Civil & Environmental Engineering
181 SENIOR DESIGN PROJECT

PROJECTS:
• Community Center
• Concrete Building
• Sub-Division
• Pedestrian Bridge
• Ultrafiltration
• Storm Drain
• Wastewater Treatment
• Road Design
• Traffic Impact Analysis

TRAFFIC IMPACT ANALYSIS
for Planning Area 9A+

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Grace Lee
Raizalyn Lubong
Linda Renteria
TRAFFIC IMPACT ANALYSIS

Primary Elements:
- Trip Generation
- Trip Distribution
- Intersection Capacity Utilization Method
- Mitigation

TRIP GENERATION

Definition
In planning, the determination of the number of trips produced by and attracted to each zone, mode or area.

General Procedure
- Site Plan
  - Obtain exact areas for each land use
- ITE Trip Generation
  - Rate coefficients vary for different land uses
  - Average rate coefficient of AM and PM peak flow
  - In and Out percentage rates
TRIP GENERATION

Example of Trip Generation Calculations:

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Size Units</th>
<th>A.M. Peak Hour</th>
<th>P.M. Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In</td>
<td>Out</td>
<td>Total</td>
</tr>
<tr>
<td>Medium Density Residential (SFD) Trip Rate</td>
<td>2380 DU</td>
<td>0.19</td>
<td>0.58</td>
</tr>
<tr>
<td>Trip Generation</td>
<td>458.15</td>
<td>1,374.45</td>
<td>1,832.60</td>
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</table>

A.M. Peak Generator Rate : 0.77 25% 75%
P.M. Peak Generator Rate : 1.02 64% 36%
Assume 7 du/ac

Plan # Reference # Acres # DU
Total 340 2380

TRIP DISTRIBUTION

- Determining Trip Distribution Percentages
  - Existing Counts
  - Assigning Project Volumes
    - Adding to Existing
  - Growth Rate
    - For the City of Irvine, 1% per year

Existing AM Trip Distribution

- Irvine Blvd.
- Project Site Bryan
- Strand Canyon Rd.
- Jeffrey Rd.
- Trabuco Rd.

= IN  = OUT
INTERSECTION CAPACITY UTILIZATION

ICU levels of service gives insight information
- How an intersection is functioning (A, B, C...)
- How much additional capacity is available to handle traffic fluctuations and incidents

**Calculation Method** = Volume / Capacity

**Critical Movements**

**LOS Scale**

<table>
<thead>
<tr>
<th>ICU</th>
<th>ICU</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.6</td>
</tr>
<tr>
<td>B</td>
<td>0.7</td>
</tr>
<tr>
<td>C</td>
<td>0.8</td>
</tr>
<tr>
<td>D</td>
<td>0.9</td>
</tr>
<tr>
<td>E</td>
<td>1.0</td>
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**INTERSECTION CAPACITY UTILIZATION**

**PROJECT:** Planning Area 5A+
**INTERVAL:** PM Peak Hour
**INTERSECTION:** Jeffrey Road and Irvine Boulevard

<table>
<thead>
<tr>
<th>Movement</th>
<th>Existing Lanes</th>
<th>Existing Capacity (VPHG)</th>
<th>Existing Volume (VPH)</th>
<th>Other Project Volume (VPH)</th>
<th>Existing Volume/VIC</th>
<th>Ex. + Other Volume/VIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>NL</td>
<td>2</td>
<td>2800</td>
<td>246</td>
<td>253</td>
<td>239</td>
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<tr>
<td>NT</td>
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<td>20</td>
<td>19</td>
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</table>

**LEGEND**
- N = Northbound
- S = Southbound
- E = Eastbound
- W = Westbound
- L = Left
- T = Through
- R = Right
- N.S. = Not Signalized

**North/South Critical Sums** = 0.13
**East/West Critical Sums** = 0.37
**Clearance** = 0.05
**ICU Value** = 0.55

**LOS** = A A F
### MITIGATION

#### Adding lanes

**PROJECT:** Planning Area 9A+  
**INTERVAL:** PM Peak Hour  
**INTERSECTION:** Jeffrey Road and Irvine Boulevard

<table>
<thead>
<tr>
<th>Movement</th>
<th>Northbound</th>
<th>Southbound</th>
<th>Eastbound</th>
<th>Westbound</th>
<th>North/South Critical</th>
<th>East/West Critical</th>
<th>LOS</th>
<th>ICU Value</th>
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<tbody>
<tr>
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<td>NL</td>
<td>NL</td>
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<td>ST</td>
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<td>ST</td>
<td>0.52</td>
<td>0.52</td>
<td>D</td>
<td>1.05</td>
</tr>
</tbody>
</table>

**Legend:**
- N = Northbound  
- S = Southbound  
- E = Eastbound  
- W = Westbound  
- T = Through  
- L = Left  
- R = Right  
- N.S. = Not Signalized  
- LOS = Level of Service  
- ICU = Incident Command Unit  
- V/C = Volume/Capacity

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### THANK YOU!

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University of California, Irvine