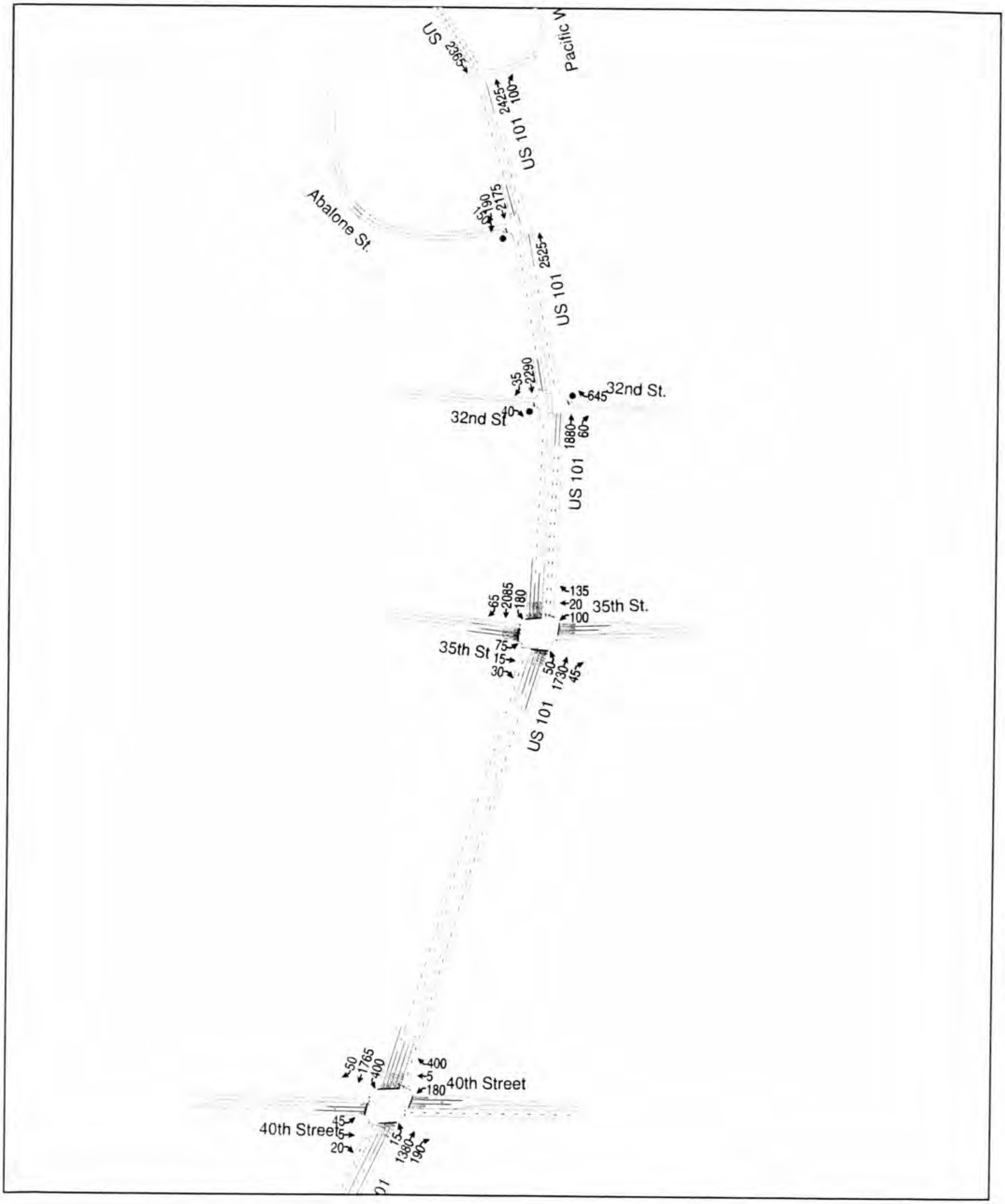
US 101

Direction	NB	SB	All
Average Speed (mph)	8	9	8
Total Travel Time (hr)	**1042**	**987**	**2029**
Distance Traveled (mi)	8456	8403	16859
Unserved Vehicles (#)	**2144**	**2073**	**4217**
Performance Index	856.0	790.2	1646.2

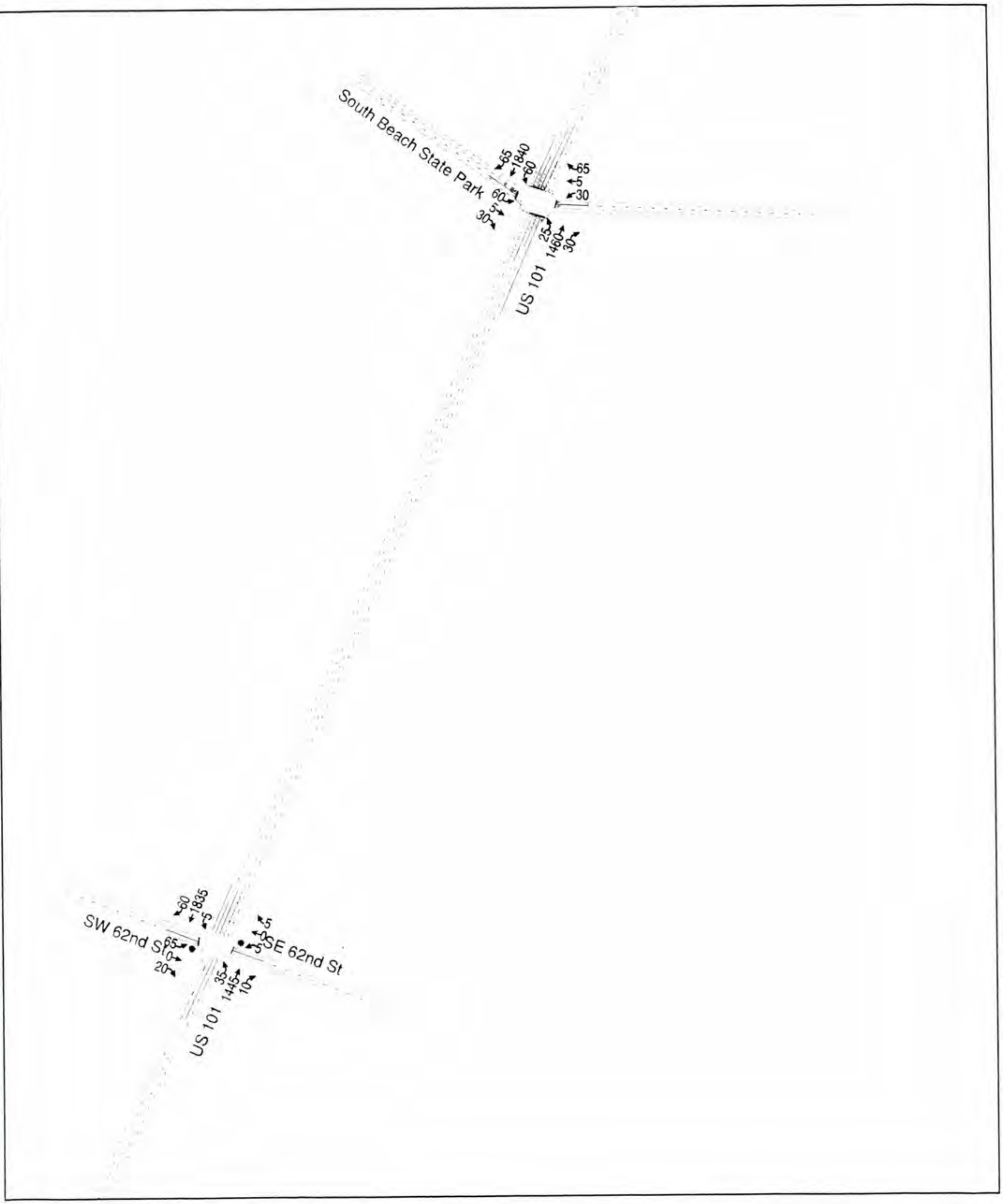
APPENDIX H

2030 Volumes and Traffic Operations Analysis for Off-Season Conditions and Land Use Scenario #2

2030 Scenario2-Off Season



2030 Scenario2-Off Season



Preliminary Signal Warrant Calculation

Project:	Newport Alternate Mobility Standard
Year:	2030
Alternative	Scenario 1 & Scenario 2
Percentage of Standard:	70%

Intersection: 62nd / US 101 – Scen 1 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	47500	Yes
	Minor	1	1850	850	NO
Case B	Major	2	11100	47500	Yes
	Minor	1	950	850	NO

Intersection: 62nd / US 101 – Scen 1 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	39400	Yes
	Minor	1	1850	700	NO
Case B	Major	2	11,100	39400	Yes
	Minor	1	950	700	NO

Intersection: 62nd / US 101 – Scen 1 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	35200	Yes
	Minor	1	1850	650	NO
Case B	Major	2	11100	35,200	Yes
	Minor	1	950	650	NO

Intersection: 62nd / US 101 – Scen 2 30 HV

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	45750	Yes
	Minor	1	1850	850	NO
Case B	Major	2	11100	45750	Yes
	Minor	1	950	850	NO

Intersection: 62nd / US 101 – Scen 2 AAvg

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	38000	Yes
	Minor	1	1850	700	No
Case B	Major	2	11100	38000	Yes
	Minor	1	950	700	No

Intersection: 62nd / US 101 – Scen 2 Off-Season

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	33900	Yes
	Minor	1	1850	650	No
Case B	Major	2	11100	33900	Yes
	Minor	1	950	650	No

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	**75**	**15**	**30**	**100**	**20**	**135**	**50**	**1730**	**45**	**180**	**2085**	**65**
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (prot)	1749	1733	1449	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	**0.74**	**1.00**	**1.00**	**0.75**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (perm)	1365	1733	1449	1346	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**
Adj. Flow (vph)	88	18	35	118	24	159	53	1821	47	189	2195	68
RTOR Reduction (vph)	**0**	**0**	**31**	**0**	**0**	**140**	**0**	**0**	**10**	**0**	**0**	**13**
Lane Group Flow (vph)	88	18	4	118	24	19	53	1821	37	189	2195	55
Confl. Peds. (#/hr)	**2**		**2**	**2**		**2**	**2**		**2**	**2**		**2**
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	**Perm**		**Perm**	**Perm**		**Perm**	**Prot**		**Perm**	**Prot**		**Perm**
Protected Phases		4			8		5	2		1	6	
Permitted Phases	**4**		**4**	**8**		**8**			**2**			**6**
Actuated Green, G (s)	16.2	16.2	16.2	16.2	16.2	16.2	5.9	84.4	84.4	16.4	94.9	94.9
Effective Green, g (s)	**15.7**	**15.7**	**15.7**	**15.7**	**15.7**	**15.7**	**6.4**	**84.9**	**84.9**	**16.9**	**95.4**	**95.9**
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.05	0.65	0.65	0.13	0.73	0.74
Clearance Time (s)	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	**165**	**209**	**175**	**163**	**205**	**172**	**85**	**2108**	**918**	**224**	**2369**	**1037**
v/s Ratio Prot		0.01			0.01		0.03	c0.56		0.11	c0.68	
v/s Ratio Perm	**0.06**		**0.00**	**c0.09**		**0.01**			**0.03**			**0.04**
v/c Ratio	0.53	0.09	0.02	0.72	0.12	0.11	0.62	0.86	0.04	0.84	0.93	0.05
Uniform Delay, d1	**53.7**	**50.8**	**50.4**	**55.1**	**51.0**	**50.9**	**60.6**	**17.9**	**8.0**	**55.3**	**14.4**	**4.7**
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.40	0.59	1.00	1.00	1.00
Incremental Delay, d2	**4.2**	**0.2**	**0.1**	**15.6**	**0.3**	**0.4**	**7.5**	**2.8**	**0.0**	**24.1**	**7.8**	**0.1**
Delay (s)	57.9	51.0	50.5	70.7	51.3	51.3	53.1	9.9	4.8	79.3	22.1	4.8
Level of Service	**E**	**D**	**D**	**E**	**D**	**D**	**D**	**A**	**A**	**E**	**C**	**A**
Approach Delay (s)		55.2			58.9			11.0			26.1	
Approach LOS		**E**			**E**			**B**			**C**	

Intersection Summary			
HCM Average Control Delay	**23.0**	**HCM Level of Service**	**C**
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	**130.0**	**Sum of lost time (s)**	**9.0**
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	**15**		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	45	5	20	180	5	400	15	1380	190	400	1765	50
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1713	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1380	1716	1458	1360	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	6	24	212	6	471	16	1453	200	421	1858	53
RTOR Reduction (vph)	0	0	19	0	0	201	0	0	69	0	0	11
Lane Group Flow (vph)	53	6	5	212	6	270	16	1453	131	421	1858	42
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	28.7	28.7	28.7	28.2	28.2	28.2	1.6	68.0	68.0	20.8	87.2	87.2
Effective Green, g (s)	28.7	28.7	28.7	27.7	27.7	27.7	2.1	68.5	68.5	21.3	87.7	87.7
Actuated g/C Ratio	0.22	0.22	0.22	0.21	0.21	0.21	0.02	0.53	0.53	0.16	0.67	0.67
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	305	379	322	290	366	303	28	1701	749	547	2178	984
v/s Ratio Prot		0.00			0.00		0.01	c0.45		0.13	c0.58	
v/s Ratio Perm	0.04		0.00	0.16		c0.19			0.09			0.03
v/c Ratio	0.17	0.02	0.02	0.73	0.02	0.89	0.57	0.85	0.17	0.77	0.85	0.04
Uniform Delay, d1	41.0	39.6	39.6	47.7	40.4	49.7	63.5	26.5	16.0	52.0	16.2	7.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.22	0.81	0.69	0.81	0.49	0.47
Incremental Delay, d2	0.3	0.0	0.0	9.7	0.0	26.8	20.3	4.6	0.4	2.8	2.0	0.0
Delay (s)	41.3	39.6	39.6	57.4	40.4	76.5	97.6	26.1	11.4	44.8	9.9	3.4
Level of Service	D	D	D	E	D	E	F	C	B	D	A	A
Approach Delay (s)		40.7			70.3			25.0			16.0	
Approach LOS		D			E			C			B	

Intersection Summary			
HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: South Beach State Park & US 101

2030 Scenario2-Off Season

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	60	5	30	30	5	65	25	1460	30	60	1840	65
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1607	1462		1630	1477		1614	3228	1458	1630	3228	1404
Flt Permitted	0.62	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1051	1462		1253	1477		1614	3228	1458	1630	3228	1404
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.85	0.85	0.95	0.95
Adj. Flow (vph)	71	6	35	35	6	76	26	1537	35	71	1937	68
RTOR Reduction (vph)	0	32	0	0	68	0	0	0	9	0	0	11
Lane Group Flow (vph)	71	10	0	35	14	0	26	1537	26	71	1937	57
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	13.0	13.0		13.0	13.0		4.4	96.0	96.0	9.0	100.6	100.6
Effective Green, g (s)	13.5	13.0		13.0	13.0		4.9	96.5	96.0	9.0	101.1	101.1
Actuated g/C Ratio	0.10	0.10		0.10	0.10		0.04	0.74	0.74	0.07	0.78	0.78
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	109	146		125	148		61	2396	1077	113	2510	1092
v/s Ratio Prot		0.01			0.01		0.02	c0.48		0.04	c0.60	
v/s Ratio Perm	c0.07			0.03					0.02			0.04
v/c Ratio	0.65	0.07		0.28	0.09		0.43	0.64	0.02	0.63	0.77	0.05
Uniform Delay, d1	56.0	53.0		54.2	53.1		61.2	8.2	4.5	58.9	8.0	3.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.17	0.43	0.05
Incremental Delay, d2	13.1	0.2		1.2	0.3		4.7	1.3	0.0	6.1	1.4	0.1
Delay (s)	69.1	53.2		55.4	53.4		65.9	9.6	4.6	75.0	4.8	0.2
Level of Service	E	D		E	D		E	A	A	E	A	A
Approach Delay (s)		63.3			54.0			10.4			7.0	
Approach LOS		E			D			B			A	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2425	100	0	2365
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	2553	105	0	2489
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5046	2557			2660	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5046	2557			2660	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1	33			156	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	2553	105	2489
Volume Left	0	0	0
Volume Right	0	105	0
cSH	1700	1700	1700
Volume to Capacity	1.50	0.06	1.46
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	149.2%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	150	0	2525	2175	190
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	176	0	2658	2289	200
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.53					
vC, conflicting volume	3622	2293	2491			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4178	2293	2491			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	1	31	178			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	176	1329	1329	2289	200
Volume Left	0	0	0	0	0
Volume Right	176	0	0	0	200
cSH	31	1700	1700	1700	1700
Volume to Capacity	5.73	0.78	0.78	1.35	0.12
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	331.4		
Intersection Capacity Utilization	141.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	40	0	0	645	0	1880	60	0	2290	35
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	47	0	0	759	0	1979	63	0	2411	37
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.53	0.53		0.53	0.53	0.53				0.53		
vC, conflicting volume	4181	4475	1228	3235	4430	993	2449			2044		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	5240	5797	1228	3446	5712	0	2449			1187		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	72	100	100	0	100			100		
cM capacity (veh/h)	0	0	171	1	0	570	185			304		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	47	759	989	989	63	1607	840
Volume Left	0	0	0	0	0	0	0
Volume Right	47	759	0	0	63	0	37
cSH	171	570	1700	1700	1700	1700	1700
Volume to Capacity	0.28	1.33	0.58	0.58	0.04	0.95	0.49
Queue Length 95th (ft)	27	810	0	0	0	0	0
Control Delay (s)	33.9	182.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	F					
Approach Delay (s)	33.9	182.6	0.0			0.0	
Approach LOS	D	F					

Intersection Summary			
Average Delay	26.5		
Intersection Capacity Utilization	106.7%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	65	0	20	5	0	5	35	1445	10	5	1835	60
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	76	0	24	6	0	6	37	1521	11	5	1932	63
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2786	3551	970	2604	3609	770	1997			1534		
vC1, stage 1 conf vol	1944	1944		1602	1602							
vC2, stage 2 conf vol	842	1607		1002	2007							
vCu, unblocked vol	2786	3551	970	2604	3609	770	1997			1534		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	91	93	100	98	87			99		
cM capacity (veh/h)	63	81	254	83	57	344	280			424		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	76	24	6	6	37	1014	518	5	966	966	63
Volume Left	76	0	6	0	37	0	0	5	0	0	0
Volume Right	0	24	0	6	0	0	11	0	0	0	63
cSH	63	254	83	344	280	1700	1700	424	1700	1700	1700
Volume to Capacity	1.22	0.09	0.07	0.02	0.13	0.60	0.30	0.01	0.57	0.57	0.04
Queue Length 95th (ft)	157	8	6	1	11	0	0	1	0	0	0
Control Delay (s)	294.4	20.6	51.4	15.6	19.8	0.0	0.0	13.6	0.0	0.0	0.0
Lane LOS	F	C	F	C	C			B			
Approach Delay (s)	230.0		33.5		0.5			0.0			
Approach LOS	F		D								

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		

2030 US 101 Segment V/C Analysis

Volumes

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3515	3225	2960	2700	2640	2400
35th to 50th	2245	3065	1870	2565	1665	2285
50th to 62nd	2145	2610	1790	2185	1590	1950

V/C

Scenario 1	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.70	2.48	2.28	2.08	2.03	1.85
35th to 50th	0.64	0.88	0.53	0.73	0.48	0.65
50th to 62nd	0.61	0.75	0.51	0.62	0.45	0.56

Volumes

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	SB
Pacific to 35th	3355	3125	2830	2615	2525	2330
35th to 50th	2125	2965	1770	2480	1585	2215
50th to 62nd	2035	2540	1700	2135	1515	1900

V/C

Scenario 2	30 HV		AA		Offseason	
	NB	SB	NB	SB	NB	
Pacific to 35th	2.58	2.40	2.18	2.01	1.94	1.79
35th to 50th	0.61	0.85	0.51	0.71	0.45	0.63
50th to 62nd	0.58	0.73	0.49	0.61	0.43	0.54

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	41	35	82	26	1537	35	71	1937	68
v/c Ratio	0.63	0.21	0.26	0.36	0.28	0.62	0.03	0.53	0.75	0.06
Control Delay	74.0	20.5	52.7	16.7	61.9	10.1	2.0	71.6	4.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.0	20.5	52.7	16.7	61.9	10.1	2.0	71.6	4.3	0.2
Queue Length 50th (ft)	53	4	25	4	20	305	0	58	194	1
Queue Length 95th (ft)	96	34	54	45	51	414	9	m70	85	m0
Internal Link Dist (ft)		573		801		2367			3870	
Turn Bay Length (ft)					150		320	215		150
Base Capacity (vph)	146	242	181	280	94	2475	1217	150	2611	1147
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.17	0.19	0.29	0.28	0.62	0.03	0.47	0.74	0.06

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	53	6	24	212	6	471	16	1453	200	421	1858	53
v/c Ratio	0.19	0.02	0.08	0.79	0.02	0.98	0.20	0.82	0.23	0.85	0.82	0.05
Control Delay	39.0	35.2	13.4	65.9	36.0	58.9	75.9	21.2	2.9	55.0	14.3	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	35.2	13.4	65.9	36.0	58.9	75.9	21.2	2.9	55.0	14.3	4.9
Queue Length 50th (ft)	33	4	0	154	4	188	11	506	15	159	264	4
Queue Length 95th (ft)	64	14	21	222	15	#335	m0	448	17	m#188	#550	m7
Internal Link Dist (ft)		558			505			3870			1419	
Turn Bay Length (ft)	120		155	120		155	215		215	130		175
Base Capacity (vph)	334	415	371	317	400	522	81	1777	854	495	2262	1032
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.01	0.06	0.67	0.02	0.90	0.20	0.82	0.23	0.85	0.82	0.05

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	88	18	35	118	24	159	53	1821	47	189	2195	68
v/c Ratio	0.51	0.08	0.16	0.69	0.11	0.50	0.73	0.89	0.05	0.83	0.91	0.06
Control Delay	58.4	45.1	15.9	70.0	45.8	12.6	75.3	9.9	0.7	53.1	14.5	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	45.1	15.9	70.0	45.8	12.6	75.3	9.9	0.7	53.1	14.5	3.5
Queue Length 50th (ft)	64	12	0	88	17	0	42	156	1	154	425	7
Queue Length 95th (ft)	109	33	27	141	40	51	m#50	210	m2	m114	m260	m5
Internal Link Dist (ft)		441			300			1419			620	
Turn Bay Length (ft)	120		155	120		155	130		175	130		175
Base Capacity (vph)	211	267	253	208	262	354	73	2057	907	227	2404	1065
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.07	0.14	0.57	0.09	0.45	0.73	0.89	0.05	0.83	0.91	0.06

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: NE US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	55	44.9	10.1	55.0	0.69	44.9	A
40th Street	II	45	59.8	21.2	81.0	0.75	33.2	B
35th St.	II	35	31.2	9.9	41.1	0.28	24.9	C
Hurbert St	II	31	200.2	427.9	628.1	1.73	9.9	F
Total	II		336.1	469.1	805.2	3.44	15.4	E

Arterial Level of Service: SB US 101

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hurbert St	III	30	21.9	412.9	434.8	0.16	1.4	F
35th St	III	31	200.2	14.5	214.7	1.73	28.9	B
40th Street	III	35	34.1	14.3	48.4	0.28	21.1	C
South Beach State Pa	III	55	49.0	4.3	53.3	0.75	50.5	A
Total	III		305.2	446.0	751.2	2.92	14.0	E

US 101

Direction	NB	SB	All
Average Speed (mph)	14	14	14
Total Travel Time (hr)	**513**	**516**	**1029**
Distance Traveled (mi)	6933	7477	14410
Unserved Vehicles (#)	**1191**	**1141**	**2332**
Performance Index	328.6	324.0	652.6

APPENDIX I

Duration of Congestion Analysis with Average Annual Volumes - Land Use Scenario #1

2009 Counts - Two-way Roadway Segment Volues

	N of Ferry Slip		S of Ferry Slip		S of Pacific Way				
	Mp 142.4	% of Peak	MP 142.51	% of Peak	MP142.16	NB	SB	Total	% of Peak
9/15/2009 5:00 AM	137	10%	139	11%	9/22/2009 5:00 AM	106	41	147	9%
9/15/2009 6:00 AM	369	27%	364	28%	9/22/2009 6:00 AM	256	149	405	25%
9/15/2009 7:00 AM	871	63%	829	63%	9/22/2009 7:00 AM	529	310	839	52%
9/15/2009 8:00 AM	962	70%	933	71%	9/22/2009 8:00 AM	667	465	1132	70%
9/15/2009 9:00 AM	1063	77%	1021	77%	9/22/2009 9:00 AM	611	485	1096	68%
9/15/2009 10:00 AM	1204	87%	1168	88%	9/22/2009 10:00 AM	675	619	1294	80%
9/15/2009 11:00 AM	1338	97%	1269	96%	9/22/2009 11:00 AM	732	698	1430	88%
9/15/2009 12:00 PM	1359	98%	1313	99%	9/22/2009 12:00 PM	728	747	1475	91%
9/15/2009 1:00 PM	1279	92%	1225	93%	9/22/2009 1:00 PM	762	821	1583	98%
9/15/2009 2:00 PM	1252	91%	1211	92%	9/22/2009 2:00 PM	745	799	1544	95%
9/15/2009 3:00 PM	1375	99%	1309	99%	9/22/2009 3:00 PM	752	865	**1617**	**100%**
9/15/2009 4:00 PM	**1383**	**100%**	**1323**	**100%**	9/22/2009 4:00 PM	690	862	1552	96%
9/15/2009 5:00 PM	1282	93%	1253	95%	9/22/2009 5:00 PM	610	844	1454	90%
9/15/2009 6:00 PM	839	61%	813	61%	9/22/2009 6:00 PM	393	536	929	57%
9/15/2009 7:00 PM	539	39%	513	39%	9/22/2009 7:00 PM	251	394	645	40%
9/15/2009 8:00 PM	397	29%	389	29%	9/22/2009 8:00 PM	168	219	387	24%
9/15/2009 9:00 PM	210	15%	208	16%	9/22/2009 9:00 PM	91	127	218	13%

2005 Counts - Total Intersection Approach Volumes

US 101 @ 32nd Street		
	TOTAL	% of Peak
4/5/2005 5:00 AM Tues		
4/5/2005 6:00 AM Tues	392	27%
4/5/2005 7:00 AM Tues	1,005	69%
4/5/2005 8:00 AM Tues	1,052	72%
4/5/2005 9:00 AM Tues	1,053	72%
4/5/2005 10:00 AM Tues	1,038	82%
4/5/2005 11:00 AM Tues	1,280	87%
4/5/2005 12:00 PM Tues	1,383	94%
4/5/2005 1:00 PM Tues	1,264	86%
4/5/2005 2:00 PM Tues	1,317	90%
4/5/2005 3:00 PM Tues	1,326	91%
4/5/2005 4:00 PM Tues	**1,464**	**100%**
4/5/2005 5:00 PM Tues	1,271	87%
4/5/2005 6:00 PM Tues	806	55%
4/5/20059 7:00 PM Tues	710	48%
4/5/2005 8:00 PM Tues	282	19%
4/5/20059 9:00 PM Tues		

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction to Meet OHP Standard
Land Use Scenario 1

	US 101 & 32nd Raw Count (April 2005)		US 101 & 35th Street		
				2030 AAV-Scen1	2030 AAV-Scen1
			V/C ~ 0.90	Full Development	21% Reduction
Hour	**Total Volume**	**% of Peak**	**Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**4,700**	1,414	1,117
7:00-8:00	1005	68.5%	**4,700**	3,624	2,863
8:00-9:00	1052	71.7%	**4,700**	3,794	2,997
9:00-10:00	1053	71.8%	**4,700**	3,797	3,000
10:00-11:00	1038	70.8%	**4,700**	3,743	2,957
11:00-12:00	1280	87.3%	**4,700**	4,616	3,646
12:00-1:00	1383	94.3%	**4,700**	**4,987**	3,940
1:00-2:00	1264	86.2%	**4,700**	4,558	3,601
2:00-3:00	1317	89.8%	**4,700**	**4,749**	3,752
3:00-4:00	1326	90.4%	**4,700**	**4,782**	3,777
4:00-5:00	1467	100.0%	**4,700**	**5,290**	4,179
5:00-6:00	1271	86.6%	**4,700**	4,583	3,621
6:00-7:00	806	54.9%	**4,700**	2,906	2,296
7:00-8:00	710	48.4%	**4,700**	2,560	2,023
8:00-9:00	282	19.2%	**4,700**	1,017	803
Hours of Congestion				**4**	**0**

	US 101 & 32nd Raw Count (April 2005)		US 101 & 40th Street		
				2030 AAV-Scen1	2030 AAV-Scen1
			V/C ~ 0.80	Full Development	21% Reduction
Hour	**Total Volume**	**% of Peak**	**Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**4,200**	1,411	1,115
7:00-8:00	1005	68.5%	**4,200**	3,617	2,858
8:00-9:00	1052	71.7%	**4,200**	3,786	2,991
9:00-10:00	1053	71.8%	**4,200**	3,790	2,994
10:00-11:00	1038	70.8%	**4,200**	3,736	2,951
11:00-12:00	1280	87.3%	**4,200**	**4,607**	3,639
12:00-1:00	1383	94.3%	**4,200**	**4,978**	3,932
1:00-2:00	1264	86.2%	**4,200**	**4,549**	3,594
2:00-3:00	1317	89.8%	**4,200**	**4,740**	3,745
3:00-4:00	1326	90.4%	**4,200**	**4,773**	3,770
4:00-5:00	1467	100.0%	**4,200**	**5,280**	4,171
5:00-6:00	1271	86.6%	**4,200**	**4,575**	3,614
6:00-7:00	806	54.9%	**4,200**	2,901	2,292
7:00-8:00	710	48.4%	**4,200**	2,555	2,019
8:00-9:00	282	19.2%	**4,200**	1,015	802
Hours of Congestion				**7**	**0**

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction to Meet OHP Standard
Land Use Scenario 1

	US 101 & 32nd Raw Count (April 2005)		US 101 & 50th Street/South Beach State Park Entrance		
Hour	**Total Volume**	**% of Peak**	**V/C ~ 0.80 Capacity**	**2030 AAV-Scen1 Full Development Total Volume**	**2030 AAV-Scen1 21% Reduction Total Volume**
6:00-7:00	392	26.7%	**3,800**	1,148	907
7:00-8:00	1005	68.5%	**3,800**	2,942	2,324
8:00-9:00	1052	71.7%	**3,800**	3,080	2,433
9:00-10:00	1053	71.8%	**3,800**	3,083	2,436
10:00-11:00	1038	70.8%	**3,800**	3,039	2,401
11:00-12:00	1280	87.3%	**3,800**	3,748	2,961
12:00-1:00	1383	94.3%	**3,800**	**4,049**	3,199
1:00-2:00	1264	86.2%	**3,800**	3,701	2,924
2:00-3:00	1317	89.8%	**3,800**	**3,856**	3,046
3:00-4:00	1326	90.4%	**3,800**	**3,882**	3,067
4:00-5:00	1467	100.0%	**3,800**	**4,295**	3,393
5:00-6:00	1271	86.6%	**3,800**	3,721	2,940
6:00-7:00	806	54.9%	**3,800**	2,360	1,864
7:00-8:00	710	48.4%	**3,800**	2,079	1,642
8:00-9:00	282	19.2%	**3,800**	826	652
Hours of Congestion				**4**	**0**

	US 101 & 32nd Raw Count (April 2005)		US 101 & Pacific Way		
Hour	**Total Volume**	**% of Peak**	**V/C ~ 0.90 Capacity**	**2030 AAV-Scen1 Full Development Total Volume**	**2030 AAV-Scen1 21% Reduction Total Volume**
6:00-7:00	392	26.7%	**2,900**	1,526	1,205
7:00-8:00	1005	68.5%	**2,900**	**3,912**	**3,090**
8:00-9:00	1052	71.7%	**2,900**	**4,095**	**3,235**
9:00-10:00	1053	71.8%	**2,900**	**4,099**	**3,238**
10:00-11:00	1038	70.8%	**2,900**	**4,040**	**3,192**
11:00-12:00	1280	87.3%	**2,900**	**4,982**	**3,936**
12:00-1:00	1383	94.3%	**2,900**	**5,383**	**4,253**
1:00-2:00	1264	86.2%	**2,900**	**4,920**	**3,887**
2:00-3:00	1317	89.8%	**2,900**	**5,126**	**4,050**
3:00-4:00	1326	90.4%	**2,900**	**5,161**	**4,077**
4:00-5:00	1467	100.0%	**2,900**	**5,710**	**4,511**
5:00-6:00	1271	86.6%	**2,900**	**4,947**	**3,908**
6:00-7:00	806	54.9%	**2,900**	**3,137**	2,478
7:00-8:00	710	48.4%	**2,900**	2,764	2,183
8:00-9:00	282	19.2%	**2,900**	1,098	867
Hours of Congestion				12	11

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction to Meet OHP Standard
Land Use Scenario 1

	US 101 & 32nd Raw Count (April 2005)		US 101 & Abalone Street		
Hour	Total Volume	% of Peak	V/C ~ 0.90 Capacity	2030 AAV-Scen1 Full Development Total Volume	2030 AAV-Scen1 21% Reduction Total Volume
6:00-7:00	392	26.7%	2,640	1,569	1,239
7:00-8:00	1005	68.5%	2,640	4,021	3,177
8:00-9:00	1052	71.7%	2,640	4,209	3,325
9:00-10:00	1053	71.8%	2,640	4,213	3,329
10:00-11:00	1038	70.8%	2,640	4,153	3,281
11:00-12:00	1280	87.3%	2,640	5,122	4,046
12:00-1:00	1383	94.3%	2,640	5,534	4,372
1:00-2:00	1264	86.2%	2,640	5,058	3,996
2:00-3:00	1317	89.8%	2,640	5,270	4,163
3:00-4:00	1326	90.4%	2,640	5,306	4,192
4:00-5:00	1467	100.0%	2,640	5,870	4,637
5:00-6:00	1271	86.6%	2,640	5,086	4,018
6:00-7:00	806	54.9%	2,640	3,225	2,548
7:00-8:00	710	48.4%	2,640	2,841	2,244
8:00-9:00	282	19.2%	2,640	1,128	891
Hours of Congestion				13	11

	US 101 & 32nd Raw Count (April 2005)		US 101 & 32nd Street		
Hour	Total Volume	% of Peak	V/C ~ 0.90 Capacity	2030 AAV-Scen1 Full Development Total Volume	2030 AAV-Scen1 21% Reduction Total Volume
6:00-7:00	392	26.7%	3,650	1,539	1,216
7:00-8:00	1005	68.5%	3,650	3,946	3,117
8:00-9:00	1052	71.7%	3,650	4,131	3,263
9:00-10:00	1053	71.8%	3,650	4,134	3,266
10:00-11:00	1038	70.8%	3,650	4,076	3,220
11:00-12:00	1280	87.3%	3,650	5,026	3,970
12:00-1:00	1383	94.3%	3,650	5,430	4,290
1:00-2:00	1264	86.2%	3,650	4,963	3,921
2:00-3:00	1317	89.8%	3,650	5,171	4,085
3:00-4:00	1326	90.4%	3,650	5,206	4,113
4:00-5:00	1467	100.0%	3,650	5,760	4,550
5:00-6:00	1271	86.6%	3,650	4,990	3,942
6:00-7:00	806	54.9%	3,650	3,165	2,500
7:00-8:00	710	48.4%	3,650	2,788	2,202
8:00-9:00	282	19.2%	3,650	1,107	875
Hours of Congestion				11	7

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction to Meet OHP Standard
Land Use Scenario 1

	US 101 & 32nd		US 101 & 62nd Street		
	Raw Count (April 2005)			2030 AAV-Scen1	2030 AAV-Scen1
			V/C ~ 0.80	Full Development	21% Reduction
Hour	**Total Volume**	**% of Peak**	**Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**3,200**	1,085	857
7:00-8:00	1005	68.5%	**3,200**	2,781	2,197
8:00-9:00	1052	71.7%	**3,200**	2,911	2,300
9:00-10:00	1053	71.8%	**3,200**	2,914	2,302
10:00-11:00	1038	70.8%	**3,200**	2,873	2,269
11:00-12:00	1280	87.3%	**3,200**	**3,542**	2,799
12:00-1:00	1383	94.3%	**3,200**	**3,828**	3,024
1:00-2:00	1264	86.2%	**3,200**	**3,498**	2,764
2:00-3:00	1317	89.8%	**3,200**	**3,645**	2,879
3:00-4:00	1326	90.4%	**3,200**	**3,670**	2,899
4:00-5:00	1467	100.0%	**3,200**	**4,060**	**3,207**
5:00-6:00	1271	86.6%	**3,200**	**3,518**	2,779
6:00-7:00	806	54.9%	**3,200**	2,231	1,762
7:00-8:00	710	48.4%	**3,200**	1,965	1,552
8:00-9:00	282	19.2%	**3,200**	780	617
Hours of Congestion				**7**	**1**

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	**85**	**15**	**35**	**110**	**20**	**140**	**60**	**2075**	**50**	**205**	**2420**	**75**
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (prot)	1749	1733	1450	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	**0.74**	**1.00**	**1.00**	**0.75**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (perm)	1366	1733	1450	1346	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**
Adj. Flow (vph)	100	18	41	129	24	165	63	2184	53	216	2547	79
RTOR Reduction (vph)	**0**	**0**	**36**	**0**	**0**	**143**	**0**	**0**	**11**	**0**	**0**	**13**
Lane Group Flow (vph)	100	18	5	129	24	22	63	2184	42	216	2547	66
Confl. Peds. (#/hr)	**2**		**2**	**2**		**2**	**2**		**2**	**2**		**2**
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	**Perm**		**Perm**	**Perm**		**Perm**	**Prot**		**Perm**	**Prot**		**Perm**
Protected Phases		4			8		5	2		1	6	
Permitted Phases	**4**		**4**	**8**		**8**			**2**			**6**
Actuated Green, G (s)	16.2	16.2	16.2	16.2	16.2	16.2	4.0	75.0	75.0	15.8	86.8	86.8
Effective Green, g (s)	**15.7**	**15.7**	**15.7**	**15.7**	**15.7**	**15.7**	**4.5**	**75.5**	**75.5**	**16.3**	**87.3**	**87.8**
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.04	0.63	0.63	0.14	0.73	0.73
Clearance Time (s)	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	**179**	**227**	**190**	**176**	**222**	**186**	**65**	**2031**	**885**	**234**	**2348**	**1029**
v/s Ratio Prot		0.01			0.01		0.04	c0.68		0.13	c0.79	
v/s Ratio Perm	**0.07**		**0.00**	**c0.10**		**0.02**			**0.03**			**0.05**
v/c Ratio	0.56	0.08	0.03	0.73	0.11	0.12	0.97	1.08	0.05	0.92	1.08	0.06
Uniform Delay, d1	**48.9**	**45.8**	**45.5**	**50.1**	**46.0**	**46.0**	**57.7**	**22.2**	**8.5**	**51.2**	**16.4**	**4.5**
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.70	0.23	0.15	0.96	0.89	1.57
Incremental Delay, d2	**4.6**	**0.2**	**0.1**	**15.5**	**0.3**	**0.4**	**25.7**	**35.0**	**0.0**	**6.2**	**39.0**	**0.0**
Delay (s)	53.5	46.0	45.6	65.6	46.3	46.4	66.2	40.1	1.3	55.3	53.6	7.1
Level of Service	**D**	**D**	**D**	**E**	**D**	**D**	**E**	**D**	**A**	**E**	**D**	**A**
Approach Delay (s)		50.6			54.2			40.0			52.4	
Approach LOS		**D**			**D**			**D**			**D**	

Intersection Summary			
HCM Average Control Delay	**47.4**	**HCM Level of Service**	**D**
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	**120.0**	**Sum of lost time (s)**	**9.0**
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	**15**		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	60	15	25	230	15	500	30	1625	215	500	2005	60
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1714	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1365	1716	1458	1345	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	18	29	271	18	588	32	1711	226	526	2111	63
RTOR Reduction (vph)	0	0	22	0	0	193	0	0	74	0	0	13
Lane Group Flow (vph)	71	18	7	271	18	395	32	1711	152	526	2111	50
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	30.0	30.0	30.0	29.5	29.5	29.5	2.4	58.9	58.9	18.6	75.1	75.1
Effective Green, g (s)	30.0	30.0	30.0	29.0	29.0	29.0	2.9	59.4	59.4	19.1	75.6	75.6
Actuated g/C Ratio	0.25	0.25	0.25	0.24	0.24	0.24	0.02	0.49	0.49	0.16	0.63	0.63
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	341	429	365	325	415	343	42	1598	703	532	2034	919
v/s Ratio Prot		0.01			0.01		0.02	c0.53		0.16	c0.65	
v/s Ratio Perm	0.05		0.00	0.20		c0.28			0.11			0.03
v/c Ratio	0.21	0.04	0.02	0.83	0.04	1.15	0.76	1.07	0.22	0.99	1.04	0.05
Uniform Delay, d1	35.6	34.1	33.9	43.2	34.9	45.5	58.2	30.3	17.1	50.3	22.2	8.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.79	1.25
Incremental Delay, d2	0.3	0.0	0.0	17.2	0.1	96.0	56.2	44.1	0.7	9.2	19.0	0.0
Delay (s)	35.9	34.1	33.9	60.4	34.9	141.5	114.4	74.4	17.8	54.9	36.5	10.6
Level of Service	D	C	C	E	C	F	F	E	B	D	D	B
Approach Delay (s)		35.2			114.3			68.6			39.5	
Approach LOS		D			F			E			D	

Intersection Summary			
HCM Average Control Delay	61.1	**HCM Level of Service**	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	**Sum of lost time (s)**	9.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	65	5	35	50	5	85	30	1720	40	85	2100	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	1459		1630	1473		1614	3228	1458	1630	3228	1408
Flt Permitted	0.64	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1081	1459		1246	1473		1614	3228	1458	1630	3228	1408
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	76	6	41	59	6	100	32	1811	42	89	2211	79
RTOR Reduction (vph)	0	36	0	0	89	0	0	0	13	0	0	15
Lane Group Flow (vph)	76	11	0	59	17	0	32	1811	29	89	2211	64
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	9.6	9.6		9.6	9.6		2.3	58.3	58.3	5.5	61.5	61.5
Effective Green, g (s)	10.1	9.6		9.6	9.6		2.8	58.8	58.3	5.5	62.0	62.0
Actuated g/C Ratio	0.12	0.11		0.11	0.11		0.03	0.69	0.68	0.06	0.73	0.73
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	128	164		140	166		53	2223	995	105	2344	1022
v/s Ratio Prot		0.01			0.01		0.02	c0.56		0.05	c0.68	
v/s Ratio Perm	c0.07			0.05					0.02			0.05
v/c Ratio	0.59	0.06		0.42	0.10		0.60	0.81	0.03	0.85	0.94	0.06
Uniform Delay, d1	35.7	33.9		35.3	34.0		40.8	9.4	4.4	39.5	10.2	3.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.2	0.2		2.0	0.3		17.9	2.4	0.0	43.4	8.6	0.0
Delay (s)	42.9	34.1		37.4	34.3		58.6	11.8	4.4	83.0	18.8	3.4
Level of Service	D	C		D	C		E	B	A	F	B	A
Approach Delay (s)		39.5			35.4			12.5			20.7	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	85.4	Sum of lost time (s)	7.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2855	105	0	2750
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	3005	111	0	2895
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5904	3009			3118	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5904	3009			3118	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	17			102	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	3005	111	2895
Volume Left	0	0	0
Volume Right	0	111	0
cSH	1700	1700	1700
Volume to Capacity	1.77	0.07	1.70
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	173.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	160	0	2960	2535	215
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	188	0	3116	2668	226
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.41					
vC, conflicting volume	4230	2672	2897			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	6033	2672	2897			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	17	122			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	188	1558	1558	2668	226
Volume Left	0	0	0	0	0
Volume Right	188	0	0	0	226
cSH	17	1700	1700	1700	1700
Volume to Capacity	11.34	0.92	0.92	1.57	0.13
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	303.6		
Intersection Capacity Utilization	162.7%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	45	0	0	720	0	2240	60	0	2655	40
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	53	0	0	847	0	2358	63	0	2795	42
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.39	0.39		0.39	0.39	0.39				0.39		
vC, conflicting volume	4846	5241	1422	3812	5199	1183	2839			2423		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	7718	8728	1422	5076	8620	0	2839			1525		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	58	100	100	0	100			100		
cM capacity (veh/h)	0	0	126	0	0	423	129			167		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	53	847	1179	1179	63	1863	974
Volume Left	0	0	0	0	0	0	0
Volume Right	53	847	0	0	63	0	42
cSH	126	423	1700	1700	1700	1700	1700
Volume to Capacity	0.42	2.00	0.69	0.69	0.04	1.10	0.57
Queue Length 95th (ft)	45	1462	0	0	0	0	0
Control Delay (s)	52.7	481.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F					
Approach Delay (s)	52.7	481.5	0.0			0.0	
Approach LOS	F	F					

Intersection Summary			
Average Delay	66.7		
Intersection Capacity Utilization	122.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑↱		↰	↑↑	↱
Volume (veh/h)	70	0	25	15	0	10	35	1710	10	10	2110	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	82	0	29	18	0	12	37	1800	11	11	2221	68
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3232	4130	1115	3044	4193	909	2291			1813		
vC1, stage 1 conf vol	2244	2244		1881	1881							
vC2, stage 2 conf vol	987	1886		1163	2313							
vCu, unblocked vol	3232	4130	1115	3044	4193	909	2291			1813		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	86	67	100	96	83			97		
cM capacity (veh/h)	40	53	203	53	30	279	214			330		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	82	29	18	12	37	1200	611	11	1111	1111	68
Volume Left	82	0	18	0	37	0	0	11	0	0	0
Volume Right	0	29	0	12	0	0	11	0	0	0	68
cSH	40	203	53	279	214	1700	1700	330	1700	1700	1700
Volume to Capacity	2.07	0.14	0.33	0.04	0.17	0.71	0.36	0.03	0.65	0.65	0.04
Queue Length 95th (ft)	221	12	29	3	15	0	0	2	0	0	0
Control Delay (s)	713.5	25.7	102.8	18.5	25.3	0.0	0.0	16.3	0.0	0.0	0.0
Lane LOS	F	D	F	C	D			C			
Approach Delay (s)	532.5		69.1		0.5			0.1			
Approach LOS	F		F								

Intersection Summary			
Average Delay	14.6		
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	**67**	**12**	**28**	**87**	**16**	**111**	**47**	**1639**	**40**	**162**	**1912**	**59**
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**	**14**	**12**	**12**
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (prot)	1749	1733	1450	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	**0.75**	**1.00**	**1.00**	**0.75**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**	**0.95**	**1.00**	**1.00**
Satd. Flow (perm)	1372	1733	1450	1351	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**
Adj. Flow (vph)	79	14	33	102	19	131	49	1725	42	171	2013	62
RTOR Reduction (vph)	**0**	**0**	**29**	**0**	**0**	**115**	**0**	**0**	**10**	**0**	**0**	**13**
Lane Group Flow (vph)	79	14	4	102	19	16	49	1725	32	171	2013	49
Confl. Peds. (#/hr)	**2**		**2**	**2**		**2**	**2**		**2**	**2**		**2**
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	**Perm**		**Perm**	**Perm**		**Perm**	**Prot**		**Perm**	**Prot**		**Perm**
Protected Phases		4			8		5	2		1	6	
Permitted Phases	**4**		**4**	**8**		**8**			**2**			**6**
Actuated Green, G (s)	14.7	14.7	14.7	14.7	14.7	14.7	5.4	77.1	77.1	15.2	86.9	86.9
Effective Green, g (s)	**14.2**	**14.2**	**14.2**	**14.2**	**14.2**	**14.2**	**5.9**	**77.6**	**77.6**	**15.7**	**87.4**	**87.9**
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.05	0.65	0.65	0.13	0.73	0.73
Clearance Time (s)	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**	**4.0**	**4.5**	**4.5**
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	**162**	**205**	**172**	**160**	**201**	**168**	**85**	**2087**	**909**	**225**	**2351**	**1030**
v/s Ratio Prot		0.01			0.01		0.03	c0.53		0.10	c0.62	
v/s Ratio Perm	**0.06**		**0.00**	**c0.08**		**0.01**			**0.02**			**0.04**
v/c Ratio	0.49	0.07	0.02	0.64	0.09	0.09	0.58	0.83	0.03	0.76	0.86	0.05
Uniform Delay, d1	**49.5**	**47.0**	**46.8**	**50.4**	**47.2**	**47.2**	**55.8**	**16.1**	**7.7**	**50.3**	**11.8**	**4.4**
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.70	0.22	0.16	0.97	1.00	1.60
Incremental Delay, d2	**3.1**	**0.2**	**0.1**	**9.0**	**0.3**	**0.3**	**5.6**	**2.4**	**0.0**	**1.4**	**0.4**	**0.0**
Delay (s)	52.6	47.2	46.8	59.5	47.4	47.5	44.6	6.0	1.3	50.2	12.1	7.1
Level of Service	**D**	**D**	**D**	**E**	**D**	**D**	**D**	**A**	**A**	**D**	**B**	**A**
Approach Delay (s)		50.5			52.3			7.0			14.9	
Approach LOS		**D**			**D**			**A**			**B**	

Intersection Summary			
HCM Average Control Delay	**14.8**	**HCM Level of Service**	**B**
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	**120.0**	**Sum of lost time (s)**	**9.0**
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	**15**		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	47	12	20	182	12	395	24	1284	170	395	1584	47
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1714	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1370	1716	1458	1350	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	55	14	24	214	14	465	25	1352	179	416	1667	49
RTOR Reduction (vph)	0	0	19	0	0	226	0	0	68	0	0	12
Lane Group Flow (vph)	55	14	5	214	14	239	25	1352	111	416	1667	37
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	26.1	26.1	26.1	25.6	25.6	25.6	3.0	61.7	61.7	19.7	78.4	78.4
Effective Green, g (s)	26.1	26.1	26.1	25.1	25.1	25.1	3.5	62.2	62.2	20.2	78.9	78.9
Actuated g/C Ratio	0.22	0.22	0.22	0.21	0.21	0.21	0.03	0.52	0.52	0.17	0.66	0.66
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	298	373	317	282	359	297	51	1673	737	562	2122	959
v/s Ratio Prot		0.01			0.01		0.01	c0.42		0.12	c0.52	
v/s Ratio Perm	0.04		0.00	0.16		c0.17			0.08			0.03
v/c Ratio	0.18	0.04	0.02	0.76	0.04	0.80	0.49	0.81	0.15	0.74	0.79	0.04
Uniform Delay, d1	38.3	37.0	36.9	44.6	37.8	45.1	57.4	24.0	15.1	47.4	14.6	7.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.12	0.73	0.64	0.90	0.73	1.04
Incremental Delay, d2	0.3	0.0	0.0	11.8	0.1	15.3	6.1	3.6	0.4	2.9	1.7	0.0
Delay (s)	38.6	37.1	36.9	56.4	37.9	60.4	70.3	21.2	10.0	45.6	12.2	7.6
Level of Service	D	D	D	E	D	E	E	C	B	D	B	A
Approach Delay (s)		37.9			58.7			20.7			18.6	
Approach LOS		D			E			C			B	

Intersection Summary			
HCM Average Control Delay	26.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	51	4	28	40	4	67	24	1360	32	67	1659	59
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1608	1459		1630	1474		1614	3228	1458	1630	3228	1405
Flt Permitted	0.61	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1038	1459		1256	1474		1614	3228	1458	1630	3228	1405
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	60	5	33	47	5	79	25	1432	34	71	1746	62
RTOR Reduction (vph)	0	30	0	0	72	0	0	0	9	0	0	11
Lane Group Flow (vph)	60	8	0	47	12	0	25	1432	25	71	1746	51
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	10.3	10.3		10.3	10.3		4.1	89.2	89.2	8.5	93.6	93.6
Effective Green, g (s)	10.8	10.3		10.3	10.3		4.6	89.7	89.2	8.5	94.1	94.1
Actuated g/C Ratio	0.09	0.09		0.09	0.09		0.04	0.75	0.74	0.07	0.78	0.78
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	93	125		108	127		62	2413	1084	115	2531	1102
v/s Ratio Prot		0.01			0.01		0.02	c0.44		0.04	c0.54	
v/s Ratio Perm	c0.06			0.04					0.02			0.04
v/c Ratio	0.65	0.06		0.44	0.09		0.40	0.59	0.02	0.62	0.69	0.05
Uniform Delay, d1	52.7	50.4		52.1	50.5		56.4	6.9	4.0	54.2	6.1	2.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.14	0.49	0.12
Incremental Delay, d2	14.3	0.2		2.8	0.3		4.2	1.1	0.0	6.2	1.0	0.1
Delay (s)	67.1	50.6		54.9	50.9		60.6	8.0	4.1	67.7	4.0	0.4
Level of Service	E	D		D	D		E	A	A	E	A	A
Approach Delay (s)		60.7			52.3			8.8			6.3	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2255	83	0	2173
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	2374	87	0	2287
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	4665	2378			2463	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4665	2378			2463	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1	42			187	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	2374	87	2287
Volume Left	0	0	0
Volume Right	0	87	0
cSH	1700	1700	1700
Volume to Capacity	1.40	0.05	1.35
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	139.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	126	0	2338	2003	170
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	148	0	2461	2108	179
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.58					
vC, conflicting volume	3343	2112	2289			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3591	2112	2289			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	2	41	214			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	148	1231	1231	2108	179
Volume Left	0	0	0	0	0
Volume Right	148	0	0	0	179
cSH	41	1700	1700	1700	1700
Volume to Capacity	3.59	0.72	0.72	1.24	0.11
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	302.7		
Intersection Capacity Utilization	130.1%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑↱		↰	↑↑	↱
Volume (veh/h)	55	0	20	12	0	8	28	1351	8	8	1667	51
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	65	0	24	14	0	9	29	1422	8	8	1755	54
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2555	3265	881	2407	3315	719	1810			1433		
vC1, stage 1 conf vol	1774	1774		1487	1487							
vC2, stage 2 conf vol	781	1491		920	1827							
vCu, unblocked vol	2555	3265	881	2407	3315	719	1810			1433		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	19	100	92	86	100	97	91			98		
cM capacity (veh/h)	80	97	291	103	80	372	331			464		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	65	24	14	9	29	948	482	8	877	877	54
Volume Left	65	0	14	0	29	0	0	8	0	0	0
Volume Right	0	24	0	9	0	0	8	0	0	0	54
cSH	80	291	103	372	331	1700	1700	464	1700	1700	1700
Volume to Capacity	0.81	0.08	0.14	0.03	0.09	0.56	0.28	0.02	0.52	0.52	0.03
Queue Length 95th (ft)	102	7	11	2	7	0	0	1	0	0	0
Control Delay (s)	143.0	18.5	45.4	14.9	16.9	0.0	0.0	12.9	0.0	0.0	0.0
Lane LOS	F	C	E	B	C			B			
Approach Delay (s)	109.8		33.2		0.3			0.1			
Approach LOS	F		D								

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	36	0	0	569	0	1770	47	0	2097	32
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	42	0	0	669	0	1863	49	0	2207	34
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.58	0.58		0.58	0.58	0.58				0.58		
vC, conflicting volume	3829	4141	1125	3013	4108	936	2243			1915		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4437	4977	1125	3023	4921	0	2243			1119		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	79	100	100	0	100			100		
cM capacity (veh/h)	0	0	200	3	0	624	223			354		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	42	669	932	932	49	1472	769
Volume Left	0	0	0	0	0	0	0
Volume Right	42	669	0	0	49	0	34
cSH	200	624	1700	1700	1700	1700	1700
Volume to Capacity	0.21	1.07	0.55	0.55	0.03	0.87	0.45
Queue Length 95th (ft)	19	474	0	0	0	0	0
Control Delay (s)	27.7	82.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	F					
Approach Delay (s)	27.7	82.7	0.0			0.0	
Approach LOS	D	F					

Intersection Summary			
Average Delay	11.6		
Intersection Capacity Utilization	98.3%	ICU Level of Service	F
Analysis Period (min)	15		

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction to Meet V/C < 1.00
Land Use Scenario 1

	US 101 & 32nd Raw Count (April 2005)		US 101 & 35th Street		
			V/C ~ 1.00	2030 AAV-Scen1 Full Development	2030 AAV-Scen1 8% Reduction
Hour	**Total Volume**	**% of Peak**	**Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**5,200**	1,414	1,300
7:00-8:00	1005	68.5%	**5,200**	3,624	3,334
8:00-9:00	1052	71.7%	**5,200**	3,794	3,490
9:00-10:00	1053	71.8%	**5,200**	3,797	3,493
10:00-11:00	1038	70.8%	**5,200**	3,743	3,444
11:00-12:00	1280	87.3%	**5,200**	4,616	4,246
12:00-1:00	1383	94.3%	**5,200**	4,987	4,588
1:00-2:00	1264	86.2%	**5,200**	4,558	4,193
2:00-3:00	1317	89.8%	**5,200**	4,749	4,369
3:00-4:00	1326	90.4%	**5,200**	4,782	4,399
4:00-5:00	1467	100.0%	**5,200**	**5,290**	4,867
5:00-6:00	1271	86.6%	**5,200**	4,583	4,217
6:00-7:00	806	54.9%	**5,200**	2,906	2,674
7:00-8:00	710	48.4%	**5,200**	2,560	2,355
8:00-9:00	282	19.2%	**5,200**	1,017	936
Hours of Congestion				**1**	**0**

	US 101 & 32nd Raw Count (April 2005)		US 101 & 40th Street		
			V/C ~ 1.00	2030 AAV-Scen1 Full Development	2030 AAV-Scen1 8% Reduction
Hour	**Total Volume**	**% of Peak**	**Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**5,000**	1,411	1,298
7:00-8:00	1005	68.5%	**5,000**	3,617	3,328
8:00-9:00	1052	71.7%	**5,000**	3,786	3,483
9:00-10:00	1053	71.8%	**5,000**	3,790	3,487
10:00-11:00	1038	70.8%	**5,000**	3,736	3,437
11:00-12:00	1280	87.3%	**5,000**	4,607	4,238
12:00-1:00	1383	94.3%	**5,000**	4,978	4,579
1:00-2:00	1264	86.2%	**5,000**	4,549	4,185
2:00-3:00	1317	89.8%	**5,000**	4,740	4,361
3:00-4:00	1326	90.4%	**5,000**	4,773	4,391
4:00-5:00	1467	100.0%	**5,000**	**5,280**	4,858
5:00-6:00	1271	86.6%	**5,000**	4,575	4,209
6:00-7:00	806	54.9%	**5,000**	2,901	2,669
7:00-8:00	710	48.4%	**5,000**	2,555	2,351
8:00-9:00	282	19.2%	**5,000**	1,015	934
Hours of Congestion				**1**	**0**

	US 101 & 32nd Raw Count (April 2005)		JS 101 & 50th Street/South Beach State Park Entranc		
Hour	Total Volume	% of Peak	V/C ~ 1.00 Capacity	2030 AAV-Scen1 Full Development Total Volume	2030 AAV-Scen1 8% Reduction Total Volume
6:00-7:00	392	26.7%	**4,850**	1,148	1,056
7:00-8:00	1005	68.5%	**4,850**	2,942	2,707
8:00-9:00	1052	71.7%	**4,850**	3,080	2,834
9:00-10:00	1053	71.8%	**4,850**	3,083	2,836
10:00-11:00	1038	70.8%	**4,850**	3,039	2,796
11:00-12:00	1280	87.3%	**4,850**	3,748	3,448
12:00-1:00	1383	94.3%	**4,850**	4,049	3,725
1:00-2:00	1264	86.2%	**4,850**	3,701	3,405
2:00-3:00	1317	89.8%	**4,850**	3,856	3,547
3:00-4:00	1326	90.4%	**4,850**	3,882	3,572
4:00-5:00	1467	100.0%	**4,850**	4,295	3,951
5:00-6:00	1271	86.6%	**4,850**	3,721	3,423
6:00-7:00	806	54.9%	**4,850**	2,360	2,171
7:00-8:00	710	48.4%	**4,850**	2,079	1,912
8:00-9:00	282	19.2%	**4,850**	826	760
Hours of Congestion				**0**	**0**

	US 101 & 32nd Raw Count (April 2005)		US 101 & Pacific Way		
Hour	Total Volume	% of Peak	V/C ~ 1.00 Capacity	2030 AAV-Scen1 Full Development Total Volume	2030 AAV-Scen1 8% Reduction Total Volume
6:00-7:00	392	26.7%	**3,200**	1,526	1,404
7:00-8:00	1005	68.5%	**3,200**	**3,912**	**3,599**
8:00-9:00	1052	71.7%	**3,200**	**4,095**	**3,767**
9:00-10:00	1053	71.8%	**3,200**	**4,099**	**3,771**
10:00-11:00	1038	70.8%	**3,200**	**4,040**	**3,717**
11:00-12:00	1280	87.3%	**3,200**	**4,982**	**4,584**
12:00-1:00	1383	94.3%	**3,200**	**5,383**	**4,952**
1:00-2:00	1264	86.2%	**3,200**	**4,920**	**4,526**
2:00-3:00	1317	89.8%	**3,200**	**5,126**	**4,716**
3:00-4:00	1326	90.4%	**3,200**	**5,161**	**4,748**
4:00-5:00	1467	100.0%	**3,200**	**5,710**	**5,253**
5:00-6:00	1271	86.6%	**3,200**	**4,947**	**4,551**
6:00-7:00	806	54.9%	**3,200**	**3,137**	2,886
7:00-8:00	710	48.4%	**3,200**	2,764	2,542
8:00-9:00	282	19.2%	**3,200**	1,098	1,010
Hours of Congestion				**12**	**11**

	US 101 & 32nd Raw Count (April 2005)		US 101 & Abalone Street		
Hour	Total Volume	% of Peak	V/C ~ 1.00 Capacity	2030 AAV-Scen1 Full Development Total Volume	2030 AAV-Scen1 8% Reduction Total Volume
6:00-7:00	392	26.7%	**3,300**	1,569	1,443
7:00-8:00	1005	68.5%	**3,300**	**4,021**	**3,700**
8:00-9:00	1052	71.7%	**3,300**	**4,209**	**3,873**
9:00-10:00	1053	71.8%	**3,300**	**4,213**	**3,876**
10:00-11:00	1038	70.8%	**3,300**	**4,153**	**3,821**
11:00-12:00	1280	87.3%	**3,300**	**5,122**	**4,712**
12:00-1:00	1383	94.3%	**3,300**	**5,534**	**5,091**
1:00-2:00	1264	86.2%	**3,300**	**5,058**	**4,653**
2:00-3:00	1317	89.8%	**3,300**	**5,270**	**4,848**
3:00-4:00	1326	90.4%	**3,300**	**5,306**	**4,881**
4:00-5:00	1467	100.0%	**3,300**	**5,870**	**5,400**
5:00-6:00	1271	86.6%	**3,300**	**5,086**	**4,679**
6:00-7:00	806	54.9%	**3,300**	3,225	2,967
7:00-8:00	710	48.4%	**3,300**	2,841	2,614
8:00-9:00	282	19.2%	**3,300**	1,128	1,038
Hours of Congestion				**11**	**11**

	US 101 & 32nd Raw Count (April 2005)		US 101 & 32nd Street		
Hour	Total Volume	% of Peak	V/C ~ 1.00 Capacity	2030 AAV-Scen1 Full Development Total Volume	2030 AAV-Scen1 8% Reduction Total Volume
6:00-7:00	392	26.7%	**3,860**	1,539	1,416
7:00-8:00	1005	68.5%	**3,860**	**3,946**	3,630
8:00-9:00	1052	71.7%	**3,860**	**4,131**	3,800
9:00-10:00	1053	71.8%	**3,860**	**4,134**	3,804
10:00-11:00	1038	70.8%	**3,860**	**4,076**	3,750
11:00-12:00	1280	87.3%	**3,860**	**5,026**	**4,624**
12:00-1:00	1383	94.3%	**3,860**	**5,430**	**4,996**
1:00-2:00	1264	86.2%	**3,860**	**4,963**	**4,566**
2:00-3:00	1317	89.8%	**3,860**	**5,171**	**4,757**
3:00-4:00	1326	90.4%	**3,860**	**5,206**	**4,790**
4:00-5:00	1467	100.0%	**3,860**	**5,760**	**5,299**
5:00-6:00	1271	86.6%	**3,860**	**4,990**	**4,591**
6:00-7:00	806	54.9%	**3,860**	3,165	2,911
7:00-8:00	710	48.4%	**3,860**	2,788	2,565
8:00-9:00	282	19.2%	**3,860**	1,107	1,019
Hours of Congestion				**11**	**7**

Hour	US 101 & 32nd Raw Count (April 2005) Total Volume	% of Peak	US 101 & 62nd Street V/C ~ 1.00 Capacity	2030 AAV-Scen1 Full Development Total Volume	2030 AAV-Scen1 8% Reduction Total Volume
6:00-7:00	392	26.7%	**3,370**	1,085	998
7:00-8:00	1005	68.5%	**3,370**	2,781	2,559
8:00-9:00	1052	71.7%	**3,370**	2,911	2,679
9:00-10:00	1053	71.8%	**3,370**	2,914	2,681
10:00-11:00	1038	70.8%	**3,370**	2,873	2,643
11:00-12:00	1280	87.3%	**3,370**	**3,542**	3,259
12:00-1:00	1383	94.3%	**3,370**	**3,828**	**3,521**
1:00-2:00	1264	86.2%	**3,370**	**3,498**	3,218
2:00-3:00	1317	89.8%	**3,370**	**3,645**	3,353
3:00-4:00	1326	90.4%	**3,370**	**3,670**	**3,376**
4:00-5:00	1467	100.0%	**3,370**	**4,060**	**3,735**
5:00-6:00	1271	86.6%	**3,370**	**3,518**	3,236
6:00-7:00	806	54.9%	**3,370**	2,231	2,052
7:00-8:00	710	48.4%	**3,370**	1,965	1,808
8:00-9:00	282	19.2%	**3,370**	780	718
Hours of Congestion				**7**	**3**

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	78	14	32	101	18	129	55	1909	46	189	2226	69
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1749	1733	1450	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1369	1733	1450	1349	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	92	16	38	119	21	152	58	2009	48	199	2343	73
RTOR Reduction (vph)	0	0	33	0	0	133	0	0	11	0	0	13
Lane Group Flow (vph)	92	16	5	119	21	19	58	2009	37	199	2343	60
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	15.8	15.8	15.8	15.8	15.8	15.8	4.1	75.2	75.2	16.0	87.1	87.1
Effective Green, g (s)	15.3	15.3	15.3	15.3	15.3	15.3	4.6	75.7	75.7	16.5	87.6	88.1
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.04	0.63	0.63	0.14	0.73	0.73
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	175	221	185	172	217	181	66	2036	887	237	2356	1032
v/s Ratio Prot		0.01			0.01		0.03	c0.62		0.12	c0.73	
v/s Ratio Perm	0.07		0.00	c0.09		0.01			0.03			0.04
v/c Ratio	0.53	0.07	0.03	0.69	0.10	0.11	0.88	0.99	0.04	0.84	0.99	0.06
Uniform Delay, d1	49.0	46.1	45.8	50.1	46.2	46.3	57.4	21.7	8.4	50.5	16.0	4.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.72	0.27	0.16	0.95	0.91	1.61
Incremental Delay, d2	3.7	0.2	0.1	12.2	0.3	0.4	33.1	8.9	0.0	2.5	4.4	0.0
Delay (s)	52.6	46.3	45.9	62.3	46.5	46.7	74.7	14.7	1.4	50.6	19.0	7.1
Level of Service	D	D	D	E	D	D	E	B	A	D	B	A
Approach Delay (s)		50.2			53.0			16.0			21.1	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM Average Control Delay	21.7	**HCM Level of Service**	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	**Sum of lost time (s)**	9.0
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	55	14	23	212	14	468	28	1495	198	460	1845	55
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1714	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1367	1716	1458	1348	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	16	27	249	16	551	29	1574	208	484	1942	58
RTOR Reduction (vph)	0	0	21	0	0	197	0	0	75	0	0	13
Lane Group Flow (vph)	65	16	6	249	16	354	29	1574	133	484	1942	45
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	28.0	28.0	28.0	27.5	27.5	27.5	2.4	60.3	60.3	19.2	77.1	77.1
Effective Green, g (s)	28.0	28.0	28.0	27.0	27.0	27.0	2.9	60.8	60.8	19.7	77.6	77.6
Actuated g/C Ratio	0.23	0.23	0.23	0.22	0.22	0.22	0.02	0.51	0.51	0.16	0.65	0.65
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	319	400	340	303	386	320	42	1636	720	548	2087	943
v/s Ratio Prot		0.01			0.01		0.02	c0.49		0.14	c0.60	
v/s Ratio Perm	0.05		0.00	0.18		c0.25			0.09			0.03
v/c Ratio	0.20	0.04	0.02	0.82	0.04	1.11	0.69	0.96	0.18	0.88	0.93	0.05
Uniform Delay, d1	37.0	35.6	35.4	44.2	36.4	46.5	58.1	28.5	16.1	49.0	18.8	7.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.79	1.30
Incremental Delay, d2	0.3	0.0	0.0	16.9	0.1	82.1	39.1	14.9	0.6	5.5	3.2	0.0
Delay (s)	37.3	35.6	35.4	61.1	36.4	128.6	97.2	43.4	16.7	50.1	18.0	10.1
Level of Service	D	D	D	E	D	F	F	D	B	D	B	B
Approach Delay (s)		36.6			106.2			41.2			24.1	
Approach LOS		D			F			D			C	

Intersection Summary			
HCM Average Control Delay	43.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	90.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	60	5	32	46	5	78	28	1582	37	78	1932	69
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	1462		1630	1474		1614	3228	1458	1630	3228	1408
Flt Permitted	0.69	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1175	1462		1250	1474		1614	3228	1458	1630	3228	1408
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	6	38	54	6	92	29	1665	39	82	2034	73
RTOR Reduction (vph)	0	34	0	0	82	0	0	0	13	0	0	15
Lane Group Flow (vph)	71	10	0	54	16	0	29	1665	26	82	2034	58
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	8.5	8.5		8.5	8.5		1.3	51.2	51.2	5.2	55.1	55.1
Effective Green, g (s)	9.0	8.5		8.5	8.5		1.8	51.7	51.2	5.2	55.6	55.6
Actuated g/C Ratio	0.12	0.11		0.11	0.11		0.02	0.67	0.67	0.07	0.72	0.72
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	138	162		138	163		38	2170	971	110	2334	1018
v/s Ratio Prot		0.01			0.01		0.02	c0.52		0.05	c0.63	
v/s Ratio Perm	c0.06			0.04					0.02			0.04
v/c Ratio	0.51	0.06		0.39	0.10		0.76	0.77	0.03	0.75	0.87	0.06
Uniform Delay, d1	31.9	30.6		31.8	30.8		37.3	8.5	4.4	35.2	8.0	3.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	0.2		1.8	0.3		60.7	1.7	0.0	23.7	3.9	0.0
Delay (s)	35.1	30.8		33.6	31.0		98.0	10.2	4.4	58.9	11.9	3.1
Level of Service	D	C		C	C		F	B	A	E	B	A
Approach Delay (s)		33.5			31.9			11.5			13.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	76.9	Sum of lost time (s)	7.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2627	97	0	2530
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	2765	102	0	2663
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5432	2769			2869	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5432	2769			2869	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	24			128	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	2765	102	2663
Volume Left	0	0	0
Volume Right	0	102	0
cSH	1700	1700	1700
Volume to Capacity	1.63	0.06	1.57
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	160.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	147	0	2723	2332	198
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	173	0	2866	2455	208
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.42					
vC, conflicting volume	3892	2459	2665			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5100	2459	2665			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	24	151			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	173	1433	1433	2455	208
Volume Left	0	0	0	0	0
Volume Right	173	0	0	0	208
cSH	24	1700	1700	1700	1700
Volume to Capacity	7.34	0.84	0.84	1.44	0.12
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	303.2		
Intersection Capacity Utilization	150.2%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↑↱	
Volume (veh/h)	0	0	41	0	0	662	0	2061	55	0	2443	37
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	48	0	0	779	0	2169	58	0	2572	39
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.40	0.40		0.40	0.40	0.40				0.40		
vC, conflicting volume	4459	4822	1309	3507	4784	1089	2613			2229		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6637	7545	1309	4266	7449	0	2613			1078		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	68	100	100	0	100			100		
cM capacity (veh/h)	0	0	150	0	0	433	159			255		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	48	779	1085	1085	58	1714	896
Volume Left	0	0	0	0	0	0	0
Volume Right	48	779	0	0	58	0	39
cSH	150	433	1700	1700	1700	1700	1700
Volume to Capacity	0.32	1.80	0.64	0.64	0.03	1.01	0.53
Queue Length 95th (ft)	32	1228	0	0	0	0	0
Control Delay (s)	39.8	389.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	F					
Approach Delay (s)	39.8	389.9	0.0			0.0	
Approach LOS	E	F					

Intersection Summary			
Average Delay	53.9		
Intersection Capacity Utilization	113.2%	ICU Level of Service	H
Analysis Period (min)	15		

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	64	0	23	14	0	9	9	1941	60	32	1573	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	75	0	27	16	0	11	9	2043	63	34	1656	9
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2778	3852	832	3020	3830	1057	1667			2108		
vC1, stage 1 conf vol	1725	1725		2096	2096							
vC2, stage 2 conf vol	1053	2127		924	1735							
vCu, unblocked vol	2778	3852	832	3020	3830	1057	1667			2108		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	91	67	100	95	97			87		
cM capacity (veh/h)	71	47	313	50	66	222	376			253		

Direction, Lane #	**EB 1**	**EB 2**	**WB 1**	**WB 2**	**NB 1**	**NB 2**	**NB 3**	**SB 1**	**SB 2**	**SB 3**	**SB 4**
Volume Total	75	27	16	11	9	1362	744	34	828	828	9
Volume Left	75	0	16	0	9	0	0	34	0	0	0
Volume Right	0	27	0	11	0	0	63	0	0	0	9
cSH	71	313	50	222	376	1700	1700	253	1700	1700	1700
Volume to Capacity	1.05	0.09	0.33	0.05	0.03	0.80	0.44	0.13	0.49	0.49	0.01
Queue Length 95th (ft)	139	7	29	4	2	0	0	11	0	0	0
Control Delay (s)	222.3	17.6	110.2	22.0	14.8	0.0	0.0	21.4	0.0	0.0	0.0
Lane LOS	F	C	F	C	B			C			
Approach Delay (s)	168.2		75.7		0.1			0.4			
Approach LOS	F		F								

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	77.7%	**ICU Level of Service**	D
Analysis Period (min)	15		

APPENDIX J

Duration of Congestion Analysis with Average Annual Volumes and Adjusted Peak Hour Factors - Land Use Scenario #1

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction
Land Use Scenario 1

	US 101 & 32nd Raw Count (April 2005)		US 101 & 35th Street		
Hour	Total Volume	% of Peak	V/C ~ 0.85 Capacity	2030 AA-Scen1 Full Development Total Volume	2030 AA-Scen1 19% Reduction Total Volume
6:00-7:00	392	26.7%	**4,670**	1,414	1,145
7:00-8:00	1005	68.5%	**4,670**	3,624	2,936
8:00-9:00	1052	71.7%	**4,670**	3,794	3,073
9:00-10:00	1053	71.8%	**4,670**	3,797	3,076
10:00-11:00	1038	70.8%	**4,670**	3,743	3,032
11:00-12:00	1280	87.3%	**4,670**	4,616	3,739
12:00-1:00	1383	94.3%	**4,670**	**4,987**	4,040
1:00-2:00	1264	86.2%	**4,670**	4,558	3,692
2:00-3:00	1317	89.8%	**4,670**	**4,749**	3,847
3:00-4:00	1326	90.4%	**4,670**	**4,782**	3,873
4:00-5:00	1467	100.0%	**4,670**	**5,290**	4,285
5:00-6:00	1271	86.6%	**4,670**	4,583	3,712
6:00-7:00	806	54.9%	**4,670**	2,906	2,354
7:00-8:00	710	48.4%	**4,670**	2,560	2,074
8:00-9:00	282	19.2%	**4,670**	1,017	824
Hours of Congestion				**4**	**0**

	US 101 & 32nd Raw Count (April 2005)		US 101 & 40th Street		
Hour	Total Volume	% of Peak	V/C ~ 0.75 Capacity	2030 AA-Scen1 Full Development Total Volume	2030 AA-Scen1 19% Reduction Total Volume
6:00-7:00	392	26.7%	**4,330**	1,411	1,143
7:00-8:00	1005	68.5%	**4,330**	3,617	2,929
8:00-9:00	1052	71.7%	**4,330**	3,786	3,066
9:00-10:00	1053	71.8%	**4,330**	3,790	3,069
10:00-11:00	1038	70.8%	**4,330**	3,736	3,026
11:00-12:00	1280	87.3%	**4,330**	**4,607**	3,731
12:00-1:00	1383	94.3%	**4,330**	**4,978**	4,031
1:00-2:00	1264	86.2%	**4,330**	**4,549**	3,684
2:00-3:00	1317	89.8%	**4,330**	**4,740**	3,839
3:00-4:00	1326	90.4%	**4,330**	**4,773**	3,865
4:00-5:00	1467	100.0%	**4,330**	**5,280**	4,276
5:00-6:00	1271	86.6%	**4,330**	**4,575**	3,705
6:00-7:00	806	54.9%	**4,330**	2,901	2,349
7:00-8:00	710	48.4%	**4,330**	2,555	2,070
8:00-9:00	282	19.2%	**4,330**	1,015	822
Hours of Congestion				**7**	**0**

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction
Land Use Scenario 1

	US 101 & 32nd Raw Count (April 2005)		US 101 & 50th Street/South Beach State Park Entrance		
Hour	**Total Volume**	**% of Peak**	**V/C ~ 0.75 Capacity**	**2030 AA-Scen1 Full Development Total Volume**	**2030 AA-Scen1 19% Reduction Total Volume**
6:00-7:00	392	26.7%	**4,010**	1,148	930
7:00-8:00	1005	68.5%	**4,010**	2,942	2,383
8:00-9:00	1052	71.7%	**4,010**	3,080	2,495
9:00-10:00	1053	71.8%	**4,010**	3,083	2,497
10:00-11:00	1038	70.8%	**4,010**	3,039	2,462
11:00-12:00	1280	87.3%	**4,010**	3,748	3,036
12:00-1:00	1383	94.3%	**4,010**	**4,049**	3,280
1:00-2:00	1264	86.2%	**4,010**	3,701	2,998
2:00-3:00	1317	89.8%	**4,010**	3,856	3,123
3:00-4:00	1326	90.4%	**4,010**	3,882	3,145
4:00-5:00	1467	100.0%	**4,010**	**4,295**	3,479
5:00-6:00	1271	86.6%	**4,010**	3,721	3,014
6:00-7:00	806	54.9%	**4,010**	2,360	1,911
7:00-8:00	710	48.4%	**4,010**	2,079	1,684
8:00-9:00	282	19.2%	**4,010**	826	669
Hours of Congestion				**2**	**0**

	US 101 & 32nd Raw Count (April 2005)		US 101 & Pacific Way		
Hour	**Total Volume**	**% of Peak**	**V/C ~ 0.85 Capacity**	**2030 AA-Scen1 Full Development Total Volume**	**2030 AA-Scen1 19% Reduction Total Volume**
6:00-7:00	392	26.7%	**2,890**	1,526	1,236
7:00-8:00	1005	68.5%	**2,890**	**3,912**	**3,169**
8:00-9:00	1052	71.7%	**2,890**	**4,095**	**3,317**
9:00-10:00	1053	71.8%	**2,890**	**4,099**	**3,321**
10:00-11:00	1038	70.8%	**2,890**	**4,040**	**3,273**
11:00-12:00	1280	87.3%	**2,890**	**4,982**	**4,036**
12:00-1:00	1383	94.3%	**2,890**	**5,383**	**4,361**
1:00-2:00	1264	86.2%	**2,890**	**4,920**	**3,986**
2:00-3:00	1317	89.8%	**2,890**	**5,126**	**4,153**
3:00-4:00	1326	90.4%	**2,890**	**5,161**	**4,181**
4:00-5:00	1467	100.0%	**2,890**	**5,710**	**4,626**
5:00-6:00	1271	86.6%	**2,890**	**4,947**	**4,008**
6:00-7:00	806	54.9%	**2,890**	3,137	2,542
7:00-8:00	710	48.4%	**2,890**	2,764	2,239
8:00-9:00	282	19.2%	**2,890**	1,098	889
Hours of Congestion				**11**	**11**

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction
Land Use Scenario 1

	US 101 & 32nd Raw Count (April 2005)		US 101 & Abalone Street		
				2030 AA-Scen1 Full Development	2030 AA-Scen1 19% Reduction
Hour	**Total Volume**	**% of Peak**	**V/C ~ 0.90 Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**2,950**	1,569	1,271
7:00-8:00	1005	68.5%	**2,950**	**4,021**	**3,258**
8:00-9:00	1052	71.7%	**2,950**	**4,209**	**3,410**
9:00-10:00	1053	71.8%	**2,950**	**4,213**	**3,413**
10:00-11:00	1038	70.8%	**2,950**	**4,153**	**3,364**
11:00-12:00	1280	87.3%	**2,950**	**5,122**	**4,149**
12:00-1:00	1383	94.3%	**2,950**	**5,534**	**4,483**
1:00-2:00	1264	86.2%	**2,950**	**5,058**	**4,097**
2:00-3:00	1317	89.8%	**2,950**	**5,270**	**4,269**
3:00-4:00	1326	90.4%	**2,950**	**5,306**	**4,298**
4:00-5:00	1467	100.0%	**2,950**	**5,870**	**4,755**
5:00-6:00	1271	86.6%	**2,950**	**5,086**	**4,120**
6:00-7:00	806	54.9%	**2,950**	**3,225**	2,612
7:00-8:00	710	48.4%	**2,950**	2,841	2,301
8:00-9:00	282	19.2%	**2,950**	1,128	914
Hours of Congestion				**12**	**11**

	US 101 & 32nd Raw Count (April 2005)		US 101 & 32nd Street		
				2030 AA-Scen1 Full Development	2030 AA-Scen1 19% Reduction
Hour	**Total Volume**	**% of Peak**	**V/C ~ 0.90 Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**4,670**	1,539	1,247
7:00-8:00	1005	68.5%	**4,670**	3,946	3,196
8:00-9:00	1052	71.7%	**4,670**	4,131	3,345
9:00-10:00	1053	71.8%	**4,670**	4,134	3,348
10:00-11:00	1038	70.8%	**4,670**	4,076	3,301
11:00-12:00	1280	87.3%	**4,670**	**5,026**	4,070
12:00-1:00	1383	94.3%	**4,670**	**5,430**	4,398
1:00-2:00	1264	86.2%	**4,670**	**4,963**	4,019
2:00-3:00	1317	89.8%	**4,670**	**5,171**	4,188
3:00-4:00	1326	90.4%	**4,670**	**5,206**	4,217
4:00-5:00	1467	100.0%	**4,670**	**5,760**	4,665
5:00-6:00	1271	86.6%	**4,670**	**4,990**	4,042
6:00-7:00	806	54.9%	**4,670**	3,165	2,563
7:00-8:00	710	48.4%	**4,670**	2,788	2,258
8:00-9:00	282	19.2%	**4,670**	1,107	897
Hours of Congestion				**7**	**0**

Estimation of Hour of Congestion for Intersections and Levels of Trip Reduction
Land Use Scenario 1

	US 101 & 32nd Raw Count (April 2005)		US 101 & 62nd Street		
			V/C ~ 0.80	2030 AA-Scen1 Full Development	2030 AA-Scen1 19% Reduction
Hour	**Total Volume**	**% of Peak**	**Capacity**	**Total Volume**	**Total Volume**
6:00-7:00	392	26.7%	**3,490**	1,085	898
7:00-8:00	1005	68.5%	**3,490**	2,781	2,302
8:00-9:00	1052	71.7%	**3,490**	2,911	2,409
9:00-10:00	1053	71.8%	**3,490**	2,914	2,412
10:00-11:00	1038	70.8%	**3,490**	2,873	2,377
11:00-12:00	1280	87.3%	**3,490**	**3,542**	2,932
12:00-1:00	1383	94.3%	**3,490**	**3,828**	3,168
1:00-2:00	1264	86.2%	**3,490**	**3,498**	2,895
2:00-3:00	1317	89.8%	**3,490**	**3,645**	3,016
3:00-4:00	1326	90.4%	**3,490**	**3,670**	3,037
4:00-5:00	1467	100.0%	**3,490**	**4,060**	3,360
5:00-6:00	1271	86.6%	**3,490**	**3,518**	2,911
6:00-7:00	806	54.9%	**3,490**	2,231	1,846
7:00-8:00	710	48.4%	**3,490**	1,965	1,626
8:00-9:00	282	19.2%	**3,490**	780	646
Hours of Congestion				**7**	**0**

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	85	15	35	110	20	140	60	2075	50	205	2420	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1749	1733	1450	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1371	1733	1450	1350	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	15	35	110	20	140	60	2075	50	205	2420	75
RTOR Reduction (vph)	0	0	31	0	0	123	0	0	11	0	0	12
Lane Group Flow (vph)	85	15	4	110	20	17	60	2075	39	205	2420	63
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	15.2	15.2	15.2	15.2	15.2	15.2	4.0	75.0	75.0	16.8	87.8	87.8
Effective Green, g (s)	14.7	14.7	14.7	14.7	14.7	14.7	4.5	75.5	75.5	17.3	88.3	88.8
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.04	0.63	0.63	0.14	0.74	0.74
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	168	212	178	165	208	174	65	2031	885	248	2375	1040
v/s Ratio Prot		0.01			0.01		0.03	c0.64		0.12	c0.75	
v/s Ratio Perm	0.06		0.00	c0.08		0.01			0.03			0.04
v/c Ratio	0.51	0.07	0.02	0.67	0.10	0.10	0.92	1.02	0.04	0.83	1.02	0.06
Uniform Delay, d1	49.3	46.6	46.3	50.3	46.8	46.8	57.6	22.2	8.5	49.9	15.8	4.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.72	0.28	0.23	0.95	0.91	1.59
Incremental Delay, d2	3.2	0.2	0.1	10.7	0.3	0.3	43.9	17.7	0.0	2.2	11.3	0.0
Delay (s)	52.5	46.8	46.4	61.0	47.0	47.1	85.2	23.9	2.0	49.8	25.6	6.8
Level of Service	D	D	D	E	D	D	F	C	A	D	C	A
Approach Delay (s)		50.3			52.8			25.1			27.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	60	15	25	230	15	500	30	1625	215	500	2005	60
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1714	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1368	1716	1458	1349	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	15	25	230	15	500	30	1625	215	500	2005	60
RTOR Reduction (vph)	0	0	19	0	0	207	0	0	75	0	0	13
Lane Group Flow (vph)	60	15	6	230	15	293	30	1625	140	500	2005	47
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	26.7	26.7	26.7	26.2	26.2	26.2	2.4	60.9	60.9	19.9	78.4	78.4
Effective Green, g (s)	26.7	26.7	26.7	25.7	25.7	25.7	2.9	61.4	61.4	20.4	78.9	78.9
Actuated g/C Ratio	0.22	0.22	0.22	0.21	0.21	0.21	0.02	0.51	0.51	0.17	0.66	0.66
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	304	382	324	289	368	304	42	1652	727	568	2122	959
v/s Ratio Prot		0.01			0.01		0.02	c0.50		0.15	c0.62	
v/s Ratio Perm	0.04		0.00	0.17		c0.21			0.10			0.03
v/c Ratio	0.20	0.04	0.02	0.80	0.04	0.96	0.71	0.98	0.19	0.88	0.94	0.05
Uniform Delay, d1	37.9	36.6	36.4	44.7	37.4	46.7	58.1	28.8	15.9	48.6	18.6	7.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88	0.70	1.13
Incremental Delay, d2	0.3	0.0	0.0	14.8	0.1	42.0	44.2	18.6	0.6	4.4	3.2	0.0
Delay (s)	38.3	36.6	36.4	59.4	37.4	88.7	102.3	47.4	16.5	47.0	16.2	8.2
Level of Service	D	D	D	E	D	F	F	D	B	D	B	A
Approach Delay (s)		37.6			78.6			44.7			22.0	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM Average Control Delay	38.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	65	5	35	50	5	85	30	1720	40	85	2100	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	1458		1630	1473		1614	3228	1458	1630	3228	1408
Flt Permitted	0.70	1.00		0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1184	1458		1254	1473		1614	3228	1458	1630	3228	1408
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	65	5	35	50	5	85	30	1720	40	85	2100	75
RTOR Reduction (vph)	0	31	0	0	76	0	0	0	13	0	0	14
Lane Group Flow (vph)	65	9	0	50	14	0	30	1720	27	85	2100	61
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	8.4	8.4		8.4	8.4		1.4	55.2	55.2	5.4	59.2	59.2
Effective Green, g (s)	8.9	8.4		8.4	8.4		1.9	55.7	55.2	5.4	59.7	59.7
Actuated g/C Ratio	0.11	0.10		0.10	0.10		0.02	0.69	0.68	0.07	0.74	0.74
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	130	151		130	153		38	2220	994	109	2379	1038
v/s Ratio Prot		0.01			0.01		0.02	c0.53		0.05	c0.65	
v/s Ratio Perm	c0.05			0.04					0.02			0.04
v/c Ratio	0.50	0.06		0.38	0.09		0.79	0.77	0.03	0.78	0.88	0.06
Uniform Delay, d1	34.0	32.7		33.9	32.8		39.4	8.5	4.2	37.2	8.0	2.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.0	0.2		1.9	0.3		67.6	1.7	0.0	28.9	4.3	0.0
Delay (s)	37.0	32.9		35.8	33.1		106.9	10.2	4.2	66.1	12.3	3.0
Level of Service	D	C		D	C		F	B	A	E	B	A
Approach Delay (s)		35.4			34.1			11.7			14.0	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	81.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2855	105	0	2750
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	2855	105	0	2750
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5609	2859			2962	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5609	2859			2962	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	0	21			118	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	2855	105	2750
Volume Left	0	0	0
Volume Right	0	105	0
cSH	1700	1700	1700
Volume to Capacity	1.68	0.06	1.62
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	173.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑	↱
Volume (veh/h)	0	160	0	2960	2535	215
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	160	0	2960	2535	215
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1246		
pX, platoon unblocked	0.41					
vC, conflicting volume	4019	2539	2752			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	5507	2539	2752			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	21	140			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	160	1480	1480	2535	215
Volume Left	0	0	0	0	0
Volume Right	160	0	0	0	215
cSH	21	1700	1700	1700	1700
Volume to Capacity	7.75	0.87	0.87	1.49	0.13
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	272.5		
Intersection Capacity Utilization	162.7%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑	↱		↑↱	
Volume (veh/h)	0	0	45	0	0	720	0	2240	60	0	2655	40
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	45	0	0	720	0	2240	60	0	2655	40
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								700				
pX, platoon unblocked	0.39	0.39		0.39	0.39	0.39				0.39		
vC, conflicting volume	4519	4979	1352	3616	4939	1124	2697			2302		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6877	8051	1352	4574	7949	0	2697			1218		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	68	100	100	0	100			100		
cM capacity (veh/h)	0	0	141	0	0	423	147			220		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	45	720	1120	1120	60	1770	925
Volume Left	0	0	0	0	0	0	0
Volume Right	45	720	0	0	60	0	40
cSH	141	423	1700	1700	1700	1700	1700
Volume to Capacity	0.32	1.70	0.66	0.66	0.04	1.04	0.54
Queue Length 95th (ft)	32	1083	0	0	0	0	0
Control Delay (s)	42.1	348.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	F					
Approach Delay (s)	42.1	348.2	0.0			0.0	
Approach LOS	E	F					

Intersection Summary			
Average Delay	43.9		
Intersection Capacity Utilization	122.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Volume (veh/h)	70	0	25	15	0	10	35	1710	10	10	2110	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	70	0	25	15	0	10	35	1710	10	10	2110	65
Pedestrians		2			2			2			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3069	3924	1059	2889	3984	864	2177			1722		
vC1, stage 1 conf vol	2132	2132		1787	1787							
vC2, stage 2 conf vol	937	1792		1102	2197							
vCu, unblocked vol	3069	3924	1059	2889	3984	864	2177			1722		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	89	76	100	97	85			97		
cM capacity (veh/h)	47	62	221	63	40	298	237			358		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	70	25	15	10	35	1140	580	10	1055	1055	65
Volume Left	70	0	15	0	35	0	0	10	0	0	0
Volume Right	0	25	0	10	0	0	10	0	0	0	65
cSH	47	221	63	298	237	1700	1700	358	1700	1700	1700
Volume to Capacity	1.49	0.11	0.24	0.03	0.15	0.67	0.34	0.03	0.62	0.62	0.04
Queue Length 95th (ft)	169	9	21	3	13	0	0	2	0	0	0
Control Delay (s)	442.2	23.3	78.8	17.5	22.8	0.0	0.0	15.3	0.0	0.0	0.0
Lane LOS	F	C	F	C	C			C			
Approach Delay (s)	332.0		54.3		0.5			0.1			
Approach LOS	F		F								

Intersection Summary			
Average Delay	8.3		
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	69	12	28	89	16	113	49	1681	41	166	1960	61
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1749	1733	1450	1715	1699	1421	1722	3228	1406	1722	3228	1406
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1376	1733	1450	1354	1699	1421	1722	3228	1406	1722	3228	1406
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	69	12	28	89	16	113	49	1681	41	166	1960	61
RTOR Reduction (vph)	0	0	25	0	0	100	0	0	10	0	0	12
Lane Group Flow (vph)	69	12	3	89	16	13	49	1681	31	166	1960	49
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	13.9	13.9	13.9	13.9	13.9	13.9	5.4	77.6	77.6	15.5	87.7	87.7
Effective Green, g (s)	13.4	13.4	13.4	13.4	13.4	13.4	5.9	78.1	78.1	16.0	88.2	88.7
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11	0.11	0.05	0.65	0.65	0.13	0.74	0.74
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	154	194	162	151	190	159	85	2101	915	230	2373	1039
v/s Ratio Prot		0.01			0.01		0.03	c0.52		0.10	c0.61	
v/s Ratio Perm	0.05		0.00	c0.07		0.01			0.02			0.03
v/c Ratio	0.45	0.06	0.02	0.59	0.08	0.08	0.58	0.80	0.03	0.72	0.83	0.05
Uniform Delay, d1	49.8	47.7	47.5	50.7	47.8	47.8	55.8	15.3	7.5	49.9	10.7	4.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.25	0.14	1.05	0.90	1.44
Incremental Delay, d2	2.8	0.2	0.1	6.8	0.3	0.3	6.3	2.3	0.0	1.0	0.3	0.0
Delay (s)	52.7	47.9	47.5	57.5	48.1	48.1	46.0	6.2	1.1	53.2	10.0	6.1
Level of Service	D	D	D	E	D	D	D	A	A	D	A	A
Approach Delay (s)		50.8			51.9			7.2			13.1	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	49	12	20	186	12	405	24	1316	174	405	1624	49
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	14	12	12	14	12	12	14	12	12	14	12	12
Total Lost time (s)	4.0	4.0	4.0	5.0	5.0	5.0	3.5	4.0	4.0	3.5	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1739	1716	1458	1714	1716	1421	1739	3228	1421	3340	3228	1458
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1372	1716	1458	1353	1716	1421	1739	3228	1421	3340	3228	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	49	12	20	186	12	405	24	1316	174	405	1624	49
RTOR Reduction (vph)	0	0	16	0	0	241	0	0	66	0	0	12
Lane Group Flow (vph)	49	12	4	186	12	164	24	1316	108	405	1624	37
Confl. Peds. (#/hr)				2		2			2	2		
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	23.2	23.2	23.2	22.7	22.7	22.7	3.2	64.7	64.7	19.6	81.1	81.1
Effective Green, g (s)	23.2	23.2	23.2	22.2	22.2	22.2	3.7	65.2	65.2	20.1	81.6	81.6
Actuated g/C Ratio	0.19	0.19	0.19	0.18	0.18	0.18	0.03	0.54	0.54	0.17	0.68	0.68
Clearance Time (s)	4.0	4.0	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	265	332	282	250	317	263	54	1754	772	559	2195	991
v/s Ratio Prot		0.01			0.01		0.01	c0.41		0.12	c0.50	
v/s Ratio Perm	0.04		0.00	c0.14		0.12			0.08			0.03
v/c Ratio	0.18	0.04	0.01	0.74	0.04	0.62	0.44	0.75	0.14	0.72	0.74	0.04
Uniform Delay, d1	40.5	39.3	39.1	46.2	40.1	45.0	57.1	21.1	13.5	47.3	12.4	6.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.12	0.74	0.71	0.89	0.69	0.97
Incremental Delay, d2	0.3	0.0	0.0	12.0	0.1	5.1	4.9	2.6	0.3	2.7	1.3	0.0
Delay (s)	40.8	39.4	39.2	58.3	40.2	50.2	68.8	18.1	9.9	45.0	9.9	6.1
Level of Service	D	D	D	E	D	D	E	B	A	D	A	A
Approach Delay (s)		40.2			52.5			18.0			16.7	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: South Beach State Park & US 101

2030 Scenario 1 AAV - 19% Reduction

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	53	4	28	41	4	69	24	1393	32	69	1701	61
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0		4.0	4.0		3.5	3.5	4.0	4.0	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1608	1457		1630	1472		1614	3228	1458	1630	3228	1405
Flt Permitted	0.66	1.00		0.74	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1123	1457		1263	1472		1614	3228	1458	1630	3228	1405
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	53	4	28	41	4	69	24	1393	32	69	1701	61
RTOR Reduction (vph)	0	26	0	0	63	0	0	0	8	0	0	12
Lane Group Flow (vph)	53	6	0	41	10	0	24	1393	24	69	1701	49
Confl. Peds. (#/hr)	2		2				2					2
Heavy Vehicles (%)	3%	2%	3%	2%	2%	2%	3%	3%	2%	2%	3%	3%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	9.7	9.7		9.7	9.7		5.0	89.4	89.4	8.9	93.3	93.3
Effective Green, g (s)	10.2	9.7		9.7	9.7		5.5	89.9	89.4	8.9	93.8	93.8
Actuated g/C Ratio	0.08	0.08		0.08	0.08		0.05	0.75	0.74	0.07	0.78	0.78
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	95	118		102	119		74	2418	1086	121	2523	1098
v/s Ratio Prot		0.00			0.01		0.01	c0.43		0.04	c0.53	
v/s Ratio Perm	c0.05			0.03					0.02			0.04
v/c Ratio	0.56	0.05		0.40	0.08		0.32	0.58	0.02	0.57	0.67	0.05
Uniform Delay, d1	52.7	50.9		52.4	51.0		55.5	6.6	4.0	53.7	6.0	3.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.10	0.49	0.36
Incremental Delay, d2	6.9	0.2		2.6	0.3		2.5	1.0	0.0	4.5	1.0	0.1
Delay (s)	59.7	51.1		55.0	51.3		58.0	7.6	4.0	63.6	4.0	1.1
Level of Service	E	D		D	D		E	A	A	E	A	A
Approach Delay (s)		56.4			52.6			8.4			6.2	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↱		↑
Volume (veh/h)	0	0	2313	85	0	2228
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	2313	85	0	2228
Pedestrians	2		2			2
Lane Width (ft)	0.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	4545	2317			2400	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4545	2317			2400	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1	46			198	

Direction, Lane #	NB 1	NB 2	SB 1
Volume Total	2313	85	2228
Volume Left	0	0	0
Volume Right	0	85	0
cSH	1700	1700	1700
Volume to Capacity	1.36	0.05	1.31
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	142.8%	ICU Level of Service	H
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Abalone St. & US 101

PCL XL error

Subsystem: TEXT

Error: InternalError 0x50

Operator: EndFontHeader

Position: 1391617

NEWPORT TRANSPORTATION SYSTEM PLAN*

This Transportation System Plan (TSP) describes the individual elements that make up the transportation system for the City of Newport. Plus, the TSP represents recommended project improvements and goals and policies towards establishing a coordinated multi-modal transportation network for the City of Newport intended to comply with Statewide Planning Goal 12 and the Transportation Planning Rule.

The complete TSP describes in detail the various components of a transportation system, makes a complete analysis of those various components, and describes the process used to develop the plan. The current Transportation System Plan was completed in 1997 and adopted in 1999. Several updates to the plan were adopted, including major updates in 2008 and 2012. By this reference, the complete TSP as amended by Ordinance No. 1963 is incorporated herein. Where the text references "TSP," the reference is to the TSP as amended unless otherwise noted.

However, the complete plan, including the updates, contains more information than most individuals want to sort through when looking for guidance on how future decisions should be made to implement the plan. This section will therefore summarize the projects contained in the TSP and the goals and policies needed to assure compliance. Persons interested in obtaining a more thorough understanding of the reasoning for the projects, goals, and policies should review the full TSP documentation referenced in Policy 1, Goal 1 of this chapter.

Transportation System Plans for Each Mode

The TSP places a strong emphasis on the preservation and improved operation of the US 20 and US 101 corridors. The City of Newport views US 101 and US 20 as the most important arterials in the multi-modal transportation network and likewise recognizes the importance of these facilities as statewide facilities per the Oregon Highway Plan. In implementation of the City's Comprehensive Plan and the associated Transportation System Plan, the City will strive to maintain the function of these facilities to meet their statewide as well as regional needs.

The Transportation System Plan comprises all the improvements in the Middle Alternative, as developed during the TSP process. The Middle Alternative has been identified as the preferred alternative, which includes transportation improvements that support the identified goals and objectives and the adopted and acknowledged Comprehensive Plan. The following describes the recommended projects for each mode contained in the preferred alternative. For further specifics on the projects, refer to the complete Transportation System Plan.

The TSP was amended in 2008 to add a North Side Local Street Plan to support commercial development and redevelopment activity within the area bounded by 12th Street on the north, John Moore/Harney Drive on the east, the Pacific Ocean on the west, and the Yaquina Bay on the south. The 2008 amendment included a more comprehensive Pedestrian and

Bicycle Plan for the entire City. In February of 2010 a refinement plan was prepared for the South Beach Peninsula to identify transportation and related improvements to SE Marine Science Drive, SE Ferry Slip Road, SE Pacific Way, SE 25th Street and SW Abalone Street, needed to support marine research and industrial development anchored by the new NOAA pacific marine operations center. The TSP was last amended in 2012 to address needed system improvements south of the Yaquina Bay Bridge in Newport's South Beach Area, including an infrastructure refinement plan for the Coho / Brant neighborhood situated west of Highway 101 and north of SW 35th Street.

*Added by Ordinance No. 1802 (1-4-99); Amended by Ordinance No. 1963 (8-18-08) and Ordinance No. 2045 (11-5-12).

The City has concentrated recent efforts on addressing transportation and land use issues in the South Beach area (south of the Yaquina Bay Bridge) where a significant amount of the City's new development is anticipated. A combination of anticipated 2030 levels of land development in South Beach and increasing background traffic volumes along US 101 will result in greater congestion levels, particularly during the summertime peak. However, traffic growth is likely to be high enough that other times of the year will also experience significant congestion. The City has an adopted South Beach Urban Renewal Plan that includes street improvements which will be critical new components of the system. However, due to limited State transportation funding for bridge improvement or replacement, the capacity of the Yaquina Bay Bridge is expected to continue to be the major constraint in the operation of the transportation system south of the bridge. Because of this, the City and ODOT worked together to identify a transportation system and management strategy that will support future growth in South Beach, one that includes alternative mobility standards for US 101, strategic improvements to the state highway, and a variety of improvements to both the local roadway system and the pedestrian and bicycle system. The improvements are discussed further in the *Transportation Planning in South Beach* section. The local and state actions and improvements that are identified for South Beach constitute the reasonable limits of what can be done to improve congestion on US 101, short of building more capacity into the Yaquina Bay Bridge. The City is committed to finding long-term solutions sufficient to address the existing capacity and structural limitations of the existing structure that affect the bridge's ability to carry vehicles and pedestrians. To this end, the City will continue to engage ODOT, Lincoln County, and its other regional partners in conversations regarding future project planning and funding that would lead to improvements to, and possibly replacement of, the Yaquina Bay Bridge.

Roadway Improvements

The roadway improvements include new roadway construction for extensions and improvements to existing facilities as well as the development of new facilities. The recommended roadway improvements are listed in Table 1 and are discussed in more detail in the Transportation System Plan. Table 1 identifies project location, description and priority for projects in the local roadway system. As indicated by headings in Table 1, the projects listed are identified by the 1997 TSP, as well as updates to this plan in 2008 and 2012. All project cost estimates are shown in 2012 dollars; cost estimates for projects from the 1997 TSP (and 2008 update) have been adjusted for projects that have been altered or partially implemented. Costs for projects yet to be implemented have been adjusted to account for inflation.

Table 1: Roadway Improvement Projects

Project Description	Functional Class	Sidewalks	Bicycle Lanes	Priority	Estimated Cost ($2012)	*Source*
New Roadway Projects or Extensions						
NE Harney Street between NE 3rd and Hwy 20	Minor Arterial	Yes	Yes	High	$824,000	*2012 Cost Estimate*
North-South Arterial – Phase IB (between NE 7th St and NE 32nd St) From 1997 TSP	Minor Arterial	No	No	Medium	$3,720,000	*1997 TSP*
Extend NW Nye St to Ocean View Dr From 1997 TSP	Minor Arterial	Yes	Yes	High	$240,000	*1997 TSP*
Connect SE 1st St (between SE Douglas and SE Fogarty)	Local	Yes	Yes (one side)	Low	$250,000	*1997 TSP*
Extend NE Avery St (between NE 71st St and NE 73rd St	Local	Yes	No	Low	$369,000	*2012 Cost Estimate*
Extend SW Abbey St to SW Elizabeth St	Collector	Yes	No	Medium	$141,000	*2012 Cost Estimate*
Extend NE 5th St (between NE 7th Dr and Newport Heights Rd	Local	No	No	Low	$1,680,000	*2012 Cost Estimate*
Extend NW Biggs to NW 60th St and Extend NW 60th St to US 101	Collector	Yes	No	Low	$102,000	*1997 TSP/1995 Cost Estimate*
Extend NW Harney Dr (between US 101 and Ocean View Dr)	Collector	Yes	Yes	Medium	$452,000	*1997 TSP/ 1995 Cost Estimate*
Extend SW Abalone from SW 29th Street to SW 35th Street/US 101	Collector	Yes	Yes	High	$2,315,000	*2012 Coho / Brant Plan*
Ash Street at SE 40th Street, extend to approx. 1,200 feet south	Collector	Yes	Yes	Medium	$1,473,000	*2012 SB TSP update*
New SE 50th Street segment extending from existing road to South Beach State Park entrance	Collector	Yes	Yes	Low	$1,565,000	*2012 SB TSP update*

Project Description	Functional Class	Sidewalks	Bicycle Lanes	Priority	Estimated Cost ($2012)	*Source*
New road from SE 50th Street to SE 62nd Street at US 101	Collector	Yes	Yes	Low	$5,017,000	*2012 SB TSP update*
Extend SW 28th Street south from SW 27th Street to connect with SW Brant Street	Local	Yes	No	Low	$554,000	*2012 Coho / Brant Plan*
Construct SW 35th street from US 101 to SE Ferry Slip Rd	Collector	Yes	Yes	Medium	$653,000	*2012 Coho / Brant Plan*
Improvements to Existing Roadways						
Reconstruct NE 3rd St (between NE Eads St and NE Harney Dr)	Local	Yes	No	Medium	$243,000	*1997 TSP*
Extension of 60th east of Highway 101 to connect with Hazel Ct and the improvement of hazel down to NE 57th Street	Collector	Yes	No	Low	$94,000	*1997 TSP*
Widen US 101 to five lanes (NE NE 31st Street to North City Limits)	Principal Arterial	Yes	Yes	Low	$13,000,000	*1997 TSP*
Widen US 20 to five lanes (John Moore Rd to US 101)	Principal Arterial	Yes	Yes	Medium	$1,730,000	*1997 TSP*
Add travel lanes on US 101 from Yaquina Bay Bridge to SE 32nd Street and restrict westbound movements at Pacific Way to emergency and transit vehicles only.	Principal Arterial	Yes	Yes	Medium	$659,000	*2012 SB TSP update*
Add travel lanes on US 101 from SE 40th Street to South Beach State Park/New SW 50th Street	Principal Arterial	Yes	Yes	Low	$1,602,000	*2012 SB TSP update*
Add travel lanes on US 101 from New SE 50th Street to SW 62nd Street	Principal Arterial	Yes	Yes	Low	$799,000	*2012 SB TSP update*
Widen and pave SE Ash Street from Ferry Slip to SE 40th	Collector	Yes	Yes	High	$506,000	*2012 SB TSP update*
Add eastbound through lane to receive traffic from second southbound through lane at SE 40th and US 101	Collector	No.	No.	Medium	$161,000	*2012 SB TSP update*
Widen SE Ferry Slip to three lane section from SE Marine Science Dr to SE 29th St	Minor Arterial	Yes	Yes	Medium	$547,000	*2010 SB Peninsul a Plan*

Project Description	Functional Class	Sidewalks	Bicycle Lanes	Priority	Estimated Cost ($2012)	*Source*
Widen and pave SW 27th St from SW Brant St to SW Abalone St	Local	Yes	No	High	$145,000	*2012 Coho / Brant Plan*
Widen and pave SW 27th St from SW Coho St to existing improvements	Local	Yes	No	Low	$101,000	*2012 Coho / Brant Plan*
Widen and pave SW 28th St from Brant to Abalone slope (with pedestrian. stairs down embankment)	Local	No	No	Low	$303,000	*2012 Coho / Brant Plan*
Widen and pave SW 29th St from SW Coho St to SW Brant St	Local	No	No	Low	$229,000	*2012 Coho / Brant Plan*
Widen and pave SW 30th from SW Brant St to SW Abalone St	Local	Yes	Yes	High	$311,000	*2012 Coho / Brant Plan*
Widen and pave SW Coho St from SW 29th St to SW 30th St	Local	Yes	Yes	Low	$186,000	*2012 Coho / Brant Plan*
Widen and pave SW Brant St from SW 27th to SW 30th St	Local	Yes	No	High	$707,000	*2012 Coho / Brant Plan*
North Side Local Street Plan Street and Roadway Projects						
Improve to 2-lane NE Benton Street from NE 8th Street to NE 10th Street	Local	Yes	No	High	$316,000	*2008 North Side TSP update*
SW 9th St/ NE Benton St Connectivity Enhancement; Pedestrian xing and signage improvements from Abbey to NE 11th to facilitate corridor as a local parallel route to US 101 and access between US 20 and the bay front. Consider all way stop at 9th/Hurbert.	Local			High	$34,000	*2008 North Side TSP update*
Improve to 3-lane urban standard NE 1st Street from US 101 to US 20 to provide westbound-to-northbound bypass of US 101 and US 20 intersection.	Local	Yes	Yes	High	$557,000	*2008 North Side TSP update*

Project Description	Functional Class	Sidewalks	Bicycle Lanes	Priority	Estimated Cost ($2012)	*Source*
Improve to 2-lane urban standard SW Neff Street from US 101 to SW 2nd Street to add system connectivity.	Local	Yes	Yes	High	$515,000	*2008 North Side TSP update*
Improve to 2-lane urban standard SW 7th Street from SW 2nd Street to SW Elizabeth Street to add system connectivity.	Collector	Yes	Yes	Low	$19,200,000	*2008 North Side TSP update*
Alternative Port Access Road Improvements: Evaluate improvements to SE Benson Road and/or SE John Moore Drive to improve access to waterfront area	Collector (Benson) Arterial (John Moore)			Medium/ Low	Planning study needed to determine alignment and cost	*2008 North Side TSP update*

Transportation System Management/New Traffic Signals

Transportation System Management is a traffic control tool that attempts to maximize the efficiency of the existing transportation system without additional roadway capacity. TSM projects can be characterized as being low-capital cost alternatives that can be implemented in a relatively short time frame and that aim to make better use of existing facilities, either by operational changes or by better traffic management.

There are several TSM projects that have been recommended for implementation in Newport. These projects are listed in Table 2 below. Table 2 identifies project location, description and priority for TSM projects in the local roadway system. As indicated by headings in Table 2, the projects listed are identified by the 1997 TSP, as well as updates to this plan in 2008, 2010 and 2012. All project cost estimates are shown in 2012 dollars; cost estimates for projects from the 1997 TSP (and 2008 update) have been adjusted to account for inflation.

Table 2: Transportation Management System (TSM) Improvement Projects

Location/ Limits	Project Description	Priority	Estimated Cost ($ 2012)	*Source*
TSM Improvement Projects – City-wide				
US 101 Revisions (between OR 20 and Yaquina Bay Bridge)	Removal of on-street parking, no bike lanes, left turns only at Bayley, Abbey, Hurbert, Angle, and Olive	High	$31,000	*1997 TSP*
US 101/NE Avery Street	Access management modification (right-in, right-out only)	High	$18,000	*1997 TSP*
John Moore Rd at SE Bay Blvd	Provide realignment and channelization	High	$51,000	*1997 TSP*
US 101 to Cape	Provide island and channelization	High	$7,500	*1997 TSP*
Naterlin at US 101 (Yaquina Bay Bridge)	Provide realignment and channelization	High	$45,000	*1997 TSP*
NE 52nd St Area Improvements	Improve NE Lucky Gap between NE 52nd St and NE 54th St; provide access from Longview Hills to NE 52nd St	Medium	$1,000,000	*1997 TSP*
NW 56th St Improvement Area	Eliminate Old Hwy Loop between NW 55th St and NW 58th St; extend NW 56th St to US 101; improve NW Gladys St between NW 56th St and NW 60th St as a frontage road	High	$545,000	*1997 TSP*
US 101	Surface Parking Lots for 101 Business: Construct surface parking lots to supplement parking removed from 101 restriping	Medium	$270,000	*1997 TSP*
Abbey St	Construct a new parking structure on Abbey St parking lot (4 levels with top level open); include bike racks; restripe Bay Blvd to accommodate parallel parking south of Fall St to Naterlin Dr	Low	$3,975,000	*1997 TSP*
NE 57th St	Eliminate US 101 access; cul-de-sac NE 57th St on its western terminus; connect NE Hazel Ct to NE 60th St	Medium	$270,000	*1997 TSP*
SW 2nd St between US 101 and SW Angle St	Close SW 2nd St between US 101 and SW Angle St (to be completed as part of signalization project at US 101 and Angle St)	Low	$45,000	*1997 TSP*
US 101 and Hurbert St	Signal improvements to provide for left turns	High	$270,000	*1997 TSP*
US 101/OR 20	Signal revisions/improvements; realign E Olive St	High	$1,120,000	*1997 TSP*

Location/ Limits	Project Description	Priority	Estimated Cost ($ 2012)	*Source*
US 101 at NW 11th Street	Realign intersection to eliminate slight off-set. Consider need for additional east/west turning lanes and/or signalization improvements.	High	$570,000 ROW needed	*2008 North Side TSP update*
US 101 at NW 6th Street	Realign intersection to eliminate off-set. Consider need for added east/west turning lanes and/or improved signal to address congestion problem.	High	$730,000 ROW needed	*2008 North Side TSP update*
North Side Local Street Plan TSM Improvement Projects				
US 101, US 20 north to NW 12th Street	Evaluate opportunities for driveway and/or minor street closures or consolidation.	High	As redevelopment occurs.	*2008 North Side TSP update*
US 101 at US 20	Add 2nd southbound left turn lane. Widen eastbound US 20 to receive 2 lanes of traffic, transition to one lane east of US 101.	High	$885,000 ROW needed	*2008 North Side TSP update*
US 20 at NE Coos Street	Add signal and improve intersection to encourage north/ south local street alternative to US 101. Signal could help relieve congestion at NE Eads.	High	$605,000	*2008 North Side TSP update*
US 20 at SE John Moore Drive	Add north/south left turn lanes and adapt signal phase. Combine northbound right/through lanes.	Medium	$220,000	*2008 North Side TSP update*
SW Hatfield Drive at SW Bay Boulevard	Stripe separate right and left turn lanes, add crosswalk and no parking designation on Hatfield Dr. Add curb extensions on Bay Blvd. to facilitate pedestrian crossing.	High	$52,000	*2008 North Side TSP update*
SW 2nd Street, SW Coast Street to SW Lee Street	Realign intersections of SW Lee Street, SW Hurbert Street, SW High Street and SW Coast Street to eliminate off-sets.	Medium	$805,000 ROW needed	*2008 North Side TSP update*
US 101 at Angle Street	Modify 1997 TSP to install traffic signal and left turn lanes on US 101. Remove on-street parking in vicinity of intersection to accommodate added lanes. Consider alternative to retain on-street parking by eliminating lefts on US 101 at Angle and evaluating local connectivity thru refinement plan after installation of signal at US 101/Abbey.	Medium	$600,000	*2008 North Side TSP update*
US 101 at Hurbert Street	Modify 1997 TSP to install left turn lanes on US 101. Remove on-street parking in area of intersection for	High	$100,000	*2008 North Side TSP update*

Location/ Limits	Project Description	Priority	Estimated Cost ($ 2012)	*Source*
	added lanes. Consider alternative to retain on-street parking by eliminating lefts on US 101 at Hurbert and evaluating local connectivity thru refinement plan after installation of signal at US 101/Angle.			
John Moore Drive at Bay Blvd.	Stripe John Moore for separate left and right turns. Modify curb radii to enhance right turns from John Moore onto Bay. Add eastbound left turn lane and pedestrian crossing.	High	$400,000	*2008 North Side TSP update*
Various Locations	Signage Improvements: ▫ Directional signs from US 20 to both John Moore and 9th for Bay Front visitors ▫ Directional signs from Bay Front parking lots and along Bay Blvd to Naterlin for Ocean access ▫ Improve signage to parking on Bay	High	$21,000	*2008 North Side TSP update*
South Beach TSM Improvement Projects				
US 101 at 32nd Street	Remove traffic signal from intersection of US 101 and SE 32nd Street. Convert intersection of US 101 and 32nd Street right in and right out. Add one travel lane in each direction, construct multi-use path on west side with buffer and shoulder. Add shoulder/bike lane and sidewalk on east side of the highway. Acquire right-of-way as needed and institute access management.	High	$787,000 ($190,000 for interim improvements per 2012 Coho/Brant Refinement Plan)	*2012 South Beach TSP update*
US 101 at 35th Street	Widen intersection to add channelization and install traffic signal. Add one travel lane in each direction and construct multi-use path on west side with buffer and shoulder. Add shoulder/bike lane and sidewalk on east side of US 101. Construct 35th Street to connect with US 101 (approx. 600-700 ft.) with multi-use path on north side and sidewalk on south side. Acquire right-of-way as needed and institute access management.	High	$1,935,000 ($1,119,000 for interim improvements per 2012 Coho/Brant Refinement Plan)	*2012 South Beach TSP update*
US 101 at SW 40th Street	Widen intersection to add channelization and install traffic signal. Add one travel lane in each	Medium	$2,624,000	*2012 South Beach TSP update*

Location/ Limits	Project Description	Priority	Estimated Cost ($ 2012)	*Source*
	direction and construct multi-use path on west side with buffer and shoulder. Add shoulder/bike lane and sidewalk on the east side of US 101 north of 40th Street and shoulder to the south. Add sidewalks on north side of 40th [cost does not include 2nd EB through lane to receive dual SB lefts from US 101 (see Project #12)]. Acquire right-of-way as needed and institute access management.			
US 101 at South Beach State Park/New SW 50th Street	Construct traffic signal and intersection improvements to add new east leg. Multi-use path with buffer on west side of US 101 and shoulder/bike lanes on both sides. Multi-use path on north side of 50th and sidewalk on south side.	Low	$1,970,000	*2012 South Beach TSP update*
US 101 at SW 62nd Street	Widen intersection to add channelization. Shoulder/bike lanes on both sides of US 101. Multi-use path on west side of US 101 with buffer and north side of 62nd. Sidewalk on south side of 62nd.	Low	$1,054,000	*2012 South Beach TSP update*
SE Ferry Slip Road	Close intersection of US 101 at SE Ferry Slip Road, and overlay and widen roadway from SE 32nd Street to north end of SE Ash Street (~1,100 feet).	High	$144,000	*2012 South Beach TSP update*
SE 40th Steet at US 101 to approx. 500-700 feet east	Add eastbound through lane to receive traffic from second south bound through lane at intersection of 40th Street with US 101	Medium	$154,000	*2012 South Beach TSP update*

New Traffic Signals

It has been identified that as traffic volumes increase, several intersections throughout Newport will require the installation of traffic signals. The cost for each traffic signal is estimated at $500,000, totaling $3.5 million for seven signals. This includes the cost for installation and signal coordination infrastructure but does not include intersection road work.

Listed below are the locations that will likely require new traffic signals or turn lanes, as traffic volumes increase. Intersection road work, such as turn lanes, also may be needed with these traffic signals. New traffic signals on state highways must be authorized by the State Traffic Engineer. These intersections should be monitored to determine the point in time at which signalization is warranted:

- US 101 at Abbey Street (High)
- US 101 at Angle Street (Low)
- US 101 at NE 36th St. (Medium)
- US 101 at NE 73rd St. (Low)
- US 101 at SE 35th Street (High)
- US 101 at SW 40th Street (High)
- US 101 at South Beach State Park/New SW 50th Street (Low)

Transportation modeling shows that traffic flow near the bridge would be improved by relocating the traffic signal at 32nd Street southward to 35th Street. When the planned 35th Street intersection widening is complete and a traffic signal is installed, the traffic signal from the intersection of US 101 and SE 32nd Street will be removed and replaced with a stop sign for motorists approaching US 101 from the side street. In addition, the 32nd Street intersection with US 101 will be limited to right in and right out traffic movements.

Functional Classification System

Streets perform various roles in a community, ranging from carrying large volumes of through traffic to providing direct access to abutting property. These functions are often conflicting, and a hierarchical classification system is needed to determine the appropriate function and purpose of each roadway.

Figures 1 through 3, and Table 43 presents the recommended functional classification system plan for the City of Newport. This plan recommends four roadway classifications as follows:

- **Principal Arterials** – These facilities carry the highest volumes of through traffic and primarily function to provide mobility and not access. Principal arterials provide continuity for intercity traffic through the urban area and are usually multi-lane facilities. The only facilities identified as principal arterials are US Highways 101 and 20.

- **Minor Arterials** – These facilities interconnect and augment the principal arterial system and accommodate trips of somewhat shorter length. Such facilities interconnect residential, shopping, employment, and recreational activities within the community.

- **Collector Streets** – These streets provide both land access and movement within residential, commercial, and industrial uses. These streets gather traffic from local roadways and serve as connectors to arterials.

- **Local Streets** – These streets provide land access to residential and other properties within neighborhoods and generally do not intersect any arterial routes. All remaining streets not listed in Table 4 are classified as local streets.

Figure 1: Functional Classification of Roadways – Agate Beach Map

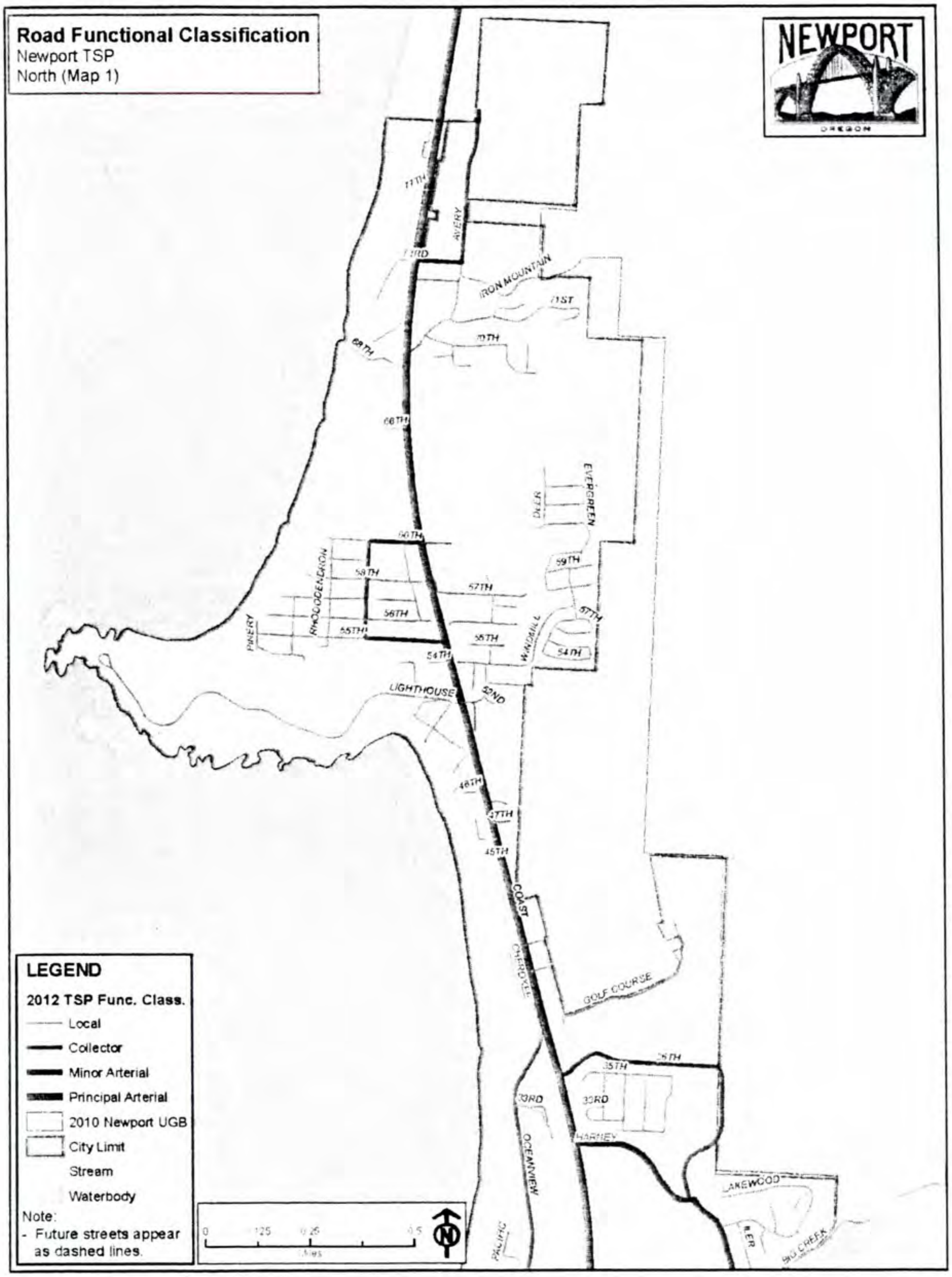


Figure 2: Functional Classification of Roadways – Downtown Map

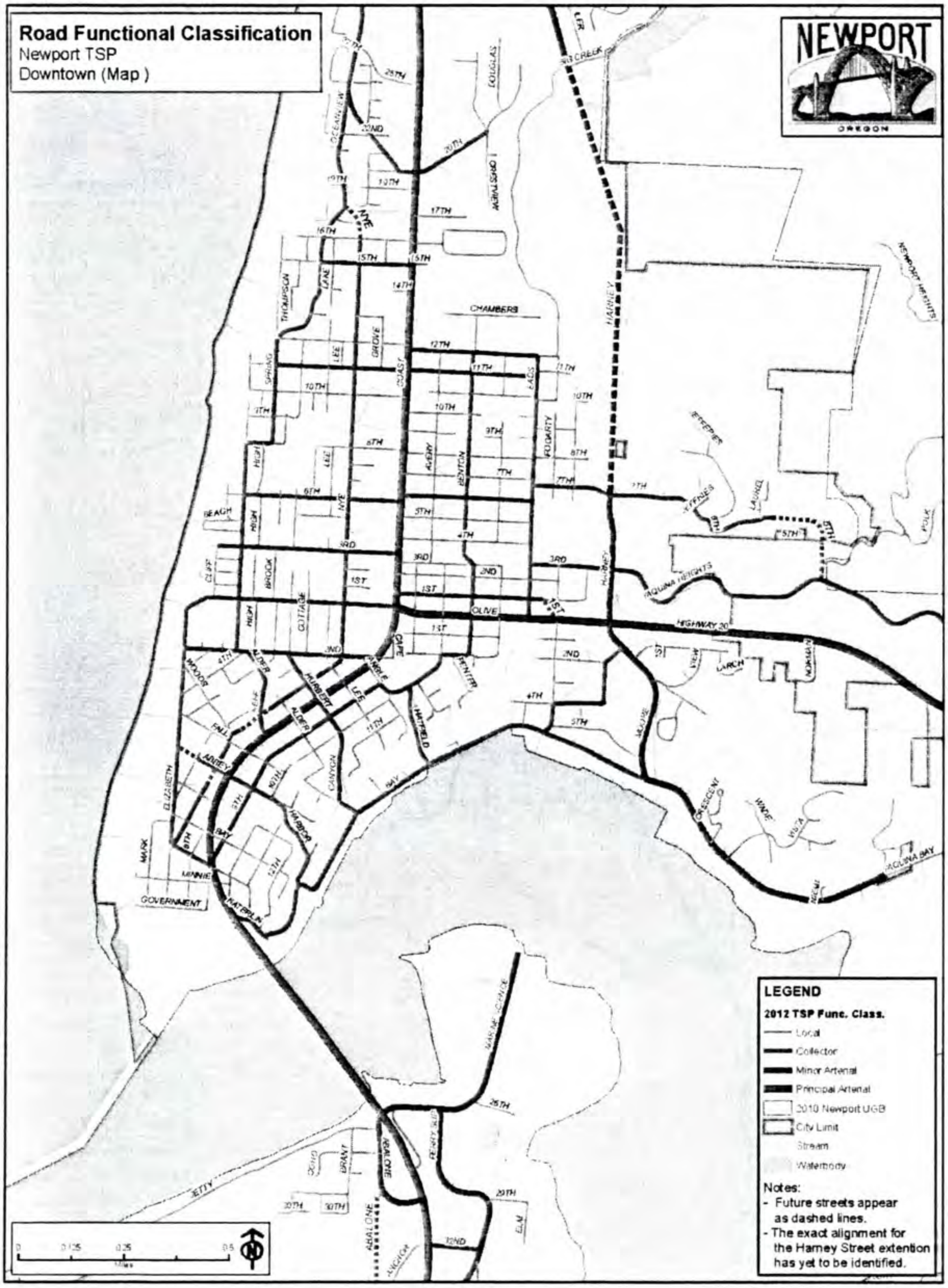


Figure 3: Functional Classification of Roadways – South Beach Map

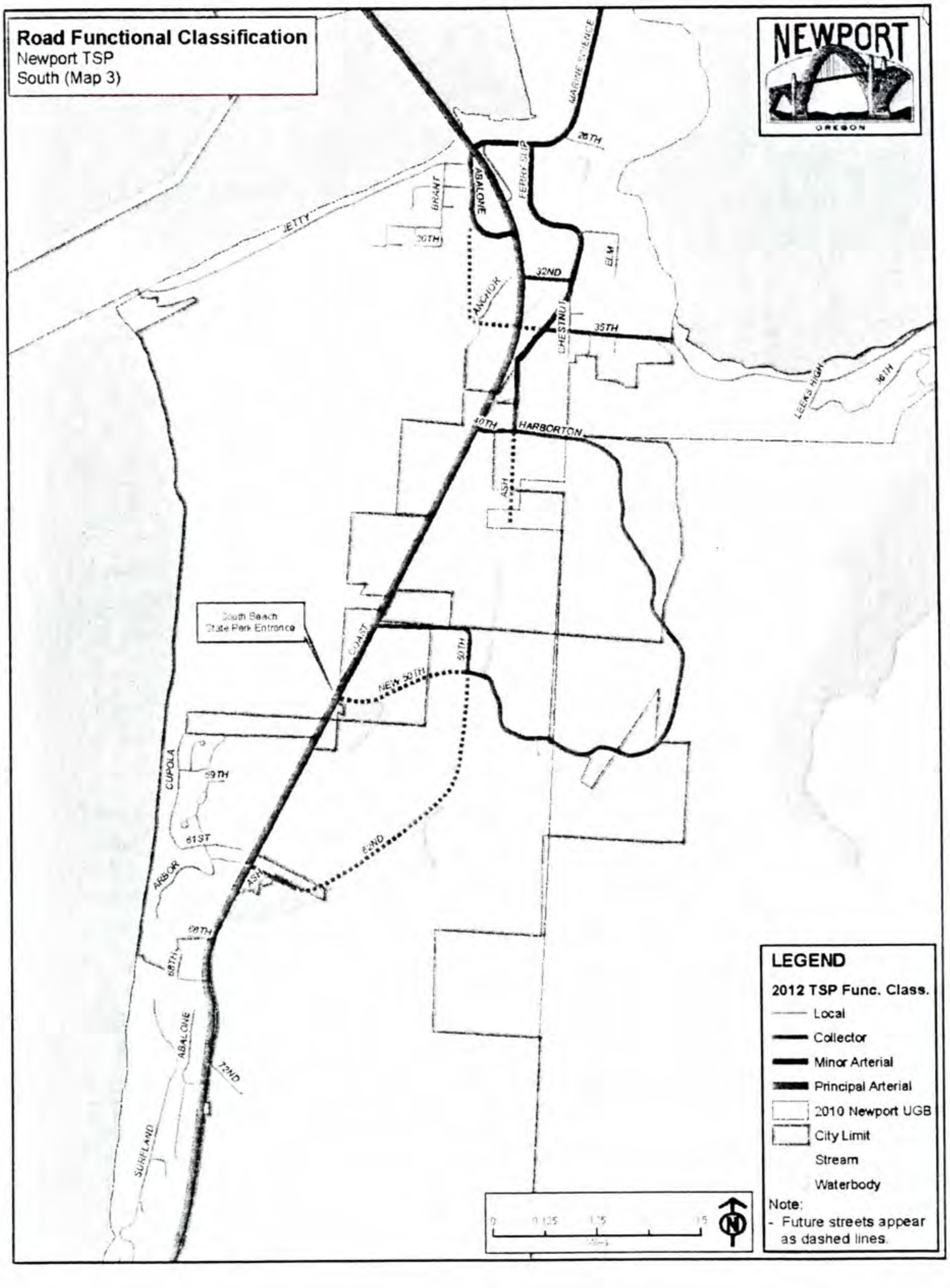


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Table 4: Functional Classification of Roadways

Principal Arterials	**Limits**
US Hwy 101	North UGB Limits to South UGB Limits
US Hwy 20	Hwy 101 to East UGB Limits
Minor Arterials	**Limits**
SW Abalone St	Hwy 101 to SE Marine Science Dr
SE Bay Blvd	John Moore Rd to East UGB Limits
SE Ferry Slip Rd	SE Marine Science Dr to SE Ash St
Harney Dr	Hwy 101 to Hwy 20
John Moore Rd	SE Bay Blvd to Hwy 20
North-South Arterial	Harney Dr to Harney Dr
SE Marine Science Dr	SW Abalone St to end of Street
Collectors	**Limits**
SW Abalone St	Stub out at cemetery to SW 35th St
SE Abbey St	Hwy 101 to SW Harbor Way
SW Alder St	SW 2nd St to SW Neff Way
SW Angle St	SW 2nd St to SW 9th St
SE Ash St	SE Ferry Slip to southern terminus
SE Avery St	SE 2nd St to East Olive (Hwy 20)
NE Avery St	NE 73rd to North UGB Limits
SE Bay Blvd	SE John Moore Rd to SW Naterlin Dr
SW Bayley St	SW 7th St to SW 11th St
NE Benton St	NE 3rd St to NE 12th St
SW Canyon Way	SW Hurbert St to SW Fall St
NW Coast St	SW 2nd St to NW 8th St
NE Coos St	NE 3rd St to SE 2nd St
NE Eads St	East Olive (Hwy 20) to NE 12th St
NW Edenview Way	Hwy 101 to NW Ocean View Dr
SW Elizabeth St	SW Bayley St to W Olive St
SW Fall St	SW Canyon Way to SW Bay Blvd
SW Fall St	SW Elizabeth St to Hwy 101
SE Ferry Slip Road	SE Marine Science Dr to SE Ash St
SE Fogarty St	SE Bay Blvd to SE 4th St
SW Harbor Way	SW Abbey St to SW 13th St
SE Harborton St	SE 40th St to SE 50th St
SE Harney Dr	SE 4th St to SE John Moore Rd
SW Hatfield Dr	SW 9th St to SW Bay Blvd
SW Hurbert St	SW 2nd St to SW Canyon Way
SW Naterlin Dr	SW Government St to SW Bay Blvd
SW Neff Way	SW Alder St to Hwy 101
NW Nye St	West Olive St to NW Ocean View Dr
SW Nye St	SW 2nd St to West Olive St
NW Ocean View Dr	NW 12th St to Hwy 101
W Olive St	SW Elizabeth St to Hwy 101
NW Spring St	NW 8th St to NW 12th St
NE Yaquina Heights Rd	NE Harney Dr to Hwy 20
NE 1st St	Hwy 20 to Hwy 101
SE 2nd St	SE Benton St to SE Coos St
SW 2nd St	SW Elizabeth St to SW Angle St
NW 3rd St	NW Coast St to Hwy 101
NE 3rd St	NW Harney St to NE Eads St

SE 4th St	SE Fogarty St to SE Harney Dr
NW 6th St	NW Coast St to Hwy 101
NE 6th St	Hwy 101 to NE Eads St
NE 7th St	NE 7th Dr to Yaquina Heights Dr
SW 7th St	SW 2nd St to SW Elizabeth St
NW 8th St	NW Coast St to NW Spring St
SW 9th St	Hwy 101 to SE 10th St
SE 10th St	SE Benton St to SW 9th St
NW 11th St	NW Spring St to Hwy 101
NE 11th St	Hwy 101 to NE Eads St
NE 12th St	Hwy 101 to NE Eads St
SW 13th St	SW Harbor Way to SW Bay St
NW 15th St	NW Ocean View Dr to Hwy 101
NE 20th St	Hwy 101 to NE Crestview Dr
SE 32nd St	Hwy 101 to SE Ferry Slip Road
SE 35th St	Hwy 101 to eastern terminus
SE 40th St	Hwy 101 to SE Harborton St
SE 50th St	SE Harborton St to US 101
SE 62nd St	SE 50th St to Hwy 101
NE 73rd St	Hwy 101 to NE Avery St

The hierarchical functional classification system requires different design standards for each roadway classification. For instance, major thoroughfare routes require different access control standards, paving requirements, right-of-way widths, and traffic safety devices. The TSP includes graphics showing the typical design standards for each roadway under the functional classification system.

The suggested design standards are to be used as a guideline for roadway construction, including the development of new roads and the reconstruction of existing roads. The roadway design standards are established to ensure consistency throughout the City, but because the City has diverse topographic and natural constraints, they must provide flexibility for unique and special situations. The City also may permit alternate street cross-section design in response to the challenges and needs of specific areas, where these standards are supported by the recommendations of a refinement planning process. Recent examples of where a more flexible approach to roadway design was adopted include the Coho/Brant and South Beach Peninsula Transportation Refinement Plans.

Transportation Planning in South Beach

Overview

Primary access to businesses and residents in South Beach principally relies on US 101. Recent analysis of the transportation system's capability to support existing and future growth indicates that the existing Oregon Highway Plan's (OHP) mobility standards or "targets" would not be met along US 101 for the 2030 planning horizon. This condition results from the combination of background traffic growth (e.g., through traffic) and anticipated development within the South Beach area. Substantial highway improvements in South Beach would not be sufficient to respond to the additional travel demand because the system is limited by the capacity of the Yaquina Bay Bridge, given its physical constraints as well as system infrastructure costs. To respond to this expected future condition, and to come into compliance with the State's expectations for mobility on US 101, the TSP identifies a variety of improvements to local street, bicycle, and pedestrian systems, as well as to US 101 that will improve local circulation and facilitate traffic movements on US 101. The identified improvements on the local roadway system, are described in Table 1[1]. The Oregon Transportation Commission recognizes that the mobility targets established in OHP Table 6 may not be feasible or practical in all circumstances. OHP Policy 1F states that alternate mobility targets can be developed to reflect the balance between relevant objectives related to land use, economic development, social equity, and mobility and safety for all modes of transportation. New mobility standards for US 101 have been identified and analyzed in conjunction with planned transportation system improvements in the report titled "Newport Transportation System Plan Update - Alternate Mobility Standards Final Technical Memorandum #13 Summary of Measures of Effectiveness," dated April 2012 in order to confirm that the mobility targets can reasonably be met within the planning horizon.

The Oregon Transportation Commission has sole authority to set standards for state facilities. The City supports the application of alternative mobility standards at intersections on US 101 in order to facilitate planned growth in South Beach. This change to mobility standards on US 101 as a result of planning done in 2011-12 represents a decision to accept a higher level of congestion. In recognition of the constraint that the existing Yaquina Bay Bridge poses to access to South Beach, and the lack of funds for large capacity improvements on the highway system in the foreseeable future, the City has chosen to help implement the State's alternate mobility standards, given that a higher level of controlled congestion on US 101 is an acceptable trade-off for accommodating economic development and reduced costs of total transportation system improvements associated with development.

An infrastructure refinement plan was prepared for the Coho/Brant neighborhood concurrent with the preparation of the TSP. That plan identifies needed improvements to local and collector streets in the neighborhood considering the transportation network identified in the TSP update for the greater South Beach area.

Development of an Alternative Mobility Standard

A substantial seasonal increase in traffic volumes occurs on US 101 during the summer months due to tourist traffic. During the peak traffic months of July and August, Newport weekday traffic is 21% higher than the annual average traffic volumes and 40% higher than traffic volumes during January. The Oregon Highway Plan (OHP)'s mobility targets apply during this peak summer traffic period.[2] Current traffic conditions in South Beach; however, are better than the conditions allowed by the OHP mobility targets.[3]

The capacity of the two-lane Yaquina Bay Bridge also affects highway operations in South Beach. The narrow travel lanes, lack of highway shoulders and the significant road grade from the middle of the bridge to its south end in South Beach affect the bridge's capacity when compared to a typical highway. The TSP Update calculated that the two-lane bridge's capacity is about 25% less than a typical highway. No replacement bridge can be expected in the planning horizon to provide additional capacity, so South Beach traffic movements will continue to be affected by this condition in 2030.

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[1] In 2012, Ordinance 2045 updated the TSP to include transportation improvements for South Beach. The technical memoranda that constitute the analysis and recommendations for the transportation system in South Beach are documented and included in Ordinance 2045. *Newport Transportation System Plan Update - Alternate Mobility Standards Final Technical Memorandum #13 Summary of Measures of Effectiveness* informs the development of alternate mobility standards for US 101 in the South Beach study area. The development of these standards is based on the findings of technical memoranda #5, #10, #11 and #12 prepared for the Newport Transportation System Plan (TSP) Update.

[2] OHP Policy 1F, Table 6.

[3] Newport TSP Technical Memorandum #5.

OHP mobility targets apply at the end of the planning horizon to evaluate the effect of future community development on highway operations, and substantial development is expected in South Beach during the planning horizon. Traffic volumes that would result from the level of development expected to occur in South Beach by 2030 were combined with ODOT's projections for background traffic growth. These future traffic volumes then were evaluated with the current local road network and current highway configuration, and with the existing road network and a five-lane highway alternative. The analysis showed that the existing network and the existing highway could not meet the OHP mobility targets anywhere in the system. Congestion would be so severe that traffic volumes would exceed the capacity of all highway intersections and the average travel speed would be 3.9 miles per hour for northbound traffic, and 2.5 miles per hour for southbound traffic on the existing highway. When the analysis included a five-lane highway, conditions north of 50th Street still could not meet the OHP targets and still exceeded capacity. South of 50th Street, most highway movements could meet the OHP targets, but none of the intersecting streets could. The average travel speed for a five-lane highway would be less than nine miles per hour for northbound traffic and less than six miles per hour for southbound traffic.[4]

A local road network is proposed in the South Beach Urban Renewal Plan to provide a local transportation system that is better able to support development in South Beach. The network would provide a more interconnected local street system that would allow local travel to occur on city streets rather than solely on the highway. This network was included in the Preferred System for the TSP Update because it would provide better long-term traffic conditions than the existing network and a five-lane highway.

The OHP mobility targets cannot be met on US 101 in South Beach because of high seasonal traffic and the reduced highway capacity caused by the Yaquina Bay Bridge. The OHP calls for consideration of alternative mobility standards where it is infeasible to meet the OHP mobility targets. Future traffic conditions in South Beach will be affected by high seasonal traffic and the reduced capacity of the Yaquina Bay Bridge. The alternative mobility standard incorporates a seasonal adjustment to use the annual average traffic volume; assigns new mobility targets; evaluates mobility only at existing traffic signals and at the locations where signalized intersections are proposed as part of the TSP Update; and accounts for the development of community services in South Beach, thereby minimizing future travel on US 101 to reach such services elsewhere in Newport. The results are alternative mobility standards effective at the current signalized US-101/SE 32nd Street intersection and at the future signalized highway intersections at South 35th Street, SE 40th Street and at SE 50th Street/South Beach State Park.

[4] Newport TSP Update, Technical Memorandum #11.

Trip Budget Program

The purpose of the Trip Budget Program is to ensure that the planned transportation system meets the needs of existing and future development in South Beach. The underlying premise of the program is that the planned transportation system can accommodate a reasonable level of land development and still operate at an acceptable level. The assumed number of trips that will be generated by development in South Beach over a 20-year planning horizon was determined based on projected population growth and permitted land uses, but with the assumption that not all areas were 100% buildable due to environmental constraints.[5] The land uses in this scenario, and the vehicular trips this future growth will generate, are anticipated to be accommodated on the adopted planned transportation system over a similar time horizon. The Trip Budget Program will be used to maintain the balance between the expected land uses and the identified needed transportation improvements in South Beach.

The City maintains a zoning overlay for South Beach that sets the parameters for allocating trips to new development and provides a framework for how and when the City of Newport and ODOT will revisit 20-year growth assumptions. The overlay, titled the South Beach Transportation Overlay Zone ("SBTOZ"), includes developable and redevelopable land in the South Beach portion of Newport, from the Yaquina Bay Bridge south to properties accessing SE 62nd Street (Figure 2: South Beach Overlay Zone). The SBTOZ helps the City track the consumption of trips from future development. It is a tool to assess new growth and compare it to the assumptions upon which the transportation system and improvements are based.

TAZ Trip Budgets

The Trip Budget Program is based on the number of trips projected to be generated from new development in South Beach over a 20-year time horizon. South Beach transportation analysis zones ("TAZs") were created, as shown in Figure 2, to forecast future trips. Future development assumptions were made based on existing land use designations, environmental constraints in the area, and information gathered from property owners and businesses regarding assumptions about the amount of development that could be expected for each of the TAZs within the planning horizon. Table XX lists the TAZs in the SBTOZ and the PM peak hour trip total for each TAZ, at the time of plan adoption. The total number of trips available in the SBTOZ at the time of plan adoption also is shown in Table XX; these totals are the basis for the Trip Budget Program.

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[5] Land Use Scenario #2 in Newport Transportation System Plan Update - Alternate Mobility Standards Technical Memorandum #12 Analysis of South Beach Land Use Scenarios. Further supported by technical reports titled "Review of Newport TSP Update – Technical Memorandum #10: Biological/Wetlands Review" and "Newport Transportation System Plan Update – Alternate Mobility Standards Technical Memorandum #11 2030 Baseline System."

Table 4: South Beach Overlay Zone Trip Budget Totals

Area	TAZ Trip Budget[1]
Area A	1,237
Area B and C	798
Area D	606
Area E	167
Area F	626
Area G	257
Area H	300
Area I	181
Area J	200
Trip Reserve Total[2]	**490**
SBTOZ Trip Total	**4,862**

[1]TAZ Trip Budgets are projected PM Peak Hour Trips forecasted for each TAZ during the next 20 years. TAZ Trip Budgets are based upon Scenario #2 in the "Newport Transportation System Plan Update– Alternate Mobility Standards Final Technical Memorandum #12."
[2] The SBTOZ Trip Reserve Total is 10% of the PM Peak Hour Trips from each TAZ. These trips can be allocated anywhere within the SBTOZ through Newport Zoning Code provisions.

City shall develop a process for the allocating trips out of the TAZ Trip Budget. Such a process may provide for vesting trips with a valid land use decision or through the issuance of a vesting letter. As part of the trip allocation process, the City is responsible for determining whether or not remaining trips available in the TAZ can accommodate the development proposal. Proposed developments that would generate more PM peak hour trips than what remains in the budget for the TAZ can be approved only by submitting a land use application requesting to use trips from the Trip Reserve Fund or through mitigation supported with a traffic impact analysis.

Trip Reserve Fund

Trips from the Trip Reserve Fund can be allocated to development projects anywhere within the SBTOZ. The trips in the reserve fund were calculated based on the cumulative total of all the TAZs in the SBTOZ and roughly equal 10% of the total PM peak hour trips available in the SBTOZ, as shown in Table 4. Reserve trips may be allocated across TAZ boundaries, to any land use type that is permitted by the underlying zoning.[6] Through the SBTOZ, the City applies the following criteria to determine when trips should be allocated out of the Trip Reserve Fund to support a proposed development project:

- There are insufficient unassigned trips remaining in the TAZ to accommodate the proposed types of use(s).
- The proposal to use trips from the Trip Reserve Fund to meet the requirements of the Trip Budget is supported by a Transportation Impact Analysis.
- There are sufficient trips available in the Trip Reserve Fund to meet the expected trip generation needs of the proposal.

Approval of the allocation of trips from the Trip Reserve Fund is a discretionary decision, subject to attendant public notice, opportunity to comment, and an appeals process. Allocation of reserve trips is approved only where a transportation analysis demonstrates that the impacts from the

[6] As opposed to TAZ trips, which must be allocated within the TAZ boundaries where development is proposed.

proposed development is consistent with the planned preferred transportation system, or that the transportation impacts can be mitigated with improvements proposed as part of the development.

Transportation Impact Analysis Requirement

To ensure that the number of trips available in the Trip Budget and Trip Reserve Fund are not being exceeded by development, the City will need to know the expected trip generation from each development proposal. In order for this information to be included in a development application, the City has traffic-related submittal requirements in the Zoning Ordinance. For development proposals, including changes in uses that will have a limited impact on the transportation system, this can be accomplished by determining the number of PM peak hour trips expected from the future development and ensuring that the effect to the transportation system is consistent with the transportation improvements planned for South Beach. Additional traffic analysis is required for higher traffic generating uses, such as development proposals that include a requested change in the underlying land use designation or zone or proposals that request trips from the Trip Reserve Fund to support a development proposal. The "two tiered" nature of such submittals in the City Zoning Ordinance requires a Trip Assessment Letter of all applicants, and requires a Transportation Impact Analysis ("TIA") when certain prescribed threshold conditions are met. The TIA section in the Zoning Code also includes thresholds that, if met or exceeded by a development proposal, would require that a TIA be submitted to the City for review and approval through a Type III review process.

The Zoning Code shall describe the thresholds for requiring a TIA that are applicable to development anywhere in Newport. The required elements of a TIA also are described. However, City staff has some discretion to determine the level of analysis necessary, based in part on the size and expected impact of the proposed project. Initial information on a proposed project and expected transportation impacts is gained through a pre-application conference between City staff and the applicant. The zoning code should allow the City to require needed transportation improvements as a condition of approval when the TIA shows that there is a need for the improvements. A fee-in-lieu option may also be included in the zoning code to provide for some flexibility as to when those improvements are made.

Trip Generation Calculation

The number of PM peak hour trips a proposed development is expected to put on the transportation system is based on trip generation by use in the latest edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual. One identified way to reduce the number of trips across the Yaquina Bay Bridge to reach essential goods and services is to promote a mix of uses in South Beach and to encourage service-related uses not currently found south of the bridge. Consistent with this approach, certain land use types must only consider the "primary trips" for the use rather than the trips that also would accrue from "passby" or "diverted-link" trips. Passby and diverted link trips involve intermediate stops on the way from a trip origin to a primary destination. "Passby" or "diverted linked" trips are identified by the type of use in the latest edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual. The following uses will be required to calculate only "primary trips":

- Personal service oriented uses, such as professional offices and branch banks.
- Sales or general retail uses, total retail sales area under 15,000 square feet, such as a grocery store. This does not include restaurants.
- Repair oriented uses.

Monitoring the Trip Budget Program

The trip generation information obtained from the Trip Assessment Letter required of each development proposal, as well as alterations or changes in use, in South Beach will be used by City staff to keep the Trip Budget updated. Upon approval of the trip allocation, City staff will update the available PM peak hour trip total for the subject TAZ by deducting the trips allocated to the permitted development. In the case of a change in use, where the new use generates less trips than the previous use, or through mitigation capacity is added to the system then trips may be added to the Trip Budget. The Trip Reserve Fund will be similarly updated when development is allocated trips from the Fund.

The Planning Commission and City Council should receive periodic updates on the status of the Trip Budget. The frequency of these updates may depend upon the respective body's work program but occur at least once a year.

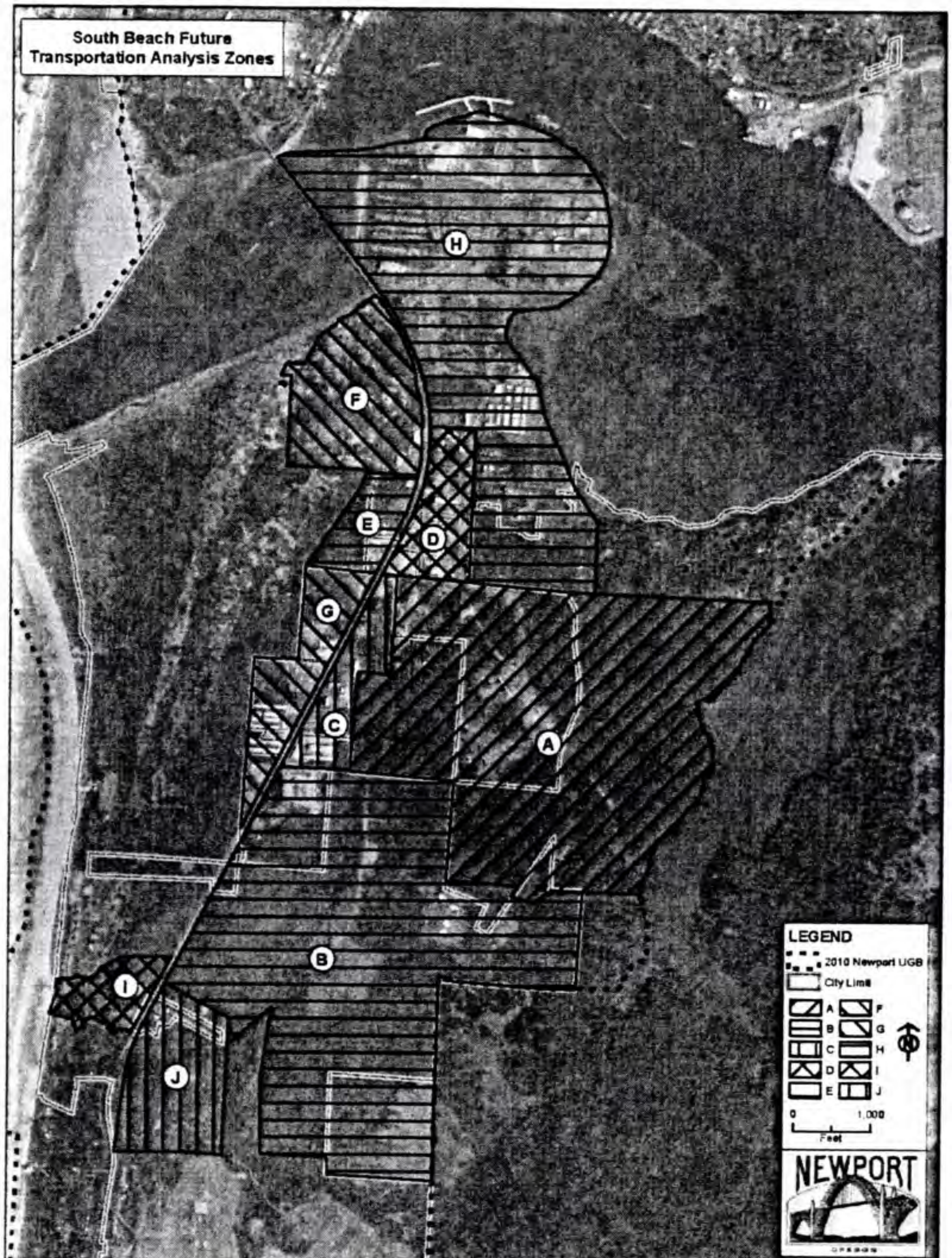
Amending the Trip Budget Program

It is unlikely that development will match up precisely to the assumptions in the future transportation analysis and, despite the flexibility afforded by the trip reserve, the Trip Budget Program may need to be updated to reflect actual development trends or to accommodate economic development opportunities that were not foreseen at the time of its adoption. These updates will be accomplished by:

- A comprehensive reassessment of the trip budget program that will begin no more than 10 years from effective date of Trip Budget Program ordinance.
- A reevaluation of the Newport Transportation System Plan and the associated trip budget will occur when 65% of the total trips in any given TAZ have been committed to permitted development.
    - This review will be initiated no later than 6 months from the time the threshold is reached. In anticipation of development reaching the 65% threshold, the City could also choose to commence the review any time development pressure in a certain TAZ warrants such an action.
    - The development proposal that triggers the 65% Review will not be denied based on this required review. Subsequent development proposals within the subject TAZ may also be reviewed and approved by the City during the review process. If the review necessitates updates to the Trip Budget Program, proposed changes will be adopted through a TSP and associated Zoning Code amendments.
    - To ensure that the 65% Review provides timely information, it will be completed within 12 months from initiation, or pursuant to a schedule that is part of a work program previously agreed upon by both the City and ODOT.

Major updates or adjustments of the land use scenarios and the trip budget for South Beach will require a legislative amendment to the TSP. Transportation Planning Rule findings of compliance with the adopted transportation system plan must support the modification.

Figure 4: South Beach Overlay Zone[7]



[7] Corresponds with Figure 2-2 from Newport Transportation System Plan Update - Alternate Mobility Standards Technical Memorandum #12 Analysis of South Beach Land Use Scenarios.

Pedestrian Facility Improvements

Specific to the City's pedestrian plan are recommendations for a continuous sidewalk system in good repair that will connect existing and future pedestrian and transit traffic generators. Emphasis is given to the pedestrian/transit interface. Also critical to the plan is the support it provides for tourist foot traffic, from the main traffic area and to specific tourist attractions. To this end, sidewalk improvements were identified to link existing sidewalks and to provide a system of sidewalks to ensure a balanced transportation system that offers realistic non-motorized alternatives. Early City efforts focused on providing safe and convenient travel for children who walk to school. The pedestrian and bicycle plan was greatly expanded in 2008 when the City adopted a new Pedestrian and Bicycle Plan. The City's existing pedestrian facilities and proposed pedestrian system are illustrated in the 2008 Pedestrian and Bicycle Plan.[8] The update to the transportation system serving South Beach resulted in recommended projects that will enhance the pedestrian experience south of the bridge, including sidewalks along the west side of US 101, south to 35th Street, which will be part of future roadway improvements, and a multi-use path and sidewalks east of the highway, along 40th Street, Harborton Road, and 50th Street. South Beach improvements are illustrated Figure 3, Recommended South Beach Pedestrian and Bicycle Projects.

In 2011 the City conducted a series of charrettes with the public to improve recreational access to Agate Beach. The Agate Beach Wayside Project resulted in a conceptual design and list of associated improvements after extensive outreach by the City of Newport and Lincoln County with neighboring property owners, business owners, Oregon Department of Transportation, the Oregon Parks and Recreation Department, Surfrider Foundation, and other stakeholders.
Major elements of the project include: improved parking lot circulation and safety; pedestrian improvements for Lucky Gap Trail; pedestrian improvements to North Agate Beach (i.e. "surfer access"), and; improvements to NW Agate Way and sidewalks on NW Gilbert Way.

Table 5 includes the recommended pedestrian facility improvements needed over the next 20 years. As indicated in the source column in Table 5, the projects listed are identified in the 1997 TSP, as well as updates to this plan in 2008 and 2012. All project cost estimates are shown in 2011 dollars; cost estimates for projects from the 1997 TSP (and 2008 update) have been adjusted to account for inflation.

Planning level cost estimates have been prepared for projects needed to provide continuous sidewalks within the school bus perimeter and in the core area, and to provide sidewalks where they do not currently exist on streets that will be part of the future arterial or collector network.

Adding sidewalks along a roadway are only part of the pedestrian solution; many busy streets and intersections are difficult to cross and can be barriers to walking. Allowing people to cross streets as freely as possible is important in maintaining a pedestrian-friendly environment. Often the width of the street, the geometry of the intersection, and the signal timing are designed only for the needs of the vehicle; not the pedestrian.

To increase pedestrian crossing opportunities and safety, two approaches can be considered: (1) designing roads that allow crossings to occur safely by incorporating design features such as raised medians or signal timing that creates gaps in traffic; or (2) constructing actual pedestrian crossings with pedestrian-activated signals, mid-block curb extensions, marked crosswalks, etc.

[8] See maps 2-1, 3-1, 3-2, and 3-3 in the 2008 Pedestrian and Bicycle Plan. Note that the location of the shared use path and the proposed sidewalk along Highway 101 depicted on Map 3-3, Proposed Pedestrian System in South Newport, has been updated; see Figure 3, Recommended South Beach Pedestrian and Bicycle Projects.

There are a variety of locations in Newport where crosswalk improvements are necessary to maintain pedestrian safety. The 2008 Pedestrian and Bicycle Plan identify several techniques that can be implemented at busy intersections.

Bicycle Facility Improvements

US 101 is the state-designated bike route that is known nationally as the Oregon Coast Bike Route. In Newport, the Oregon Coast Bike Route diverges from the highway between Ocean View Drive and the Yaquina Bay Bridge onto city streets located west of the highway that have lower traffic volumes and are closer to the Pacific Ocean. Other City-designated routes are along Ocean View Drive, Coast Street, and Elizabeth Street. These routes are currently signed, but lack separated bike lanes. The City's goal is to provide bicycle routes that enable safe and efficient travel for through bike traffic traveling along the Oregon Coast, as well as to provide a system for traveling within the city. The system of bicycle facilities has been designed to connect both north-south and east-west bicycle traffic. It has also been designed to connect all major generators of bicycle traffic with residential neighborhoods and tourist facilities. The pedestrian and bicycle plan was greatly expanded and adopted by the City of Newport in 2008. The existing bicycle facilities and proposed bicycle facilities are illustrated in the 2008 Pedestrian and Bicycle Plan.[9] The update to the transportation system serving South Beach resulted in recommended projects to enhance the pedestrian experience south of the bridge. Sidewalks will be extended on both sides of the highway south to 35th Street. South of 35th Street, a multi-use path will be constructed on the west side of the highway; a sidewalk will be constructed on the east side. Multi-use paths and sidewalks will be constructed along SE 40th Street, Harborton Road and the new alignment for SE 50th Street.

Table 5 presents the recommended bicycle route improvements. The cost estimate for upgrading existing roads to include bicycle lanes has been prepared for each route or series of routes. The cost estimates for bicycle facilities on new roadways have been included in the roadway construction cost estimates. All project cost estimates are shown in 2012 dollars; cost estimates for projects from the 1997 TSP (and 2008 update) have been adjusted to account for inflation.

[9] See Maps 2-2, 3-4, 3-5, and 3-6 in the 2008 Pedestrian and Bicycle Plan. The location of the proposed shared use path in South Beach was updated by the 2012 South Beach amendments (see Figure 3 Recommended South Beach Pedestrian and Bicycle Projects).

Table 5: Recommended Pedestrian and Bicycle Improvements[10]

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
US 101 Crossings						
NW 68th Undercrossing	n/a	An undercrossing of US 101 at NW 68th	ODOT / Newport	Low	$2,340,000	*2008 Ped. Bike Plan*
Mid-block between 16th Street & 17th Street	n/a	Add median, raised stop bars, appropriate signage, and striped continental crosswalk	ODOT / Newport	Low	$265,000	*2008 Ped. Bike Plan*
NW 15th Street	n/a	Add crosswalk	ODOT / Newport	Low	$11,500	*2008 Ped. Bike Plan*
13th Street	n/a	Add median, raised stop bars, appropriate signage, and striped continental crosswalk	ODOT / Newport	Low	$265,000	*2008 Ped. Bike Plan*
10th Street	n/a	Add median, raised stop bars, appropriate signage, and striped continental crosswalk	ODOT / Newport	Medium	$265,000	*2008 Ped. Bike Plan*
8th Street	n/a	Add median, raised stop bars, appropriate signage, and striped continental crosswalk	ODOT / Newport	Medium	$265,000	*2008 Ped. Bike Plan*
3rd Street / 4th Street	n/a	Add median, raised stop bars, appropriate signage, and striped continental crosswalk	ODOT / Newport	High	$265,000	*2008 Ped. Bike Plan*
2nd Street (outside City Hall)	n/a	Add median, raised stop bars, appropriate signage, and striped continental	ODOT / Newport	High	$265,000	*2008 Ped. Bike Plan*

[10] All project estimates, unless otherwise noted, are shown in 2012 dollars. Costs are escalated at a 4% per year from the previous project estimate (1997, 2008 or 2011).

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
		crosswalk				
SW Angle Street	n/a	Add curb extensions	ODOT / Newport	High	$78,000	*2008 Ped. Bike Plan*
SW Lee Street	n/a	Add curb extensions	ODOT / Newport	High	$53,000	*2008 Ped. Bike Plan*
SW Hurbert Street	n/a	Add curb extensions	ODOT / Newport	High	$38,000	*2008 Ped. Bike Plan*
SW Alder Street	n/a	Add curb extensions	ODOT / Newport	High	$53,000	*2008 Ped. Bike Plan*
SW Neff Way	n/a	Add median, raised stop bars, appropriate signage	ODOT / Newport	Medium	$265,000	*2008 Ped. Bike Plan*
SW Abbey Street	n/a	Tighten the turning radius for vehicles, add marked crosswalks	ODOT / Newport	Low	$205,000	*2008 Ped. Bike Plan*
SW Bay Street	n/a	Tighten the turning radius for vehicles, add marked crosswalks	ODOT / Newport	Low	$205,000	*2008 Ped. Bike Plan*
Mid-block between SW Bayley Street & SW Minnie Street	n/a	Add median, raised stop bars, appropriate signage, and striped continental crosswalk, and curb extensions	ODOT / Newport	Medium	$265,000	*2008 Ped. Bike Plan*
Sidewalks						
US 101[11]	Yaquina Bay Bridge to Abalone Street	Construct sidewalk on west side of highway			$186,000	*2012 South Beach TSP update*
US 101[12]	Abalone Street to Anchor Way/35th Street	Construct sidewalk on west side of highway			$332,000	*2012 South Beach TSP update*

[11] Funding currently proposed from FEMA as part of tsunami evacuation route. The Ash Street Extension roadway improvement project (south of SE 40th Street) shows a multi-use path at this location. This estimate is for an independent sidewalk improvement.

[12] Project included as part of the Ash Street Extension roadway improvement project (south of SE 40th Street) as a multi-use path.

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
NE Avery Street	US 101 to end of street	Construct sidewalk on west side of street	Newport	Medium	$219,000	*2008 Ped. Bike Plan*
NE 71st Street	NE Avery Street to NE Echo Ct	Construct sidewalk on south side of street	Newport	Low	$115,000	*2008 Ped. Bike Plan*
NE 70th Street	NE Avery St to fire access easement road	Construct sidewalk on north side of street	Newport	Low	$79,000	*2008 Ped. Bike Plan*
Fire Access Easement	NE 70th St to NE 71st St	Construct pedestrian accessway	Newport	Low	$18,000	*2008 Ped. Bike Plan*
US 101	NE Avery St to Agate Beach Access Rd	Construct sidewalk on west side of street	ODOT / Newport	Low	$700,000	*2008 Ped. Bike Plan*
NE 57th Street	US 101 to NE Evergreen Ln	Construct sidewalk on south side of street	Newport	Medium	$130,000	*2008 Ped. Bike Plan*
NE Evergreen Lane	End of street to NE 54th St	Construct sidewalk on west side of street	Newport	Low	$245,000	*2008 Ped. Bike Plan*
NE 54th Street	NE Evergreen Ln to NE 56th St	Construct sidewalk on north side of street	Newport	Low	$60,000	*2008 Ped. Bike Plan*
NE 56th Street	NE 54th St to NE Lucky Gap St	Construct sidewalk on east/south of street	Newport	Low	$85,000	*2008 Ped. Bike Plan*
NE Lucky Gap Street	NE 56th St to NE 57th St	Construct sidewalk on east side of street	Newport	Low	$55,000	*2008 Ped. Bike Plan*
NW 60th Street	US 101 to end of street	Construct sidewalk on both sides of street	Newport	Medium	$155,000	*2008 Ped. Bike Plan*
NW 58th Street	US 101 to end of street	Construct sidewalk on both sides of street	Newport	Medium	$225,000	*2008 Ped. Bike Plan*
NW 57th Street	NW Gladys St to end of street / NW Biggs St to end of street	Construct sidewalk on south side of street	Newport	Low	$115,000	*2008 Ped. Bike Plan*
NW 56th Street	US 101 Access Rd to	Construct sidewalk on south side of	Newport	Medium	$145,000	*2008 Ped. Bike Plan*

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
	end of street	street				
NW 55th Street	US 101 to end of street	Construct sidewalk on north side of street	Newport	Medium	$160,000	*2008 Ped. Bike Plan*
NW Rhododendron Street	NW 55th St to NW 60th St	Construct sidewalk on east side of street	Newport	Medium	$105,000	*2008 Ped. Bike Plan*
NW Biggs Street	NW 56th St to NW 60th St	Construct sidewalks on both sides of street	Newport	Medium	$155,000	*2008 Ped. Bike Plan*
NW Gladys Street	NW 56th St to NW 60th St	Construct sidewalks on west side of street	Newport	Low	$90,000	*2008 Ped. Bike Plan*
NW Lighthouse Drive	US 101 to end of street	Construct sidewalks on north side of street	Newport	Low	$335,000	*2008 Ped. Bike Plan*
NE Harney Street	US 101 to NE Big Creek Rd	Construct sidewalks on south side of street	Newport	Medium	$210,000	*2008 Ped. Bike Plan*
NE Lakewood Drive	NE Harney to end of street	Construct sidewalk on one side of street	Newport	Medium	$190,000	*2008 Ped. Bike Plan*
NE Crestview Drive	NE 20th St to end of street	Complete sidewalk gaps on west side of street	Newport	Low	$34,000	*2008 Ped. Bike Plan*
NE Crestview Place	NE 20th St to end of street	Construct sidewalks on west side of street	Newport	Low	$63,000	*2008 Ped. Bike Plan*
NE 20th Place	NE 20th St to end of street	Construct sidewalks on south side of street	Newport	Low	$61,000	*2008 Ped. Bike Plan*
NE Douglas Street	NE 20th Pl to end of street	Construct sidewalks on west side of street	Newport	Low	$59,000	*2008 Ped. Bike Plan*
NW Oceanview Drive	US 101 to NW Spring St	Construct sidewalks on west side of street	Newport	Low	$495,000	*2008 Ped. Bike Plan*
NW Spring Street	NW Oceanview Dr to NW 8th St	Construct sidewalks on west side of street	Newport	Medium	$105,000	*2008 Ped. Bike Plan*
NW 8th Street	NW Spring St to NW Coast St	Construct sidewalks on north side of street	Newport	Medium	$32,000	*2008 Ped. Bike Plan*

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
NW 15th Street	NW Oceanview Dr to NW Grove St	Construct sidewalks on south side of street	Newport	Low	$68,000	*2008 Ped. Bike Plan*
NW 12th Street	NW Spring St to just east of NW Nye St	Construct sidewalks on south side of street	Newport	Medium	$87,000	*2008 Ped. Bike Plan*
NW 11th Street	NW Spring St to US 101	Complete sidewalk gaps on both sides of street	Newport	High	$130,000	*2008 Ped. Bike Plan*
NW 10th Street	NW Spring St to NW Nye St	Construct sidewalk on south side of street	Newport	Medium	$79,000	*2008 Ped. Bike Plan*
NW 6th Street	NW Coast St to NW Nye St	Construct sidewalks on north side of street	Newport	High	$183,000[13]	*2008 Ped. Bike Plan*
NW 12th Street	US 101 to NE Benton St	Complete sidewalk gaps on south side of street	Newport	High	$60,000	*2008 Ped. Bike Plan*
NE 8th Street	US 101 to NE Eads St	Construct sidewalks on one side of the street	Newport	Medium	$130,000	*2008 Ped. Bike Plan*
NE 7th Street	US 101 to NE Eads St	Construct sidewalks on one side of the street	Newport	High	$130,000	*2008 Ped. Bike Plan*
NE Jeffries Place	NE 7th St to end of street	Construct sidewalks on west side of street	Newport	Low	$39,000	*2008 Ped. Bike Plan*
NE 7th Drive	NE 7th St to end of street	Construct sidewalks on west side of street	Newport	Low	$94,000	*2008 Ped. Bike Plan*
NE 6th Street	NE 7th Drive to end of street	Construct sidewalks on south side of street	Newport	Low	$100,000	*2008 Ped. Bike Plan*
NE 4th Street	US 101 to NE Douglas St	Construct sidewalks on both sides of street	Newport	High	$170,000	*2008 Ped. Bike Plan*
NE 3rd Street	NE Eads St to NE Harney St	Complete sidewalk gaps on both sides of street	Newport	High	$140,000	*2008 Ped. Bike Plan*
NE 2nd Street	US 101 to NE Eads St	Complete sidewalk gaps on both sides of street	Newport	Medium	$125,000	*2008 Ped. Bike Plan*

13 Project cost estimate developed in 2012.

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
SE 1st Street	US 101 to SE Douglas St	Construct sidewalks on south side of street	Newport	High	$105,000	*2008 Ped. Bike Plan*
SE 2nd Street	SE Benton St to SE Douglas St	Construct sidewalks on south side of street	Newport	High	$46,000	*2008 Ped. Bike Plan*
SE Benton Street	SE 1st St to US 20	Construct sidewalks on west side of street	Newport	High	$18,000	*2008 Ped. Bike Plan*
SE Coos Street	SE 2nd St to US 20	Construct sidewalk on west side of street	Newport	Medium	$39,000	*2008 Ped. Bike Plan*
SE Douglas Street	SE 2nd St to US 20	Construct sidewalk on west side of street	Newport	Medium	$39,000	*2008 Ped. Bike Plan*
SE 2nd Street	SE Fogarty St to SE Harney St	Construct sidewalks on south side of street	Newport	High	$45,000	*2008 Ped. Bike Plan*
SE 4th Street	SE Fogarty St to SE Harney St	Construct sidewalks on south side of street	Newport	High	$45,000	*2008 Ped. Bike Plan*
SE Harney Street	SE 4th Street to SE 2nd St	Construct sidewalks on east side of street	Newport	High	$39,000	*2008 Ped. Bike Plan*
Bay Blvd	Length of street	Complete sidewalk gaps on both sides of street	Newport	Medium	$185,000	*2008 Ped. Bike Plan*
SW Hatfield Drive	SW Bay Blvd to SW 10th St	Construct sidewalks on west side of street	Newport	Low	$67,000	*2008 Ped. Bike Plan*
SW Harbor Drive	SW Bay St to SW 11th St	Construct sidewalks on west side of street	Newport	High	$51,000	*2008 Ped. Bike Plan*
SW Neff Way / SW Alder St	US 101 to SW 2nd St	Construct sidewalks on both sides of street	Newport	High	$170,000	*2008 Ped. Bike Plan*
SW 7th Street	SW Alder St to SW Elizabeth St	Construct sidewalks on north side of street	Newport	Medium	$180,000	*2008 Ped. Bike Plan*
SW Elizabeth Street	SW Government St to SW Abbey St	Construct sidewalk on west side of street	Newport	High	$145,000	*2008 Ped. Bike Plan*
SW	Yaquina State	Construct sidewalk	State Parks /	Low	$140,000	*2008 Ped.*

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
Government Street / Yaquina State Park	Park	adjacent to road through park	Newport			*Bike Plan*
SE Marine Science Dr	SW Abalone to end of street	Construct sidewalks on south and east side of street	Newport	Medium	$250,000	*2010 South Beach Peninsula Plan*
SE Ferry Slip Road	SE 29th St to SE Marine Science Dr	Construct sidewalks on east side of street	Newport	Medium	$27,000	*2010 South Beach Peninsula Plan*
SW Brant Street	SW Abalone St to end of street	Construct sidewalks on west side of street	Newport	High	$433,000[12]	*2012 Coho/Brant Infra. Plan*
SE 35th Street	SE Ferry Slip Rd to end of street	Construct sidewalk on one side of street	Newport	High	$400,000	*2008 Ped. Bike Plan*
SE Fogarty Street	US 20 to SE Bay Blvd	Construct sidewalk on east side of street	Newport	Medium	$110,000	*2008 Ped. Bike Plan*
NE 36th Street	US 101 to NE Harney St	Construct sidewalk on one side of street	Newport	Medium	$135,000	*2008 Ped. Bike Plan*
NE 10th Court	NE Eads to NE Benton St	Construct sidewalks on both sides of street	Newport	Medium	$120,000	*2008 Ped. Bike Plan*
NE 10th Street	NE Benton St to US 101	Construct sidewalks on both sides of street	Newport	Medium	$125,000	*2008 Ped. Bike Plan*
NE 5th Street	NE Benton St to NE Eads St	Construct sidewalks on both sides of street	Newport	Medium	$125,000	*2008 Ped. Bike Plan*
NE Fogarty Street	US 20 to NE 3rd Street	Construct sidewalks on both sides of street	Newport	Medium	$115,000	*2008 Ped. Bike Plan*
SE Moore Drive	Bay Blvd to SE 2nd Street	Construct sidewalk on west side of road	Newport	Medium	$125,000	*2008 Ped. Bike Plan*
SE 2nd Street	SE Moore Drive west	Construct sidewalks on both sides of street	Newport	Medium	$23,000	*2008 Ped. Bike Plan*

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
SE 5th Street	SE Moore Drive west	Construct sidewalks on both sides of street	Newport	Medium	$180,000	*2008 Ped. Bike Plan*
San-Bay-O Circle	Proposed connection to Crestview to proposed connection to Chambers Ct	Construct sidewalk along one side of street from proposed connections to Crestview and to Chambers Court	Newport	Medium	$48,000	*2008 Ped. Bike Plan*
Sidewalks and Bike Lanes						
40th Street	East of US 101 to South Beach Village	Construct bicycle lane and sidewalk along north side of street			$89,000	*2012 South Beach TSP update*
NW Nye Street	NW 15th St to SW 2nd St	Construct bicycle lanes on both sides of street and complete sidewalk gaps on east side of street	Newport	High	$195,000	*2008 Ped. Bike Plan*
NE Benton Street / NE Coos Street	NE 12th Street to US 20	Construct bicycle lanes and sidewalks on both sides of street	Newport	Medium	$525,000	*2008 Ped. Bike Plan*
NE 7th Street	NE Eads St to NE 6th St	Construct bicycle lanes on both sides of street and sidewalks on south side of street	Newport	High	$215,000	*2008 Ped. Bike Plan*
NE Harney Street	US 20 to NE 3rd Street	Construct bicycle lanes and sidewalks on both sides of street and sidewalks on south side of street	Newport	Medium	$91,000	*2008 Ped. Bike Plan*
US 20	NE Harney St / SE Moore Dr to US 101 intersection	Construct bicycle lanes and fill in sidewalk gaps on both sides of street	ODOT / Newport	Medium	$55,000	*2008 Ped. Bike Plan*
SW 10th Street	SW Hatfield Dr to SE 2nd St	Stripe bicycle lanes on south side of street and fill in sidewalk gaps on both sides of street	Newport	Medium	$45,000	*2008 Ped. Bike Plan*

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
SW 2nd Street	SW Nye St to SW Coast St	Strip bicycle lanes on both sides of the street and complete sidewalk gaps on north side of the street	Newport	Low	$72,000	*2008 Ped. Bike Plan*
SW 26th Street	SW Brant St to SW Abalone St	Construct sidewalk on north side and striped bike lane on south side of the street	Newport	Medium	$52,000	*2012 Coho / Brant Plan*
Recommended Bicycle System Improvements						
Bicycle Parking		Parking at major bus stops and bus stations (for tourists)		High	$28,000	*2008 Ped. Bike Plan*
Bicycle Racks		Racks for all Dial-a-Ride vehicles (10 racks)		High	$14,000	*2008 Ped. Bike Plan*
West Olive St	Elizabeth St to Nye St	Striping for bicycle lanes along identified roadways to complete the East-West Bike Route.		High	$3,000	*2008 Ped. Bike Plan*
SW 2nd St	Nye St to Angle St					
Angle St	SW 2nd St to SW 9th St					
SW 9th St/Avery St	Angle St to SE 1st St					
SE 1st St	Avery St to Fogarty St					
Fogarty St	SE 1st St to SE 2nd St					
SE 2nd St	Fogarty St to Harney Dr					
John Moore Rd	Harney Dr to US 20					
Eads St	NE 12th St to NE 3rd St	Provide a bike route		Low	$145,000	*2008 Ped. Bike Plan*
NE 3rd St	Eads St to Harney Rd					
Big Creek Rd	Harney Dr to NE 12th St	Provide bikeway; also includes sidewalk improvements.		Medium	$205,000	*2008 Ped. Bike Plan*

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
		Road will be closed to traffic after completion of the North-South Arterial.				
Ocean View Dr	US 101 to the new Nye St extension	Add bicycle route signs along identified roadways to provide a north-south alternate bicycle route to US 101 (signed route only).		High	$1,000	*2008 Ped. Bike Plan*
Nye St	Ocean View Dr to Olive St					
Olive St	Nye St to the Beach at Elizabeth St					
Elizabeth St	Olive St to SW 2nd St (connects to existing bicycle path along Elizabeth St)					
Bicycle Lanes						
SW Canyon Way	SW Fall St to SW 9th St	Construct bicycle lane on east side of street	Newport	Low	$11,000	*2008 Ped. Bike Plan*
US 101	Yaquina Bay Bridge to South Beach State Park Access	Stripe bicycle lanes on both sides of street	ODOT	Low	$64,000	*2008 Ped. Bike Plan*
West Olive	US 101 to SW Elizabeth St	Stripe bicycle lanes on both sides of street	Newport	Medium	$24,000	*2008 Ped. Bike Plan*
New Boat Launch Pathway	Marine Science Dr to New Boat Launch	Designate bike and pedestrian lane on access road on Northern edge of parking lot	Port	Low	$11,000	*2008 Ped. Bike Plan*
Shared Roadways / Bicycle Boulevards						
Oregon Coast Bicycle Route	US 101 to Yaquina Bay Bridge	Implement Level 1 and 2 bicycle boulevard applications (signage, pavement markings)	Newport	Medium	$9,000	*2008 Ped. Bike Plan*
NE Harney	US 101 to NE	Implement Level 1	Newport	Low	$2,000	*2008 Ped.*

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
Street	Big Creek Rd	and 2 bicycle boulevard applications (signage, pavement markings)				*Bike Plan*
11th Street	NW Spring St to NE Eads St	Implement Level 1 and 2 bicycle boulevard applications (signage, pavement markings)	Newport	High	$2,000	*2008 Ped. Bike Plan*
6th Street	NW Coast St to NE Eads St	Implement Levels 1, 2 and 3 bicycle boulevard applications (signage, pavement markings, intersection treatments)	Newport	High	$2,000	*2008 Ped. Bike Plan*
NW 3rd Street / NW 4th Street	NW Coast St to NE Eads St	Implement Levels 1, 2 and 3 bicycle boulevard applications (signage, pavement markings, intersection treatments)	Newport	Medium	$3,000	*2008 Ped. Bike Plan*
SW 7th Street	SW 2nd St to SW Elizabeth St	Implement Level 1 and 2 bicycle boulevard applications (signage, pavement markings)	Newport	Medium	$2,000	*2008 Ped. Bike Plan*
SW 10th / 9th Street	SE 2nd St to SW Bay St	Implement Levels 1, 2 and 3 bicycle boulevard applications (signage, pavement markings, intersection treatments)	Newport	High	$3,000	*2008 Ped. Bike Plan*
SW Canyon Way / SW Hurbert Street	SW Bay Blvd to NW 6th St	Implement Levels 1, 2 and 3 bicycle boulevard applications (signage, pavement markings, intersection treatments)	Newport	High	$3,000	*2008 Ped. Bike Plan*

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
SW Bay Street	SW 9th St to SW 12th St	Implement Level 1 and 2 bicycle boulevard applications (signage, pavement markings)	Newport	High	$1,000	*2008 Ped. Bike Plan*
SW 10th Street / SW 12th Street	SW Bay St to US 101	Implement Level 1 and 2 bicycle boulevard applications (signage, pavement markings)	Newport	High	$1,000	*2008 Ped. Bike Plan*
Bay Blvd	SW Naterlin Dr to SE Moore Dr	Implement Level 1 and 2 bicycle boulevard applications (signage, pavement markings)	Newport	Medium	$3,000	*2008 Ped. Bike Plan*
South Beach State Park	US 101	Implement Level 1 and 2 bicycle boulevard applications (signage, pavement markings)	Newport	Low	$3,000	*2008 Ped. Bike Plan*
NE Eads Street	US 20 to NE 12th Street	Implement Levels 1, 2 and 3 bicycle boulevard applications (signage, pavement markings, intersection treatments)	Newport	High	$18,000	*2008 Ped. Bike Plan*
SE Moore Drive	Bay Blvd to US 20	Implement Level 1 and 2 bicycle boulevard applications (signage, pavement markings)	Newport	High	$2,000	*2008 Ped. Bike Plan*
SW 26th Street	US 101 to west of town	Implement Level 1 and 2 bicycle boulevard applications (signage, pavement markings)	Newport	Medium	$1,000	*2008 Ped. Bike Plan*
Old Boat Launch access	US 101 to old boat launch	Implement Level 1 and 2 bicycle blvd applications (signage, pavement markings)	Newport	Low	$17,000	*2008 Ped. Bike Plan*

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
Shared-use Paths						
Ferry Slip Road	Marine Science Drive to SE 29th Street	Shared use path	Newport	High	$77,000	*2010 South Beach Peninsula Plan*
Bay Road		Shared use path	Newport	Medium	$432,000	*2008 Ped. Bike Plan*
Harborton Road	40th Street to 50th Street	Multi-use path along south side with bicycle lanes and sidewalk along north side	Newport	Medium	$1,344,000	*2012 South Beach TSP update*
Realigned 50th Street	East of US 101 to existing 50th Street[14]	Multi-use path along north side with bicycle lanes and sidewalk along south side	ODOT / Newport	Low	$435,000	*2012 South Beach TSP update*
US 101	SE Ash St to South Beach State Park	Construct shared-use path on west side of road	ODOT / Newport	Low	$349,000	*2012 South Beach TSP update*
NE Big Creek Road	NE Harney St to NE 12th St	Construct a shared-use path along the NE Big Creek right-of-way	Newport	Medium	$520,000	*2008 Ped. Bike Plan*
SE 2nd Street Bridge	SE Douglas St to SE Fogarty St	Construct a non-motorized shared-use bridge over the existing ravine to provide a more direct connection to Yaquina View Elementary School from the nearby residential areas	Newport	Low	$1,750,000 to $3,500,000	*2008 Ped. Bike Plan*
Yaquina Bay Bridge	Bridge	Shared use path along west side of bridge; Provide a dedicated travel space for bicyclists and pedestrians	Newport	Low	$16,000,000 to $21,000,000	*2008 Ped. Bike Plan; 2012 South Beach TSP update*

[14] Project included as part of the Ash Street Extension roadway improvement project north of SE 40th Street as a multi-use path.

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
North Jetty Trail	SW Naterlin Dr to north jetty	Construct a shared-use path out the north jetty	Newport	High	$920,000	*2008 Ped. Bike Plan*
San-Bay-O Connection	San-Bay-O Circle to NE Crestview	Construct a shared-use path connection; requires an easement over private property. Exact location uncertain.	Newport	Medium	$41,000	*2008 Ped. Bike Plan*
Route to Main Shopping Area	NE Chambers Ct to Frank Wade Park and Park to San-Bay-O Circle	Construct a shared-use path connecting to main shopping area	Newport	High	$96,000	*2008 Ped. Bike Plan*
Path across old RV Park	SE Pacific Way to Marine Science Dr	Improve pathway through RV park, route pedestrians off blind corner at SE Pacific Drive and Marine Science Dr	Newport	High	$1,000	*2008 Ped. Bike Plan*
Estuary Trail Access	SE 35th St to Chestnut St	Provide a dedicated travel space for bicyclists and pedestrians as an alternative to Idaho Point Road	Newport	Medium	$205,000	*2008 Ped. Bike Plan*
Connector to OCCC	SE 35th St to OCCC	Provide a dedicated travel space for bicyclists and pedestrians	Newport	Medium	$530,000	*2008 Ped. Bike Plan*
Ash Extension	Ash Street end to SE 35th St	Provide a dedicated travel space for bicyclists and pedestrians along railway right-of-way	Newport	Medium	$225,000	*2008 Ped. Bike Plan*
Connector to US 101 Stairways	US 101 to SW 26th and SW 27th Avenues	Provide access to US 101 stairways	Newport	High	$93,000	*2008 Ped. Bike Plan*
Develop of SW Coho St	S Jetty Rd to SW 29th St	Construct shared use path	Newport	Medium	$84,000[15]	*2008 Ped. Bike Plan*

[15] Project cost developed in 2012 as part of the *Newport Coho/Brant Infrastructure Refinement Plan.*

Project	From - to	Description	Project Lead	Priority	Estimated Cost ($ 2012)	*Source*
Connector – SW 29th Street or SW 30th Street	State Park and South Beach neighborhood	Links into State Park trail system	Newport	High	$129,000[16]	*2008 Ped. Bike Plan*
Connector	State Park to South Shore	Links into State Park trail system	Newport	Medium	$185,000	*2008 Ped. Bike Plan*
Connector	South Shore to Airport	Links State Park trail system to airport	Newport	Low	$1,050,000	*2008 Ped. Bike Plan*
Yaquina Bay Estuary Trail Extension	Yaquina Bay Trail to SE 35th Street	Extends existing trail	Newport	High	$380,000	*2008 Ped. Bike Plan*
NW Coast Street	NW 8th St to NW 11th St	Provide bicycle and pedestrian improvements over existing gravel road	Newport	Medium	$135,000	*2008 Ped. Bike Plan*
NW Nye Street	NW 15th St to Oceanview	Construct shared-use path connecting Nye to Oceanview	Newport	Medium	$130,000	*2008 Ped. Bike Plan*
SW Coho St	Jetty Way to SW 29th St	Construct shared-use path	Newport	Medium	$82,000	*2012 Coho / Brant Plan*
Jetty Way	SW 26th St to South Beach State Park parking areas	Construct shared-use path	OPRD / Newport	Low	$486,000	*2012 Coho / Brant Plan*
SW Abalone Street	SE Marine Science Dr to US 101	Construct sidewalks on west side of street	Newport	High	$490,000	*2012 Coho/Brant Infra. Plan*
Wayside Improvements						
Agate Beach	SW Corner of US 101 and NW Agate Way to north end of Agate Beach	Realign parking, improve streets, sidewalks, trails, and construct restroom/showers	Newport	High	$697,120[17]	*2011 Agate Beach Design Charrette*

[16] Project cost developed in 2012 as part of the *Newport Coho/Brant Infrastructure Refinement Plan.*

[17] Project cost developed in 2011. Project funded in 2012 with FHWA Scenic Byways Grant.

Transit Plan

It is difficult for cities the size of Newport to support fixed-route transit. The City had attempted to provide such transit service through the Newport Area Transit System, but low ridership and funding constraints lead to discontinuation of the service in July 1991. In November 1992, Lincoln County, with some funding from the City of Newport, began operation of a county-wide public transit system, the Central Coast Connection. The name was later changed to Lincoln County Transit (LCT). Lincoln County Transit currently provides the combined services of a scheduled stop system and a dial-a-ride service. County employees coordinate a daily fixed-route intercity shuttle system with east and south county buses operating as feeder lines to the intercity shuttle. The LCT shuttle makes intercity runs from Newport to Lincoln City daily. Newport is the hub for all intercity routes. The LCT shuttle and the intercity feeder lines between Siletz, Toledo, Waldport, Yachats, and Newport are open to the general public. LCT has added a coast to valley service that operates five days from Newport to Corvallis and Albany Amtrak. Dial-a-ride service operates on a demand/response basis for Newport residents.

Lincoln County Transit provides bus service to the South Beach community through the "Newport City Loop," between 7:30 a.m. to 5:30 p.m., seven days a week. Stops are provided north and south of the Yaquina Bay Bridge. Improvements to the transit system could make bus ridership more viable for South Beach employees and residents, with the dual benefit of reducing single-occupancy trips on US 101 and supporting economic development in the area. Anecdotal evidence supports the assertion that the infrequency of bus service and the daytime-only service hours hinder employees working in South Beach from commuting by bus. In addition to the recommended transit improvements included in the TSP, the City is committed to working with Lincoln County Transit to improve the bus system and, in particular, increasing ridership in South Beach and decreasing local single-occupancy vehicle trips on US 101 and the Yaquina Bay Bridge .

Table 6 displays all the recommended transit improvements included in the Plan with their associated annual or capital costs. Funding is from state and federal sources.

Table 6: Recommended Transit Improvements

Transit Improvements	**Priority**	**Estimated Annual Operating Costs**	**Estimated Capital Cost**
Support expanded daily Lincoln County Transit Service to enhance commute options for Newport employers and access to retail districts	High	$434,200	-------
Provide covered bus shelters at major bus stops	High		$40,000
Enhance dial-a-ride service through the use of private taxis as a backup service	Medium	8,000	-------
Construct a centrally located transit facility	Low		$500,000
Total Cost (Transit Improvements)			**$540,000**

Airport Transportation Plan

The Newport Municipal Airport is owned by the City of Newport. It is classified as a General Aviation General Utility category airport and is a public airport capable of handling corporate-type aircraft. The Newport Municipal Airport Master Plan outlines a staged development program for the airport (see Table 7, below).

Table 7: Staged Development Program – Projected Development

Stage II (1995-1999)	Local	FAA	Other	Total
Road Relocation	$18,000	$162,000	$0	$180,000
Land Acquisition	$1,000	$9,000	$0	$10,000
Hangar Taxiways	$4,000	$32,000	$0	$36,000
Auto Parking	$40,000	$0	$0	$40,000
Aircraft Apron	$11,000	$94,000	$0	$105,000
Clear Zone Earthwork	$10,000	$90,000	$0	$100,000
Runway Marking	$200	$1,800	$0	$2,000
Single-Unit Hangars (5)	$0	$0	$125,000	$125,000
FBO Hangar	$0	$0	$300,000	$300,000
Corporate Hangar	$0	$0	$200,000	$200,000
Airport Maintenance Shop	$200,000	$0	$0	$200,000
ARFF Station/City Fire Station	$9,000	$81,000	$0	$90,000
Total Stage II	**$293,200**	**$469,800**	**$625,000**	**$1,388,000**
Stage III (2000-2009)				
Terminal	$300,000	$280,000	$0	$580,000
Auto Parking	$225,000	$0	$0	$225,000
Terminal Roadway	$22,000	$198,000	$0	$220,000
Apron Expansion	$10,000	$90,000	$0	$100,000
Relocate VOR	$50,000	$0	$0	$50,000
Parallel Taxiway Extension	$39,000	$351,000	$0	$390,000
Overall Runway 16-34 & Taxiway	$88,000	$787,000	$0	$875,000
Runway 2-20 Taxiway	$23,000	$207,000	$0	$230,000
Corporate Hangars (2)	$0	$0	$400,000	$400,000
Single-Unit Hangars (5)	$0	$0	$375,000	$375,000
Total Stage III	**$757,000**	**$1,913,000**	**$775,000**	**$3,445,000**
Total Stages II and III	**$1,050,200**	**$2,382,800**	**$1,400,000**	**$4,833,000**

Source: Newport Municipal Airport Master Plan, 1991

Water Transportation

The upland areas adjacent to, and development within, Yaquina Bay are controlled by the City of Newport, Lincoln County, the Port of Newport, and the State of Oregon. The tourism, commercial fishing, and commercial shipping industries that use the bay provide a significant part of the local economy. The Recommended Water Transportation Plan considers a wide variety of needs and acknowledges the competition between marine-related industries for certain tracts of waterfront property.

Recommended improvement projects for the port have been prioritized into three categories based on the time frame for implementation (see Table 8, below). Funding has not been determined for all of the projects.

Table 8: Recommended Port Improvement Projects

Priority 1 – Develop in the Next 5 Years **Project**	**Cost (\$ X 1,000)**	**Funding Source**
Rehabilitation of Port Dock 5 Pier	75	Port
Multi-Level Parking Structure	2,000	Urban Renewal
Revitalization of Newport International Terminal	Unknown	Port
Rehabilitation of Existing Corps of Engineers Breakwater and d175 Feet of New West Extension	1,200	Corps/State/Port
Marine Commercial Lease Facility	Undetermined	Undetermined
Priority 2 – Develop in the Next 5 to 10 Years **Project**		
Widening of Bay Blvd	Undetermined	Undetermined
Public Viewing Dock	Undetermined	Undetermined
Priority 3 – Develop in Next 10 to 15 Years **Project**		
Second Ship Berth	32,000	Port
Second Barge Berth	5,800	Port

Source: Public Facilities Plan, 1990 and Port of Newport Staff Review, 1996

Rail Transportation

Willamette and Pacific Railroad provides freight service from the western Willamette Valley to the terminus of the rail line at Toledo, six miles east of Newport. There is no direct service into Newport.

Pipeline Transportation

Current pipeline service includes transmission lines for electricity, cable television, and telephone service, and pipeline transport of water, sewage, and natural gas. The Newport TSP encourages the continued use of these services for the movement of these commodities through the City.

The Plan also recognizes the increasing likelihood that telecommuting and other "super-highway" technologies will become viable alternatives to physical commuting, thus reducing and possibly even eliminating some auto trips during the peak hours. The use of telecommuting and other similar technologies should be encouraged through land use policy and plans.

Other Elements of TSP

Funding

The City of Newport Transportation System Plan also contains a section on the funding of the various projects and an analysis of transportation funding alternatives. For a complete discussion on the available options, please refer to the TSP and the adopted TSP updates.

There are a variety of funding options available to the City of Newport. To fund all of the recommended capital improvement projects in the TSP and the TSP updates would most likely require a number of new revenue sources. For purposes of illustration, the following provides an example of what it would take to fund the entire TSP (see Table 9). The funding options include:

- Obtain $16 million in additional revenue from State grants and programs
- Use revenue bonds to pay for recommended parking structure
- Create local improvement districts to pay for neighborhood street improvement projects
- Increase SDC charges from $300/dwelling unit to $837 (from 20% to 50% of needed capital expenditure)
- Implement a city-wide street utility fee (e.g. $2/month for all residences)

Table 9 shows that the new funding sources would generate a surplus of revenue of about $1 million in Years 1-5. If this surplus were carried forward into Year 6-10, there would be enough revenue for all of the recommended capital improvement projects.

Table 9 shows that the new funding sources would generate a surplus of revenue of about $1 million in Years 1-5. If this surplus were carried forward into Years 6-10, there would be enough revenue for all of the recommended capital improvement projects.

Table 9 displays a potential scenario that would fund the entire recommended 1997 TSP over the 20 year period. It does show that the recommended 1997 TSP can realistically be implemented over the next 20 years. Regardless, the following funding strategy should include the following:

- Aggressively pursue federal and state funding options for capital improvement projects, especially for US 20 and US 101.

- Increase System Development Charges (SDCs) to a more comparable rate with surrounding communities (i.e. 50 to 60% of the needed revenue, $875 to $1,000 per dwelling unit).

- Seek one or more of the local funding options previously discussed.

- Carefully prioritize capital improvement projects.

Access Management

The purpose of the Access Management Plan is to define an effective access management program that will enhance mobility and improve the safety of roadways in the City of Newport. Access management strategies that limit the number of conflict points, separate conflicts as much as possible, reduce deceleration requirements, and separate turning traffic from traffic will all contribute to better mobility and safety on the City of Newport's roadways.

The primary focus of the access management plan is on the major arterials in the City of Newport; US 101 and US 20. The plan seeks to maintain the function of these roadways as the primary through routes in the City of Newport. The Access Management Plan as detailed in the TSP establishes policies and criteria that support this function.

The Access Management Plan must address the growth in traffic in Newport through planning for the future transportation system. The Oregon Transportation Planning Rule requires in Section 660-12-045 Subsection (2):

> *Local governments shall adopt land use or subdivision ordinance regulations, consistent with applicable federal and state requirements, to protect transportation facilities, corridors, and sites for their identified functions. Such regulations shall include: (a) Access control measures, for example, driveways and public road spacing, median control and signal spacing standards, which are consistent with the functional classification of roads and consistent with limiting development on rural lands to rural uses and densities; [...]*

Access management can be most effectively implemented when it is integrated into the land use permitting process. Or developing areas, this allows jurisdictions an immediate tool to implement their access management goals as these areas apply for permits and submit plans for agency review. Applying access management to a developed arterial – representative of the conditions of many sections of US 101 and US 20 in the City of Newport – is a much more difficult task due to right-of-way limitations and the economic concerns of adjacent property owners. In such areas, access management can best be implemented as adjacent properties redevelop or as part of roadway improvement or retrofit plans.

Access management is a set of measures to regulate access to streets, roads, and highways from public roads and private driveways. The purpose of access management is to maximize the efficiency and safety of the existing roadway while preserving the flow of traffic and limiting the number of traffic conflicts. A traffic conflict occurs where the paths of two traffic movements intersect. Crossing conflicts are the most serious because of the potential for collisions. The area and complexity of the crossing conflicts are also affected by the roadway cross-section. For example, with a four-lane cross-section, each conflict involves two lanes, whereas with a two-lane section, each of the conflict points involves only one lane.

There are many different strategies for accomplishing access management, but the common theme of all strategies is to reduce traffic conflicts. Strategies to reduce conflicts are listed below followed by select examples for tools that can be used to implement the strategy:

- Limit the number of conflict points
  - Installation of median barriers or closure to eliminate left turns at ingress and egress points
  - Installation of traffic signals at high volume intersections or driveways
  - Optimization of traffic signal spacing and coordination
  - Installation of physical barriers along frontage properties, e.g. curbs, fences, Landscaping
  - Regulate maximum width of driveways

- Separate conflicts as much as possible when they cannot be eliminated
  - Regulate minimum spacing of driveways
  - Consolidate access for adjacent properties
  - Regulate maximum number of driveways per frontage property

- Consolidate existing access as parcels redevelop
  - Require access on adjacent cross-section (when available) in lieu of driveways on major highways

- Reduce deceleration requirements
  - Improve driveway sight distance
  - Increase effective approach width of driveway
  - Restrict parking on roadway adjacent to driveway to increase driveway turning speeds
  - Install right-turn acceleration lane

- Separate turning traffic from through traffic
  - Install continuous two-way left turn lane
  - Require adequate internal design and circulation plan
  - Provide local service roads
  - Encourage connections between adjacent properties

Many of these tools can be used within the City of Newport. Specific recommendations for application of these access management strategies will be provided in the Goals ad Policies section.

During the development of the Newport TSP, specific access management goals were established for the City of Newport's primary arterials, US 101, and US 20. These access management goals address these facilities in both the established and the developing areas of the City as defined in the maps contained in the Access Management Plan contained in the TSP. The goals reflect the input of the Technical Advisory Committee, the Citizens Sounding Board, and public input from the Open Houses as well as correspondence from members of the public.

Supporting access management goals were developed for the two types of areas in the City: established areas and developing areas. The goals for these areas are defined below as well as the range of strategies that were explored by the study team.

Established Areas

Many properties now having direct access to the highway within these established areas will eventually redevelop. At such time, alternate access may be provided and existing private accesses can be closed. The reduction in traffic conflicts, due to preventing future private accesses and closing old private accesses, will allow the highway to operate safely at higher volumes of traffic.

The types of access management tools most appropriate for these established areas include:

- Optimize traffic signal spacing and coordination
- Install physical barriers along frontage properties, e.g. curbs, fences, landscaping
- Regulate maximum width of driveways
- Regulate minimum spacing of driveways
- Consolidate access for adjacent properties
- Regulate maximum number of driveways per frontage property
- Require access on adjacent cross-street (when available) in lieu of driveways on US 101 and US 20
- Require adequate internal design and circulation plan
- Encourage connections between adjacent properties
- Install traffic signals at high volume intersections or driveways

Spacing goals for the established areas are 500 feet for driveways, ¼ mile for public roads, and ½ mile for signals. As redevelopment occurs, these spacing standards and access management tools should be evaluated and applied as appropriate to the specific needs of the project.

Developing Areas

The types of access management tools most appropriate for these areas are:

- Install median barriers or closure to eliminate left turns at ingress and egress points
- Install traffic signals at high volume intersections or driveways
- Optimize traffic signal spacing and coordination
- Install physical barriers along frontage properties, e.g. curbs, fences, landscaping
- Regulate maximum width of driveways
- Regulate minimum spacing of driveways
- Consolidate access for adjacent properties
- Regulate maximum number of driveways per frontage of property
- Require access on adjacent cross-street (when available) in lieu of driveways on major highways
- Improve driveway sight distance
- Increase effective approach width of driveway
- Install right-turn acceleration lane
- Install continuous two-way left turn lane
- Require adequate internal design and circulation plan
- Provide local service roads
- Encourage connections between adjacent properties

Spacing standards for primary arterials in developing areas are 800 feet for driveways, ½ to one mile for public roads, and ½ to one mile for signals. As development and redevelopment occurs, these spacing standards and access management tools should be evaluated and applied as appropriate to the specific needs of the project.

GOALS AND POLICIES

The following goals and policies are intended to guide the decision makers and the development community in the administration of the Transportation System Plan (TSP) and the development of applicable implementing ordinances consistent with the TSP. This section is not intended to provide review criteria for specific projects or to function as a capital improvement plan.

Goal 1: To provide a safe and efficient multi-modal transportation system consistent with the Transportation System Plan.

Policy 1: To improve and maintain a transportation system that is consistent with the adopted 1997 TSP, as amended by the following updates:

A. Transportation system Plan Update Technical Memo # 2 (Northside Local Street Plan) dated July 2008.

B. Transportation System Plan Update Technical Memo # 4 (Pedestrian and Bicycle Plan) dated July 2008.

C. Newport Transportation System Plan Update - Alternate Mobility Standards Final Technical Memorandum #13 Summary of Measures of Effectiveness dated April 2012.
D. South Beach Peninsula Transportation Refinement Plan, dated February 9, 2010.
E. Agate Beach Wayside Improvements Design Charrette Concept Plan dated, March 2, 2011.
F. Coho/Brant Infrastructure Refinement Plan, dated July 2012.

Policy 2: To develop implementing ordinances and funding options consistent with the following:

A. Street System Plan

1. New roadway projects, transportation management system improvements and improvements to existing roadways shall be consistent with the TSP subject to available funding.

2. Streets created as part of a subdivision shall be designed in accordance with the adopted street design classification system in the TSP and the development standards in the subdivision ordinance unless a modification through the subdivision approval process is granted. The City shall require all new development to make street frontage improvements consistent with adopted engineering standards proportional to the impact of the development on public facilities.

3. The City will implement street cross-section designs that deviate from adopted street classification system standards where such designs apply to a defined area, respond to area-specific challenges and needs, and are supported by the findings and recommendations of an adopted Refinement Plan.

4. The City shall require that any change to the acknowledged Comprehensive Plan land use designations must make a finding that the change will not reduce the function of streets, especially Highway 101 and Highway 20, as identified in the TSP.

5. The City supports optimizing the existing transportation system through modifications to US 101 and local transportation system improvements in South Beach, as identified in the TSP. The capacity of the Yaquina Bay Bridge is expected to continue to be the major constraint in the operation of the transportation system south of the bridge, and funding for a new or expanded facility is not likely in the foreseeable future.

6. To ensure that capacity on US 101 is sufficient to accommodate planned local growth south of the Yaquina Bay Bridge, the City supports adoption of alternate mobility standards by the Oregon Transportation Commission for the section of highway between the bridge and South 62nd Street. These standards will allow a higher level of congestion than would be acceptable without the alternate standards. The alternate standards will support economic development and reduce the costs of total transportation system improvements associated with development.

7. Comprehensive plan land use changes and development proposals that meet established thresholds for traffic generation or heavy vehicles, or that propose to

take access directly from US 101, shall submit a transportation impact analysis as part of the application. The analysis shall evaluate the impacts of the development and propose mitigation that would allow transportation facilities to operate under conditions consistent with the planned transportation system. These analyses are a necessary tool to aid City decision-making related to the transportation system and its adequacy to accommodate both existing and future users. Whenever a direct property connection to US 101 is proposed, the City will coordinate with ODOT to ensure that the analysis addresses both state and local requirements.

8. Many of the commercial activities needed by residents are missing from the South Beach community. South Beach residents currently must travel across the Yaquina Bay Bridge to obtain these goods and services. Development of commercial uses that provide for the goods and services needed in the South Beach community warrants special consideration by the City of Newport. The Newport Development Code shall include special traffic analysis provisions for certain uses in order to encourage such development.

9. The City shall monitor the transportation impacts of development in South Beach through a South Beach Transportation Overlay Zone (SBTOZ) and an associated Trip Budget Program to ensure that vehicle trips that result from new development do not exceed the number of trips that can be accommodated by the planned transportation system. When development in the SBTOZ occurs inside the urban growth boundary but outside City limits, the City shall coordinate with Lincoln County through the development approval process to ensure that County-approved trips are recorded.

10. The Trip Budget Program envisions circumstances where an applicant may, identify measures as part of a traffic impact analysis that mitigate the impacts the development will have on the transportation system allowing trips to be authorized in excess of what would otherwise be permitted in the TAZ. An amendment to the TSP is not required in such cases; however, the City should update the Trip Budget to reflect the additional trips.

11. The City shall continue to engage ODOT in conversations regarding future project planning and funding that would lead to improvements to, and possibly replacement of, the Yaquina Bay Bridge. A recent decision by the Oregon Department of Transportation to place the bridge on the "Weight-Restricted Bridges on Major State Routes" list highlights the need for Newport to find long term solutions that sufficiently address the existing capacity and structural limitations that affect the bridge's ability to carry vehicles and pedestrians.

B. Pedestrian System Plan

1. The City shall provide a continuous pedestrian network consistent with the TSP, to the greatest extent possible considering funding limitations, topographic constraints, and existing development patterns.

2. The City shall provide a safe walking environment.

3. The City shall provide a pedestrian-oriented urban design especially on the Bay Front, in the City Center, and in Nye Beach.

4. The City shall work to implement the Goal, Policies and Implementation Strategies related to pedestrian facilities identified on pages 1-3 and 1-4 of the Newport Pedestrian and Bicycle Plan adopted in 2008. The City also shall work to implement identified pedestrian system improvements in South Beach, consistent with the adopted TSP.

C. Bicycle System Plan

1. The City shall provide a safe and efficient bicycle network consistent with the TSP, considering funding limitations, topographic constraints, and existing development patterns.

2. The City shall work to implement the Goal, Policies and Implementation Strategies related to bicycle facilities identified on pages 1-3 and 1-4 of the Newport Pedestrian and Bicycle Plan adopted in 2008. The City shall also work to implement identified bicycle system improvements in South Beach, consistent with the adopted TSP.

D. Transit System Plan

1. The City shall support the Lincoln County Transit Service consistent with the TSP considering funding limitations, topographic constraints, and existing development patterns.

2. The City shall work with Lincoln County Transit to identify and address the following:

a. Barriers to transit ridership, such as frequency of buses, convenience and proximity of the transit stops to employment areas, etc.

b. Enhancements to service, including but not limited to modifying existing transit loops, adding stops to the loops, or adding additional routes.

c. Impediments to providing service (funding, ridership numbers, etc.)

d. Physical amenities to promote transit use, such as shelters, signage, benches, posted schedules, signal timing/preferential treatment at intersections, etc.

3. The City shall continue to work with Lincoln County Transit, ODOT, and Lincoln County to identify opportunities for transit improvements in the planned roadway system, such as "queue-jump" opportunities for buses through intersection configurations and preferential signal timing along US 101.

4. The City shall encourage new retail, office, industrial, and institutional developments to provide transit facilities on site if identified in an adopted transit plan and shall work to ensure that there are safe pedestrian and bicycle connections through and from the site to existing and planned transit routes.

5. The City shall explore with Lincoln County Transit opportunities to provide shuttle service across the bay during the busy tourist season to help reduce traffic congestion, i.e. on the Yaquina Bay Bridge, subject to the availability of funding.

E. Access Management Plan

1. The City shall implement an access management strategy for the established and developing areas of the City of Newport along Highway 101, Highway 20,

and other arterials that supports the City's Transportation Goal and ensures that those streets can accommodate traffic in a safe and efficient manner as traffic increases.

2. In established areas of the City of Newport as identified in the TSP, the City shall encourage consolidation or reduction of accesses as possible during property redevelopment and/or frontage improvements. Spacing goals for the established areas are 500 feet for driveways, ¼ mile for public roads, and ½ mile for signals. As redevelopment occurs, these spacing standards and access management tools should be evaluated and applied as appropriate to the specific needs of the project.

3. In developing areas of the City of Newport as identified in the TSP, as sites develop or redevelop, accesses shall be planned, consolidated, and/or reduced to meet the spacing standard to the greatest extent possible. Spacing standards for primary arterials in developing areas are 800 feet for driveways, ½ mile to one mile for public roads, and ½ mile to one mile for signals.

4. The City shall develop specific ordinance provisions to further this access management plan.

F. Funding Plan

1. The City shall continue to employ a variety of local funding options such as the local gas tax, street utility fee, general obligation bonds, local improvement districts, developer exactions, system development charges, to fund the planned transportation system.

2. The City shall carefully prioritize capital improvement projects through the development, maintenance, and implementation of the TSP and Capital Improvement Program.

3. The City shall aggressively pursue federal and state funding options for capital improvement projects, especially for Highways 101 and 20.

4. The City shall continue to plan for and finance needed infrastructure improvements necessary to support economic development consistent with adopted urban renewal plans.

5. The City shall pursue extending the South Beach Urban Renewal Plan to provide funding for projects beyond the year 2020 if needed to better coordinate City plans with the timeline for future state funding.

CHAPTER 14.43 SOUTH BEACH TRANSPORTATION OVERLAY ZONE (SBTOZ).

14.43.010. Purpose. The purpose of the SBTOZ is to promote development in the South Beach area of Newport in a way that maintains an efficient, safe, and functional transportation system. This Section implements the Trip Budget Program for South Beach established in the Newport Transportation System Plan to ensure that the planned transportation system will be adequate to serve future land use needs.

14.43.020. Boundary. The boundary of the SBTOZ is shown on City of Newport Zoning Map.

14.43.030. Applicability. The provisions of this Section shall apply to development that has the effect of increasing or decreasing vehicle trips to a property that is within the city limits. Any conflict between the standards of the SBTOZ and those contained within other chapters of the Newport Zoning Ordinance shall be resolved in favor of the SBTOZ.

14.43.040. Permitted Land Uses. Any permitted use or conditional use authorized in the underlying zone may be permitted, subject to the applicable provisions of this Ordinance and the additional provisions of this overlay zone.

14.43.050. Definitions

A. Transportation Analysis Zone (TAZ). A geographical area used in transportation planning modeling to forecast travel demands.

B. Trip. A single or one-direction vehicle movement with either the origin or destination inside the area being studied as specified in the latest edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.

C. Primary Trip. A trip made for the specific purpose of visiting the generator. The stop at the generator is the primary reason for the trip. The trip typically goes from origin to generator and then returns to the origin. Primary trips do not include "passby" or "diverted linked" trips as those terms are defined in the latest edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.

D. Trip Budget Program. The program for tracking the number of vehicle trips attributed to new development as described in Chapter 14.43 of the Newport Zoning Ordinance and Transportation System Plan element of the Newport Comprehensive Plan.

14.43.060. Trip Generation. Proposed development on parcels within the SBTOZ may not generate more PM peak hour trips than are budgeted for the TAZ in which the parcel is located, except as provided in Section 14.43.100.

A. Documentation that this requirement is met can be provided through the submittal of a Trip Assessment Letter, pursuant to 14.43.080.A, or a Traffic Impact Analysis, if required by 14.45.010.

B. The PM peak hour trip generation is determined through the latest edition of the ITE Trip Generation Manual. The following uses are required to calculate primary trips only, as defined in 14.43.050.C:

(1) Personal service oriented uses.

(2) Sales or general retail uses, total retail sales area under 15,000 square feet.

(3) Repair oriented uses.

14.43.070. Trip Budget Ledger. The Community Development Director shall maintain a ledger which contains the following:

A. For each TAZ, the total number of vehicular PM peak-hour trips permitted to be generated by future development projects.

B. The balance of unused PM peak-hour trips within each TAZ.

C. The balance of unused PM peak-hour trips in the Trip Reserve Fund.

D. For each TAZ, where applicable, the number of trips allocated from the Trip Reserve Fund.

E. For each TAZ, where applicable, the number of additional trips authorized as a result of mitigation performed in accordance with recommendations contained in a Traffic Impact Analysis approved by the City of Newport, pursuant to Chapter 14.45.

F. The percentage of the total trips that have been allocated within each TAZ.

14.43.080. Trip Assessment Letter.

A. Proposed development that would increase or decrease the number of vehicle trips being generated to or from a property must submit a Trip Assessment Letter that demonstrates that the proposed development or use will not generate more PM peak-hour trips than what is available in the trip budget for the TAZ in which it is located. A Trip Assessment Letter shall be prepared and submitted:

(1) Concurrent with a land use that is subject to a land use action; or

(2) If no land use action is required, than prior to issuance of a building permit.

B. Upon request by the applicant, the City shall develop and provide applicant with a Trip Assessment Letter.

C. The latest edition of the Trip Generation Manual published by the Institute of Transportation Engineers (ITE) shall be used as the standard by which to determine expected PM peak hour vehicle trips, unless a specific trip generation study that is approved by the City Engineer indicates an alternative trip generation rate is appropriate.

D. A copy of the Trip Assessment Letter will be provided to ODOT prior to City action on the proposal.

E. A Trip Assessment Letter shall rely upon information contained in a Traffic Impact Analysis, where such analysis has been prepared pursuant to Chapter 14.45 of this Ordinance.

14.43.090. Allocation of Trips. Trips are allocated by TAZ in the SBTOZ. The trip totals for each TAZ, available for future allocation within the SBTOZ, can be obtained from the Community Development Department.

A. Trips may not be transferred from one TAZ to another.

B. Total number of trips allocated to any TAZ may be exceeded only through:

(1) The allocation of trips from the Trip Reserve Fund, pursuant to 14.43.100, or
(2) Mitigation of the expected impacts of the proposed development, supported by a Traffic Impact Analysis (Chapter 14.45).

C. City shall allocate trips to proposed development by deducting them from the Trip Budget Ledger if trips available in the Trip Budget Ledger meet or exceed the number of trips identified in the Trip Assessment Letter.

D. Except as otherwise provided in this subsection, City shall deduct trips from the Trip Budget Ledger at such time as a land use decision is approved and is to treat those trips as vested so long as that land use decision is valid. In the event a land use decision expires, the City shall add the trips back to the Trip Budget Ledger.

(1) For a tentative (preliminary) plat that does not include phases, trips shall be vested so long as the application for final plat is submitted within the time established by the Subdivision Ordinance;

(2) For a tentative (preliminary) plat that includes phases the total vesting period for all phases shall not be greater than ten (10) years;

(3) For a final plat, trips shall vest for a period of ten (10) years from the date the plat is recorded;

(4) City shall not deduct trips from the Trip Budget Ledger at such time as a land use decision is issued for a property line adjustment, partition plat, or minor replat; and

(5) An applicant seeking approval of a tentative or final plat may elect to have the City not deduct trips from the Trip Budget Ledger at such time as a land use decision is approved. In such cases the land use decision shall note that use of the resulting lots may be limited to available trips within the TAZ as documented in the Trip Budget Ledger.

E. For development that is not subject to a land use decision, the City shall deduct trips from the Trip Budget Ledger at such time as a Trip Assessment Letter is submitted or requested by the applicant. The number of trips deducted is to be documented in writing as vested with the development for a period of six months or until such time as a building permit is issued, whichever is shorter. If a building permit is not obtained within this timeframe than the City shall add the trips back to the Trip Budget Ledger. City implementation of this subsection shall be a ministerial action.

14.43.100. Trip Reserve Fund. The Trip Reserve Fund total is maintained by the Community Development Department.

A. Development proposals that require trips from the Trip Reserve Fund to satisfy the requirements of this Section are subject to a Type III review process.

B. Trips from the Trip Reserve Fund may be used to satisfy the requirements of this Section for any permitted land use type, provided all of the following criteria is met:

(1) There are insufficient unassigned trips remaining in the TAZ to accommodate the proposed types of use(s);

(2) The proposal to use trips from the Trip Reserve Fund to meet this Section is supported by a Transportation Impact Analysis, pursuant to Chapter 14.45; and

(3) There are sufficient trips available in the Trip Reserve Fund to meet the expected trip generation needs of the proposal.

14.43.110. Notice of Allocation of Trips. Notice of a proposal to allocate trips from the Trip Budget and notice of the subsequent decision is not required. The City will provide notice of an application for approval of trips from the Trip Reserve Fund in a manner consistent with that of a Type III notice procedure.

14.43.120. Amending the Trip Budget Program.

A. A comprehensive reassessment of the Trip Budget Program will occur no later than 10 years from the effective date of this ordinance.

B. The Trip Budget Program shall be evaluated for compliance with the provisions of OAR 660-012 prior to, or concurrent with, changes in the comprehensive plan land use designations within the SBTOZ.

C. A reevaluation of the Trip Budget Program is required when 65% of the total trips in any given TAZ have been committed to permitted development.

(1) A 65% Review will be initiated by the City and coordinated with ODOT. A 65% Review must be initiated no later than 6 months from the time the threshold is reached.

(2) The 65% Review will be completed within 12 months from initiation, or pursuant to a schedule that is part of a work program previously agreed upon by both the City and ODOT. Prior to completion, applicants can propose mitigation and potentially obtain approval of proposed development, pursuant to OAR 660-012-0060.

City of Newport
South Beach Future Transportation Analysis Zones
October 30, 2012

State of Oregon
Department of Transportation

PERIMETER OF SOUTH BEACH FUTURE TRANSPORTATION ANALYSIS ZONES A - J

A tract of land situated in Sections 8, 9, 16, 17, 20, 21, 29, and 30, Township 11 South, Range 11 West, Willamette Meridian, City of Newport, Lincoln County, Oregon, the said tract being more particularly described as follows:

BEGINNING at a point on the South line of said Section 16, which point is the Southeast corner of that tract of land designated Parcel 4 in Statutory Bargain and Sale Deed recorded in Document 200716072, deed records of Lincoln County, the said point bears N89°54'54"E 288.22 feet, per County Survey 16166, from a three-inch diameter brass cap marking the corner common to Sections 16, 17, 20 and 21 in said Township and Range;

thence Easterly along the South line of said Section 16 to the Easterly line of the City of Newport Urban Growth Boundary (UBG) as amended in City of Newport Ordinance No. 1899 and adopted by the City Council of the City of Newport on December 4, 2006;

thence Southwesterly and Southerly along said UBG to its intersection with the South line of said Section 21;

thence Westerly along the South line of said Section 21, 420 feet, more or less, to a brass cap marking the corner common to Sections 20, 21, 28 and 29 in said Township and Range;

thence continuing Westerly, along the South line of said Section 20 (being also the North line of said Section 29), 1150 feet, more or less, to the most Southerly corner of that tract of land designated Tract "B" in Statutory Special Warranty Deed recorded in Document 2011-02151, deed records of Lincoln County, said corner being marked by a 5/8-inch iron rod set in County Survey 10586;

thence N72°28'34"W along the Southerly line of said tract 218.43 feet, per County Survey 15273, to the East 1/16th line of said Section 20;

thence Southerly along the East 1/16th line of said Section 20, and continuing Southerly along the East 1/16th line of said Section 29 to the East-West quarter line thereof;

thence Westerly along said East-West quarter line to the center of said Section 29, being the Southwest corner of Small's Addition to Yaquina City, as recorded in Plat Book 4, Page 37;

thence Northerly along the North-South quarter line of said Section 29, 330 feet, more or less, to the Northwest corner of Small's Addition to Yaquina City;

thence Westerly, parallel with said East-West quarter line, to the Easterly line of that tract of land described in deed to the City of Newport recorded in MF 131-430, deed records of Lincoln County, said tract being shown in County Survey 10740;

thence Northerly along said Easterly line, and continuing along the Easterly line of that tract of land described in deed to the City of Newport recorded in Book 101, Page 594, deed records of Lincoln County, to the most Northerly corner of said City of Newport tract;

thence Southwesterly along the Northerly line of said City of Newport tract 752 feet, more or less, to the West 1/16th line of said Section 29;

thence Southerly along said West 1/16th line to the East-West quarter line of said Section 29;

thence Westerly along said East-West quarter line to the Easterly right-of-way line of the South Coast Highway (Hwy 101);

thence Northerly along said Easterly right-of-way line to the most Southerly corner of Lot 6, Block 2, Surfland Unit No. 2, as recorded in Plat Book 8, Page 73;

thence Westerly in a straight line, crossing said South Coast Highway, to the most Northeasterly corner of Tract 'J', Southshore, as recorded in Plat Book 15, Page 53;

thence Westerly along the Northerly line of said Tract 'J' to the most Westerly corner of Lot 8, Southshore;

thence Northerly in a straight line, crossing Tract 'L' (Arbor Drive), to the most Easterly corner of Lot 7, Southshore;

thence Northwesterly along the North line of said Lot 7, 244 feet, more or less, to the Northwest corner thereof, said corner being the Northeast corner of Tract 'A', Southshore;

thence Westerly along the North line of said Tract 'A' 72 feet, more or less, to the Ocean Shore Boundary, defined as the vegetation line in Oregon Revised Statutes Chapter 390-770;

thence Northerly in a straight line to the Southwest corner of the Beach Home Condominiums at Southshore, Stage 8, as recorded in Condominium Book 1, Page 150;

thence Northerly along the West line and Easterly along the North line of said condominium plat to the Northeast corner thereof, said corner being on the Westerly line of Tract 'M', Southshore (Cupola Drive);

thence Easterly in a straight line, crossing said Tract 'M', to the most Westerly corner of Tract 'C', Southshore, said corner being on the Easterly line of said Tract 'M';

thence Northerly and Easterly along the Northerly line of said Tract 'C', and continuing along the Northerly lines of Tracts 'M', 'D' and 'E' to a 3-inch diameter brass cap marking the corner common to Sections 19, 20, 29 and 30, Township 11 South, Range 11 West, Willamette Meridian, said corner being the Initial Point of the plat of Southshore;

thence continuing Easterly along the Northerly line of said Tract 'E' and the Northerly line of Tract 'P' and its Easterly extension to the Easterly right-of-way line of said South Coast Highway;

thence Northeasterly along said Easterly right-of-way line to the West 1/16th line of said Section 20;

thence Northerly along said West 1/16th line to a point on the Westerly right-of-way line of Hwy 101, said point being on the East line of South Beach State Park, as shown in County Survey 10457;

thence continuing Northerly along the West 1/16th line of said Section 20, 2100 feet, more or less, to the NW 1/16th corner of said Section 20;

thence, continuing Northerly along said West line 82.51 feet (N04°05'38"E 82.51 feet per County Survey 10457) to an angle point in the boundary of South Beach State Park;

thence Easterly along said boundary 551 feet, more or less, to the southerly extension of the East line of South Beach State Park;

thence Northerly along said extension and said East line 1212.5 feet, more or less, to a point on the North line of said Section 20, said point bears N85°24'57"W 775.50 feet from the quarter corner on the North line of said Section 20 per County Survey 10457;

thence Northeasterly in a straight line to a 5/8 inch iron rod set in County Survey 15289 at the Southwest corner of that tract of land described in deed recorded in Document 2006-19503, deed records of Lincoln County;

thence Northerly along the West line of said tract, and continuing Northerly along the West line of that tract of land described in MF 113-499, deed records of Lincoln County, and its Northerly extension to the South line of Block 18, Waggoner's Addition to South Beach, as recorded in Plat Book 4, Page 13;

thence Westerly along said South line to the West right-of-way line of SW Dungeness Street (formerly Clay Street);

thence Northerly along said right-of-way line to the South line of SW 29th Street;

thence Westerly along said South line to the West line of Waggoner's Addition to South Beach;

thence Northeasterly along said West line to the Northwest corner thereof, being the Northwest corner of Emerald Bay Estates Condominium Stage II, as recorded in Condominium Book 1, Page 114;

thence Easterly along the North line of said Stage II and Emerald Bay Estates Condominium, Stage 1, as recorded in Condominium Book 1, Page 111, and continuing Easterly along the North line of Block 1, Waggoner's Addition To South Beach, to the Southwest corner of Block 5, South Beach, as recorded in Plat Book 3, Page 3;

thence Northeasterly along the Northwesterly line of said Block 5 and Block 6, South Beach to the Northeast corner of Lot 3, said Block 6, said corner being an angle point in the Northwesterly line of Lot 7, Playa Del Sur Townhouse Subdivision, as recorded in Plat Book 18, Page 14A;

thence, continuing Northerly and Northeasterly along the Northwesterly line of Playa Del Sur Townhouse Subdivision to the most Northerly corner thereof;

thence Northeasterly in a straight line to the Northwest corner of The Regatta, A Condominium, as recorded in Condominium Book 1, Page 201;

thence Northeasterly along the Northwesterly line of The Regatta, A Condominium and its Northeasterly extension to the Northeasterly right-of-way line the South Coast Highway (Hwy 101);

thence Northwesterly along said Northeasterly right-of-way line to its intersection with the 2010 Newport Urban Growth Boundary;

thence along said Urban Growth Boundary as it meanders Easterly, Northerly and Southerly along the Marina Artificial Water Line and the shore of Yaquina Bay to its intersection with the Northerly line of the plat of Harborton, as recorded in Plat Book 6, Page 19;

thence Southeasterly along said Northerly line, and continuing Southeasterly along the Easterly line of Harborton to its intersection with the North right-of-way line of SE 35th Street (40 feet wide), said intersection being Southeast corner of the plat of Neolha Point Townhomes, as recorded in Plat Book 18, Page 7;

thence Southeasterly along the North right-of-way line of SE 35th Street to its intersection with the Northerly extension of the most Northerly East line of that tract of land designated

Parcel 3 in Statutory Bargain and Sale Deed recorded in Document 200716072, deed records of Lincoln County;

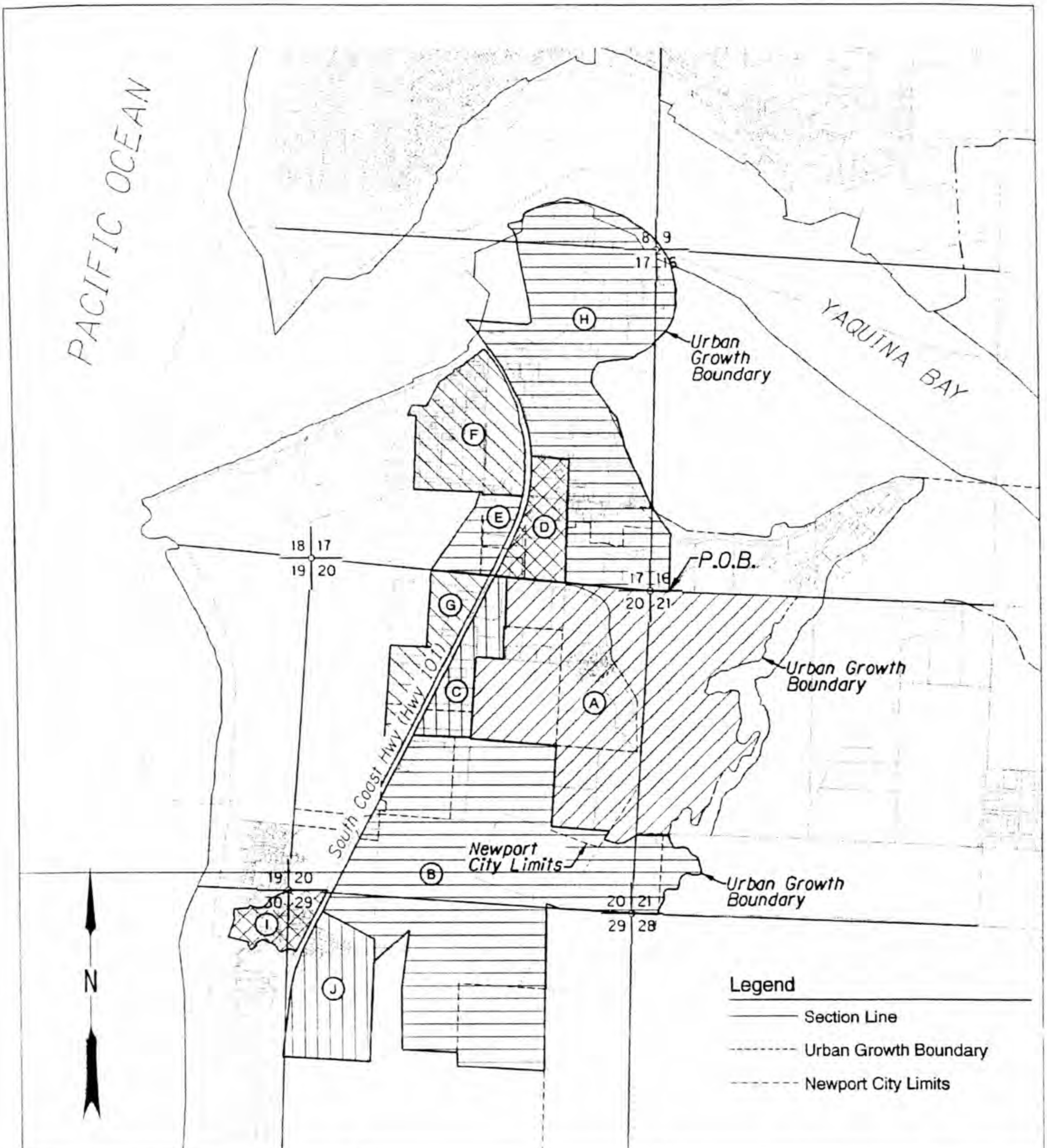
thence Southerly along said most Northerly East line and its Southerly extension, and continuing along the East line of that tract of land designated Parcel 4 in Statutory Bargain and Sale Deed recorded in Document 200716072, deed records of Lincoln County, to the South line of Section 16, Township 11 South, Range 11 West, W.M. and the **POINT OF BEGINNING**.

REGISTERED
PROFESSIONAL
LAND SURVEYOR

OREGON
JULY 19, 1994
JOHN V. THATCHER
2681

RENEWS: 7/1/2014

SIGNED: ____________



Sections 8, 9, 16, 17, 20, 21, 29, & 30
T. 11S, R. 11W, W.M.
City of Newport
Lincoln County, Oregon

SCALE 1" = 2000'

2000 1000 0 2000
FEET

South Beach Future
Transportation Analysis Zones A-J
Map By
CH2MHILL
Survey & Mapping
2020 SW 4TH AVE. SUITE 300 PORTLAND, OR 97201
PH: (503) 235-5000

CHAPTER 14.44 TRANSPORTATION STANDARDS

14.44.010 Purpose. The purpose of this Chapter is to provide planning and design standards for the implementation of public and private transportation facilities and city utilities and to indicate when and where they are required. Streets are the most common public spaces, touching virtually every parcel of land. Therefore, one of the primary purposes of this Chapter is to provide standards for attractive and safe streets that can accommodate vehicle traffic from planned growth and provide a range of transportation options, including options for driving, walking, bus, and bicycling. This Chapter implements the City's Transportation System Plan.

14.44.020 When Standards Apply. The standards of this section apply to new development or redevelopment for which a building permit is required that places demands on public or private transportation facilities or city utilities. Unless otherwise provided, all construction, reconstruction, or repair of transportation facilities, utilities, and other public improvements within the City shall comply with the standards of this Chapter.

14.44.030 Engineering Design Criteria, Standard Specifications and Details. The design criteria, standard construction specifications and details maintained by the City Engineer, or any other road authority within Newport, shall supplement the general design standards of this Chapter. The City's specifications, standards, and details are hereby incorporated into this code by reference.

14.44.040 Conditions of Development Approval. No development may occur unless required public facilities are in place or guaranteed, in conformance with the provisions of this Code. Improvements required as a condition of development approval, when not voluntarily accepted by the applicant, shall be roughly proportional to the impact of the development on public facilities. Findings in the development approval shall indicate how the required improvements are directly related and roughly proportional to the impact.

14.44.050 Transportation Standards.

A. Development Standards. The following standards shall be met for all new uses and developments:

1. All new lots created, consolidated, or modified through a land division, partition, lot line adjustment, lot consolidation, or street vacation must have frontage or approved access to a public street.

2. Streets within or adjacent to a development subject to Chapter 13.05, Subdivision and Partition, shall be improved in accordance with the Transportation System Plan, the provisions of this Chapter, and the street standards in Section 13.05.015.

3. Development of new streets, and additional street width or improvements planned as a portion of an existing street, shall be improved in accordance Chapter 13.05, and public streets shall be dedicated to the applicable road authority;

4. Substandard streets adjacent to existing lots and parcels shall be brought into conformance with the standards of Chapter 13.05.

B. Guarantee. The City may accept a future improvement guarantee in the form of a surety bond, letter of credit or non-remonstrance agreement, in lieu of street improvements, if it determines that one or more of the following conditions exist:

1. A partial improvement may create a potential safety hazard to motorists or pedestrians;

2. Due to the developed condition of adjacent properties it is unlikely that street improvements would be extended in the foreseeable future and the improvement associated with the project under review does not, by itself, provide increased street safety or capacity, or improved pedestrian circulation;

3. The improvement would be in conflict with an adopted capital improvement plan; or

4. The improvement is associated with an approved land partition or minor replat and the proposed land partition does not create any new streets.

C. Creation of Rights-of-Way for Streets and Related Purposes. Streets may be created through the approval and recording of a final subdivision or partition plat pursuant to Chapter 13.05; by acceptance of a deed, provided that the street is deemed in the public interest by the City Council for the purpose of implementing the Transportation System Plan and the deeded right-of-way conforms to the standards of this Code; or other means as provided by state law.

D. Creation of Access Easements. The City may approve an access easement when the easement is necessary to provide viable access to a developable lot or parcel and there is not sufficient room for public right-of-way due to topography, lot configuration, or placement of existing buildings. Access easements shall be created and maintained in accordance with the Uniform Fire Code.

E. Street Location, Width, and Grade. The location, width and grade of all streets shall conform to the Transportation System Plan, subdivision plat, or street plan, as applicable and are to be constructed in a manner consistent with adopted City of Newport Engineering Design Criteria, Standard Specifications and Details. Street location, width, and grade shall be determined in relation to existing and planned streets, topographic conditions, public convenience and safety, and in appropriate relation to the proposed use of the land to be served by such streets, pursuant to the requirements in Chapter 13.05.

CHAPTER 14.45 TRAFFIC IMPACT ANALYSIS

14.45.010. Applicability. A Traffic Impact Analysis (TIA) shall be submitted to the city with a land use application under any one or more of the following circumstances:

A. To determine whether a significant affect on the transportation system would result from a proposed amendment to the Newport Comprehensive Plan or to a land use regulation, as specified in OAR 660-012-0060.

B. ODOT requires a TIA in conjunction with a requested approach road permit, as specified in OAR 734-051-3030(4).

C. The proposal may generate 100 PM peak-hour trips or more onto city streets or county roads.

D. The proposal may increase use of any adjacent street by 10 vehicles or more per day that exceeds 26,000 pound gross vehicle weight.

E. The proposal includes a request to use Trip Reserve Fund trips to meet the requirements of Chapter 14.43, South Beach Transportation Overlay Zone.

14.45.020. Traffic Impact Analysis Requirements.

A. Pre-application Conference. The applicant shall meet with the City Engineer prior to submitting an application that requires a Traffic Impact Analysis (TIA). This meeting will be coordinated with ODOT when an approach road to US-101 or US-20 serves the property so that the completed TIA meets both City and ODOT requirements.

B. Preparation. The submitted TIA shall be prepared by an Oregon Registered Professional Engineer that is qualified to perform traffic engineering analysis and will be paid for by the applicant.

C. Typical Average Daily Trips and Peak Hour Trips. The latest edition of the Trip Generation Manual, published by the Institute of Transportation Engineers (ITE) shall be used to gauge PM peak hour vehicle trips, unless a specific trip generation study that is approved by the City Engineer indicates an alternative trip generation rate is appropriate. An applicant may choose, but is not required, to use a trip generation study as a reference to determine trip generation for a specific land use which is not well represented in the ITE Trip Generation Manual and for which similar facilities are available to count.

D. Intersection-level Analysis. Intersection-level analysis shall occur at every intersection where 50 or more peak hour vehicle trips can be expected as a result of the proposal.

E. Transportation Planning Rule Compliance. The TIA shall comply with the requirements of OAR 660-012-0060.

F. Structural conditions. The TIA shall address the condition of the impacted roadways and identify structural deficiencies or reduction in the useful life of existing facilities related to the proposed development.

G. Heavy vehicle routes. If the proposal includes an increase in 10 or more of the vehicles described in Section 14.45.010.D, the TIA shall address the provisions of Section 14.45.020.F for the routes used to reach US-101 or US-20.

14.45.030. Study Area. The following facilities shall be included in the study area for all TIAs:

A. All site-access points and intersections (signalized and unsignalized) adjacent to the proposed site. If the proposed site fronts an arterial or collector street, the analysis shall address all intersections and driveways along the site frontage and within the access spacing distances extending out from the boundary of the site frontage.

B. Roads through and adjacent to the site.

C. All intersections needed for signal progression analysis.

D. In addition to these requirements, the City Engineer may require analysis of any additional intersections or roadway links that may be adversely affected as a result of the proposed development.

14.45.040. Approval Process. When a TIA is required, the applicable review process will be the same as that accorded to the underlying land use proposal. If a land use action is not otherwise required, then approval of the proposed development shall follow a Type II decision making process.

14.45.050. Approval Criteria. When a TIA is required, a development proposal is subject to the following criteria, in addition to all criteria otherwise applicable to the underlying proposal:

A. The analysis complies with the requirements of 14.45.020;

B. The TIA demonstrates that adequate transportation facilities exist to serve the proposed development or identifies mitigation measures that resolve the traffic safety problems in a manner that is satisfactory to the City Engineer and, when state highway facilities are affected, to ODOT; and

C. Where a proposed amendment to the Newport Comprehensive Plan or land use regulation would significantly affect an existing or planned transportation facility, the TIA must demonstrate that solutions have been developed that are consistent with the provisions of OAR 660-012-0060; and

D. For affected non-highway facilities, the TIA establishes that any Level of Service standards adopted by the City have been met, and development will not cause excessive queuing or delays at affected intersections, as determined in the City Engineer's sole discretion; and

E. Proposed public improvements are designed and will be constructed to the standards specified in Chapter 14.44 Transportation Standards or Chapter 13.05, Subdivision and Partition, as applicable.

14.45.060. Conditions of Approval. The City may deny, approve, or approve a development proposal with conditions needed to meet operations, structural, and safety standards and provide the necessary right-of-way and improvements to ensure consistency with the City's Transportation System Plan

14.45.070. Fee in lieu Option. The City may require the applicant to pay a fee in lieu of constructing required frontage improvements.

A. A fee in lieu may be required by the City under the following circumstances:

(1) There is no existing road network in the area.

(2) There is a planned roadway in the vicinity of the site, or an existing roadway stubbing into the site, that would provide better access and local street connectivity.

(3) When required improvements are inconsistent with the phasing of transportation improvements in the vicinity and would be more efficiently or effectively built subsequent to or in conjunction with other needed improvements in area.

(4) For any other reason which would result in rendering construction of otherwise required improvements impractical at the time of development.

B. The fee shall be calculated as a fixed amount per linear foot of needed transportation facility improvements. The rate shall be set at the current rate of construction per square foot or square yard of roadway built to adopted City or ODOT standards at the time of application. Such rate shall be determined by the

City, based upon available and appropriate bid price information, including but not limited to surveys of local construction bid prices, and ODOT bid prices. This amount shall be established by resolution of the City Council upon the recommendation of the City Engineer and reviewed periodically. The fee shall be paid prior to final plat recording for land division applications or issuance of a building permit for land development applications.

C. All fees collected under the provisions of Section 14.45.070 shall be used for construction of like type roadway improvements within City of Newport's Urban Growth Boundary, consistent with the Transportation System Plan. Fees assessed to the proposed development shall be roughly proportional to the benefits the proposed development will obtain from improvements constructed with the paid fee.

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