Moving toward Sustainability at University Campuses

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Transportation Sustainability

- A sustainable transportation system has been defined as one that satisfies current transport and mobility needs without compromising the ability of future generations to meet their own
Purpose

Understand university traffic patterns

- Jamarradar equipment was stationed at seven different locations around the Cal State Long Beach campus.
- Collect the speed and volume of vehicles

Create a more sustainable campus

- Single occupant vehicle remain to be the most popular mode of travel and parking availability continues to be a problem.
Data was collected for 24 hours at each point (Monday to Thursday)

Volume data is used as input for Synchro software

LOS and ICU are determined for each intersection
### Intersection Analysis A

<table>
<thead>
<tr>
<th>INTERSECTION</th>
<th>Level Of Service (LOS)</th>
<th>Intersection Capacity Utilization (ICU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beach Drive and Earl Warren Drive</td>
<td>B</td>
<td>70.6 %</td>
</tr>
<tr>
<td>Beach Drive and Merriam Way</td>
<td>C</td>
<td>88.5 %</td>
</tr>
<tr>
<td>Beach Drive and State University Drive</td>
<td>B</td>
<td>58.3 %</td>
</tr>
<tr>
<td>State University Drive and Deukmejian Way</td>
<td>A</td>
<td>40.3 %</td>
</tr>
</tbody>
</table>

*Signalization of intersection (Beach drive and Merriam way) to improve traffic flow*
GREEN HOUSE GAS EMISSIONS

- Major GHG gas emitted from vehicles is Carbon dioxide
- Volume data was used to calculate emissions
- Emissions on every road segment were calculated for 24 hours

\[
\text{CO}_2 \text{ emissions per mile} = \frac{\text{CO}_2 \text{ per gallon}}{\text{MPG}} = \frac{8,887}{21.6} = 411 \text{ grams}
\]
GRAPH SHOWING HOURLY EMISSIONS
PERCENTAGE DISTRIBUTION OF MODE OF TRANSPORT

- Drive Alone: 67.2%
- Transit: 14.2%
- Carpool/Vanpool: 6.1%
- Walk: 5.7%
- Bike: 4.2%
- Dropped off: 2.0%
- Motorcycle/Scooter: 0.7%
RECOMMENDATIONS

- Parking permits should be priced based on how far away from the school a student lives.
- Increase the number of carpool parking spaces to encourage students to travel together.
  - Strict laws should be enforced for those using carpool parking spaces.
- Increase the number of off campus trippers to locations where the Cal state student concentration are high.
- Educating students by showing the statistics of CO2 emissions.
# Speed Analysis

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of lanes (both directions)</th>
<th>Length of segment (Mile)</th>
<th>Speed Limit (MPH)</th>
<th>85&lt;sup&gt;th&lt;/sup&gt; Percentile (MPH)</th>
<th>50&lt;sup&gt;th&lt;/sup&gt; Percentile (MPH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 State University Drive</td>
<td>2</td>
<td>0.2</td>
<td>15</td>
<td>24</td>
<td>18</td>
</tr>
<tr>
<td>2 East Campus Drive</td>
<td>2</td>
<td>0.4</td>
<td>25</td>
<td>28</td>
<td>24</td>
</tr>
<tr>
<td>3 West Campus Drive</td>
<td>2</td>
<td>0.4</td>
<td>25</td>
<td>22</td>
<td>19</td>
</tr>
<tr>
<td>4 Beach Drive</td>
<td>4</td>
<td>0.4</td>
<td>15</td>
<td>28</td>
<td>24</td>
</tr>
<tr>
<td>5 Earl Warren Drive</td>
<td>2</td>
<td>0.5</td>
<td>25</td>
<td>23</td>
<td>18</td>
</tr>
<tr>
<td>6 Merriam Way</td>
<td>5 (2 NB, 3 SB)</td>
<td>0.5</td>
<td>15</td>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td>7 Deukmejian Way</td>
<td>2</td>
<td>0.3</td>
<td>15</td>
<td>17</td>
<td>13</td>
</tr>
</tbody>
</table>
## Speed Analysis

<table>
<thead>
<tr>
<th>Road</th>
<th>Distance</th>
<th>Details</th>
</tr>
</thead>
</table>
| **State University Dr.** | 0.2 miles | - Low pedestrian activity  
- Stop sign in middle of section  
- Signalized light at southern end  

*#4 Highest Volume* |
| **Beach Dr.**    | 0.4 miles | - Parallel to campus dormitories creating many pedestrians  
- There are three cross walks on this length  

*#1 Highest Volume* |
| **Merriam Way**  | 0.5 miles | - Near CSULB Pyramid  
- One stop sign with a crosswalk  
- Northern end of Merriam Way is a stop light for Atherton Street  

*#2 Highest Volume*
RECOMMENDATIONS

- Speed Tables
- Channelization Posts
Things to Consider

- Age group who typically attends universities
- Future and current growth of students attending universities
- More motor vehicles typically cause an increase in the emission of greenhouse gases on-campus.
- Escalation in climate temperature.
Questions?

Thank you.