TRAFFIC AND TRANSPORTATION

As part of the master plan effort, traffic, parking, and pedestrian information, including traffic flow counts were assembled in order to identify the existing access and circulation patterns within the campus. The existing data was used to identify access and circulation issues as well as to identify the transportation recommendations incorporated into the Master Plan.

Regional and Local Access to Campus

Dartmouth is located in the southeastern portion of Massachusetts, approximately 2 hours from Boston. The UMD campus is less than 5 miles from both I-195 and Route 140 (see Figure1) and is also accessible via state routes 6, 88, and 177. The campus is located off of Old Westport Road.

Vehicular access within the campus is mainly provided from Ring Road, a circumferential road with a diameter of approximately one-half mile. Driveways provide access to the 17 faculty/staff/commuter parking lots on the interior of Ring Road. Driveways to the Cedar Dell Apartments, Residence Halls, Tripp Athletic Center, and Power Plant are also located off of the Ring Road.

All vehicles must enter the campus from the north via Old Westport Road. The entrance to the campus is three lanes – two lanes provide through-access to the eastern portion of Ring Road and the pick-up/drop-off area in front of the Dion Science/Engineering/Nursing Building; one lane serves as a right-turning lane to the western portion of Ring Road. The campus exit is also three lanes – two left turn lanes to Old Westport Road eastbound and one right-turn lane to Old Westport Lane westbound.

During peak hours, the majority of campus traffic was observed to enter the site via a left turn from westbound Old Westport Road (70 percent in the arrival peak and 85 percent in the departure peak). Approximately 90 percent of vehicles during peak hours turn right on Old Westport Road to leave the campus.

Ring Road is one lane in each direction with parallel parking spaces on the outside edge of Ring Road. Ring Road provides access to all of the commuter lots within the campus (Lots 1 – 17), the Cedar Dell campus apartments, the Residence Halls, and vehicular access to the Athletic Fields.
**Traffic Conditions**

Vehicle traffic volume and pedestrian counts were collected to develop a base traffic network for the study area representing peak-period conditions. Campus traffic peak hours were identified through the placement of 24-hour automatic traffic recorders (ATRs). ATR data were collected on the Ring Road and at the main entrance to the campus on Wednesday, October 15, 2003. Traffic flow variations along the Ring Road and at the campus entrance are shown in Figure 2 and Figure 3, respectively. Peak traffic periods on the campus roads occur from 8:00 a.m. to 10:00 a.m. and from 2:00 p.m. to 4:00 p.m.
The following five intersections were chosen for full turning movement counts:

- Old Westport Road/Campus entrance;
- North Dorm Driveway/Ring Road;
- Centennial Drive/Dorm Crosswalk/Ring Road;
- South Dorm Driveway/Ring Road; and
- Cedar Dell Driveway/Ring Road.

Vehicle turning movement and pedestrian counts were conducted at all study area intersections on Wednesday, October 29th, 2003. The ATR placement was configured to approximate turning movements between the campus entrance and Ring Road. Together these locations account for all vehicles entering and exiting the main campus. Movements to and from individual parking lots were not recorded.

Count data were collected from 8:00 to 10:00 A.M. and from 2:00 to 4:00 P.M. The morning peak-hour occurred from 8:00–9:00 A.M. and the evening peak-hour was observed to occur between 2:30 P.M. and 3:30 P.M. The highest traffic periods occur during the fifteen minutes prior to the start of classes, i.e. 8:45 to 9:00 a.m.

From the Cedar Dell driveway, a traffic “spike” occurred during the fifteen minute count-period between 8:45 and 9:00 a.m. The timing of the spike directly corresponds to the start of 9:00 a.m. class period. Because the apartments at Cedar Dell are more than one-half mile from the campus, students drive from the Cedar Dell apartments to the parking lots within Ring Road. Another, less drastic spike was observed during the 15 minutes before the 10:00 a.m. class period. The 10 a.m. spike was accompanied by an increase in entering traffic – which may be associated with either students returning from 9:00 a.m. classes (9:00 a.m. to 9:50 a.m.) and/or students being picked up for their 10 a.m. class.
- From 8:00 to 8:45 a.m., approximately 25 vehicles exited Cedar Dell every fifteen minutes. In the 15 minutes from 8:45 to 9:00 a.m., 75 vehicles exited Cedar Dell.

- From 9:00 to 9:45 a.m., approximately 25 vehicles continued to leave Cedar Dell every fifteen minutes. Between 9:45 and 10:00 a.m., 51 vehicles exited Cedar Dell.

- The 9:45 to 10 a.m. exiting spike was accompanied by an entering spike of 33 vehicles arriving (an average of 8 vehicles arrived every fifteen minutes between 9:00 a.m. and 9:45 a.m.

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**Pedestrian Conditions**

Sidewalks are provided throughout the campus with most pedestrian activity occurring on the main campus within Ring Road. Campus buildings located outside of Ring Road include the residential dormitories and the athletic center. No sidewalks are provided along Ring Road except for a small section near the entrance booth used for drop-off and pick-up. Crosswalks across Ring Road are provided at five locations; the entranceway of Cedar Dell Village, two at the East Campus Residence Halls, and two at the Tripp Athletic Center. A sidewalk located on the north side of the roadway connecting Ring Road to Cedar Dell Village serves residents walking to

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*Figure 4: Existing Conditions (2003) Traffic Volumes, A.M. Peak Hour (8.00 - 9.00 A.M.)*

*Figure 5: Existing Conditions (2003) Traffic Volumes, P.M. Peak Hour (2.30 - 3.30 P.M.)*
On Centennial Drive, a sidewalk is located on the north side. This sidewalk provides access to campus for students walking from the East Campus Residence Halls. A flashing yellow traffic signal is located at the Ring Road pedestrian crossing to Centennial Drive.

Pedestrian counts were conducted at the study area intersections in conjunction with vehicle counts. Existing A.M. and P.M. peak-hour pedestrian volumes appear in Figure 6 and Figure 7. Approximately 440 and 600 pedestrians cross Ring Road at Centennial Drive and 180 and 210 pedestrians cross at the South Dorm Drive during the A.M. and P.M. peak hour, respectively. No pedestrians were observed to cross the Ring Road at the North Dorm Drive.

For residents living in the Oak Glen Hall and Pine Dale Hall, a crosswalk at South Dorm Drive and Ring Road is provided; however, students are observed to create a more direct path to campus. This desired path crosses diagonally across Ring Road from South Dorm Drive and then cuts through the woods and Lot 5 to connect with an existing sidewalk.

No pedestrians were observed at the entrance to the campus at either Old Westport Road or Ring Road.
Transit Services

The campus operates an intracampus van service and a shuttle service to the College of Visual and Performing Arts in New Bedford. A map of transit routes serving UMD is provided in Figure 8.

Van service is provided throughout campus starting at the campus center and making stops at residential halls, the library, and the gym. Service runs daily from 5:00 P.M. until 2:15 A.M.

Shuttle buses provide service between the main campus and the UMD College of Visual & Performing Arts Star Store building in New Bedford. Buses pick up or drop off students at Cedar Dell Road, Centennial Way, and the Campus Center. Shuttles are provided between 8:00 A.M. and 10:20 P.M. on Mondays and Wednesdays. Tuesdays and Thursdays shuttles start at 9:00 A.M. and stop at 10:20 P.M. On Fridays, the shuttle leaves the UMD campus only once at 8:00 A.M. and arrives back at campus at 3:20 P.M.

The Southeastern Regional Transit Authority serves the towns of Dartmouth, New Bedford, Westport, and Fall River and connects all buildings related to the UMD campus. Buses run between 5:30 A.M. and 8:00 P.M. on Mondays and Fridays and between 7:00 A.M. and 8:00 P.M. on Saturdays. No service is provided on Sundays.

Parking

There are approximately 4,600 parking spaces on the UMD campus to serve a daytime population of nearly 8,600 faculty, staff, administration, and students. Parking spaces are assigned by permit-type within all of the parking lots on the campus. The following table summarizes the various types of permits issued and the number of spaces available to each permit-type within the campus.

<table>
<thead>
<tr>
<th>User Group</th>
<th>Permits</th>
<th>Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty/Staff</td>
<td>1,500</td>
<td>730</td>
</tr>
<tr>
<td>Administration</td>
<td>205</td>
<td>120</td>
</tr>
<tr>
<td>Commuter Students</td>
<td>2,400</td>
<td>2,044</td>
</tr>
<tr>
<td>Cedar Dell</td>
<td>700</td>
<td>565</td>
</tr>
<tr>
<td>Residence Halls</td>
<td>1,030</td>
<td>931</td>
</tr>
<tr>
<td>Handicap</td>
<td>26</td>
<td>129</td>
</tr>
<tr>
<td>Rideshare</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Visitors</td>
<td>Temporary Permits</td>
<td>74</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,863</strong></td>
<td><strong>4,595</strong></td>
</tr>
</tbody>
</table>

Any faculty, staff, or student of UMD may apply for a parking permit. Approximately 5,860 permits were issued for the 2003-2004 year. There is no cost for a parking permit. The parking office does attempt to verify that vehicles registered to Cedar Dell and Residence Hall residents are owned by the resident applying for the permit. The following are some of the restrictions and allowances that are associated with specific permits:

- Vehicles with administration permits are allowed to park in faculty/staff spaces.
- Cedar Dell and Residence Hall permitted vehicles are allowed to park in the commuter spaces.
- Vehicles with Cedar Dell permits are not allowed to park at the Residence Halls.
- Vehicles with Resident Hall permits are not allowed to park at Cedar Dell.
- Commuter permitted vehicles are not allowed to park at either Cedar Dell or the Residence Halls.

Observations indicate that typically particular core lots fill beyond capacity (vehicles are parked on the lawn and in unmarked spaces) while other core lots and Ring Road spaces are not completely filled. Lots 3, 13, 16, and 17 were filled beyond their capacity while spaces were still available along Ring Road and in Lots 1 and 15.
Existing Transportation Issues

Single access point to campus creates following issues:
- Significant queues for high left turn volumes from Old Westport Road into campus in the morning peak hours;
- Vehicles exiting the campus from eastbound Ring Road must cross multiple entering lanes at Ring Road/Entrance Drive;
- Single entrance/exit point for emergency access/egress. No secondary access route to campus.

Wayfinding/signage issues:
- Lane configuration at entrance/exit unclear to visitors;
- There are no signs directing visitors to visitor services or visitor parking at the entrance of campus or within the campus Ring Road.

Pedestrian access:
- Crosswalks do not always exist within pedestrian desire lines (i.e. students crossing the Ring Road from the South Dorm Driveway do not use the existing crosswalk but cross to Lot 5 to Centennial Drive);
- There are no sidewalks adjacent to the Ring Road for recreational pedestrian/bicycle use.
- Residence halls and Cedar Dell are beyond a five-minute walk from campus core. Resident halls and student apartment locations encourage residents to drive to core campus.

Parking:
- Parking demand is not equally distributed throughout parking lots – some core lots are more desirable for parking than other core lots.
- On-campus residents who drive and park in the commuter lots take up desirable commuter spaces.

Transit:
- Infrequent van service between residence halls and campus center
- Congestion at Campus Center where vans, shuttles, pedestrians, cars, and service vehicles vie for loading/unloading space.

Recommendations

Front Entrance. Improve operations at campus entrance. Reduce amount of pavement to increase intersection efficiency and safety. Visitor information booth could be located along entrance to direct visitors to parking and destinations.

Two front entrance alternatives were developed as part of the master plan process:

Option 1 – Unsignalized. This alternative consolidates the Old Westport Road/Campus Entrance intersection. Intersection operations will be more efficient and safety will be improved by reducing the area where vehicles can enter and exit the campus to Old Westport Road. This alternative preserves the three lanes exiting the campus; the existing median would be narrowed to 10 feet. The three lanes entering the campus would be shifted approximately 30 feet to the east to the space previously occupied by the median. Left turns would be allowed from both Old Westport Road westbound travel lanes (Old Westport Road would become one exclusive left-turn lane and one shared left/through travel lane). Left turns into the campus would be channelized by pavement markings on the roadway. Old Westport Road eastbound would become one through lane and one right turn lane. (See Figure 9)
OPTION 1
NARROW ENTRANCE/EXIT CROSS-SECTION
• IMPROVES SAFETY
• SOME LEVEL OF SERVICE IMPROVEMENTS
• CLARIFIES LANE-USE
A visitor information island would be accessed through a pull out area accessed from the right lane. The visitor booth could be located in the island to provide drive-up information for visitors needing parking information, campus maps, or directions to visitor destinations.

The Ring Road/Campus Entrance intersection could be improved by implementing a southbound free-right turn from the entrance road to the Ring Road and by channelizing the eastbound Ring Road right turn.

Option 2 – Signalized. This alternative creates a new campus entrance to the east of the pond and as part of the existing Old Westport Road/Cross Road intersection. The Old Westport Road/Cross Road intersection would become a four-legged, signalized intersection and the primary entrance to the campus. The existing driveway would be maintained to provide access to and from the west. The existing driveway would be consolidated to two exiting lanes and one entering lane. (See Figure 10)

A visitor information island would be located at the western access. The visitor area would be accessed through a pull out area accessed from the right lane. The visitor booth could be located in the island to provide drive-up information for visitors needing parking information, campus maps, or directions to visitor destinations.

A comparison of existing intersection operations with the proposed signalized operations is provided in the Appendix.

Pedestrian Zone. Create a pedestrian zone in the area between North Dormitory Drive and South Dormitory Drive. This zone will include Centennial Drive, the critical connection between the Ring Road and the core campus. The pedestrian zone should include:

- narrowed travel lanes
- gateway visual cues to identify the pedestrian zone to drivers
- crosswalk enhancements (neckdowns, in-pavement flashers, or other safety improvements) to increase visibility of pedestrians within the zone
- removal of Ring Road parallel parking to eliminate students crossing between parked cars.

(See Figure 11)

Transit Opportunities. Increase transit frequency and improve reliability. Shuttle opportunities exist between residence halls and the core campus. Transit can also connect students to jobs, remote parking lots, and the town of Dartmouth.

Ring Road. Create sidewalks or trails along the Ring Road to encourage walking and recreational opportunities for students, faculty, staff, and visitors. Sidewalks and/or trails will improve the connectivity around the campus.

Emergency Access Road. An emergency access road could provide a secondary access route to and from the campus at Chase Road. The emergency access road would not be open to public access at any time. The emergency access route would provide a secondary means of access to the campus for emergency purposes only for campus evacuation or emergency access to campus by emergency personnel (i.e. fire, police, or paramedics). The emergency access road would connect the existing roadway located behind the Public Safety building to Chase Road. The existing roadway would need to be paved and widened. The emergency access road is not appropriate for daily campus traffic due to its proximity to the Chase Road neighborhoods.
Figure 10: Front Entrance Redesign Option 2

**OPTION 2
NEW ENTRANCE/EGRESS**

- Improves Safety
- Improves Level of Service
- Signals Intersection
- Accommodates Pedestrians
- Redistributes Circulation
- Secondary Egress
**Future Housing.** Locate future housing within a 5 minute walking radius of campus (1/4 mile). Housing location will encourage additional walking on the campus and provide better access between student housing and classes and student life.

**Future Parking.** Based on existing student, faculty, and staff parking ratios and the proposed growth in on-campus housing, the campus will need an additional 600 spaces by 2010. The majority of this parking is associated with the transition from
commuter students to resident students. By 2010, the master plan forecasts 6,000 resident students (compared to the existing 3200 residents); the additional resident students will require approximately 1400 parking spaces. However, some of the resident parking will be available as fewer commuter spaces are needed.

_Future parking needs of the campus are summarized in the following table:_

<table>
<thead>
<tr>
<th>Users</th>
<th>FTE</th>
<th>Spaces/FTE</th>
<th>Future Existing Spaces</th>
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<tbody>
<tr>
<td>Faculty/Staff/Administration</td>
<td>1050</td>
<td>0.9</td>
<td>893</td>
</tr>
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<td></td>
<td>850</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commuter Students</td>
<td>2650</td>
<td>0.4</td>
<td>1060</td>
</tr>
<tr>
<td></td>
<td>2044</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resident Students</td>
<td>6000</td>
<td>0.5</td>
<td>3000</td>
</tr>
<tr>
<td></td>
<td>1496</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handicap</td>
<td>—</td>
<td>—</td>
<td>150</td>
</tr>
<tr>
<td>Rideshare</td>
<td>129</td>
<td>—</td>
<td>10</td>
</tr>
<tr>
<td>Visitor</td>
<td>2</td>
<td>—</td>
<td>75</td>
</tr>
<tr>
<td>Total</td>
<td>4,595</td>
<td></td>
<td>5,188</td>
</tr>
</tbody>
</table>

Detailed parking projections are provided in the Appendix.

Additionally, on-campus parking rules and regulations should be enforced. Resident students should not be allowed to park in commuter spaces during core-campus hours. The University may want to consider implementing parking fees to encourage carpooling and discourage single occupant vehicles. The revenue collected could be used to fund additional parking enforcement and patrols.

1 Parking ratios based on existing parking ratios and parking space needs cited in _Parking for Institutions and Special Events_ (Eno Foundation). _Parking for Institutions and Special Events_ cites average parking needs of 0.3 spaces/commuter student; 0.7 spaces/daytime staff; and 0.5 spaces/resident student.