APPENDIX A

Meeting Notes

MEMORANDUM

To: Eleni Churchill

From: Joe Segale, P.E./PTP

Re: Colchester Avenue May 27, 2010 Public Meeting Summary

Date: Prepared June 2, 2010

This memorandum summarizes the results of the public meeting held on May 27, 2010 for the Colchester Avenue Corridor Plan. The meeting was conducted at the McClure conference room at Fletcher Allen Health Care located directly on Colchester Avenue. An overview of the meeting is provided, major themes are summarized, a summary of short-term strategies is presented, and the relevance of this meeting to long-term strategies and the complete street concept is discussed. A detailed listing of participant comments is attached as well as meeting notices that were mailed or hand delivered.

Meeting Overview

The purpose of this meeting was to gather feedback from residents and other stakeholders on transportation issues along Colchester Avenue. The meeting consisted of an informal walking tour between 5:00 and 6:00 pm and a public workshop between 7:00 and 9:00 pm. There were three segments of the formal meeting. The meeting started with a welcome from members of the Task Force and a presentation by RSG that described the transportation system and issues identified to date. The second, and longest, phase of the meeting consisted of a roaming workshop. Participants were organized randomly into four groups. Four stations were arranged that focused on 1) traffic congestion and safety, 2) bicycle and pedestrian, 3) transit and 4) community character issues. Each participant group spent approximately twenty minutes at each station during which experts facilitated a discussion, answered questions and took notes. During the final phase of the meeting, the facilitators summarized major themes and all meeting participants were given an opportunity to offer additional comments and ask more questions.

Approximately 40 people participated in the meeting, not including the consultants, City and CCMPO staff and others helping to run the meeting. Several methods were used to make the general public aware of the meeting. Postcards were mailed directly to land owners along and near the corridor; flyers were dropped off at every house and apartment along the corridor and posted in CCTA bus shelters; an invitation was posted on the neighborhood, on-line newsletter Front Porch Forum, and press releases were sent to the Burlington Freepress and Seven Days. Invitations were sent to the Burlington Business Association and Church Street Marketplace; Burlington Bike/Walk Council; AARP City of Burlington; the City of Winooski City Council, Planning Commission, and Development Review Board; and legislators in Burlington and

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Winooski. The meeting notice was posted on the CCTV events calendar, City of Burlington Website and Twitter/Facebook pages, and on the Colchester Avenue Corridor Plan web site.

Common Themes and Issues

Major themes and common issues are summarized below. The complete list of comments is attached.

Traffic Congestion and Safety

Safety was the biggest concern. The most prominent safety concern is ***speed*** within the corridor. Other concerns include ***erratic driving*** (which many be attributed to the ***narrow and poorly marked lanes***), the very ***poor condition of the road's surface***, ***lack of exclusive left turn lanes with dedicated left-turn signals***, and ***unmarked pedestrian crossings***. ***Confusion over lane assignment*** due to a lack of signs and worn pavement markings was a concern to many of the participants. The intersections of Colchester Avenue with ***Pearl/Prospect*** and with ***Riverside/Barrett/Mills*** were identified often as dangerous.

Streetscape and Amenities

Poor drainage along sidewalks was identified as a major concern. Standing water forces pedestrians off sidewalks to trample grass on adjacent lawns and the green strip. During the cold months, poor drainage results in ice and slush making walking difficult, particularly for older people. During the breakout session, the need for ***increased lighting*** throughout the corridor ***without installing "ugly" light fixtures or increasing light pollution*** was identified to help address security and traffic safety concerns. Placing ***utilities underground, maintenance of green space, keeping/increasing existing sight lines***, and ***making dirt "goat paths" more official*** were also emphasized by meeting participants.

Transit

A common concern was the ***frequency and size of the busses*** travelling along Colchester Avenue. Participants asked if services could be consolidated and if different bus sizes should be considered. There was also a lot of interest shown in giving ***signal priority to buses*** as well as well as offering more direct service along the corridor that does not pull into FAHC. In the short-term, participants would like to see bus stops ***shoveled during the winter*** months and ***more shelters***.

Bicycle and Pedestrian

The ***FAHC and the East Avenue*** intersections were identified as particularly bad locations for pedestrians. The crosswalk over Mary Fletcher Drive (FAHC entrance) is not protected by pedestrian signals. Buses waiting to turn left on to Colchester Avenue block the view of pedestrians from vehicles in the right-turn lane (which are allowed to turn right-on-red.) Vehicles turning right-on-red from Colchester Avenue to East

Avenue do not yield to pedestrians. Pedestrians crossing Colchester Avenue in the vicinity of the Trinity campus are not directed to a specific location and there is a lack of pedestrian crossings between Kampus Kitchen and Riverside Avenue. Overall, participants identified a lack of **a *continuous bicycle facility along the corridor, lack of bike/ped signage, a need for properly drained and connected sidewalks on both sides of the corridor***, and ***safety*** as paramount issues.

Short-term Corridor Improvements

Implementation of recommendations was a common theme raised at the public meeting. Therefore, the suggestions generated during the meeting with the potential for implementation relatively soon have been consolidated into a list of short-term projects and actions. These ideas could be implemented starting in 2010 and over the next several years. A few examples of short-term strategies include:

- Installing signs that designate lane use (such as through, shared through/right, shared through/left) so that drivers know what lanes to use, even when line striping fades;
- Prohibiting right-turn-on red at some signalized intersections where conflicts are common between pedestrians and vehicles;
- Installing signs and refreshing the paint at the pedestrian crossing located near Kampus Kitchen; and
- Including pavement markings at the Pearl/Prospect Street intersection that keep drivers on the correct path as they pass through the center of the intersection.

Many of the short-term recommendations can be addressed as part of, or shortly after, the resurfacing project planned for Colchester Avenue in August 2010. Other short-term recommendations will require some additional design and planning and may be implemented over the next two or three years. Staff from the City of Burlington Department of Public Works and the CCMPO are working together to move the short-term recommendations forward.

Long Term Corridor Improvements

Some of the issues identified by meeting participants will take longer to address because they involve reconstruction or other significant changes with impacts and costs that need to be more fully evaluated. One example is the need to address the haphazard way by which pedestrians cross Colchester Avenue in the vicinity of the Trinity Campus. It will be necessary to devise a means to channel the pedestrian flow to a specific location (using wayfinding combined with some type of barrier) and then installing a mid-block crossing with proper control. Another example is providing protected left-turns at the major intersections. This improvement requires changing intersection lane configuration and installing new traffic signal heads. These types of suggestion require detailed analyses and the preparation plans and may involve reconstruction of the roadway and the purchase of new equipment. In addition, while these improvement strategies seem to make sense, they need to be considered in the context of a long term vision for the corridor. During the second public meeting to be held in the fall of 2010, meeting participants will be asked to help brainstorm ideas to meet the long-term vision for the corridor.

Complete Street Concept

At the end of the public meeting, one meeting participant asked about the status of the complete street concept that was proposed for Colchester Avenue in the Burlington Transportation Plan. Full implementation of the complete street concept involves reconstruction of Colchester Avenue between East Avenue and Prospect Street and it is therefore a long term strategy. The concept involves reducing the number of travel lanes from four to two, providing exclusive left or right turn at the signalized intersections as appropriate, and some type of median. The reduction of through lanes will make it possible to provide dedicated bicycle lanes along each side of the roadway with only minor widening.

RSG will be evaluating how this change will affect traffic flow and congestion. Part of the evaluation may include a pilot test in the field. If approved by the City, the test would occur during the resurfacing project scheduled for August. After the first course of pavement is laid, striping consistent with the complete street concept will be applied and appropriate signs will be installed. Data will be collected and observations made to determine how well the concept works. When the final course of pavement is laid, it is anticipated that the current line striping that allows four lanes of traffic will be re-established. However, it is also possible that some components of the complete street concept could be left in place, depending on the results of the test. It is important to stress that the City has yet to determine whether or not it is willing to conduct the test at this time.

ATTACHMENT A: Meeting Notes

Corridor Walking Tour

Tour Leaders

- Joe Segale, P.E./PTP; Transportation Planner ; Resource Systems Group
- David Raphael, Landscape Architect; LandWorks

Comments

- FAHC entrance
  - Poor drainage
  - Buses block view of pedestrians
  - No pedestrian crossing equipment for x-walk along Colchester Avenue
  - Should an additional cross-walk be provided across the Colchester Avenue eastbound approach (provide x-walks on all approaches)
- Pedestrian desire line between Trinity Campus and UVM main campus cuts across the FAHC entrance (goat path is apparent)
- Rain Garden at Fleming Museum was built by UVM students and is a good example of innovative storm water management
- The Mansfield intersection generally operates well, except after Mater Christi School dismissal during mid-afternoon
- Transition at Mansfield House
- University Place intersection is really dangerous, sidewalk condition is very poor @ campus, a little better at Green
- Sewer problems along Colchester Avenue edges
- Bus stop areas are not delineated (eroded).
- Sidewalk east of Fletcher Place has particularly bad drainage
- Not enough staking space for right turns from East Avenue to Colchester Avenue
- No cross-walk at bus stops
- Only one cross-walk between Riverside and Trinity (@ Kampus Kitchen)
- Erosion along north side of Colchester Ave by the cemetery
- Calarco Court provides a short cut
- Pedestrian crossing at the bottom of hill near Winooski is unprotected
- Pedestrian desire line from Hospital to in Front of state office building
- No continuous bicycle route
- Incorporate CID Design Guidelines

Traffic Congestion and Safety Comments

Group Facilitators

- Mark Smith, P.E.; Traffic Engineer; Resource Systems Group
- Bruce Nyquest, P.E.; Traffic Engineer; Vermont Agency of Transportation
- Eleni Churchill, Senior Transportation Planner; Chittenden County MPO

Comments from First Group

- Need to have alternative routes during construction, lack of options
- Pearl & Prospect intersection is challenging/confusing
- The corridor's signs are inefficient
- Health department, no bike lanes
- Pavement conditions are very poor and there are a lot of deep/serious pot holes
- Narrow lanes
- Drainage is very poor, and some drains are too low, motorists need to swerve to avoid them
- Need sidewalks at the cemetery
- Establish regular maintenance
- Sensors would help traffic flow
- Pavement condition at the Riverside intersection is bad
- Warning/signal that the light will turn red
- No striping for left turn lanes
- No shoulders
- East Ave is gridlocked for the majority of the day, hard to access their driveways/homes.
    - This only increases when there are construction projects going on, lack of planning during construction projects within this corridor
- At the Pearl and Prospect intersection the vehicle paths are unclear; consider actuation of signals
- Resolve the bike & ped/traffic interaction issues
- Drainage is not just a seasonal issue, the grates are too low, making drainage a main concern and huge issue
- The sidewalk across from the cemetery is in very poor condition and is inundated with large puddles/potholes

- The signal at Riverside should be considered for actuation or it should be fixed if actuation is present
- Making left hand turns from Winooski (onto Mills & Barrett) is very difficult
- Striping is non-existent for much of the year

Comments from Second Group

- Prospect & Pearl Intersection is unsafe
- Trouble staying in lane, lane(s) too narrow
- Road surface is poor
- High speeds
- Side streets are too busy and are being used to cut across
- Not organized for turning
- Permitted left at the Hospital – bad for pedestrians
- Buses block sight lines, particularly at the Hospital
- Queues block driveways
- Blinking lights are dangerous for pedestrians because people run them
- Coordinate signals
- The speed is much too fast (raceway)
- Site lines are blocked by shrubs and parked cars
- Confusing lane use
- Speed is a big concern
- Crosswalks should have signage
- Left hand turns need to be addressed at the Pearl and Prospect intersection
- East Ave intersection is much too congested. A large number of drivers run the left turn light onto East Ave
- The lanes within the corridor are much too narrow, specifically when there is a bus in the adjacent lane, and the lane assignment(s) are very confusing throughout
- The surface of the road is a consistent problem
- Drivers are driving too aggressively (i.e. high speed passing, running signals (East Ave), weaving to avoid turning vehicles and lights)
- There have been consistent issues with congestion on side streets (University Place) and driveways
- Left hand turns are very challenging
- Issues with the permitted left at the hospital entrance
- Buses coming out of FAHC are blocking both lanes of traffic
- Sight-distance is compromised by trucks, buses, and high shrubbery

- Blinking lights are good at night, loops/detectors are better to detect traffic
- Traffic does not stop for pedestrians in unmarked crossings

Comments from Third Group

- The noise from trucks and ambulances using their engine breaks is a big issue.
- Ambulances should be using the new route from Main Street (Beaumont and Carrigan drives)
- Riverside and Barrett intersections have a lot of issues, specifically left hand turns
- Coordination of the Barrett and Mill St. traffic lights. There is no pedestrian crossing at this intersection
- Bad left turn locations (e.g., University Place, Mansfield)
- The intersections are too closely spaced
- South Prospect/Colchester Ave is challenging – the "jog" at the intersection is the problem
- Speed is a huge issue (consider 25mph) as is driver behavior. Drivers weave around left turning vehicles creating unsafe conditions.
- "Red" arrows create confusion – don't use them
- Poor signage and bad pavement markings throughout Colchester Ave from South Prospect to East Ave
- Winooski Bridge – issues with left turns at Barrett and Mill St.
- Bad/unsafe lefts at U-Place and Mansfield
- The intersection/light at Prospect- get cars to line up
- Left turns are challenging
- Signage at East Ave for right turns
- Signage at Prospect for left turns

Comments from Fourth Group

- Stopped cars block driveways
- Between 3 – 5pm is when traffic is at its worst, traveling downhill towards Winooski the traffic becomes bumper to bumper
- There needs to be an exclusive left turn lane into the hospital
- Cars weaving to avoid lights and cars that are turning
- Poorly marked lanes – increase last minute lane changes
- Increase the use of Beaumont Ave (Main Street entrance) for hospital traffic
- There shouldn't be a stop sign on East Ave

- The parking along East Ave blocks views
- Cars are consistently going too fast, lower the speed limit or have fewer lanes
- Concern for pedestrians crossing Colchester Ave

Traffic Congestion and Safety Summary

Safety is the biggest concern. The most prominent safety concern is ***speed*** within the corridor. Other concerns include *congestion* and ***erratic driving*** (which many attribute to the ***narrow and poorly marked lanes***), the very ***poor condition of the road's surface***, ***lack of a left hand turn lane***, and **unmarked pedestrian crossings**.

Streetscape and Amenities Comments

Group Facilitators

- David Raphael, Landscape Architect; LandWorks
- Jason Charest; Transportation Engineer; Chittenden County MPO

Comments from First Group

- Parts of the sidewalks are missing
- Bridge crossing over Winooski River is a difficult environment for pedestrians/bicyclists
- Indirect paths (jogs)
- Bicyclists conflicting with Pedestrians on sidewalks
- Bicyclists aren't given equal share of the roadway compared to motorists
- No benches aside from those ones at the bus stops
- Are the bus shelters in the right location? Are there winter maintenance problems associated with the positioning of the bus shelters?
- There is inadequate green strip width in many locations
- Poor drainage at FAHC entrance
- There needs to be more and better green spaces
- Water flows/ponding tear up the grass around sidewalks
- Need signage with better delineation for cars
- Sidewalks need better winter maintenance. Snow packs down on sidewalks and turns to ice.

- Trim bushes and brush for better sight distance
- Bury utility lines

Comments from Second Group

- Plant street trees in the vicinity of FAHC
- Utilities (e.g., power lines) should all be buried
- Old streetscaping needs updating – specifically in the area surrounding the cemetery
- Getting around the Barrett St. intersection is very difficult for bikes/peds
- The greenbelt is eroding and needs improvements
- The city owns approximately 15ft into yards, but they do not maintain these areas
- There should be more trees in the setbacks.
- Have/create a forestry program to routinely conduct maintenance on the trees, which would allow for adequate sight lines
- Traffic signal should be uniform in nature (e.g., includes signal faces and pedestrian crossing signals)
- At night there is a feeling that the hedges make peds feel unsafe
- This could be improved by better lighting in places throughout the corridor, however it is important to avoid ugly fixtures and minimize the effects of light pollution.
- Man Hole covers are eye sores
- Sidewalks become very icy in the winter (poor drainage)

Comments from Third Group

- Sewer Situation; the aging sewer should be replaced while the road is being rebuilt
- There are areas in the corridor that are too dark, there needs to be better lighting. This includes better fixtures (preferably lantern style lights) and the reduction of light pollution. Along with these design suggestions it is also important that the utilities are underground
- Too few pedestrian crossings, existing crossings should be illuminated
- No shade from sun on hot days – street trees
- Dirt paths need to be more official
- Landscaping is fairly okay, keep the corridor green
- In the winter there is a problem with sheet ice building up on the sidewalk
- Install/construct an overlook to capture the view across from the cemetery looking toward the Winooski River
- University road is dirty/dusty

Comments from Fourth Group

- Trim bushes and hedges to increase visibility
- Thibault sight distance is inadequate
- Put back the green space that used to be in front of campus kitchen and do something to provide for parking
- Better definition is needed for the bus stops
- Put all utilities underground
- There is a lack of lighting (university Road, etc)
- Signage lacks uniformity, it should be more cohesive and comprehensive
- Little speed limit signs (quantity)
- Rt 2/7 through the city is counterintuitive
- Without trees lining the road it makes the corridor feel more like an arterial and less like a neighborhood street
- Establish desire lines as real official paths
- Cars parked in driveways are spilling out onto the sidewalks and therefore blocking pedestrian throughways.

Streetscape and Amenities Summary

The biggest issues addressed in this section include **increased lighting** throughout the corridor **without installing "ugly" light fixtures or increasing light pollution**. Making **utilities underground**, maintenance of green space, keeping/increasing existing sight lines, and making dirt "goat paths" more official were also very important.

Transit Comments

Group Facilitators

- Meredith Birkett, CCTA
- Bryan Davis; Transportation Planer; Chittenden County MPO

Comments from First Group

- Bus travel though FAHC adds time to route – possibly alternate the buses going through FAHC

- The number and size of the buses through the corridor is an issue. Would the use of larger buses reduce the overall number of buses?
- Long term – signal priority
- [congestion @East Ave/Main St during peak hours]
- GPS to track buses

Comments from Second Group

- If bus routes were removed from East Ave it would be a good thing. (Note – No CCTA buses currently travel on East Avenue)
- More college street shuttle service
- Bus stops need to be shoveled throughout the winter, there is a lot of snow in the way (esp. by Kathy's Flowers) If concrete pads were used in the bus stops could they be plowed?
- Service should be extended to Colchester or at least into Winooski Rte to city limit. Could Colchester residents pay premium to ride the bus and get service?
- There needs to be better driving etiquette (driving behavior, e.g. use signals, no more weaving, speeding, etc) Drivers should signal for longer time before pulling away from bus stops and drivers/buses should not pull up next to cyclists and let passengers off

Comments from Third Group

- Consolidate the number of buses using the corridor and identify system overlaps
- Prioritized signals for buses
- College St shuttle - circle through Trinity or Winooski
- Essex Rte gets stuck in rush hour traffic on the way in to Winooski
- Marketing campaign to positively change the image of the buses/transit systems (High School and college ridership helps)
- Discount shorter trips
- Build more shelters for inclement weather

Comments from Fourth Group

- Consolidate the number of buses in the corridor
- Use smaller buses during non-peak hours
- Continue 15 minute headway (what happens when CMAQ runs out? – state may step in)
- Locations of shelters/ability to pull in/pull out – create more pull offs?

- Lights and signs for traffic control (think stop signs on school buses)
- Signal priority
- Frequency of service

Transit Summary

A major concern is the number **and size of the busses** using this corridor. Many in attendance suggested that service be consolidated to the extent possible. There was also a lot of interest shown in giving **signal priority to buses** as well as offering more direct service along the corridor that does not pull into FAHC.

Bicycle and Pedestrian Comments

Group Facilitators

- Nicole Losch; Bicycle Pedestrian Planner, City of Burlington DPW
- Erin Demers; Public Works Engineer, City of Burlington DPW

Comments from First Group

- Pedestrian issues at East Ave (signal timing, jay walking, red arrow?)
- Bike, almost hit by buses using the FAHC entrance
- The walk indicator at the East Ave – Trinity intersection ends too soon. An exclusive pedestrian phase was also suggested.
- No crosswalk at west side of East Ave
- The isn't a place for pedestrians to cross over from the bridge to Colchester Ave
- Night jaywalking at East Ave
- Accessibility to push buttons is an issue and are not easy to push/get to
- Drainage issues globally
- Multi use path is not wide enough or used well
- Shared-use path / cycle trax
- Designated bike lanes are needed on the road
- Single – lane traffic would create more space for cyclist
- Education
- Ease of maintenance

- University Rd crossing issues and bad lighting at the UVM green

Comments from Second Group

- Pedestrian safety over the bridge and then bridge to Colchester Ave
- Markings
- Shared-use path is problematic
- Need clearly marked bike/ped signage
- Could “Sharrows” be used?
- Trinity campus crossing is an issue. Creating well defined crosswalks that work with UVM and FAHC
- Using natural pedestrian walkways
- Monolithic sidewalk there is no sense of security
- Signal advanced warning of hill ahead while going down hill
- Create on-street biker accessibility and education
- “No right on red” enforcement and proper design of roadway
- Westbound at East Ave. Sun-Glare is an issue
- Between Barrett and Chase pedestrian issues with bushes and pipe – Eastside

Comments from Third Group

- FAHC entrance only has 1 crosswalk and across Mary Fletcher Dr isn’t signalized
- Dedicated bike lanes
- 4 lanes are tight
- Not clear for travel-way. Need education and jaywalking is an issue
- Westside of East Ave – No sidewalk and no dedicated crosswalk
- Sidewalks need connections throughout corridor – even if it was just leveled
- Complete sidewalks on both sides
- At Barrett there is no crossing or signals now
- Unsafe bike feeling through corridor
- Mixed feelings about bike lane vs. shared use
- “No right turn” is not observed/followed at East Ave
- CCV will increase bike/ped traffic in this corridor
- Jaywalking from Mary Fletcher to East Ave is a big issue
- Almost run over – safety is a HUGE issue

Comments from Fourth Group

- Icy sidewalks and plow timing in the winter months
- Crosswalk is missing at the entrance to FAHC
- Exit from hospital with bikes/peds need to be safer and are unmarked
- Need to stop exiting FAHC and add a ped only phase – (4-lanes) and look at a safer signalization of intersection
- No sidewalk on east side of East Ave
- Bike lane connection at East Ave now there is a goat path
- No clear travel-way for bikes coming off bike path – need connections
- 4 lane roadway needs bike path
- Narrow lanes at lower Colchester near Winooski
- Sidewalk is in very poor condition
- No clear crossing at bridge
- No gateway

Bike/Ped Summary

The entrance/exit of FAHC is a central issue. Narrow lanes, lack of bike/ped signage, creation of bike only lanes, level completed sidewalks on both sides of the corridor, and safety is paramount.

Meeting Wrap-up Summaries

Transit – Meredith Birkett

- Consolidate buses within the corridor
- Transit signal priority
- Safety of bus operations and ped/bike interactions
- Frequency – more 15 minute routes throughout the day

Traffic Congestion and Safety – Mark Smith

- Speed and aggressive driving are over arching issues
- Left turn lanes are needed and there are no protected lefts
- Lane assignment and the lack of signage is confusing to many drivers

- Riverside Intersection and Prospect Intersection

Streetscape – Jason Charest

- Street trees within reason
- Lighting at night (better quality)
- All utilities should be underground
- Uniformity of signage for user clarity

Bike & Ped – Erin Demers

- Pedestrian issues at East Ave, lack of crosswalks, and "No Turn on Red" not heeded by cars
- FAHC entrance/driveway is not an ideal crossing for pedestrians
- Poor sidewalk condition(s)
- Drainage issues
- Poor street pavement for bikes
- "Goat Paths" at FAHC
- Jaywalking

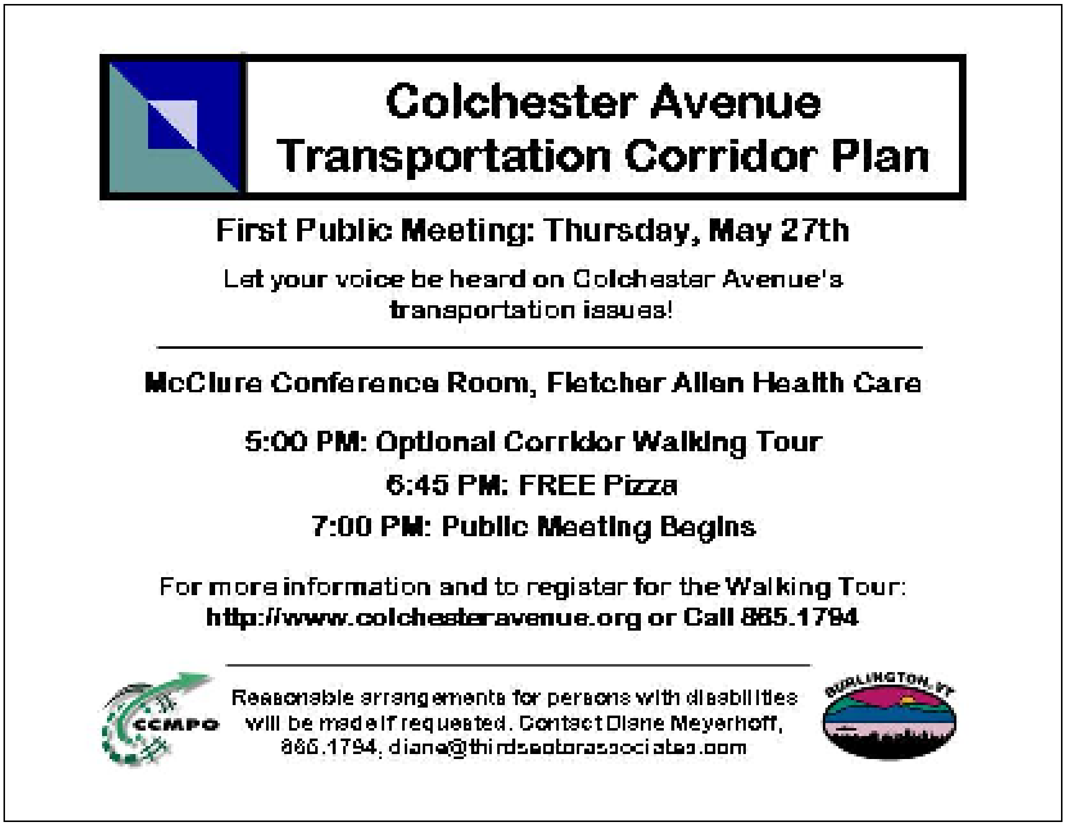
Additional Comments

- Calming of speed "humps" at Centennial Field (Need repainting – new technology - Applicable?)
- Burlington Town Plan – complete?
- What is the status of the Complete Streets concept presented in the Burlington Transportation Plan.
- Time frame for Colchester Ave Plan & Action – short and long term fixes and the cost.
- Big Picture over the next 5 years.

ATTACHMENT B: Meeting Notices

Figure 1: Flyer –Hand Delivered Along Colchester Avenue

Figure 2: Direct Mail Postcard



MEMORANDUM

To: Eleni Churchill

From: Beth Isler, PE/PTP

Re: Colchester Avenue 3 February 2011 Public Meeting Summary-DRAFT

Date: Prepared 9 February 2011

This memorandum summarizes the results of the public meeting held on 3 February 2011 for the Colchester Avenue Corridor Plan. The meeting was the second public meeting for the Plan and was conducted at the McClure conference room at Fletcher Allen Health Care located on Colchester Avenue. An overview of the meeting is provided and major themes are summarized. Meeting notices are attached (Attachment A), as well as a detailed listing of participant comments (Attachment B) and participant evaluations of the meeting (Attachment C).

Meeting Overview

The purpose of this meeting was to gather feedback from residents and other stakeholders on long-term transportation concepts for Colchester Avenue. The meeting format consisted of an overview of the corridor plan to-date and break-out sessions in which small groups of participants discussed three long-term transportation concepts. The meeting started with a welcome from members of the Task Force and a presentation by RSG that described the project, summarized the May 27th public meeting, reviewed the draft vision and goals, and presented an overview of the long-term transportation concepts. The three design concepts presented were: 1) a three-lane cross-section on the western segment between Prospect Street and East Avenue (two travel lanes and a two-way-left-turn-lane and bike lanes); 2) a four-lane cross-section on the western segment between Prospect Street and East Avenue (four travel lanes with left-turn lanes at intersections and bike lanes); and 3) a two-lane cross-section on the eastern segment between East Avenue and Riverside Avenue (two travel lanes with on-street parking and bike lanes).

The second phase of the meeting consisted of break-out groups in which participants were randomly organized into four groups. Each group discussed the three transportation concepts and provided comments on the draft vision and goals, their likes and dislikes of each concept, what they would change about a concept, and what trade-offs they observed within each concept. The location of the midblock crossing near the Trinity Campus and locations for bus shelters were particular points to be addressed. Each participant group spent approximately twenty minutes on each design concept during which experts facilitated a discussion, answered questions, and took notes. During the final phase of the meeting, the facilitators summarized major themes and all meeting participants were given an opportunity to offer additional comments and ask more questions.

Approximately 40 people participated in the meeting, not including the consultants, City and CCMPO staff and others helping to run the meeting. Several methods were used to make the general public aware of the meeting. Postcards were mailed directly to land owners along and near the corridor; flyers were dropped off at every house and apartment along the corridor and posted in CCTA bus shelters; an invitation was posted on the neighborhood, on-line newsletter Front Porch Forum, and press releases were sent to the *Burlington Freepress* and *Seven Days*. (Postcards and flyers are included in Attachment A.) Invitations were sent to the Burlington Business Association and Church Street Marketplace; Burlington Bike/Walk Council; AARP City of Burlington; the City of Winooski City Council, Planning Commission, and Development Review Board; and legislators in Burlington and Winooski. The meeting notice was posted on the CCTV events calendar, City of Burlington Website and Twitter/Facebook pages, and on the Colchester Avenue Corridor Plan web site.

Common Themes and Issues

Major themes and common issues from discussions of the three concepts are summarized below. The complete list of comments is included in Attachment B. Additional comments are included in the participant evaluation results in Attachment C.

Number of Lanes

Many participants favored the three-lane option, feeling that it calmed traffic, enhanced livability, and improved safety and comfort for pedestrians and bicyclists. These participants felt that there was no advantage to having four lanes for such a short segment of the corridor when there are only two lanes on either end. However, there was concern about how this option would be able to provide the capacity needed for future traffic volumes. More evaluation tools and data, such as a comparison of travel times in the three-lane and four-lane options, were requested. Considering a moveable median to provide for a reversible lane was suggested.

Intersections

Improvements for pedestrians such as ped signals, exclusive pedestrian phases, and “No Right Turn on Red” were suggested, particularly for the Prospect St, Fletcher Allen, East Ave, and Riverside intersections. Improvements to the Chase Street intersection were recommended, such as “Don’t Block the Box.” Some expressed that left-turns on to Mill Street should continue to be accommodated.

Bicycles

The majority of attendees wanted to see additional improvements to bicycle facilities beyond those that were developed during the pilot project. Of particular concern was how bicycles are to maneuver through intersections (especially those making left-turns). Bike boxes and queue jumping for bikes were recommended at intersections. Wider and more visible/colored bike lanes were requested. The Riverside intersection is in need of bicycle accommodations; this location is difficult because of the constraints of the Winooski Bridge to the north (not bicycle-friendly) and the up-grade on Colchester Avenue to the south. How to provide for bicycles on the eastern segment is especially challenging due to the grade and the on-street parking (and the conflict with the doors of parked cars opening into the bike lane). Bike lanes or a wide curb lane with sharrows were suggested for this segment. Ways of separating/buffering bicycles from vehicular traffic were discussed, such as placing the bike lane between the parking lane and the sidewalk/greenstrip.

Pedestrians

As noted, pedestrian accommodations such as ped signals, exclusive ped phases, and "No Right Turn on Red" were suggested for most of the corridor's intersections. In addition, crosswalk visibility should be improved, such as in-pavement lights and curb extensions at the mid-block crosswalk in the eastern segment by Centennial Field/Kampus Kitchen. It was suggested that pedestrian crossing improvements at intersections such as East Avenue be pursued prior to consideration of mid-block crosswalks or pedestrian bridges/tunnels.

Transit

Consolidate and improve bus stops. Include bus turn-outs, particularly in the three-lane option.

Streetscape/Cross-section

Drainage needs to be improved, particularly by the Fletcher Allen driveway. Meeting participants responded positively to the burial of utilities. On-street parking in the eastern segment was a less clear cut issue, with many people expressing the need for parking and others less sure about how necessary it was. Many said that they would prefer to have bike lanes or a greenstrip than on-street parking. The function of the greenstrip as snow storage was also considered important. Consolidating parking on one side of the street was suggested.

ATTACHMENT A: Meeting Notices

Figure 1: Flyer –Hand Delivered Along Colchester Avenue

Colchester Avenue Transportation Corridor Plan

Second Public Meeting
Thursday, February 3, 7:00 PM
(FREE Pizza at 6:45 PM)

Let your voice be heard on Future Plans for Colchester Avenue

McClure Conference Room, Fletcher Allen Health Care
FREE parking for cars – follow signs
FREE bike parking in front of building

All meetings are fully accessible. Individuals who require special arrangements to participate are encouraged to contact Diane Meyerhoff, 865.1794 (or leave a message at http://www.colchesteravenue.org , click "contact us") at least 72 hours in advance.

Figure 2: Direct Mail Postcard

ATTACHMENT B: Meeting Notes

Breakout Groups

Red Group Comments

Group Facilitators

- Joe Segale, PE/PTP; Transportation Planner and Engineer; Resource Systems Group
- Jason Charest, Transportation Planning Engineer; Chittenden County MPO

General Comments

- Disconnect between 1st meeting and demo project
- Large Park&Ride to remove some vehicles from the corridor
- Skateboards are troublesome

Comments from Red Group on Western Segment (Pearl/Prospect to East Ave), Three-Lane Option

- Split phasing at Prospect St, add additional lanes
- Elderly going to the hospital at South Prospect & Pearl
- No right on red at the Hospital
- Fix ponding at the Hospital Entrance
- Address lack of paint durability
- Exclusive pedestrian phase at East Ave
- There are pros & cons to pedestrian barriers (feels like cattle)
- Opportunities for pedestrian tunnels or skywalks?
- Exclusive pedestrian phase at Prospect & Pearl
- No right turns on red Prospect & Pearl
- Pedestrian refuge in front of medical college building Prospect & Pearl
- Additional crosswalks on Prospect St
- University Place is a good street for bikes
- Crosswalk across Colchester Ave from University Place
- No right turns exiting from the Hospital
- Implement exclusive pedestrian phasing before considering mid-block crosswalk or underground tunnels/skywalks

Comments from Red Group on Western Segment (Pearl/Prospect to East Ave), Four-Lane Option

- Refuge at East Ave (Western side of Colchester Ave)

- Landscaping/planting to help buffer the road
- Arena effect on traffic
- More driver aggression vs 3-lane alternative
- Compare travel times to 3-lane
- Changeable Lanes?
    - 2 lanes inbound AM (1 lane outbound)
    - 2 lanes outbound PM (1 lane inbound)
- 3 vs 4 lanes, where does Burlington want to go?
- Managed lanes
- Want to compare wait time in 3-Lane and 4-Lane
- This corridor is an angry road – race track
- Needs landscaping to buffer in lanes
- No skateboards

Comments from Red Group on Eastern Segment (East Ave to Riverside Ave)

- Parking is important to residents, few could ever visit people
- People forming 2 lanes Eastbound
- Bulbs out periodically throughout the corridor for trees etc
- Conflicts between bikes and car doors
- Utilize Mill Street access to Barrett Street
- Left turns into Mill St need to be accommodated
- Pedestrian crossing at Kampus kitchen needs to be improved, visibility.
- Left hand turns into Chase mill need to be accommodated
- Parking for visitors is key
- There is a serious need for parking
- Needs to be pedestrian crossing signage for crosswalk in front of UVM baseball field
- Cars traveling side by side

Red Group Summary

Would like to see more improvements at the Prospect St intersection, particularly for pedestrians. Consider "No Right Turn on Red" at Hospital Entrance and improve drainage. Improve pedestrian facilities at East Avenue before pursuing midblock crosswalks or bridges/tunnels. Need to compare travel times and speeds in three-lane and four-lane options. Driving was faster/more aggressive when it was four lanes. Parking is absolutely needed in the eastern segment. Improve the midblock crosswalk at Kampus Kitchen. Improve Mill Street intersection: accommodate left-turns at Mill Street and utilize Mill Street to access Barrett Street. Consider a moveable median for reversible lanes.

Silver Group Comments

Group Facilitators

- Eleni Churchill, Senior Transportation Planning Engineer; Chittenden County MPO
- Nicole Losch, Bicycle-Pedestrian Planner; City of Burlington Department of Public Works

General Comments

- Prefer 3 lane design
- Like intersection redesigns at Prospect & at Riverside
- Like exclusive pedestrian phase
- Move bike lane away from travel lane
- Remove parking on one side, more room for green-space and bikes
- Bus shelters should only be at high volume stops
- Tighter Chase St. entrance
- Traffic calming, specifically on Chase St.
- Underground utilities

Comments from Silver Group on Western Segment (Pearl/Prospect to East Ave), Three-Lane Option

- If it's parking or green-space, green-space is preferred
- LED or in-pavement lights for crosswalks
- Crosswalks need more visibility, especially mid-block in winter
- Raised medians; would be preferred (full curb not necessary, just raised) necessary width for snow plows should be checked
- Enhanced bike lanes; colored especially before East Av, separate bike lanes
- With the 3-lane option there is a general concern for capacity in the future
- Would like to see fewer, nicer bus stops
- Move mid-block crossing to former school parking lot (next to TRC) or between two avenues circled on map
- Consolidate bus stops with shelters proposed on
    - Northwest corner of East Ave & Colchester intersection
    - West of Fletcher Allen hospital entrance
    - Move shelter to other side of Mansfield Ave
    - Across Colchester Ave from west of hospital entrance

Comments from Silver Group on Western Segment (Pearl/Prospect to East Ave), Four-Lane Option

- 4-Lane design is more difficult for pedestrians
- Feels like a highway
- Creates congestion at each end, entering single lane road
- Doesn't feel supportive of livable community
- East Ave turn lane is needed, not usable now
- Exclusive pedestrian phasing, especially at Prospect & East Ave
- Allow bikes to jump queue as well
- Close access to the former school parking lot (next to TRC) there are issues with connecting properties but this will be hard as UVM would like to keep it open

Comments from Silver Group on Eastern Segment (East Ave to Riverside Ave)

- If bike lane is next to parked cars, move bike lane next to sidewalk or separate it from travel lane (e.g. bollards)
- Need bike lanes uphill or wide curb lanes instead of bike lanes
- Parking on one side of road, more room for bikes
- "Livable" feel if street can be from slow speeds, not green-space
- Bike lanes next to sidewalks are preferred
- Bump out for mid block on East segment are needed
- Tighten entrance onto Chase
    - Don't block the box at Chase, add crosswalk
    - One way pair with Barrett
- Riverside/Barrett
    - NO roundabout
    - Like the redesign but there are concerns for Mill St left turns
    - Bike accommodations?
- Where should bikers go? (Intersection of Riverside & Colchester Ave)
- How can we accommodate bike travel through Riverside & Colchester Ave Intersection?
- Stripe "Do Not Block the Box" at intersection of (Colchester Ave & Chase St)
- Proposed bus stops with shelters
    - Riverside & Colchester Ave intersection
    - 2 shelters at Chase St & Colchester Ave intersection one on either side
    - Former school parking (next to TRC)
    - After Kathy & Co. flowers on Colchester Ave

Silver Group Summary

Prefer the 3-lane option, but concerned about capacity for future traffic volumes. Enhance bike lanes. Consolidate and improve bus stops. Four-lane option feels like a highway and is not support of livability/community; harder for pedestrians to manage safely. Improve livability through slow speeds rather than greenspace. Investigate exclusive pedestrian phases at the Prospect St. and East Ave intersections. Improve the midblock crosswalk at Kampus Kitchen, possibly with in-pavement lighting and curb extensions. Accommodate left-turns at Mill Street. Participants liked the improvements to Riverside intersection, but how to accommodate bicycles? Prefer greenspace to parking in eastern segment; put parking on one side of street only to make room for bikes. Separate bikes from travel lane and accommodate bicycles coming uphill on Colchester Avenue from the Riverside intersection. Improve the Chase Street intersection.

Blue Group Comments

Group Facilitators

- Peter Keating, Senior Transportation Planner; Chittenden County MPO
- Beth Isler, PE/PTP; Transportation Planner and Engineer; Resource Systems Group

Comments from Blue Group on Draft Vision and Goals

- Need to define "Complete Streets"

Comments from Blue Group on Western Segment (Pearl/Prospect to East Ave), Three-Lane Option

- Need bike lanes on Prospect; not clear how bikes are supposed to make a left-turn.
- Phasing of Pearl-Prospect signal is inefficient and confusing.
- Eliminate on-street parking on north side of Pearl Street (westbound) to make room for a left-turn lane onto northbound Prospect Street.
- Eliminate on-street parking to make room for bike lanes.
- Like the expansion of the UVM Green.
- Is there a way to reduce the number of curb cuts on the north side of Colchester Avenue?
- Like three lanes better than four.
- Bike lanes should be wider.
- Need a lane for westbound left-turning bikes onto southbound East Ave.
- Need ped signals at Fletcher Allen driveway.
- Consider a no-right-turn-on-red option for vehicles from Fletcher Allen (northbound rights on to eastbound Colchester Avenue) to reduce conflicts with bikes and peds.
- The locations of the Fletcher Place and Trinity crosswalks are good.
- Consider bike lanes on Fletcher Allen driveway.
- There should be bus turn-outs if three lanes.

Comments from Blue Group on Western Segment (Pearl/Prospect to East Ave), Four-Lane Option

- Like three lanes better. There is no advantage to having four lanes for such a short segment of the corridor when there are only two lanes on either end.
- The Trinity crosswalk should be closer to the goat path, as in the three-lane option.

Comments from Blue Group on Eastern Segment (East Ave to Riverside Ave)

- Like the Riverside intersection proposal.
- How are bikes accommodated in the proposed intersection? Consider bike boxes at all intersections.
- Need two lanes through the intersection north/eastbound down the hill on Colchester Avenue into Winooski.
- Opposed to losing greenstrip; want greenspace and need snow storage.
- Consider a wide curb lane/sharrows instead of bike lanes.
- Need ped signals at Riverside intersection.
- Remove on-street parking; would rather have greenstrip than parking.
- Add bike lanes.
- Consider how bikes should go up Colchester Avenue.

Blue Group Summary

Prefer the 3-lane option. Widen bike lanes. Need to clearly convey how bicycles are to maneuver at intersections, particularly left turns. Prefer bike lanes to on-street parking; keep greenstrip. The FAHC driveway needs ped signals; consider "No Right Turn on Red." In the eastern segment, consider a wide curb lane, bike lanes, some way for bikes to get up the hill. The Riverside intersection needs ped signals. Include bus turn-outs in the 3-lane option.

Green Group Comments

Group Facilitators

- Erin Demers, PE; Public Works Engineer; Resource Systems Group
- Bryan Davis, Transportation Planner; Chittenden County MPO

Comments from Green Group on Western Segment (Pearl/Prospect to East Ave), Three-Lane Option

- Is there information about who is crossing Colchester Ave and where they are going?
- Pedestrian bridge at Trinity?
- If a HAWK is installed could it be timed with the other lights during peaks hours?
- Get students to avoid East Ave (as peds) and instead use Colchester Ave or cut through Campus
- Eliminate some of the parking near India House restaurant to allow more turning cars to queue?

- Like the new Prospect & Colchester intersection
- If you get rid of the green-space you lose snow storage
- Existing and new bus stops should be pull offs as well
- Speeders run red lights at Mansfield; changes to corridor should calm traffic
- Lane pilot has calmed traffic and gotten bikers off sidewalks

Comments from Green Group on Western Segment (Pearl/Prospect to East Ave), Four-Lane Option

- Shorter green light length, turning left onto Mansfield (i.e. fewer cars); add dedicated left signal
- Crosswalks are difficult with 4 lanes of traffic
- Mansfield should be one-way north
- Prospect should be one-way south
- Can eastbound traffic at Colchester & East Ave have a dedicated left and through right?
- Moveable median – 2 lanes in/out during peak hours
- All utilities should be buried
- Fix the drainage problems

Comments from Green Group on Eastern Segment (East Ave to Riverside Ave)

- Create ramp to make it easier for bikes (this would be ADA compliant anyway)
- Created shared use path rather than sidewalk to connect bridge with pedestrian crossing uphill to Colchester Ave
- Concerned about the new development on Patchen Road; how to accommodate all the additional traffic?
- Add "don't block the box" striping at Chase Street intersection
- Create cycle lane between parked cars and curb rather that next to travel lane
- Is parking on lower Colchester needed?
- Streetlights at crosswalk- bump out to illuminate pedestrians and crosswalk at night

Green Group Summary

Prefer the 3-lane option; it calms traffic. Like the Prospect St intersection proposal. Include bus turn-outs in the 3-lane option. The 4-lane option is more difficult for pedestrians. Left turns onto Mansfield Ave are difficult. Consider one-way system: northbound on Mansfield, southbound on Prospect. Fix drainage and bury utilities. Consider a moveable median for reversible lanes. Improve crosswalk visibility. Improve the Chase St intersection. Separate bicycles from vehicles; consider how to accommodate bikes at the Riverside intersection.

Meeting Wrap-up Summaries

Red Group – Joe Segale

- Can more be done at the Pearl Street/Prospect Street intersection? Need more capacity, improve the signal timing. What pedestrian improvements could be made?
- Need more information/evaluation tools to compare the three- and four-lane options.
- Make the intersection at East Avenue work better for pedestrians to reduce demand for a crosswalk at Trinity.
- Parking is needed for the eastern segment. Could there be pockets of parking located somewhere?
- Consider ped subways.

Silver Group – Nicole Losch

- Prefer the three-lane option; four-lanes feel like a highway and are not supportive of public space.
- Consider exclusive ped phasing at all intersections.
- Put bike lanes between parking and sidewalk so parking acts as a buffer between bikes and traffic and reduces risk of getting "doored."
- For the eastern segment, put parking on one side.
- Consider shared/wide curb lanes instead of bike lanes only if there is adequate width.
- Too many bus stops along the corridor, and only add shelters at high volume stops.
- Tighten up the Chase Street intersection.
- Apply "Don't Block the Box" at intersections.
- Place utilities underground.

Blue Group – Beth Isler

- Prefer the three-lane option to four; why bother with four lanes on such a short segment when there are only two lanes on either end of the corridor?
- Accommodate bicycles at all intersections; for example, provide bike boxes. In particular, show how bicycles are supposed to make left turns (for example, stripe the bike lane through the intersection for left-turning bicycles). The intersection at Riverside Avenue needs to accommodate bicycles.
- Like the green space additions.
- Improve pedestrian safety, particularly at the Fletcher Allen driveway. Add ped signals. Consider No-Right-Turn-on-Red for vehicles exiting Fletcher Allen on to eastbound Colchester Avenue.
- The location of the crosswalk at Fletcher Place is good.
- Keep the location of the Trinity crosswalk close to the existing desire line.

- Like the changes to the intersection at Riverside Avenue.
- Don't want to lose greenstrip (also need the snow storage).

Green Group – Erin Demers

- Bicycles are extremely important. Continue to improve bicycle facilities.
- Like the green space.
- Accommodate the turning radius of large vehicles at the Prospect Street intersection.
- Like the slower speeds associated with the three-lane option.
- Like the crosswalks, and they are much easier for peds under the three-lane option.
- Concerned about queues at Mansfield Avenue.
- Why bother with four lanes when there are only two in and out of the corridor?
- Like the new Riverside intersection.
- Is parking really needed on the north/west side of Colchester Avenue by Chase Street?
- How to accommodate parking next to bike lane?

Additional Comments

- Concerned about congestion over the next 10-15 years. Is the corridor consistent with the vision for the city (that is, of focusing growth downtown)?
- Need more discussion of trade-offs- improved bike/ped/transit facilities at the cost of more congestion.
- There seems to be a disconnect in evaluation; need data to understand three-lane option.
- Corridor doesn't include Pearl Street.
- There are many positive things about the demo project and this plan. Why is there so much hesitation?

Written Comments Received after the Meeting

- I mentioned this at the meeting tonight, but want to put it in writing too: The demo re-striping needs to be presented as a central step in the progress of the Complete Streets project. It made no sense to me to hear tonight that momentum had been lost since last May. From where I'm sitting it looks like a huge thing has been achieved: the road changed from 4 lanes to 3!!! To me this looks like awesome progress. This is why so many people showed up to the meeting feeling excited and energized. I believe most of us thought we were coming to hear about when the 3 lanes would become permanent, and what was on the agenda after that. Instead we were asked to consider two "hypothetical" ideas: 3 lanes and 4 lanes. This was REALLY WEIRD. It was like we had been transported to an alternate reality where the road had not been re-striped! I couldn't understand why I was being asked yet again to compare 3 lanes vs 4 lanes without first being told the findings of the demo. You already know that almost all residents love 3 lanes -- and that some commuters don't. We know 3 lanes is safer and more livable. But what we're not sure about is whether 3 lanes can handle the traffic throughput. And that needs to be answered by data. If the data says yes, we have our answer. If no, then we have a complex decision to consider. But we need the data first. And in the absence of the data, we should have focused tonight on other aspects of the plan, and not looked at a 4 lane proposal at all. Surely it's quite simple: if 3 lanes gets approved in the spring we go with 3 lanes. If not, we go with 4 lanes.

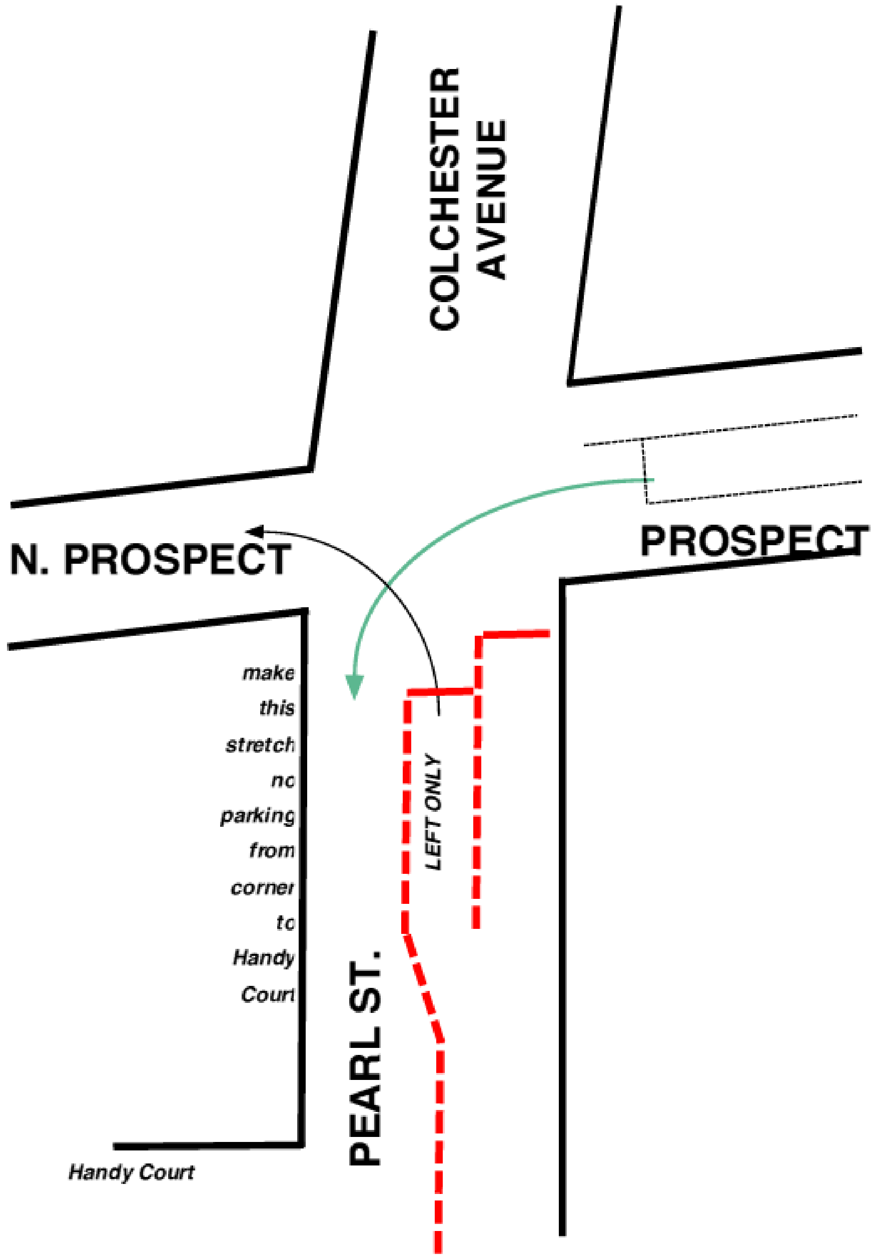
- First of all, thank you for your work on the Colchester Ave project. It's a great feeling to be part of a community that constantly strives to improve the quality of life, even when the status quo seems adequate to many people. My whole family has appreciated the changes made by the demo (hopefully permanent!) project, and I'm excited about the other ideas proposed tonight.
  Erin suggested I send an email about some thoughts I raised regarding biking on Colchester Ave...
  - Bike lanes in the winter
    I bike to work almost every day year round, and it is currently quite a challenge. I'm pleased the "complete streets" plan involves adding a lot of bike lanes – this will make riding safer and less stressful. But I feel that it ought to be decided whether the bike lanes are expected to be used year-round or not. I realize this decision could go either way, but I was not able to get an answer on this from anyone tonight, so I was hoping you could give it some thought. If they are expected to be used in winter, I hope you will consider how to plow them, and make sure that the folks that plow the roads are willing and able to keep the bike lane clear of slush and other debris. I imagine this will be challenging where there are parked cars, and will require the plow to travel more slowly and carefully.
  - Bike lanes inside parked cars
    There was discussion tonight about putting the bike lane on the road inside the parked cars. After thinking about it, I really don't like this idea. While I realize that opening doors are a problem on the outside of parked cars, I feel the possibility of being hidden from turning traffic makes a bike lane on the inside even more dangerous and therefore inadvisable. Plus there would be the additional cost and space of building some kind of barrier between the two to ensure cars don't park on the bike lane. (Less important, but noteworthy, is that a bike lane inside parked cars would have to be plowed separately, adding even more to plowing time and cost.)
  - Bike lanes outside parked cars

I actually think a bike lane on the outside of parked cars works very well in most instances. However I suspect that it may not be a good solution up a steep hill. Even with a painted bike lane, my experience tells me that traveling uphill (when it is difficult to maintain speed and follow a precise line) outside parked cars will continue to leave me feeling exposed and vulnerable. I currently choose to ride on the sidewalk up the hill from Winooski year round, and I suspect I may continue to do this even if a bike lane is painted on the road.

- Shared use sidewalk/bike path
  So perhaps another solution to consider is combining the bike lane with the sidewalk in some areas (such as coming up the hill). As I mentioned, I currently use the sidewalk for the uphill section and it works well, apart from the fact that it is too narrow to pass pedestrians. Because there is less salt and less traffic on the sidewalk it doesn't turn to slush or ice as quickly as the road so there is usually a solid base of snow to ride on. And it is surprisingly easy to bike on packed snow -- much easier than slush. So a wide path that is plowed for shared use by both bikes and pedestrians would be my preference on the uphill section.
- Communication
  On an unrelated note, is there a way I can get regular email updates so I can stay in the loop with the progress you're making? I've given feedback at various times (and helped with counting bikes!) but never heard any follow-up. (For example, I felt that it was essential to get the sensors back under the road at East Ave to get valid traffic flow statistics, but was told at the DPW meeting it was prohibitively expensive. Then I mentioned tonight that the light was working better and was told offhand that the sensors were back in. It would have been nice to hear about that when the decision was made.) I just checked the website, and there are notes from one Task Force meeting in December but no Technical Committee meeting notes. Maybe there is new info somewhere else on the website, but regardless, it would be really helpful to get an email update when there is something new to read.

- Thank you for a very well run, informative meeting last night. I am forwarding to you some websites about bike boxes, also called advanced stop lines.
  http://www.seattle.gov/transportation/bikeboxes.htm
  http://seattletimes.nwsource.com/html/traffic/2013020364_bikebox29m.html
  http://www.bicyclinginfo.org/bikesafe/case_studies/casestudy.cfm?CS_NUM=303
- SIMPLE FIX FOR PROSPECT & COLCHESTER AVE/PEARL INTERSECTION (see figure below)
  This intersection ONLY needs paint to be re-lined to lay out like corner of Main and Willard. (Though light timing is wrong on Main and Willard.) There should be NO

PARKING in front of the fraternity, it should be a westerly driving lane. Presently, cars merging into Pearl St. headed west (from Prospect) are squeezed between parked cars and cars sitting at the light. The turn is obtuse, the offset intersection not being square. Cars headed east are either backed up OR sprinting through oncoming traffic to take a left (northerly.) This is, in part, due to oncoming traffic. Cars take (sprint) turns on yellow and sometimes red after advancing through intersection...
SIMPLE FIX:
1) Left turn lane (simple line painting) on Pearl St. onto N. Prospect.
2) NO PARKING from N. Prospect to Handy Ct. on Pearl St.
The "no parking" area will allow for the doubled lane at the light, and for wider left hand turns from Prospect St. headed west as well as Colchester Ave/ Pearl St. headed straight (west).


COLCHESTER AVENUE
N. PROSPECT
PROSPECT
make this stretch no parking from corner to Handy Court
LEFT ONLY
PEARL ST.
Handy Court

ATTACHMENT C: Meeting Evaluation Results

Colchester Avenue Meeting #2 Evaluation RESULTS
February 3, 2011, McClure Conference Room, FAHC

14 Responses with 39 participants signing in.

1. How did you hear about the Summit? (check all that apply)

a) Email from Friend/Colleague	6	g) Burlington Free Press	
b) Email from Sponsors	**8**	h) Seven Days	
c) Email from Other	1	j) Television	
d) Flyer	1	k) Other (please describe)	5
e) Postcard	2	BWBC/BBC, UVM Class, TAC member, Ward 1 NPA, word-of-mouth in neighborhood	
f) Front Porch Forum	3		

2. Please rate the following aspects of the meeting:

Aspect	Fantastic	Very Good	Good	OK	Poor	Terrible
Welcome & Presentation	2	7	6			
Quality of the breakout session	5	4	4	2		
Wrap-up	2	3	4	3		
Physical facilities for this event	4	9	1			
Amount of time allowed for input	4	4	5	1		
Overall value of this event to you	4	3	3	2		

Comments:

- Vegan snacks next time and no bottled water!
- Need more time for input. Maybe an on-going blog?
- Appreciate process. Helpful info and chance to give feedback without taking FOREVER.
- Vote bike
- Bike < Car
- Breakout sessions could have been longer. We had lots of good discussion.
- The break-out session was well timed. We need data on congestion before and after the pilot/demonstration. I still don't know if 3 lanes would be good – I'd like to see if it causes more back-up traffic during rush hour on East Avenue.
- Getting consensus on this issue may be impossible. I think the City is going to have to make a tough decision and go with it.
- Local residents enjoy the opportunity to contribute to the redesign.
- Thanks for the pizza!
- Please integrate the findings of the demo project next time and use this as a starting point for discussion.

3. Anything else you'd like to share with us?

- Why do projects take years and years to be done in Burlington?
- So far so good.
- Like the "mock-ups" of landscaping.
- Love look with buried utilities, less of a wasteland look.
- Love N. Prospect/Pearl fix and also Colchester/Bridge proposal.
- 3 lanes
- Straighten out Pearl/Prospect
- More bikes please
- 3 lanes
- Match intersections

Colchester Avenue Meeting #2 Evaluation Results
February 3, 2011, McClure Conference Room, FAHC
Page 2 of 2

- Less cars
- Please look at the data and how it affects idling time along East Avenue and the corridor itself. I have experienced very long wait times (up to 20 minutes) moving/sitting in traffic from the Sheraton Inn onto East Avenue and finally turning left onto Colchester Avenue. I don't recall sitting so long before the pilot project. Of course, I notice some cars turning left onto Colchester Ave. took it slowly because the man-hole was sticking up (part of the repaving effort), so maybe that is a confounding factor.
- If the congestion goes up on this corridor it will most likely push traffic to use a different corridor into the city (unintended consequences).
- BUT: There needs to be visible achievements. The only "deliverable" after the May meeting was the unilateral imposition of the 3-lane solution. Please don't encourage public input and then completely ignore it, and introduce something totally different.
- I've seen the 4-lane cities like Chicago and I prefer the European/NYC-style narrow street cities that promote walking and bicycling.
- I am very happy with the pilot program (demonstration project)!
- Complete streets concept is essential!
- 3 lanes good – 4 lanes not-so-good (longer pedestrian crosswalks/bottlenecking of pedestrians halfway across)
- Bike bridge across/attach to Winooski Bridge
- Remove one side of East section on-street parking to enhance green space and bike lanes
- Bury the utilities throughout the corridor
- *Really would like to see some traffic slowing measures @ Colchester/Chase St. intersection (ie 90% turn/right hand turn and "don't block the box" @ intersection).

MEMORANDUM

To: Eleni Churchill

From: Joe Segale, P.E./PTP

Re: Colchester Avenue September7, 2011 Final Public Meeting Summary

This memorandum presents notes from the final public meeting for the Colchester Avenue Corridor Plan. The meeting was conducted at the McClure conference room at Fletcher Allen Health Care located directly on Colchester Avenue.

Meeting Overview

The purpose of this meeting was to gather feedback from residents and other stakeholders on the draft September 1, 2011 Colchester Avenue Corridor Plan which was made available to public on the project web site at www.colchesteravenue.org. The meeting format included a presentation by RSG that provided an overview of the draft plan and its recommendations, followed by a comment and question period. The following three members of the Colchester Avenue Task Force sat at the front of the room and assisted the consultant with addressing comments offered by the public: Sharon Bushor, Ward 1 City Councilor; Bob Penniman, CATMA; and Nicole Losch, Burlington DPW.

Approximately 35 people participated in the meeting, not including the consultants, City and CCMPO staff and others helping to run the meeting. Several methods were used to make the general public aware of the meeting. Postcards were mailed directly to land owners along and near the corridor; flyers were dropped off at every house and apartment along the corridor and posted in CCTA bus shelters; an invitation was posted on the neighborhood, on-line newsletter Front Porch Forum, and press releases were sent to the Burlington Freepress and Seven Days. Invitations were sent to the Burlington Business Association and Church Street Marketplace; Burlington Bike/Walk Council; AARP City of Burlington; the City of Winooski City Council, Planning Commission, and Development Review Board; and legislators in Burlington and Winooski. The meeting notice was posted on the CCTV events calendar, City of Burlington Website and Twitter/Facebook pages, and on the Colchester Avenue Corridor Plan web site.

Meeting Notes

Two members of the Colchester Avenue Task Force, Sharon Bushor (Burlington City Council) and Bob Penniman (CATMA) welcomed the group. Joe Segale of RSG, Inc. provided an overview of the Draft Corridor Plan (available at: www.colchesteravenue.org).

60 Lake Street, Unit 1E • Burlington, Vermont 05401
TEL 802.383.0118 • FAX 802.383.0122 • www.rsginc.com

1. Corridor Plan Overview

Joe reviewed the study area (Colchester Avenue from the Winooski Bridge to Prospect Street). He explained the process included a Task Force, Technical Steering Committee, and a total of three public meetings since January 2010. The City undertook the Complete Street demonstration project during this time and Joe presented the results. Joe reviewed input from the two previous public meetings (May 2010 and February 2011) and the Vision and Goals.

The plan is in its draft form now, with written comments accepted by the CCRPC through the end of September. The plan will then move to various City Commissions and finally to the City Council for approval. The recommendations of the Draft Plan are as follows:

Short Term (One year) Recommendations

- Make the 3 lane pilot/demonstration "complete streets" design for the western corridor segment (Prospect to East Ave) permanent.
- Reduce speed limit to 25 mph
- Transit service consolidation study
- Continue to review and optimize traffic signals
- Improve end connections of the existing shared use path
- Maintenance like pruning trees, etc.

Medium Term (1-5 Year) Recommendations

The Draft Plan has specific recommendations for the mid-term including:

- New sidewalks and streetscape for western corridor segment
- New sidewalk Greenmount Cemetery to Colarco Ct.
- Scoping and conceptual design for a the Trinity mid-block pedestrian crossing
- Install pedestrian cross-walk on Colchester Ave at the eastbound approach (west side) of the East Ave/Colchester Ave intersection.
- Scoping and design of Prospect/Pearl and Riverside/Barrett/Mill intersections; and eastern segment of the corridor (East Ave to Winooski Bridge)

Long Term (More than 5 Years) Recommendations

Western Segment: East Ave to N. Prospect Street

- Reconstruct the western segment of the corridor retaining the 3-travel lane configuration with designated bike lanes, sidewalks, streetscape improvements and bus pull-offs.
- Reconstruct and re-align the Prospect/Pearl Street intersection.
- Reconstruct and realign the East Avenue intersection.
- Construct the Trinity Mid-Block Pedestrian Crossing - Install a barrier along the sidewalk that guides pedestrians to the midblock crossing. Provide in-pavement flashers and driver signage.

Eastern Segment: East Avenue to Riverside Avenue

- On-street parking "pockets" concept.
- Reconstruct the Riverside Ave/Barrett St/Mill Street intersection

Capital Costs for all improvements are estimated at $11.15 million, without right-of-way acquisition or major utility and stormwater reconstruction.

2. Questions & Comments

Martha Lang asked about the possibility of iron fences installed by the City alongside iron fences installed by property owners and the difficulty of plowing the sidewalks. Nicole Losch of the City's Department of Public Works felt that there would be an adequate buffer available.

Jeannie Keller of Bilodeau Parkway supports the intersection realignments, especially at East and Colchester Avenues. She does not support maintaining on-street parking at the end of East Avenue, because that space could be used for right-turning vehicles. She doesn't agree with the traffic studies that show slightly longer queuing with the three-lane option. She and her neighbors have experienced a much longer delay at rush hour. She would like to see the mid-block pedestrian crossing moved toward Fletcher Place as far as possible so as not to cut off the through traffic headed to Winooski from East Avenue. There is gridlock on East Avenue for at least two hours in the morning and two hours in the evening. With the three-lane configuration, it can take 20-25 minutes to get from downtown Burlington to East Avenue.

Bob Penniman agrees that the midblock pedestrian crossing should be moved to the east as much as possible, while still respecting Martha Lang's access. There is a midblock crossing in Jericho with in-pavement flashers that has been very successful.

Wayne Senville believes the Prospect Street intersection realignment will help alleviate the backups along Colchester Avenue. Joe agreed.

Tom Derenthal of Nash Place is concerned about bus movements with a partial green strip. Joe responded that more work needs to be done to make the pull-offs successful. Tom would like bicycles prohibited from the sidewalk, like in the downtown core, when the on-road bike lanes are striped. Tom would like to see a lighting plan, especially at the new crosswalk. He's also concerned about how this proposal would be a constraint on further development downtown. Joe responded that the plan looks at how to move people downtown, not only cars. Tom doesn't feel the plan does that; there is nothing to enhance alternative transportation. Sharon responded that the struggle is trying to accommodate all types of transportation and keep a viable downtown. The plan is a balanced approach to meet these goals. Tom likes the three-lane configuration but thinks there needs to be communication to other groups that will be impacted.

Meredith Birkett of CCTA noted that the proposal to change the Essex route to avoid the FAHC entrance will save 20 minutes on that route; this is attractive for riders. In addition, amenities like shelters and preemptive signals will improve the transit riders' experience. Bob offered that transit is being enhanced in this corridor, with the Essex route on 15-minute headways at peak hour and a new traffic signal at Fort Ethan Allen. It's an ongoing effort to market transit; even with free service to the institutions' employees it's a struggle.

Nancy Kirby lives on Colchester Avenue next to cemetery. She walks, bikes, and drives. Although she wasn't happy about the new lane configuration, she thinks it can work. She's most concerned about the drainage on Colchester Avenue and the missing curbs that cause erosion.

The speed limit should be 25MPH up the hill. The lighting is poor and she's concerned about the iron fences. Bicyclists have almost knocked her over when she's on the sidewalk. She isn't supportive of spending money on the improvements until we fix the maintenance problems.

Mark Porter thinks this plan should be more about getting people in and out of the City. The backup on East Avenue is long. The pinch is going down the hill; there is only one lane going into Winooski. This makes drivers get aggressive. A pedestrian bump-out makes the road pretty, but it slows cars down. Bike improvements do the same thing. At what point is it worth it to accommodate pedestrians and bikes? We get no less queuing and no transit improvements for a $12 million investment. Joe responded that we are trying to strike a balance for all users and trying to address congestion.

Tracy Clemens likes the three-lane configuration because she gets splashed less with more buffer between her and vehicles. Between East Avenue and the cemetery there is on-street parking which makes it tight for bicyclists. Joe responded that the section is difficult; the goal is to provide a bike lane there, but it isn't worked out yet.

Phil Terry is concerned about snow storage and the snow piling up on people's front entries. Joe and Nicole responded that this is an ongoing challenge and they are aware of people's concerns.

Jared Wood is concerned about the Prospect intersection because left-turning vehicles block traffic. He'd like to have green/red arrows incorporated in to the traffic signals. He's also concerned that reducing the access to FAHC on the Essex bus route will adversely impact those with limited mobility.

A participant voiced support for the realignment of the Pearl/Prospect intersection. He has a friend who was hit at that intersection while bicycling. Bike lanes and pedestrian improvements are needed in this area. He supports the changes and hopes they can happen soon.

Vincent Cohen of Colonial Square is very impressed with what's happened so far. The big bottleneck is crossing the Winooski Bridge. He'd like two lanes going onto the bridge before the traffic light and having Riverside open into two lanes.

Serrill Lash supports the three-lane configuration as a bicyclist and a driver. The corridor has improved markedly.

Wayne Senville, a member of the Steering Committee, lives on North Prospect. He commends the consultant for a well-written report. He's supportive of the recommendations; the three-lane configuration is a good approach and the intersection realignment makes sense.

Lani Ravin works at UVM and is supportive of the plan and appreciates the description of the trade-offs that need to happen to make the corridor work better.

A participant asked about the sequence to the short and long term goals. Also, he supports additional signage going into the Winooski roundabout/circulator.

In closing remarks, Sharon and Bob thanked everyone for participating in the process and attending the meeting. Sharon encouraged participants to submit their comments on the draft plan by the end for September. Bob added that there are numerous recommendations that already happened and next steps that are going to happen: the cemetery sidewalk is going to happen; the signal has been upgraded at the FAHC entrance; and scoping can start soon for the chokepoints at either end of the corridor (this allows for more detailed design and public process). In the long term, the whole project will be done.

The meeting was adjourned at 8:45PM.

Participants

Last	First	Affiliation
Barr	Jim	
Birkett	Meredith	CCTA
Bourgeouis	Bruce	BFD
Bryant	Rich	
Bushor	Sharon	City Council
Charest	Jason	CCMPO
Clemons	Tracy	
DeBaie	David	Stantec
Derenthal	Tom	
Flash	Terrill	
Goering	Ann	
Hillyard	Richard	
Hopper	Sharon	
Keelty	Dave	FAHC
Keller	Jeanne	
Kingsbury	Lisa	UVM
Kirby	Nancy	
Koehler	Vincent	
Lacroix	John	
Lang	Martha	
Losch	Nicole	Burl DPW
Miller	Randy	

Last	First	Affiliation
O'Brien	Mike	Winooski
Paul	Karen	City Council
Pavelka	Radin	
Penniman	Bob	CATMA
Porter	Mark	
Ravin	Lani	UVM
Senville	Wayne	
Terry	Philip	
Tracy	Maxwell	
VonTurkovich	Frank	
Wallace-Brodeur	Jennifer	AARP
Wood	Jared	
Goodkind	Steve	Burl DPW

Staff/Consultant Team: Joe Segale, RSG; Eleni Churchill, CCRPC; Diane Meyerhoff, Third Sector Associates.

Colchester Avenue Task Force Meeting Minutes
January 27, 2010, 5:30-7:30pm

McClure Conference Room

Task Force Members in Attendance Dan Bradley, Burlington DPW Sharon Bushor, City Councilor Ward 1 Deac Decarreau, City Manager, Winooski Dave Keelty, Fletcher Allen Health Care Wayne Senville, City of Burlington Planning Commission Linda Seavey, UVM Sandrine Thibault, Burlington Planning and Zoning Charlene Wallace, Local Motion (for Chapin Spencer) Task Force Members not Present Meredith Birkett, CCTA Steve Bourgeouis, City of Burlington Fire Dept Dominic Brodeur, Burlington Police Dept Munir Kastic, Burlington Electric Dept Nicole Losch, DPW Burlington Bike/Ped Ed Adrian, City Councilor Ward 1 Bryce Jones, President SGA UVM Sue Parmer, American Red Cross	Facilitator Bob Penniman, CATMA Eleni Churchill, CCMPO Consultants Joe Segale, Resource Systems Group Beth Isler, Resource Systems Group Others in Attendance Richard Hillyard, Ward 1 NPA Tom Derenthal, Ward 1 NPA Jared Wood, Public Works Commission

Bob Penniman started the meeting and asked meeting participants to introduce themselves. Bob provided an update on progress since the last Task Force meeting which included the selection of Resource Systems Group team (in partnership with LandWorks and Third Sector Associates) as the project consultant. The Task Force members agreed with Bob's suggestion to hold all of its meetings in the same location (McClure conference room). Bob turned the meeting over to Joe Segale. Joe provided a presentation that included an overall description of corridor planning, a flow chart that described the roles of the project participants, a map of the study area, an overview of the scope work (including work products and meetings), an overview of the public involvement plan, a schedule, and project goals. There was an open discussion with Task Force members during the presentation. The major themes and comments from the meeting are summarized below.

- Joe presented a map that identified Colchester Avenue and its major signalized intersections as the primary study area. The study area will also include the surrounding street network. The plan will include more detailed recommendations and concept plans for the primary study area and more general/strategic recommendations for the surrounding area. Jared Wood suggested that the study area should extend from the Winooski Bridge to Battery Street instead of ending at Prospect. The central focus of the project is Colchester Avenue, but the secondary study area, which includes Colchester/Pearl Street between Prospect and Battery, and the street network surrounding Colchester Avenue, will be considered to get a comprehensive understanding of the area dynamics. This secondary study area will be shown on future maps.

- The flow chart that describes the roles of project participants indicates that the Transportation/Energy/Utilities Committee will review the draft plan before sending it to the City Council. Sharon Bushor expressed some concern about the TEU committee review because it ha no representatives from Ward 1. Dan Bradley mentioned (latter in the meeting) that the Public Works Commission should also have a review function once a plan is complete. Tom Derenthal noted that since a draft plan will not be available for another year, the exact review path to the City Council does not need to be finalized yet. All agreed that a plan will eventually be forwarded to the City Council at the appropriate time.
- The scope as presented shows the Task Force meeting after the Current and Future Conditions project memos are completed. Sharon Bushor stated her concern that Task Force members be able to help identify existing issues and to offer their observations on the affects of social/cultural (behavioral) conditions. Sharon asked for a means to provide that kind of input. Eleni Churchill stated that she will be primary contact for submitting information and observations as the study progresses. Eleni's contact information is:

  Eleni Churchill
  Chittenden County Metropolitan Planning Organization
  110 West Canal St., Suite 202
  Winooski, Vermont 05404-2109
  802-660-4071 x 11
  echurchill@ccmpo.org

- The public participation approach was discussed throughout the meeting. The Task Force wants to make sure there is adequate representation from the neighborhoods/wards affected by this project. Sharon noted that it is also important to include system users like Domino's Pizza, Campus Kitchen, and the downtown business community. Joe Segale reviewed the public participation plan. Key comments include:
  - Public Meeting 1: The Task Force members agreed that the consultants will introduce the project at the March 10, 2010 Ward 1 NPA meeting. Joe Segale will provide an overview of the project and will gather initial comments. Joe will coordinate with Richard Hillyard and Tom Derenthal prior to the meeting.
  - Public Meeting 2: The meeting will occur after the Current and Future conditions are completed (and summarized in Project Memos 1 and 2). The purpose is to make sure the consultants will have not missed any important issues and to gather input on a vision and goals for the corridor. This, and the meetings 3 and 4, will be a general public meeting separate from an NPA meeting. Wayne Senville suggested, and Joe Segale agreed, that a walking tour be held prior to the meeting.
  - Public Meeting 3: The meeting will occur after the Task Force has developed a final draft of vision and goals. Meeting participants will be asked to brainstorm strategies to help achieve the vision for the corridor in a breakout session format, and will also be given the opportunity to comment on the final draft of the vision and goals.

  - Public Meeting 4: Will occur after the Task Force has approved a Final Draft of the plan. The purpose is to gather comments on plan recommendations and priorities. The meeting will be run similar to a public hearing with a presentation followed by an open discussion of comments and questions.

- Sharon asked about the mechanism for the public to access the project and provide input on existing issues. The public participation plan also includes a web site where members of the public can download approved work products, learn about upcoming events, and send comments. Joe reviewed the public outreach tools that Diane Meyerhoff will use to bolster attendance an public meetings such as flyers, post cards, feedback forms (so we know what works), press releases, etc.
- Relative to evaluating strategies and the need for action sooner rather than latter, Sharon Bushor noted that there has already been a lot of prior planning work in the corridor. The Task Force members have been working on the corridor for a while have quite a bit of information to offer. It is important that issues and ideas do not get lost.
- Several Task Force members noted the need to address the haphazard way students cross the street. This is an immediate safety issue. An immediate issue like this must be taken up separately from this multi-year planning project; it is outside of the scope of this project.
- Also relative to evaluating strategies, Dan Bradley stated that Colchester Ave will be paved during the summer of 2010 (possibly late summer). The scope of work for the planning project includes an evaluation of the Complete Streets concept, which would likely involve dropping a through lane. The paving scheduled for the summer provides an opportunity to test different lane configurations under real conditions. Sharon Bushor expressed concern about conducting a test in late summer when UVM may be in session. Sharon felt the field test should occur before students arrive because traffic volumes are less. Joe Segale suggested that RSG should model the changes first before implementation to have a better understanding of the potential impacts first. The field test would occur before strategies are to be evaluated, but Joe stated that RSG could conduct the traffic analysis anyway since it will be based on current conditions. It may also make sense to field test just segments of the corridor, rather than the complete length.
- Jared Wood brought up the need to evaluate posted speed limits along Colchester Avenue. The posted speed limit is 30 mph, and the Public Works Commission has recommended a reduction to 25 mph. Before the change can be made, an engineering study is necessary. The engineering study involves collecting speed data. The CCMPO and RSG will work together to conduct the study.
- Jared Wood pointed out that the City is about to undertake a Downtown Plan. Wayne reported that the RFP is still under review. Sandrine explained that the Downtown plan will consider different alternatives and it may be some time before decisions are made. Regardless of timing, RSG will keep the Downtown plan in mind as the Colchester Avenue Corridor Plan moves forward. There was also a question about South Burlington’s involvement relative the Patchen Road and its connection to the study corridor. Bob Penniman explained that Patchen Road, a well as the other streets that connect to Colchester Avenue are part of the secondary study area and will be considered in the plan. Direct participation from South Burlington representatives is not anticipated.

- Joe Segale presented some project goals for discussion by Task Force. The goals are related to the process, and should not be confused with a vision statement and related goals for transportation and community along Colchester Avenue. The Task Force members offered the following suggestions:
  - Be consistent with City Transportation Plan.
  - Strengthen alternative modes in the corridor (this is more of a corridor goal, not a process goal).
  - Don't transfer the problem to other areas (e.g., shift issues to Winooski).
  - Get recommended projects in the queue for approval, funding, and implementation.
  - Be more specific on first goal: involve stakeholders and neighbors, ensure public participation, etc.
  - This plan will be successful if it is implemented.
  - Per the City Council Resolution, Bob Penniman and the CATMA office will continue to facilitate the project process with Eleni Churchill and schedule the facility for future meeting

  Next steps

  - NPA meeting March 10th
  - Discuss project with Planning & Zoning
  - Begin existing conditions assessment
  - Convene the Technical Committee

End of notes

RSG INC. TRANSPORTATION

COLCHESTER AVENUE CORRIDOR TECHNICAL COMMITTEE
Draft Meeting Notes (by B. Isler and J. Segale, March 22, 2010)

February 24, 2010
Technical Committee Meeting

<u>Present:</u> Dominic Brodeur-Burlington Police Dept., Bob Penniman-CATMA, Chapin Spencer-Local Motion, Eleni Churchill-CCMPO, Meredith Birkett-CCTA, Joe Segale-RSG, Beth Isler-RSG

<u>Technical Committee Members Not Present:</u> Amy Bell, Bruce Nyquest-VTrans; Dan Bradley-Transportation Planner Burlington DPW; Steve Bourgeois – Burlington Fire Department; Nicole Losch – Bike/Ped Planner Burlington DPW; Munir Kasti-Burlington Electric; Steve Palmer-City of Winooski; Jason Charest-CCMPO (Note – There was a large snow storm this day which contributed to the low attendance)

WELCOME & INTRODUCTIONS

Eleni welcomed everyone and introductions were made. Bob pointed out the need to recognize that the technical committee is a sub-committee of the task force.

DISCUSSION

Joe proceeded with an overview of the project.

The *VT Corridor Management Handbook* is guidance, not regulatory.

This project was originally initiated by a City Council resolution, which will ultimately be the glue for its adoption.

Chapin asked about having the Public Works (PW) Commission as a participant in the process. Bob noted that Dan Bradley and Nicole will be bringing the plan to the PW Commission. Chapin noted that along with the Transportation, Energy, and Utilities Committee, there could be a simultaneous PW Commission review. Instead of specifying the committee, just say "City Commission Reviews." Adding diversity of representation to the review will be beneficial to the public process.

It is important to note that the study area is not only the line shown along Colchester Ave; the study area is the network which includes adjacent streets. This plan may include conceptual recommendations for the street network that surrounds Colchester Avenue (such as showing potential alignments for bicycle facilities). Conceptual designs alternatives will be focused on Colchester Avenue. Transportation modeling work will show how Colchester Avenue is affected by anticipated land use and transportation system changes in the City and Region. Model forecast work will also show how changes to Colchester Avenue could affect traffic patterns on other streets (such as Pearl Street). Recommendations beyond Colchester Avenue and the side streets that connect to Colchester Avenue will not be included in this plan.

Need to recognize importance of topography in bicycle facilities (coming up the hill from Winooski). Bike/ped connections to this corridor are important.

Joe will meet with NPA Ward 1 to give them a heads up on the project on March 10, 2010.

Task force meetings and all public meetings will take place in the McClure conference room at Fletcher Allen.

Diane Meyerhoff will do flyering for the first public meeting and evaluate whether or not it was effective. If effective, flyering will be used for the other public meetings. The City has Ward 1 database that we can tap into.

Chapin noted that there are so many stakeholder groups and that we don't want to dilute the process and burn people out with meetings. Should there be additional one-on-one meetings? Need to get input up front. Chapin suggested combining public meetings #2 (to identify issues) and #3(to brainstorm strategies) into one public meeting. After some discussion it was agreed that the public meetings as described in the scope of work will remain the same which include:

- Presentation at Ward 1 NPA meeting to review scope of project and opportunities for public input (scheduled for March 10, 2010)
- Public Meeting 1 – Present findings on existing conditions, verify issues and gather feedback to be used for vision and goals. Will include a corridor walking tour. (May 2010)
- Public Meeting 2 – Strategies and recommendations brainstorming session (Early Fall 2010)
- Public Meeting 3 – Present Draft Plan for Comment (Jan/Deb 2011)

A website is also under development that will provide an opportunity for the public to submit comments. The public will have several other opportunities to comment on the plan as it moves through the City's various commissions and committees and eventually the City council. The participation of students is important because they are a significant user of transportation services in the Colchester Avenue corridor. Students are represented on Task Force and efforts should be made to make sure they participate in the public meeting to develop strategies. Chapin noted that Ward #1 tends to have more internet access so much of their input may come online.

Bob noted that the analysis of the complete street concept contained in an appendix to the Burlington Transportation Plan was focused on the four lane section between Prospect Street and East Ave. This corridor plan needs to extend the analysis all the way to the Winooski Bridge and needs to consider how lane reductions could divert traffic to other areas.

The committee discussed relevance of past planning efforts and other changes. CCTA Transit Development Plan (TDP) will go to the CCTA board in June. CCMPO Park and Ride Plan will also have influence and data to feed into Colchester Ave. Plan. Tri City Transit Study has not been updated. Fletcher Allen will not be in Winooski garage after April. There are pieces of the VT 15 and US 2 corridor studies that should be reviewed for this plan. Colchester Ave is essentially the western end of the VT 15 corridor. Add Burlington North-South Bicycle/Pedestrian Plan. Bob also noted that RSG review the Burlington Wayfinding System to determine/explain how the Campus District signing relates to the Colchester Avenue Corridor.

The Police department can assist the planning effort by providing crash reports; assisting with a technical evaluation of reducing speed limit to 25 mph; and providing data on on-street parking. There are three High Crash Locations in the corridor. VTrans data is limited, BPD would have crash reports. RSG should coordinate with Dominic to get reports- he can get back as far as 2002. Multiple intersections and conflict points make the Colchester Ave segment adjacent to Barrett Street confusing.

Relative to emergency services, traffic signal pre-emption and emergency vehicle access need to be considered. In addition, Bob noted that the fire department may be considering a relocation of the Mansfield Avenue fire station.

Meredith noted that CCTA will do the annual ride check (boardings by stop) this spring and asked if RSG will need Origin/Destination data or will boardings be enough? Joe responded that boarding data will be sufficient. Bob noted that regional data and summary results of CATMA annual employee and student surveys are also available. Meredith will talk to CCTA operations to see if they have any issues with street design.

Bob noted that UVM and City have considered the possibility of closing University Place to through traffic. RSG had analyzed that alternative sometime in the past and should review the previous work.

The plan would benefit from more definitive information about what's happening at Winooski Falls relative to development plans, success of marketing, etc. Residential seems to be occupied, but retail not as much. Eleni will contact Deac for a status. Joe pointed out that in the long-term traffic forecasts, the study should assume full build out of the project.

End of Notes

RSG INC.
TRANSPORTATION

MEMORANDUM

To: Eleni Churchill and Bob Penniman

From: Joe Segale

Re: Comments from Ward 1 NPA Meeting on March 10, 2010

Date: Prepared March 22, 2010

I provided an overview of the project scope of work, roles and responsibilities of project stakeholders and opportunities for public involvement at a regularly scheduled meeting of the Ward 1 NPA on March 10, 2010. A video recording of the meeting was made and complete meeting minutes will be available on the NPA page of the Community & Economic Development Office (CEDO) website at http://www.cedoburlington.org/neighborhoods/npa/ward_1_npa_minutes.htm. The official meeting minutes will be incorporated when available.

This memorandum highlights the major comments.

- Why doesn't the study area extend along Pearl Street to Battery Street. The study area was established by the CCMPO, City and CATMA. It is logical to end the study area at Prospect because the roadway network expands at that point and land use changes. The plan will include an analysis of how traffic volumes may change beyond the study area, but will not include detailed recommendations in any other areas. If the study area was expanded, the CCMPO would probably have to re-issue a request for proposals and then take a couple of months to re-hire a consultant team. Additional funds would also have to be found. The current scope and budget is an opportunity to move forward on Colchester Avenue.
- The plan should evaluate adding an exclusive left turn phasing for the Prospect Street/Colchester Avenue intersection. There are long queues at this intersection. The traffic signal timings appear to favor movements on Colchester and Pearl over Prospect.
- There was a concern stated more effort had not been made to make people aware that Colchester Avenue plan was to be discussed at the Ward 1 meeting and a request to use direct mailing to invite the public to future public meetings.
- One person noted that they often are stuck in traffic when passing through downtown Winooski and wondered if the plan would address that particular issue. The plan will not be addressing congestion issues in Winooski.
- The plan should incorporate new ideas from other areas of the country and world.
- It seems like there are hundreds of busses that travel along Colchester Avenue during rush hour. They take up a lot of space along the highway.

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- Need to accommodate visually impaired people that use the sidewalks.
- Students don't cross the road at cross-walks. This issue is a significant concern.
- UVM students need to be involved in the process.
- Will the plan be incorporating the ideas that were generated by the Colchester Avenue Task Force in 2004-2006? Make sure to carry those ideas forward and to present the ideas in future presentations. It is very important that all of the previous work be included.
- The section between East Avenue and Prospect Street is the widest and therefore creates the most opportunities for changes to the roadway. Some drivers harass cyclists, particularly between East Avenue and Prospect Street. Is it possible to separate bicycle and motor vehicle facilities?

Colchester Avenue Task Force Meeting Notes
December 9, 2010, 7:00-9:00 pm

McClure Conference Room

Task Force Members in Attendance	Facilitator
Sharon Bushor, City Councilor Ward 1	Bob Penniman, CATMA
Wayne Senville, City of Burlington Planning Commission	Eleni Churchill, CCMPO
Linda Seavey, UVM	Consultants
Sandrine Thibault, Burlington Planning and Zoning	Joe Segale, Resource Systems Group
Chapin Spencer, Local Motion	Others in Attendance
Nicole Losch, DPW Burlington	Chris Laramie and DJ Rousseau, Burlington Fire Department Station #3 (Mansfield Avenue)
Bruce Bourgeois, City of Burlington Fire Dept	
Task Force Members not Present	
Deac Decarreau, City Manager, Winooski	
Dave Keelty, Fletcher Allen Health Care	
Meredith Birkett, CCTA	
Dominic Brodeur, Burlington Police Dept	
Munir Kastic, Burlington Electric Dept	
Ed Adrian, City Councilor Ward 1	
To Be Determined, President SGA UVM	
Sue Parmer, American Red Cross	

Bob Penniman welcomed meeting participants and noted that work on the corridor plan has been on hold while the Colchester Avenue re-striping/complete street demonstration project was underway. Since the City has decided to extend the demonstration project until spring 2011, and the Colchester Avenue planning process needs to move forward, it makes sense to reconvene the Colchester Avenue Task Force at this point and to begin planning for the next steps of the corridor management plan.

Sharon Bushor expressed her concern with the lack of progress on the plan and the lack of involvement of the Task Force with the demonstration project. She supported the demonstration project, but felt it had its own life separate from the planning project. She was concerned that, if the City had decided not to extend the demonstration project to spring 2011, the configuration would have been put in place permanently without the public's involvement in the decision. Had that occurred, there would not be any reason for the planning process to continue.

Bob Penniman acknowledged Sharon Bushor's concerns and turned the meeting over to Joe Segale. Segale reviewed the status of the planning project, status of the demonstration project, presented a draft vision statement and goals, and presented an agenda and approach to the next pubic meeting. Comments on each topic are provided below.

Colchester Avenue Corridor Plan Status:

The revised project schedule is shown in Table 1.

Table 1: Status and Revised Schedule

Task	Description	*Status*
1	Project Initiation	Complete
2	Current Conditions	Complete
Added	Complete Street Pilot Test	Sep 2010 to Spring 2011
3	Future Conditions	Underw ay
4	Vision and Goals	Underw ay
5	Strategy Evaluation	January-March 2011
6	Implementation Plan	March- April 2011
7	Prepare Final Plan	May-June 2011

The next public meeting, which was discussed by the Task Force later in the meeting, will occur January. A final public meeting will occur sometime between April and May to present a draft plan. Joe Segale noted that the Task Force and Technical Committee will also meet several times until the plan is complete; and once a plan is completed, it will be reviewed by various City commissions.

Demonstration Project

Joe Segale reviewed the lane geometry changes currently being tested in the demonstration project. He described the decision making process, and public outreach efforts that led to the City's decision to implement the test. Results of the on-going monitoring process were summarized including traffic and safety data, comments from Stakeholders, and a summary of the number of positive and negative public comments. The Task Force offered the following comments:

- Wayne Senville noted that the demonstration project does not include all of the elements such as bus pull-outs and reconfiguration of the Prospect/Pearl and East Ave intersections, and therefore may be under-representing all of the benefits of a fully implemented complete street. When reporting out results, it is important to emphasize the demonstration project is only a partial test. Bob Penniman agreed and noted that the partial aspect of the test is the dilemma and challenge of the demonstration project.
- Sandrine Thibault asked why the traffic signal timings were not optimized. Joe Segale responded that traffic signal optimization was evaluated during the planning/design process for the demonstration project, and optimization would improve traffic flow. However, it was decided not to make too many changes at once. RSG is assisting the City with traffic signal timing changes along the corridor now.
- Sharon suggested that negative comments from the public be further explored to better understand what was not working well.
- Sharon noted that there does not appear to be an easy way for people that live outside of the City to offer comments.
- Sharon asked if the demonstration project addressed in any way the issue with pedestrians crossing from the Trinity to UVM. Joe Segale responded that the specific pedestrian crossing issue at Trinity was not addressed by the demonstration project. Bob Penniman pointed out that the three-lane configuration may allow room for a pedestrian island that could help improve safety for pedestrians.
- Bruce Bourgeois noted the Fire Department's general opposition to raised medians. Bob Penniman pointed out that a pedestrian refuge island can be short and would not

necessarily continue along the entire length of the corridor. This type of design may or may not be acceptable to the Fire Department.

- Bruce Bourgeois noted Fire Department personnel's observations that vehicle queues on the Pearl Street eastbound approach to Prospect are longer as a result of the demonstration project. The increase may be due to vehicles spilling back from the left-turn lane into Mansfield Avenue. Is it possible to add an exclusive left-turn signal for that left-turn lane?
- Wayne Senville suggested that any interim memoranda with findings and observations on the demonstration project should be available on the Colchester Avenue web site.
- Joe Segale suggested that the Colchester Avenue Technical Committee could meet monthly to review status of the planning project and status of the demonstration project (any new information, etc).

<u>Vision and Goals</u>

A draft vision statement and goals was presented for comment by the Task Force. The Task Force suggested some minor changes and clarifications resulting in the following version that will be presented as a draft for comment during the next public meeting:

Draft Vision:

Colchester Avenue will evolve into a "Complete Streets" corridor that promotes safe, comfortable, and convenient travel for all users—including motorists, pedestrians, bicyclists, and public transportation riders.

Mobility of through traffic will be balanced with accessibility to neighborhoods and local businesses as well as the Institutions on the "Hill."

The corridor will develop into an attractive public space through streetscape and site design features. It will become more livable and desirable and will serve as a welcoming gateway to Burlington.

Draft Goals:

1) *Design Colchester Avenue consistent with the "Complete Streets" concept.*
2) *Provide a range of transportation options that are safe, efficient and convenient to serve the diverse needs of residents, business, institutions and travelers through the corridor.*
3) *Enhance safety for vehicular, pedestrian, bicycle and bus travel.*
4) *Develop strategies that support community character and enhance the built environment.*
5) *Design and operate transportation projects and services within the corridor to enhance the environment* (NOTE – this goal has been re-written from "Have the transportation investments along the corridor enhance the environment" as suggested at the Task Force meeting)
6) *Develop transportation projects and services cooperatively and implement projects in time to meet immediate and long term needs.*

Public Meeting

Joe Segale explained that the purpose of the next public meeting is to verify the vision and goals and to focus on long term strategies to achieve the vision and goals. Sharon Bushor noted that the steps used to invite participation to the May 27 meeting were effective and should be used again. Sharon provided some additional names to add to the invitee list and she also asked that members of the City's TEUC and DPW Commission as well as the DPW Director be invited to the meeting. Eleni noted that the direct mailing of postcards to property owners was not very effective (a large percentage of the post cards were returned). Sandrine Thibault offered that the Planning and Zoning Department may have a more accurate list of land owners.

The Task Force agreed with the following general agenda for the meeting:

1. Welcome and Presentation
    a. Purpose of meeting and status of planning project
    b. Summary of May 27, 2010 Meeting
    c. Status of Demonstration Project
    d. Review of Draft Vision and Goals
    e. Instructions for rest of public meeting
2. Long Term Strategies Breakout Sessions
    a. Breakout groups will be formed and will spend time commenting on and maybe refining alternative concept plans to be prepared by the consultants prior to the meeting.
    b. Breakout groups will not move around. Each breakout group will comment on all concept plans developed.
3. Summary of Comments
    a. All meeting participants will reconvene at the end of the meeting.
    b. Each facilitator will summarize the comments from their breakout group

A handout summarizing the status of the demonstration project and a way to offer comments will be provided to help avoid becoming bogged down in a discussion of that project.

Sandrine suggested that the concept plans be organized around the different street types presented in the Burlington Transportation Plan (complete street, transit street, bicycle street, pedestrian street, slow street Nicole Losch suggested that the related design standards be reviewed.

The meeting will be held on Thursday, January 27, 2011 in the McClure Conference Room (date confirmed and room has been reserved by Bob Penniman following the meeting). Eleni, Bob and Joe will coordinate on final agenda.

End of Notes

RSG INC. TRANSPORTATION

COLCHESTER AVENUE CORRIDOR TECHNICAL COMMITTEE
Draft Meeting Notes
Prepared by J. Segale, January 13, 2011

January 13, 2010
Technical Committee Meeting

Present: Nicole Losch-Burlington DPW; Dominic Brodeur, Jon Young -Burlington, Police Dept; Bruce Bourgeous-Burlington Fire Department Charlene Wallace-Local Motion, Eleni Churchill-CCMPO, Jon Moore-CCTA, Joe Segale-RSG; Diane Meyerhoff

Technical Committee Members Not Present: Bob Penniman, CATMA; Amy Bell, Bruce Nyquest-VTrans; Munir Kasti-Burlington Electric; Steve Palmer-City of Winooski

Eleni Churchill welcomed the technical committee members and everyone introduced themselves. Joe Segale reviewed major tasks and status of the project, the agenda for the next public meeting, and the long term roadway concepts that will be presented at the public meeting. The public meeting was scheduled for January 27, 2011 but is being rescheduled at the request of Sharon Bushor to avoid a conflict with a public meeting related to the Burlington Telecom on the same night. The BT meeting was announced this week. Possible re-schedule dates are Feb 3 or Feb 17.

RSG suggested the following long-term concepts:

Western Segment (Prospect to East Avenue)

1. Cross-Section Design Concepts
   a. 1 travel lanes per direction, TWLTL that converts to exclusive left-turn lane at intersections, bike lanes, green-strips and sidewalks; and
   b. 2 travel lanes per direction, no median, left-turns at some intersections bike lanes, green-strips and sidewalks.
2. Pear-Prospect Street Intersection
   a. Re-aligned with existing lane configuration
   b. Re-aligned with additional turn lanes
   c. Roundabout – just show outline of footprint and discuss operational issues
      i. Traffic volumes require a 2 lane roundabout, but a 2-lane roundabout will not fit
      ii. 1-lane roundabout has long queues
3. Trinity Pedestrian Crossing
   a. Major crossing about 200 feet west of East Ave with pedestrian refuge island; may have HAWK control
   b. Barriers (rail and granite posts like Main Street) to channel pedestrians to crossing
   c. Minor crossing at Fletcher Place

<u>Eastern Segment (East Ave to Riverside)</u>

1. Cross-Section Design Concepts
    a. 1 lane each direction, bike lanes, on-street parking, green-strip and sidewalks
    b. No other options will be presented
2. Riverside-Barrett
    a. One traffic signal at River-Barrett (Mills Street becomes stop controlled)
    b. Show roundabout
3. Centennial Pedestrian Crossing
    a. Show design options

The technical committee agreed that these concepts are reasonable.

Next Steps:

- Reschedule public meeting and send new notices
- Prepare graphics and other supporting documents
- Facilitator training and organization
- Conduct public meeting

End of Notes

Colchester Avenue Task Force Meeting Notes
March 24, 2011 7:00-9:00 pm

McClure Conference Room

Task Force Members in Attendance	Facilitator
Sharon Bushor, City Councilor Ward 1 Wayne Senville, City of Burlington Planning Commission Dave Keelty, Fletcher Allen Health Care Lani Ravin, UVM Sandrine Thibault, Burlington Planning and Zoning Chapin Spencer, Local Motion Nicole Losch, DPW Burlington Bruce Bourgeois, City of Burlington Fire Dept John Moore, CCTA <u>Task Force Members not Present</u> Bob Penniman, CATMA Deac Decarreau, City Manager, Winooski Linda Seavey, UVM Meredith Birkett, CCTA Dominic Brodeur, Burlington Police Dept Munir Kastic, Burlington Electric Dept Ed Adrian, City Councilor Ward 1 To Be Determined, President SGA UVM Sue Parmer, American Red Cross	Eleni Churchill, CCMPO <u>Consultants</u> Joe Segale, Resource Systems Group <u>Others in Attendance</u> None

Eleni Churchill started the meeting and meeting participants introduced themselves. Joe Segale reviewed the following agenda:

- Project Status
- Summary of February 3, 2011 Public Meeting
- 2030 Traffic Forecast Assumptions
- Task Force Direction on Long Term Design Options
- Next Steps

Joe Segale facilitated the discussion using a PowerPoint presentation (Colchester Avenue Task Force Meeting, March 24, 2011). Slide reference numbers are provided in the notes below.

Colchester Avenue Corridor Plan Status
(Slide 3) Joe Segale reviewed the status of the major tasks. The evaluation of alternatives is underway; a draft plan is anticipated in May.

Summary of February 3, 2011 Public Meeting

(Slides 4 and 5) Joe Segale highlighted the common themes related to the comments on the 3-lane design option, intersection designs, bicycle, pedestrian, transit and streetscape designs. Lani Ravin asked about comments on the width of the bike lane that was striped as part of the demonstration project. Eleni Churchill acknowledged the concern over the width of the shoulder that was provided in the demonstration project but pointed out that the February 3rd public meeting focused on long-term options which all include a dedicated bike lane that would satisfy standards. The results from the February 3rd meeting were summarized in a memorandum that is available on the project website (www.colchesterave.org). There were no other comments offered by Task Force members.

2030 Traffic Forecast Assumptions

(Slide 6) Joe Segale reviewed the local, regional and statewide factors that were considered in developing the assumed 5% growth in traffic volumes between 2010 and 2030. The 2030 traffic volume projections were used to evaluate the performance of the long-term roadway design options. Joe discussed, among many factors, how growth assumptions within the UVM Master Plan were considered. Sharon Bushor noted that the Trinity Campus is not considered part of UVM's core campus and asked if potential growth at Trinity was considered in the traffic growth assumptions. Lani Ravin explained that although Trinity is technically not part of the core campus, UVM's master plan policy to reduce on-campus parking also applies to the Trinity Campus. In fact, if additional buildings are added to the Trinity Campus, they will most likely be built on existing parking lots and parking demand will be accommodated at remote locations.

Long Term Design Options

- **(Slide 8)** RSG has prepared a preliminary order of magnitude cost estimate to completely reconstruct the corridor at $3.8-$4.7 million for the western segment (between East Ave and Prospect) and $4.3 for the eastern segment. Given the total potential cost of approximately $9 million, it is likely that federal transportation funds will be used to implement the long-term concepts. Because federal funds will probably be used, the VTrans project development process will have to be followed. The process requires evaluation of alternatives, and the use of federal funds also means the project will have to comply with the National Environmental Policy Act (NEPA). There are three levels of NEPA compliance processes that range from a relatively simple screening and checklist (Categorical Exclusion) to the more complicated and comprehensive levels of an Environmental Assessment or Environmental Impact Statement **(Slide 9)**. Joe Segale described these processes so the Task Force had some background on the challenges to moving a big project forward and so they understood that alternatives will still need to be evaluated as a project moves forward. Sharon Bushor explained her experience with the Riverside Avenue project which took many years to complete. Sharon also stressed the need to identify projects that could be implemented much sooner, possibly by phasing or breaking out specific components (like an intersection). Eleni Churchill reminded the Task Force that a list of short-term and mid-term recommendations has already been developed and will be included in the plan. Dave Keelty asked if the level of NEPA compliance that will be required will be determined as part of the Corridor Management Plan. Joe Segale responded that determining the level of compliance is based on judgment and that RSG and the CCMPO will work with VTrans to identify the appropriate level and that will be identified in the implementation plan.
- Joe Segale reviewed the 3-lane and 4-lane cross-section options for the western segment and reviewed the related intersection design concepts **(Slides 9-12)**. The Task Force offered the following questions and comments:
    - **(Slide 9-12)** Could the 3-lane options be designed and constructed in a way that would make it easier to expand to a 4-lane design in the future if necessary? Maybe provide 10- foot wide bike lanes on each side that could be reduced to 4-

5 feet in the future to allow the addition of a fourth vehicle travel lane. There was a discussion of the related utility challenges.

- **(Slide 13)** Pearl-Prospect Street intersection. Joe clarified for Sharon that the same roadway width would be provided on South Prospect if it is aligned with North Prospect. Joe pointed out that the realignment could be constructed as a stand-alone project (not as part of the entire, long-term roadway reconstruction). There was a consensus that a roundabout is not a feasible or desirable option at this location. Bruce Bourgeois noted the long queues (sometimes to South Winooski) that form on Pearl Street and how that is a concern for the fire department. Sandrine Thibault asked if there are any technology solutions, like signal preemption, that could be used to address the problem.
- **(Slide 14)** Mansfield Intersection. No specific comments offered on the designs.
- **(Slide 15)** Mary Fletcher Drive Intersection. Joe Segale noted that the exclusive left-turn lane, with a protected left-turn phase (green arrow) results in higher levels of congestion with the 3-lane option. The exclusive left-turn lane with a protected green arrow would operate with minimal congestion with a 4-lane option.
- **(Slide 16)** East Avenue Intersection. The concept plan shows a lengthening of the right-turn lane on the East Avenue approach. Joe Segale noted that some other changes could be made to the East Avenue approach, such as allowing double lefts. Dave Keelty pointed out the limits to extending the length of the right-turn lane. Sharon Bushor emphasized the importance of the on-street parking to the India House restaurant and the residents on East Ave and did not support removing any spaces.

- **(Slides 17 and 18)** Joe Segale presented the results of a congestion analysis for all signalized intersections along the western segment under the following scenarios: 2030 with the old 4-lane configuration (pre-demonstration project), 3-lanes with concurrent pedestrian phases, 3-lanes with exclusive pedestrian phasing, 3-lanes with exclusive pedestrian phasing and some additional turn lanes, and the long-term 4-lane option with exclusive pedestrian phases. Including an exclusive pedestrian phase was a comment offered at the February 3rd public meeting. With the exception of Mary Fletcher Drive, average intersection LOS is acceptable when an exclusive pedestrian phase is assumed **(Slide 17)**. LOS results for the worst leg at each intersection was also presented **(Slide 18).** The worst leg is typically the side street approach to Colchester Avenue. Relative to the effect of exclusive pedestrian phasing on the worst leg at each intersection, the results are mixed:
    - Prospect-Pearl: The worst approach is South Prospect. The exclusive pedestrian phase causes little or no increases in delay for 3-lane and 4-lane configurations unless a left-turn lane on the Pearl Street approach is assumed.
    - Mansfield Avenue: The worst approach is Mansfield Avenue. The exclusive pedestrian phase causes a large increase in delay for the 3-lane and 4-lane options causing LOS to change from the C/D threshold to F.
    - Mary Fletcher Drive. The worst approach is Mary Fletcher Drive. The exclusive pedestrian phase causes delay to increase significantly for the 3-lane option. The

exclusive pedestrian phasing also causes delay to increase for the 4-lane option, but the LOS is still acceptable (LOS D) for a side street approach.

  - East Avenue. The Trinity driveway is the worst approach at this intersection (Note – the graph in Slide 18 incorrectly labels this as 'East Ave-SB". It should be "Trinity-SB"). The results are mixed for Trinity because it is the minor leg and traffic signal "green time" is reallocated from it to other approaches. Overall, the exclusive pedestrian signal has a minor effect on this intersection.

- **(Slide 19)** Joe Segale reviewed a table that summarizes the advantages and disadvantages of the 3-lane and 4-lane option. Specific comments offered by the Task Force are:
  - Relative to transit operations, John Moore noted that CCTA has specific desires for the design and location of pull-offs. Chapin Spencer noted that the pull-off should be down-stream of traffic lights so they can take advantage of the gaps created in the traffic stream.
  - Relative to environmental impacts, Dave Keelty noted that the 4-lane option has more impervious surface which will create more stormwater runoff, which is not currently managed properly. Joe Segale noted that a long-term reconstruction of Colchester Avenue would have to include a properly designed stormwater management system. Dave Keelty noted that the cost estimates should reflect the stormwater needs.
  - Wayne Senville noted that community character and aesthetics is affected by more than pavement width. Additional right-of-way is another factor, among others, that affect the assessment of community character and aesthetics. Sharon Bushor noted that many residents are concerned with drainage issues along the corridor.
  - Lani Ravin noted that the 4-lane option would provide more capacity to move vehicles through the corridor and may therefore attract more traffic.
  - Sharon Bushor noted the importance of keeping Burlington accessible for local businesses.
  - Sharon mentioned the possibility of using a managed lane strategy that would change the number of in-bound and out-bound lanes to coincide with morning and afternoon peaks.

<u>Mid-Block Pedestrian Crossing near Trinity.</u>

(Slides 20 and 21) Joe Segale reviewed the pedestrian desire lines, general locations and type of control. The Task Force did not attempt to identify a specific location. During the February 3rd public meeting it was suggested that the existing pedestrian crossings at Mary Fletcher Drive and East Avenue should be improved before providing a new mid-block crossing, This suggestion did not seem to be supported by the Task Force because the existing crossings are not positioned to capture the pedestrian flow desire lines. The Task Force preferred the in-pavement lights to the HAWK signal for the 3-lane option, but suggested that the HAWK may be the better choice for the 4-lane option. Nicole Losch noted that in general, a 3-lane cross-section is a better situation for the mid-block crossing because there are less potential conflict points with vehicles. Sandrine asked if the traffic impacts of the HAWK signal could be evaluated.

<u>Eastern Segment Cross-Section Option</u>

Joe Segale noted that a 4-lane option is not applicable to the eastern segment because the traffic volumes are significantly less than the western segment (and it is not interrupted by multiple signalized intersections). On-street parking and the proximity of houses to the roadway are constraints that affect the long-term design option, particularly between East Avenue and the top of the hill **(Slides 23 and 24)**. One option includes two travel lanes, bike lanes on each side, parking lane on each side, and a sidewalk – but no green strip **(Slide 27)**. Since the green strip is used for snow storage after plowing the street, this option would require additional snow removal. Sandrine Thibault noted that there are fewer cyclists in the winter and that many urban areas live with this sort of constraint. Another option maintains the green strip and on-street parking by replacing the dedicated bike lane with a 14 ft wide curb lane that allows shared use by bikes and cars **(Slide 28)**. Wayne Senville asked if the parking occupancy had been documented; if the parking spaces are not full, then it may be reasonable to eliminate some spaces. Wayne noted that some on-street spaces had been eliminated on South Willard Street. Chapin Spencer noted that elimination of some on-street spaces may encourage people to park more efficiently in off-street locations. Chapin Spencer suggested defining on-street parking spots using curb extensions so some green space could be provide. Sharon Bushor asked Joe Segale to prepare a sketch that demonstrates that concept. Sandrine Thibault expressed her preference for the dedicated bike lane over the wide curb lane.

<u>Riverside Drive-Barrett Street-Mill Street Intersection</u>

(Slide 29) Joe Segale reviewed the proposed concept plan for this location and the LOS results with and without the exclusive pedestrian phasing. Overall LOS would decrease from C to D with exclusive pedestrian phasing. Sharon Bushor asked that RSG verify the overall performance of the concept design to make sure it really will work. Chapin Spencer noted that the public space that would be created on the northwest corner by the edge of the Winooski River would support a planned pedestrian/bike bridge and would be an extension of the greenway along Riverside Avenue.

<u>Next Steps</u>

The Task Force needs time to absorb the information before it can decide what if any decisions it needs to make regarding long-term design options. Eleni will make arrangements for the next meeting sometime in the next two weeks.

End of Notes

Colchester Avenue Task Force Meeting Notes
May 17, 2011, 6:00-8:30 pm

214 Patrick, FAHC

Task Force Members in Attendance Sharon Bushor, City Councilor Ward 1 Dave Keelty, Fletcher Allen Health Care (by phone) Bob Penniman, CATMA Lisa Kingsbury, UVM (arrived at 7:00 pm) Chapin Spencer, Local Motion Nicole Losch, DPW Burlington John Moore, CCTA Task Force Members not Present Wayne Senville, City of Burlington Planning Commission Sandrine Thibault, Burlington Planning and Zoning Deac Decarreau, City Manager, Winooski Linda Seavey, UVM Bruce Bourgeois, City of Burlington Fire Dept Meredith Birkett, CCTA Dominic Brodeur, Burlington Police Dept Munir Kastic, Burlington Electric Dept Ed Adrian, City Councilor Ward 1 Sue Parmer, American Red Cross	Facilitator Eleni Churchill, CCMPO Consultants Joe Segale, Resource Systems Group Others in Attendance None

Bob Penniman opened the meeting at approximately 6:15 pm and asked Sharon Bushor to lead the discussion. Sharon reviewed the agenda and gave the Task Force members an opportunity to make revisions. At the request of Bob Penniman (latter in the meeting), status of the demonstration project was added to the agenda which included:

1. Review previous task force discussion and other meetings from December 2010 through April 2011
2. Review vision and goals
3. Task Force direction on the long term design options for the western segment (Prospect to East Avenue)
4. Implementation plan overview
5. Demonstration project Status
6. Next steps

Comments and decisions related to each of these topics are summarized below.

1. Review of Previous Task Force Discussions

Joe Segale reviewed the purpose and outcome of the Task Force meetings held on December 9 2010, March 24, 2011 and April 4, 2011; the Technical Committee meeting held on January 13, 2011 and the public meeting/workshop held on February 3, 2011 to focus on the long-term options. The key outcomes of those meetings were:

- The Task Force adopted the vision statement and goals at its December 9, 2010 meeting which were then offered for comments and verified with the public at the February 3, 2011 meeting;
- Participants at the February 3, 2011 meeting generally favored the 3-lane option for the western segment of Colchester Avenue but wanted more information on advantages and disadvantages and also expressed a desire for exclusive pedestrian phases (see February 3, 2011 meeting notes for more information);
- The Task Force held follow-up meetings on March 24, 2011 and April 4, 2011 to consider the long-term design options in more detail. At the April 4, 2011 meeting, the Task Force agreed that the concept design for the Colchester Ave-Riverside-Barrett-Mill Street intersection was acceptable; and that the overall design concept for the road design for Colchester Avenue from East Avenue to Riverside was acceptable (which maintains on-street parking while also providing bulbouts to provide some green space and street trees). Sharon noted that she still has a concern about access to and from Mill Street and asked for a special meeting with business owners and residents from that area. Bob Penniman noted that neighbors at Chase and Grove Street should also be involved. Sharon offered to help organize the meeting.
- Relative to the western segment, the Task Force continued to remain undecided about the 3-lane and 4-lane options after the April 4, 2011 meeting. At the April 4, 2011 meeting, a "hybrid" option was suggested that provides a 4-lane cross-section from Prospect to the hospital; and a 3-lane section between East Avenue and Mary Fletcher Drive (hospital access). The purpose of the hybrid option was to provide highway capacity between Mary Fletcher Drive and Prospect Street, and a more narrow roadway cross-section at the proposed Trinity mid-block pedestrian crossing. A Minimalistic 3-Lane option was also suggested. This option would have the same lane configuration and other features as the 3-lane option, but would not involve a complete reconstruction of the underground utilities (in particular stormwater).

The purpose of the May 17, 2011 meeting was to reach a decision on the 3-lane or 4-lane options.

2. <u>Vision Statement and Goals</u>

Joe Segale reviewed the key components of the Vision Statement and Goals. The key components include conversion of Colchester Avenue into a Complete Street, balancing mobility for through traffic with accessibility for neighbors and local businesses, and developing the corridor into an attractive public space. Bob Penniman asked, and the Task Force Members confirmed, that the Task Force had adopted the Vision Statement and Goals (at the December 9, 2010 meeting as noted above).

3. <u>Long Term Design Option for the Western Segment (Prospect to East Avenue)</u>

Joe Segale noted that there are two fundamental options:

A 3-lane option that includes the following key features:

- Advanced pedestrian phase at all traffic signals;
- Additional turn lanes at the intersections; and
- A mid-block pedestrian crossing at Trinity with a refuge island and pedestrian actuated in-pavement and sign mounted flashing LED lights.

A 4-lane option that includes:

- Exclusive pedestrian phases at all traffic signals;
- Additional turn lanes at intersection. (At the Colchester Avenue westbound approach to Mary Fletcher Drive, an exclusive left turn lane would be provided that would create a 5-lane cross section at that intersection);
- Exclusive pedestrian phases at all traffic signals; and
- A mid-block pedestrian crossing at Trinity with a refuge island and a pedestrian actuated HAWK signal (essentially a traffic signal that would stop traffic on Colchester Avenue when a pedestrian pushes a button).

Joe Segale presented traffic count data for a week at the end of April 2010 to demonstrate the hourly variation in volumes and noted that the traffic analysis only focuses on the PM peak hour. Joe Segale presented maps that compared the vehicle queues for the 3-lane and 4-lane options during the 2030 PM peak hour. The analysis assumes traffic signals are coordinated and optimized. Key findings of the analysis are:

- In general, the 3-lane option will result in longer queues compared to the 4-lane option. Critical areas are between Mansfield and Mary Fletcher Drive; and the Pearl Street approach to Prospect.
- The 3-lane option produces smaller queues on the Colchester Avenue approaches to East Avenue.
- The 4-lane option produces significantly smaller queues on the East Avenue approach to Colchester Avenue because it assumes the lane configuration would be changed to provide an exclusive left turn lane and a shared left-through-right turn lane (which would allow two cars to turn left from East Avenue to Colchester Avenue at the same time). In order to accommodate this lane change, and maintain on-street parking (a critical issue), East Avenue and Trinity entrance would have to be shifted to the west. Bob Penniman noted that realignment to the west is a rational assumption for the long term and could be included in site planning for potential changes to the Trinity campus and in light of the relocation of the Vermont Department of Health (located on the south west corner). Joe noted that the design concept depends on the 4-lane option because it requires two receiving lanes on Colchester Avenue to accept the double left turn. Chapin Spencer noted that the concept could work with the 3-lane option by configuring the East Avenue approach to include an exclusive left turn lane and a shared right-through lane with enough storage length. There was a consensus that the realignment of the East Avenue and Trinity approaches should be included in the plan.
- Joe Segale presented travel time estimates for the 2030 PM in the eastbound and westbound directions between East Avenue and Prospect Street. The analysis

demonstrates that there is no significant difference in the travel times between the 3-lane and 4-lane options.

- Joe Segale summarized the traffic analysis as follows: Overall, the 3-lane option will be perceived as more congested due to longer queues, but average travel times will not be significantly different than the 4-lane option.
- Joe Segale presented a concept plan that showed the hybrid alternative. The following comments were offered:
    - Joe noted that the hybrid operates essentially the same as the 4-lane option. It would have exclusive pedestrian phases at the traffic signals and would have a five lane cross-section on Colchester Avenue at Mary Fletcher Drive to accommodate the exclusive left turn lane on the westbound approach. Thus, the hybrid would have shorter queues than the 3-lane option, but would not result in significantly reduced travel times.
    - Bob Penniman noted that the hybrid allows for a shorter pedestrian crossing at the proposed Trinity mid-block cross-walk.
- The Task Force discussed advanced pedestrian and exclusive pedestrian phasing.
    - Bob Penniman noted that there may be some City regulatory, ordinance, or policy issues related to exclusive pedestrian signals. They are not commonly used in the City and may therefore create some confusion if used in just one corridor such as Colchester Avenue.
    - Chapin Spencer stated his opinion that an advanced pedestrian phase with a 3-lane cross-section is preferable and safer than an exclusive pedestrian phase with a 4 and 5 lane cross-section.
    - Sharon Bushor remained somewhat skeptical about the safety of advanced pedestrian phases and noted that the amount of time provided for the phase and details of its operation will need to be explained to the public. Joe Segale provided a handout that documents the safety record of advanced pedestrian phasing.
- After continued discussion, the Task Force agreed that the 3-lane option, with advanced pedestrian phasing and turn lanes at the intersections, is the preferred long-term design for Colchester Avenue between Prospect Street and East Avenue. Joe Segale presented a comparison matrix that summarized how each option addresses a list of issues derived from the vision and goals. Sharon asked Task Force members to offer additional comments.
    - Chapin Spencer reminded the Task Force that some residents along Colchester Avenue feel that the 3-lane option makes it more difficult and less safe to exit their driveways. Chapin noted that this issue is related to the segment between Mary Fletcher Drive and East Avenue which, as configured for the demonstration project, currently consists of two eastbound travel lanes and one westbound one travel lane. The additional eastbound through lane creates an additional conflict point. The actual long term design will provide one travel lane in each direction and will therefore eliminate this

issue; and will be safer than the 4-lane option which would have one additional through compared to the demonstration project.

- Sharon asked that the existing multi-use path on the south side of Colchester Avenue between East Avenue and Mansfield be included in the long-term option even though on-road bike lanes will be provided. The Task Force agreed that the multi-use path should be included.
- Sharon asked that the length of the right-turn lane on the eastbound Colchester Avenue approach to East Avenue be verified and that adequate distance be provided. Bob Penniman noted that UVM and FAHC have worked with the City in the past when right-of-way was needed and there is sufficient room on the south side of Colchester Avenue to accommodate a longer right-turn lane if necessary.
- John Moore noted that the 3-lane option requires pull-offs for CCTA buses and that would be acceptable if they are located consistent with CCTA's pull-off policy (generally after the traffic signal). Joe Segale noted that the corridor plan will include a recommendation for consolidating bus stops in the corridor and providing shelters and other amenities. Potential bus stop locations and pull-offs should be indicated on the concept plans. John noted that consolidation of bus stops would be acceptable to CCTA. John noted a desire to modify the existing Essex route so that is stays on Colchester Avenue, rather than having to divert to the main hospital entrance on Beaumont Drive. Bob Penniman confirmed that changes in routes are a possibility and need to be considered along with CATMA.
- Bob Penniman discussed issues related to the realignment of the North and South Prospect Streets. The realignment would require acquiring land and as previously noted, UVM and FAHC have a history of providing ROW when justified. Bob noted that the realignment will affect the UVM Green, a National Historic District, and therefore that issue would need to be addressed in the design and permitting process.

4. <u>Draft Implementation Plan</u>

Joe Segale provided an overview of the draft implementation plan which begins to identify projects, timing, cost, funding sources, project lead, partners, and next steps. It was agreed that a sub-committee will meet to review and refine the details. The sub-committee will include Bob Penniman, Nicole Losch, John Moore from the Task Force with support from Joe Segale and Eleni Churchill. It was also agreed that Councilor Kurt Wright, the current chair of the City's Transportation Energy and Utilities Committee (TEUC) will be asked to participate in the discussion. Sharon suggested that intersection improvements at Prospect and Riverside should be a priority.

5. <u>Demonstration Project Status</u>

Eleni Churchill reported that the spring data collection effort is complete and the CCMPO and City are working to summarize the results. Eleni noted that the preliminary results indicate that the amount of traffic has not decreased compared to the spring of 2010, before implementation of the demonstration project, which suggests that diversion to other roads has not happened. Sharon Bushor summarized comments from Bill Keough, Council President, that he feels data collection and comments gathered do not reflect commuter concerns. Nicole Losch stated that the final course of paving can be scheduled as late as mid-August.

6. Next Steps

After some discussion it was agreed that the public meeting on the draft plan will be held in mid-July. Potential dates are July 13 and July 14. These dates will allow enough time to write the draft report and submit it for review by the Task Force prior to the public meeting. A public meeting in mid-July will also allow the City to gather feedback on the 3-lane design to be recommended in the draft plan as a long-term design, prior to final paving of Colchester Avenue.

Action Items

- Sharon Bushor - Schedule meeting with businesses near Riverside Avenue to review the suggested design concept.
- Nicole Losch – Confirm whether or not Kurt Wright is available to assist with preparing the implementation plan and work with Eleni to schedule the implementation plan meeting.
- Bob Penniman – Reserve McClure conference room for July 13 or 14, 2011 public meeting.
- RSG – Prepare draft plan

Meeting concluded at approximately 8:30 pm

End of Notes

Commenter	Comment or Question	Response
Katherine K. Wilder 10 No. Champlain St., Apt. 625, Burlington, Vermont 05401 Friday August 26, 2011	I often travel in my electric scooter from my home to the main campus of FAHC. From Prospect Street on the south side of Colchester Ave. the curb cuts are damaged and the sidewalks are dangerous for scooters and wheelchairs. On the north side of Colchester Ave., the sidewalks are better, but there is a dangerous situation when trying to cross Colchester Ave. to get to the hospital. The walk light activator isn't at a curb cut. The crosswalk lines are placed at the entrance of a driveway. The walk light is too short and the curb cut on the hospital side of the street is in the hospital driveway. There is no curb cut at the walkway going up to the hospital. It's very dangerous.	The Corridor Plan recommends upgrades to the existing sidewalks and pedestrian crossing equipment and cross-walks that will address these issues. Comment was also forward to the City for possible action.
Susan Clark B2 Stonehedge Dr. South Burlington Monday, September 05, 2011	I frequently drive between the intersection of East Ave. and downtown Burlington. The lane changes have been a great improvement to the flow of vehicles on Colchester Ave. There was never enough space for four lanes of traffic.	Noted. No response necessary.
Deborah Blom 74 Leonard St Burlington Monday, September 05, 2011	I just saw in the Free Press that you are looking for public comments, and since I work at UVM I thought I would add my voice. I park in the UVM lot behind Ira Allen Chapel (across from and just to the east of Mansfield Ave). I was very uncertain about the new change but have found it to be much easier to turn into and out of the lot from both directions. At first I had no idea that when turning left (west) out of the lot that one should (I hope) turn into the middle lane and then merge onto Colchester going west when the traffic is free. I discovered this when other drivers (specifically a bus driver) signaled me to do so. I am not sure how one would convey this information otherwise (and whether it really is what one is supposed to do). It also feels a bit like I am breaking some sort of rule when I am turning left into the lot when going west on Colchester Ave since there are no markings. I am not sure this makes sense (it is remarkably hard to describe), but there you have it.	The center-left turn lane's purpose is to provide a place for vehicles to wait before making a left turn without blocking through traffic. Deborah is using the center left-turn lane for its intended purpose.
Deborah Weizenegger 93 Chase Street, Burlington Monday, September 05, 2011	Didn't see any mention of the exit and entrance difficulties of numerous employees and visitors to the Burlington School Dept. driveway @ 150 Colchester Ave. This driveway could be eliminated by allowing cars to access the Trinity Campus parking lot and drives in front of Mann Hall. Drivers could then use the light at the intersection of East Ave. and Colchester (If a connection was made	This connection may be a possibility as part of long-term site planning and redevelopment of the Trinity Campus.

Commenter	Comment or Question	Response
	through the narrow green belt). As it is now, it's dangerous to exit and enter 150 Colchester Ave. It's made more difficult by the density of college students walking/biking up and down Colchester. An auto exiting must pull up into the sidewalk area and wait to make a left turn. It's not possible to hold back and let the steady stream of pedestrians pass while trying to time a left hand turn out (or in) at 150 Colchester. Thanks for considering.	
John LaCroix 411 Colchester Ave, Burlington Thursday, September 8, 2011	The presentation was very good. However the mention of four lanes keeps coming up. I feel 4 lanes is too much for this section of Colchester Ave. especially if you add 2 bike lanes. Living on the avenue I can assure you that most of the bicyclists go beyond the speed limit of 25mph this needs to be addressed as they don't have running lights or any concern for vehicles. The proposed sidewalk expansion along the Cemetery is a good idea eliminating pedestrians from the road.	The plan recommends the three lane option.
Jim Barr, Director of Transportation and Parking at UVM, 21 Chase Street, Burlington September 12, 2011	Thanks for doing this – Awesome Job! 1. Will the 90 degree modification to the Colchester Ave/Chase St intersection require neighborhood Association Meetings or is that just another traffic calming initiative along Chase St? 2. I emphatically support the three lane concept given the minimal time differences. It reduces side swipes and lane changes, reduces waiting for left turning traffic, reduces distances for pedestrians at crosswalks, and allows for more options along the sides (bike lanes, bus pull offs, bump outs for green space). I would also support removing on street parking on one side (southern edge) to also allow for more green space/ bump outs. 3. Do we really want to alter Colchester Ave in order to "increase usage" as an artery into Burlington, or would it serve better to make improvements to Riverside Ave (Route 7) and relegate Colchester Ave to Residential/Traffic Calming changes? Just a thought. This would mean changing the Colchester Ave/Barrett St. intersection to possibly a "Y" intersection which might give more options for Mill St and the Dominos delivery vehicles (cars out & Trucks in)? 4. If we are fortunate enough to build a bike/walk bridge over the	1. This modification will require primarily the involvement of the adjacent neighborhoods as well as the Ward 1 NPA. 2. Noted. 3. This concept was not considered in this corridor study. Design details for the Colchester Ave/Barrett St intersection will be defined during scoping. 4. A scoping study was completed a while ago and recommended a crossing on the west site of the bridge. 5. Reconstruction of the eastern segment of Colchester Ave (East Ave to Winooski Bridge) will require relocation of overhead utilities and associated poles. Underground the utilities will be decided during the scoping/final design phase. The cost estimates presented in the plan to do not include placing utilities underground.

Commenter	Comment or Question	Response
	Winooski River, I suggest it go on the east side from Mill Street to Champlain Mill. This is a shorter distance, both sides have existing base/foundations, it looks to me it would be an easier build and less costly. 5. Lastly – it would be absolutely awesome if utilities could go underground. I know it is costly but it would also add to the available space/extend options for pedestrian/bikes/parking/pull offs with poles gone. I notice that several areas in Burlington have or are in the process of undergrounding utilities, if Colchester Ave is intended as a gateway to Burlington it would be a better choice for underground utilities than say…North Street?	
Jared Wood, Public Works Commissioner 69 Henry Street Burlington, VT Handwritten note September 12, 2011	Per the City's charter, Section 58 (B), the Public Works Commission (PWC) has the sole authority over city streets. The PWC, not the City Council or the DPW director must therefore approve the three-lane design on Colchester Avenue between Prospect and East Avenue before it is implemented on a permanent basis.	DPW staff received approval from the PWC on Wednesday, Sept 28 for the three-lane striping plan, with some minor modifications that has been tested since the fall of 2010. With PWC approval, the 3-lane final design will be implemented with the final course of pavement in the fall of 2011.
Peter Callas 184 Oak Knoll Rd, Williston Sunday, September 18, 2011	As someone who crosses Colchester Avenue frequently as a pedestrian and sometimes drives on it, the pilot 3-lane markings seem safer to me than the 4-lane configuration was. It appears that traffic flow may be poorer during rush hour with 3 lanes (although I'm not sure about that), but safety for pedestrians seems higher. Safety may also be improved for motorists because of the left turn lanes. For the intersection with Prospect, I see that the plan is to move N. Prospect so it aligns with S. Prospect. That should solve much of the gridlock problem there. Something that would help sooner would be to stagger the N. Prospect and S. Prospect lights so only one direction is green at a time. Although this would make waiting at a red light longer, this would be made up for by eliminating the major problems that occur every time someone is trying to turn left from S. Prospect onto Pearl St at the same time someone is trying to turn left from N. Prospect onto Colchester Ave (which seems to happen several times an hour). I think closing University Place to through traffic would increase	Final signal timing designs and phasing will be addressed during scoping and design. The split phasing suggested by the commenter will probably increase delay and queues significantly. Adding phases also adds inefficiencies due to lost time and more all-red time.

Commenter	Comment or Question	Response
	pedestrian safety. The alternative plan of restricting to right in and right out would also help since that would reduce through traffic (especially if the same restrictions were applied to Main St and University Place). Thanks for the opportunity to comment!	
Serrill Flash 25 East Village Drive (aka 180-25 East Avenue), Burlington Tuesday, September 20, 2011	I wholeheartedly endorse the draft plan. Complete streets are important to me as a mechanism to support alternative forms of transportation (bicycle, bus, walking). I would like serious consideration given to a traffic sign already posted near the hospital (heading east on Colchester Ave- giving bicycles permission to use a full traffic lane). I'd like a similar sign placed before crossing the Winooski Bridge Burlington side. It is too dangerous to change lanes on the bridge or prior to roundabout. As a bicyclist heading toward Colchester, I need to place myself in the left lane prior to roundabout. Thanks for listening.	Comment passed along to the City.
Martha Lang 135 Colchester Avenue Phone call to Joe Segale September 20, 2011 Notes summarizing comment prepared by Joe Segale	(1) She thinks the crossing will be located in front of her house and students will congregate on her lawn while waiting to cross the street. (2) She asked for a "map" that shows the crossing location. (3) She feels the flashing beacons will flash in her house (4) She feels the in-pavement/beacon set up is unsafe, and that it has not been tried and tested in a situation like Colchester Ave where there will be a large number of ped crossings. (5) She believes that a traffic signal should be installed at Fletcher Place with pedestrian equipment. (6) She is ready to “go to the mat” and fight the crossing using legal action if necessary.	(1) It is unlikely the crossing would be in front of her house, but the final location has yet to be determined. (2) A Draft Plan was made available on-line which shows the approximate location of the crossing. The final location has not been determined. (3) The exact location of the crossing is to be determined. The potential for the flashing beacon’s impacting her house should be evaluate during design and mitigation, like shields, should be considered. (4) Studies have indicated they are safe, but she is not convinced. (5) It is unlikely that conditions would satisfy traffic signal warrants at Fletcher Place, but this needs to be verified. The impact of the additional traffic signal on traffic flow needs to be evaluated. (6) No legal action is necessary at this point. The mid-block crossing recommendation will go through scoping and design where all issues identified will be evaluated and Martha will have

Commenter	Comment or Question	Response
		plenty of opportunities to discuss her concerns.
Jared Wood, Public Works Commissioner 69 Henry Street Burlington, VT September 21, 2011 voice mail	The proposed mid-blocking crossing will not work. A traffic signal at the intersection of Colchester Avenue and Fletcher Place would be a much better solution. The proposed mid-block crossing with flashing lights is a recipe for disaster.	Additional analyses are required for the mid-block crossing. It is unlikely that conditions would satisfy traffic signal warrants at Fletcher Place, but this needs to be verified. The impact of the additional traffic signal on traffic flow needs to be evaluated.
Karen Paul Burlington City Councilor Saturday, September 24, 2011	I had a few people talk with me after the public hearing we all attended at FAHC a week or so ago and he had a few questions. The consensus of questions I got went something like this comment from one constituent: "What are we getting for $11+million? As he understands it, we presently have a three-lane road with bike lanes and when the long-term plan is implemented we will still have a three-lane road with bike lanes. Granted, a small portion of the money is devoted to three specific intersection improvements that are intended to increase capacity and improve safety. However, it doesn't appear that the balance of the money will do much to improve functionality." In order to address this question, I would request that the final report make it clear how the money is allocated among: 1) improvements to functionality, capacity and safety; 2) roadway maintenance (reconstruction of failing infrastructure that would be required regardless of the corridor study recommendations); and, 3) aesthetic upgrades (new lighting and landscaping). Also, it appears that report notes that the budget does not include the cost right-of-way, major stormwater reconstruction and major utility reconstruction. Presumably, if these items are included the construction estimate is much higher. Please confirm that if you would.	Steve Goodkind's response via e-mail on Sept 26, 2011: - When this plan was presented to the TUEC, I spoke about the "$11 Million" cost. It is just an estimate of the total cost, however the proposals in the corridor study will not be undertaken as one project and may never be completely implemented. We will pursue them as a series of individual projects such as the Prospect and Pearl intersection. Each piece will have its own criteria for funding ranging from safety to congestion to enhanced mobility as well as its own budget estimate. I believe the $11 million is an underestimate of the total cost, however it is unlikely for the foreseeable future that we will ever undertake this entire set of recommendations and we will not spend $11 million on this corridor unless someone other than the taxpayers of Burlington pick up the tab. Eleni Churchill's response via e-mail on Sept 26, 2011—following Steve's response: The Plan proposes short medium and long term recommendations on how to fully transform the entire study corridor (Pearl St to Winooski Bridge) into a "Complete Street." The estimated cumulative costs for all recommended improvements in the next 20 years are 11+ million and that includes: • Short-term recommendation (fall of 2011): Pave the avenue retaining the three lane

Commenter	Comment or Question	Response
		roadway profile with designated bike lanes—this is included in the City's paving budget. • Short-term recommendations (within one year): $ 50, 000 – These include minor operational improvements as well as maintenance and public transit service evaluations. • Medium-term recommendations (1-5 years): $ 3.4 million - These include fixing/upgrading sidewalks, curbs and surface related drainage problems on the western segment (Pearl St to East Ave); New sidewalk from Greenmount Cemetery to Colarco Ct; Trinity Mid-Block Pedestrian Crossing; Consolidation and upgrade bus shelters; Transit priority signals; Chase Street traffic calming measures; etc. • Long-term recommendations (5 to 20 years): $7.7 million – These are the most expensive improvements and they include full depth reconstruction (not just paving) of the corridor from Pearl St to the Winooski bridge to address issues with underground stormwater and utilities; addition of bike lanes for the eastern corridor segment (East Ave to Winooski Bridge); and major reconstruction of three intersections within the Colchester Ave corridor (Pearl/Prospect, East Ave and Riverside/Barrett). Attached you will find a document that provides an overview of project implementation steps and a detail "Implementation Plan" table that includes brief descriptions of all recommendations, estimated costs, timeframe, possible funding sources, next steps, etc. We did not organize

Commenter	Comment or Question	Response
		the recommendations into the categories you are suggesting (we have other categories) but that is something we can do if it will provide valuable information for stakeholders and the general public. Steve mentions that 11 million is an underestimate of the total costs and he is probably right. Right-of-Way (ROW) and utility relocation costs were not included in the cost estimates of this plan. Detail design plans are required in order to calculate the amount (if any) of ROW needed for specific improvements and these plans are developed during scoping and final design phases of a project. As Steve suggested, this plan will be implemented gradually as a series of individual projects and the City could prioritize these improvements depending on funding availability (federal, state, local and private) and other relevant factors.
Martha Lang 138 Colchester Ave Burlington, VT Wednesday, September 28,2011	A strobe mid-block crossing in front of any one of the fives house I own on Colchester Avenue is a poor idea. I will fight you to Vermont Supreme Court. The Jericho crossing and 4,000 students per day using Colchester Avenue is a stupid comparison. Fencing in the students will mean I will put up a fence on my property. You have not done your homework.	The exact location of the Trinity Campus mid-block pedestrian crossing has not been determined. The example in Jericho was provided to demonstrate what in-pavement LED lights and the associated signs look like. We agree that there will be many more pedestrians crossing at the proposed Trinity Mod-Block Location. As noted in the plan, the exact location has not been determined and additional analyses are necessary.

Commenter	Comment or Question	Response
Jenifer Wallace-Brodeur Associate State Director AARP September 28, 2011	Thank you for the work that has gone into the Colchester Avenue Corridor Plan. I believe RSG and the Colchester Avenue Task Force have done a great job of presenting options for the corridor along with a good analysis of the trade-offs for each possible scenario. AARP is particularly pleased to see an emphasis on complete streets principles resulting in a much improved, safer environment for pedestrians, bicyclists, transit users, and drivers. Please accept the following specific comments on the draft plan.	Noted. No response necessary.
Jenifer Wallace-Brodeur Associate State Director AARP September 28, 2011	On page 10 there is a paragraph describing potential usage of older pedestrians in the corridor. We know that 21 percent of adults age 65 and older do not drive. We also know that people who don't drive are more likely to miss things they'd like to do for lack of transportation. However, we challenge the assertion that "the boomer generation is expected to bring their culture of "automobility" forward and their aging will not necessarily increase demand for use of other modes." The 2009 National Household Travel Survey shows a reversal in past declines in the use of public transportation by older adults. Between 2001 and 2009, use of public transportation among this cohort increased by 40 percent. Walking is the second most popular means of getting around after travel by car, regardless of age and driving status. Among drivers, eight percent of all trips are taken on foot and nearly 20 percent of the trips by non-drivers are on foot. You can find more about our analysis of the travel patterns of older Americans at http://assets.aarp.org/rgcenter/ppi/liv-com/fs218-transportation.pdf.	The report has been modified to include this information and to emphasize the importance of transit system and sidewalk network improvements for senior citizens travelling in the corridor.
Jenifer Wallace-Brodeur Associate State Director AARP September 28, 2011	AARP is very attentive to street crossings as this is an area of top concern for our members. In the four lane scenario, the crossings will be significantly wider, creating a greater deterrent to use by older pedestrians. If this option is selected, we strongly urge execution of the recommended plan for an exclusive pedestrian phasing and addition of a pedestrian refuge on Colchester Avenue at the entrance to the hospital. Whether you choose the three or four lane option, we ask that the amount of time allowed to cross the street at all intersections along the corridor follow current guidelines for older pedestrians in the Manual on Uniform Traffic Control Devices. We also support the addition of the Trinity Campus mid-block crossing. It	The Three Lane option is recommended in the plan. The Four Lane option, if had been selected, would have included exclusive pedestrian phasing.

Commenter	Comment or Question	Response
	is essential that this crossing have adequate signage, lighting and ongoing maintenance to ensure pedestrian safety.	
Jenifer Wallace-Brodeur Associate State Director AARP September 28, 2011	The realignment at Prospect and Pearl is a much needed improvement for all users. Including dedicated left turn lanes with an exclusive left turn signal in all directions may be a way to not only improve safety for drivers but also move traffic more efficiently along the corridor. If there isn't room for a left turn lane then we recommend including an exclusive left turn as part of the signal phasing. Left turns are particularly challenging for older drivers and providing an exclusive left turn signal can reduce the likelihood of crashes in these situations.	Final signal timing designs and phasing will be addressed in scoping and final design for the intersection project. It should be noted though that the split phasing suggested by the commenter will probably increase delay and queues significantly. Adding phases also adds inefficiencies due to lost time and more all-red time. Additional left turn lanes will also be considered in the scoping and final design process. Initial analyses indicate very little benefit from including an exclusive left turn lane on the Pearl Street approach.
Jenifer Wallace-Brodeur Associate State Director AARP September 28, 2011	AARP supports the recommendation of the Task Force and adoption of the three lane design option presented for the western portion of the corridor. We believe the design of the four lane option will degrade the pedestrian environment by increasing the width of the road overall, making crossing distances much wider, and potentially leading to greater speeds. Overall, the three lane design provides an appropriate balance of modes leading to a safer, more inviting travel experience for those who are not driving.	Noted. No response necessary.
Wayne Senville Former Burlington Planning Commission & Colchester Avenue Task Force Member September 12, 2011	First of all, I want to express my thanks for the excellent work you have done on the project. I did have a few comments, but first want to note that I agree with the draft report's principal recommendations for dealing with the three main intersections in the corridor (Prospect, East Ave., and Riverside Ave.) and for going with three travel lanes between North Prospect and East Avenue -- subject to the points I note below: Please note on page 4 that my service on the Burlington Planning Commission ended in 2010.	A footnote about the Wayne Senville's term on the planning commission ending has been added.
Wayne Senville Former Burlington Planning Commission Member Colchester Avenue Task Force September 12, 2011	I disagree with the following sentence on page 10: "A common misperception is that older people will shift from automobile traffic to transit or walking … aging will not necessarily increase demand or use of other modes." Maybe I'm wrong, but from what I've read and heard, I think the opposite will be true, especially given the substantial expected increase in vision loss (especially macular	The paragraph has been modified. See response to similar AARP comment.

Commenter	Comment or Question	Response
	degeneration) from an aging population. I'm curious what the source for your statement is? I would also suggest you contact AARP-Vermont for their reaction.	
Wayne Senville Former Burlington Planning Commission Member Colchester Avenue Task Force September 12, 2011	I found the last two sentences on page 29 puzzling, where you indicate the need to do your roadway design plans based on an assumed increase in traffic of 5 percent between 2010 and 2030. This is at odds with the Report's statement on page 23 (and Figure 16), that "projections developed using the model suggest that traffic will not change significantly over the next twenty years, and may even decrease slightly." I also disagree with the statement on page 29 that it is prudent to plan for an increase in roadway traffic. What would seem more prudent, from both a city and countywide perspective, would be to focus our planning efforts on reducing traffic volumes (or, at least, keeping them level). If we are to achieve, for example, the goals set out in the Burlington Climate Action Plan, we need to take steps to reduce (or at least stabilize) traffic volumes -- not continue to plan for and accommodate increases increasing amounts of traffic. What's more, as I noted, even the traffic models you indicate you're relying on do not project an increase in traffic volumes on Colchester Avenue (see pages 23-24). My recommendation is to delete the last two sentences of the 4.4 Summary since they are inconsistent with the traffic projections stated on page 23 and in Figure 16 on page 24. I don't know if you're other calculations (for example, travel times) were based on a five percent increase in travel time; if so, they may well at least slightly overstate the likely delays.	The 5% increase in traffic for the plan's twenty-year planning horizon was reviewed and accepted by the Task Force as a reasonable assumption.
Wayne Senville Former Burlington Planning Commission Member Colchester Avenue Task Force September 12, 2011	On page 31, the report lists as a long-term action closing the University Place intersection with Colchester Avenue to general through traffic. I would urge this be switched to either a short-term or mid-term goal. I do not see any benefits to delaying this relatively simple action. Any closing of University Place to through traffic, however, needs to maintain through access for emergency vehicles.	Other members of the Task Force feel that some additional analyses should be undertaken before the road is closed to all personal vehicle traffic. The implementation time frame is 5 years which is reasonable to prepare and implement a design that prohibits personal vehicles, accommodates emergency vehicle access, accommodates continued access for shuttles and transit service, addresses parking changes, and accommodates pedestrians and bikes.

Commenter	Comment or Question	Response
Wayne Senville Former Burlington Planning Commission Member Colchester Avenue Task Force September 12, 2011	On page 36, under the second bullet dealing with the Four Lane design option, you indicate that this option increases pavement width from 40 to 54 feet. I would reword the start of the sentence to: "This option increases the pavement width (curb to curb) by 35 percent, from 40 feet to approximately 54 feet ..." I think inserting the percentage increase helps indicate just how significant an increase in width you're talking about under this option. In terms of pedestrian crossings, I think the report would benefit by including a chart showing the comparative pedestrian crossing time needed in the Three Lane versus the Four Lane option (comparable to the charts you include identifying vehicle travel times). I am also concerned that for older residents, the needed crossing time may be even longer than for the average person. This makes the 54 foot distance even more of a barrier. Seniors also, in my opinion, don't like to be "stranded" in a relatively narrow median, even if they are provided. The bottom line is that increasing the crossing distance for pedestrians is a major concern which I think is barely touched on in the draft report. I would recommend highlighting this as a concern with the Four Lane option, even with the exclusive pedestrian phasing.	The 35% increase is included and a chart has been added comparing travel times for average and senior citizen pedestrians.
Wayne Senville Former Burlington Planning Commission Member Colchester Avenue Task Force September 12, 2011	On page 44, in your paragraph about the trade-offs between the Three and Four Lane options, you accurately state that there will be a minimal difference in travel time through the corridor. But then you indicate that motorist perceptions of delay will be more likely with the Three Lane option because of increased queues during rush hour. I would argue that motorists may well be equally upset when they're stuck at longer red light cycles necessitated by the exclusive pedestrian phasing of the signals under this option. Is there some source you relied on to support your statement that queuing is more likely to irritate motorists (than waiting for longer pedestrian crossing times)? If there isn't a source for this, I would recommend deleting the sentence.	The sentence in the report is properly qualified by saying motorists "may" perceive more congestion due to longer queues and then notes that travel time is the more important measure. It is important to acknowledge the queues because they are the most obvious visual characteristics of congestion. Comments on the queues were offered by members of the public and the fire department during various meetings.
Wayne Senville Former Burlington Planning Commission Member Colchester Avenue Task Force September 12, 2011	I missed the meeting(s) that discussed Mill Street. I do have concerns about traffic exiting Mill Street and desiring to turn left -- in particular the degree of visibility (or lack of visibility) motorists will have in seeing traffic heading over the bridge into Burlington. Did you consider retaining a traffic light -- but having it vehicle activated	A traffic signal at Mill Street was not considered in the study but could be evaluate as part of the scoping and final design for this intersection project. A traffic signal warrant analysis should be conducted to determine if traffic and safety

Commenter	Comment or Question	Response
	only (is it possible to have the signal activated just by vehicles turning left coming out of Mill Street?).	conditions justify a traffic signal at Mill Street. A key consideration in the warrant analysis is the amount of traffic on the side street, which is relatively low from Mill Street. Installing a traffic signal at Mill Street might also result in queues that block the Riverside intersection—this and other operational impacts need to be evaluated.
Wayne Senville Former Burlington Planning Commission Member Colchester Avenue Task Force September 12, 2011	In the North Prospect Street alignment, I think one important addition would be either a left turn lane from Pearl Street onto North Prospect for traffic heading eastbound -- or, if that is not feasible given the ROW, consideration that an advance green left turn signal for motorists might be helpful. I have heard a few comments complaining about traffic backing up on Pearl Street. From my almost daily (usually, two or three times a day) use of this intersection as either a motorist or pedestrian, when I've seen back-ups on Pearl Street, they are often triggered by cars waiting (sometimes 20 to 30 seconds) to turn left onto North Prospect. The difficulty of turning left is compounded by the limited visibility motorists have of westbound traffic given the slope of Colchester Avenue just east of the intersection; cautious motorists wait until there is a very large gap in the oncoming traffic flow.	Final signal timing designs and phasing will be addressed in scoping and final design for the intersection project. It should be noted though that the split phasing suggested by the commenter will probably increase delay and queues significantly. Adding phases also adds inefficiencies due to lost time and more all-red time. Additional left turn lanes will also be considered in the scoping and final design process. Initial analyses indicate very little benefit from including an exclusive left turn lane on the Pearl Street approach.
Wayne Senville Former Burlington Planning Commission Member Colchester Avenue Task Force September 12, 2011	My final comment -- and perhaps this more reflects the public presentation last week -- is that for the Three Lane option to work there have to be bus pull-offs. I think this needs to be more strongly emphasized in the Plan's description of the Three Lane option as it's important both for traffic flow and for emergency vehicle ease of use of Colchester Ave.	Added a sentence noting the importance of pull-offs for the three lane option.
Chapin Spencer, Executive Director, Local Motion, September 26, 2011	Overall, Local Motion has been very appreciative of the process and is supportive of the draft report. A lot of good work has gone into the report and Local Motion wants to thank the CCMPO / CCRPC, the City of Burlington, CATMA and RSG for working through a number of challenging issues. We are very supportive of: The three lane overall design • The 25 mph speed limits • The proposals for mid-block crossings with islands	Local Motion's comments were addressed and have been incorporated in the final report.

Commenter	Comment or Question	Response
	• The commitment to advance pedestrian signal phasing along the corridor • The continuous bike facilities through the corridor • The realignment of the Pearl and Prospect intersection Small issues: • We would like the typical diagrams to show 6' bike lanes where they are adjacent to parked cars. • Figure 39 that shows a potential pocket park should include some words in the bottom right that speak to an "Enhanced bike/pedestrian connection to Winooski". • Figure 33, there needs to be some mention (whether in the chart or in the adjacent narrative) that the ROW costs in the 4-lane alternative would be significant...and would greatly increase the projected $4.7 construction cost. With the $3.8 and $4.7 numbers, it's misleading that the total costs would be so close. The ROW acquisition would drive the timeline and the budget through the roof. • Local Motion feels that additional work is needed to identify a workable typical in the East Avenue to Winooski section. Snow storage is critical for DPW operations, but so are many other needs in a very constrained corridor. We're concerned that there really isn't a feasible typical portrayed in the document. Looking at the needs of bicyclists and pedestrians, Local Motion wants to make sure there are continuous facilities for both, but we also want to see a functional and aesthetic corridor for all modes. • The east bound bike lane as it approaches East Avenue needs to be on the inside of the right turn lane. Make sure this is in the design. • We want the pedestrian facilities as part of the Green Mountain Walkway to be better called out. To make this an attractive corridor, we'd like to see the shared-use path on the South side of the Green to East Avenue section have more than a 5' buffer to the street, have street furniture and trees on the hospital side, and have improved sidewalks	

Commenter	Comment or Question	Response
	connecting to the facility (where worn cattle paths exist now). It's underutilized green space now.	
Nancy Kirby Via Telephone Call to Eleni Churchill, CCMPO Friday, September 30, 2011	Nancy Kirby called me last Friday (September 30th) and she provided her comments on the draft Colchester Ave plan over the phone. Her comments are summarized below: - She believes very strongly that green strips are essential and should be retained as upgrades to the eastern corridor segment move forward. Alternatives that eliminate the green strips are not taking into consideration the numerous benefits they provide in terms of drainage, safety for pedestrians and snow storage. - She would like to see more crosswalks (without flashing lights) east of East Ave, especially directly in front of the *Kampus Kitchen*. She also supports the Trinity mid-block crossing. - Supports the 3 lane profile for the western corridor segment. - She would like to see landscaping improvements in the corridor and in general she prefers shrubs rather than trees. Nancy provided an example of the landscaping at the Trinity campus entrance as a good model to follow for the rest of the corridor. - Supports the sidewalk from the Greenmount Cemetery to Colarco Ct. - She would like see the drainage issues resolved and curbs fixed.	Noted. No response necessary.

APPENDIX B

Complete Street Demonstration Project Report

FINAL MEMORANDUM

Colchester Avenue “Complete Streets” Demonstration Project
Monitoring Results – Summer/Fall 2010 & Spring 2011

BACKGROUND

The 2011 *Burlington Transportation Plan* recommends that Burlington’s gateway streets—Colchester Avenue is one of these streets—should be redesigned as “Complete Streets” accommodating the safe and efficient travel of all modes of transportation. The reconfiguration of Colchester Avenue as a “Complete Street” has been re-iterated in numerous past initiatives as well as the current *Colchester Avenue Corridor Plan* effort.

During a scheduled repaving of Colchester Avenue between Prospect Street and East Avenue, the City has taken the opportunity to test (in the interim between base course and top course of paving) the “Complete Streets” concept by reducing the vehicle lanes of travel from four to three. The corridor was temporarily restriped with one through lane each direction and a center lane accommodating left turns—See the *Restriping Plan* in the next page. No changes to the striping, or lane use were made to the street approaches entering this section of the corridor. There were no modifications to the traffic signal timings at the start of the demonstration project—signal retiming and optimization occurred several weeks after the restriping of the avenue.

Implementation of the demonstration project—pavement milling; paving of the base course; and restriping of avenue (construction period)—took place between September 7th and 17th, 2010. Extensive data (volumes, intersection queues, speeds, travel times, and crashes) were collected and traffic behaviors observed before and after the “Complete Streets” restriping was implemented. This memorandum summarizes data results and field observations of the corridor.

Information presented in this memorandum will be considered by the City in combination with comments from the public, emergency services, “Hill” Institutions, CCTA, CATMA and other stakeholders to inform a decision on whether the three lane configuration will be retained during final striping of the avenue.

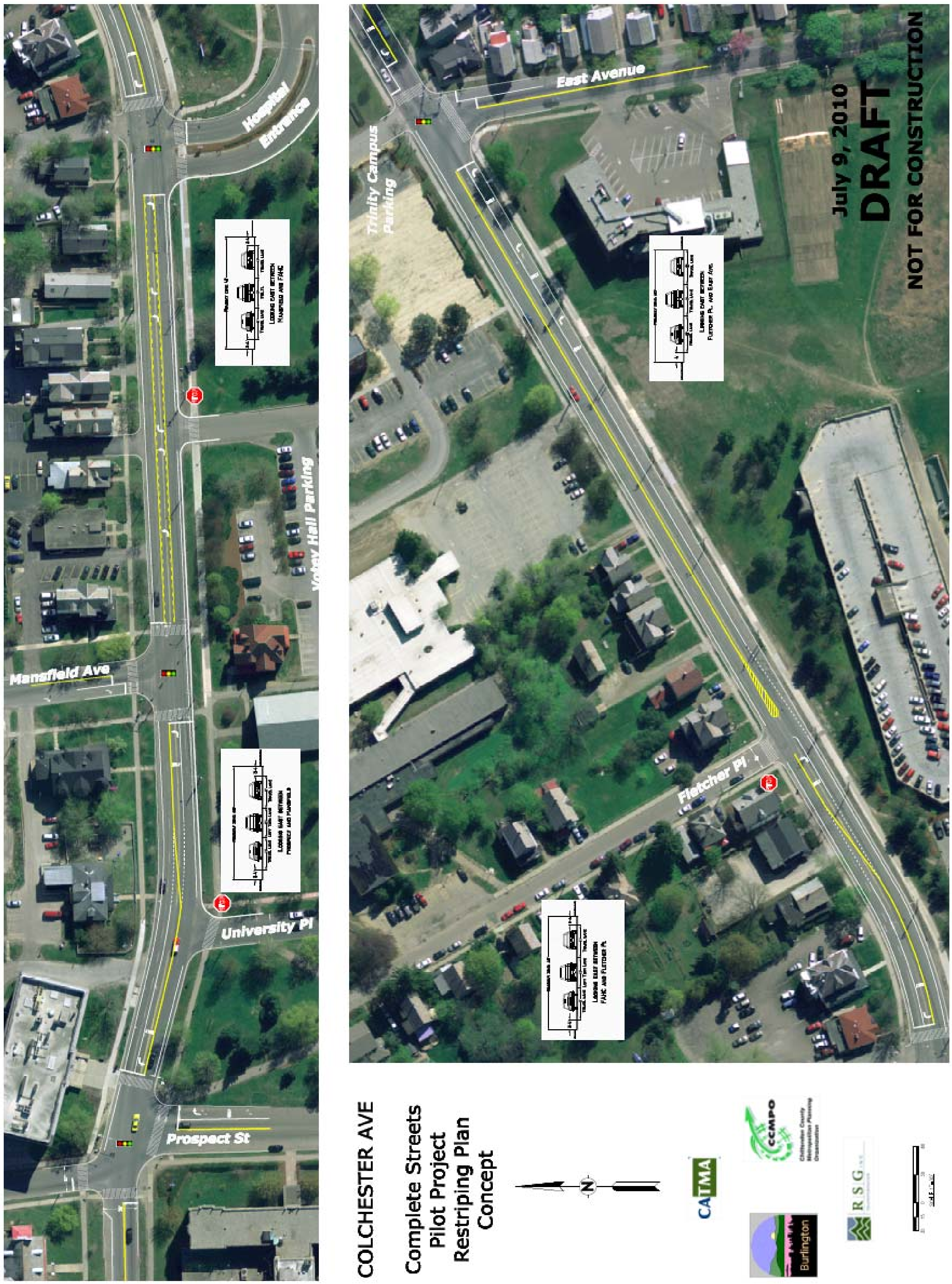
DATA COLLECTION & RESULTS

Traffic Counts

Traffic volumes were collected by the CCMPO using automatic traffic recorders before and after the Colchester Avenue restriping—between August 15th to September 30th—at the following locations:

- Pearl Street
- North Prospect Street
- South Prospect Street
- Mansfield Avenue
- Colchester Avenue – east of East Avenue
- East Avenue
- Riverside Avenue

Traffic volumes were also collected on Colchester Avenue (east of Fletcher Place) during three time periods before and after the restriping of the avenue—April 30th to May 4th, 2010; October 8th to 22nd, 2010; and May 6th to 12th, 2011.


COLCHESTER AVE
Complete Streets Pilot Project Restriping Plan Concept
Hospital Entrance
Mansfield Ave
University Pl
Prospect St
Votey Hall Parking
Trinity Campus Parking
East Avenue
Fletcher Pl
July 9, 2010
DRAFT
NOT FOR CONSTRUCTION
CATMA
CCMPO
Burlington
RSG

Traffic Volumes – Fall of 2010

Traffic volume data for the AM and PM peak hours of travel were plotted for count locations listed in the "Traffic Counts" section and are shown in Figures 1 through 7 below.

Figures 1 to 4, illustrate that traffic on Colchester Avenue decreased as motorists avoided the corridor during construction and immediately following the restriping of the avenue but motorists gradually returned to the avenue a couple of weeks after construction. Figures 6 and 7 indicate an increase in traffic on Riverside Avenue and North Prospect St during and immediately following construction as these routes serve as alternate routes to Colchester Avenue. These graphs also show that traffic on these alternate routes was steadily decreasing to (almost) pre-construction levels by the beginning of October as traffic shifted back to Colchester Avenue.

Figure 1: Traffic Volumes on South Prospect Street

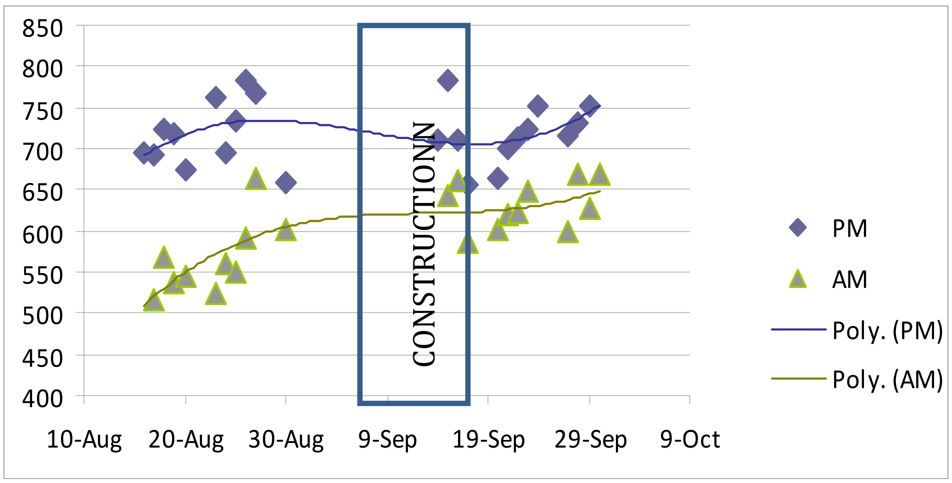


Figure 2: Volume on Mansfield Ave

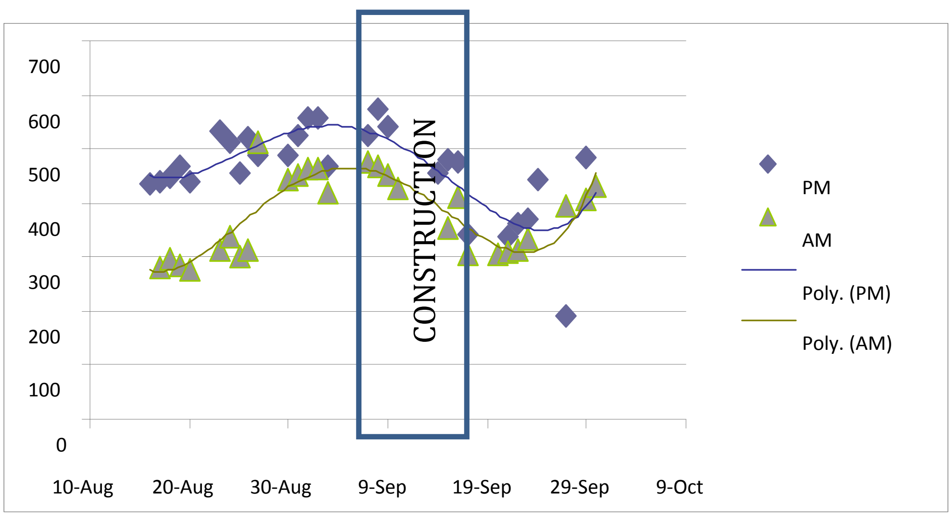


Figure 3: Volume on Colchester Ave (east of East Ave)

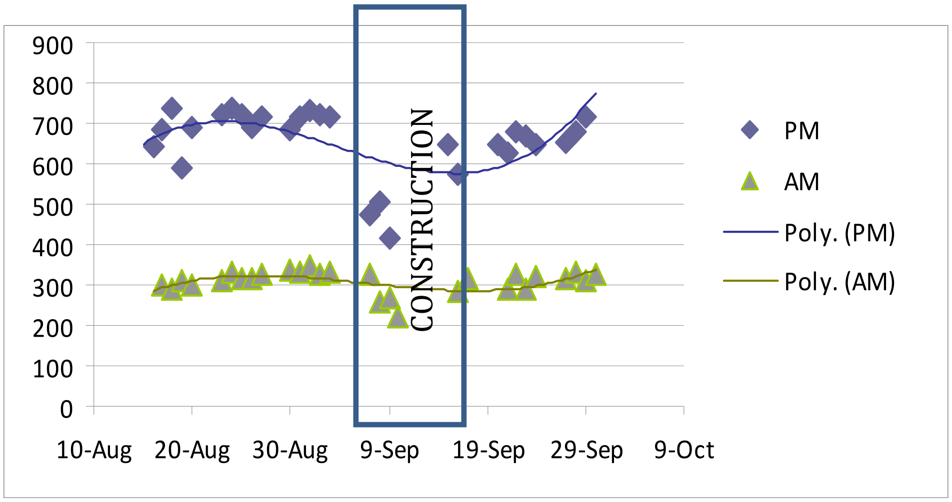


Figure 4: Volume on East Avenue

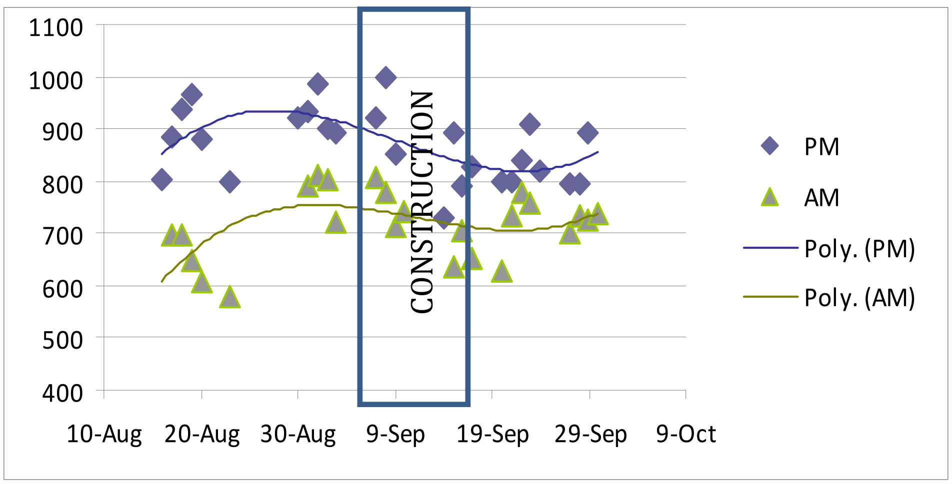
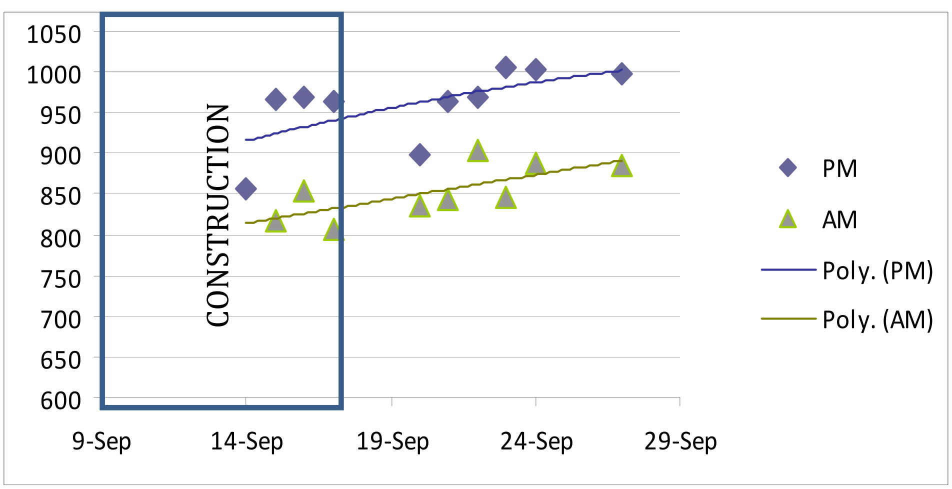


*Figure 5: Volume on Pearl Street**



**NOTE: data before construction was not available at this location*

Figure 6: Volume on North Prospect Street

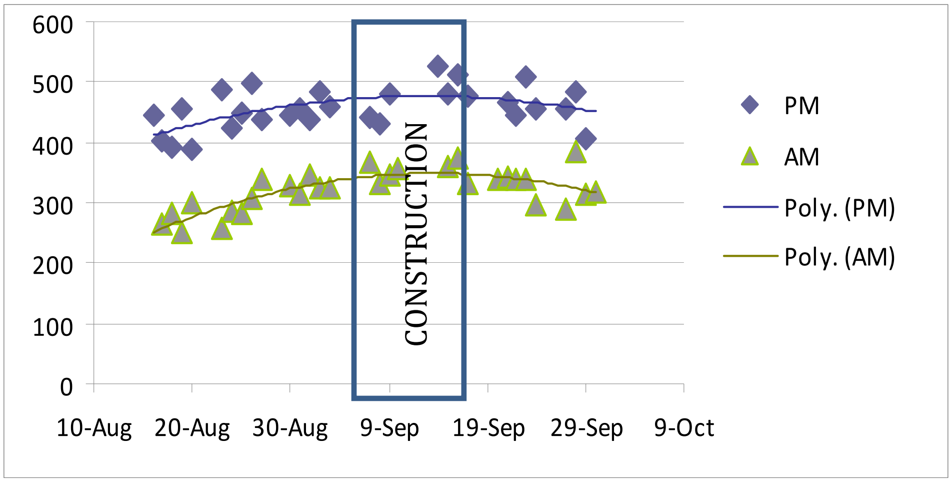
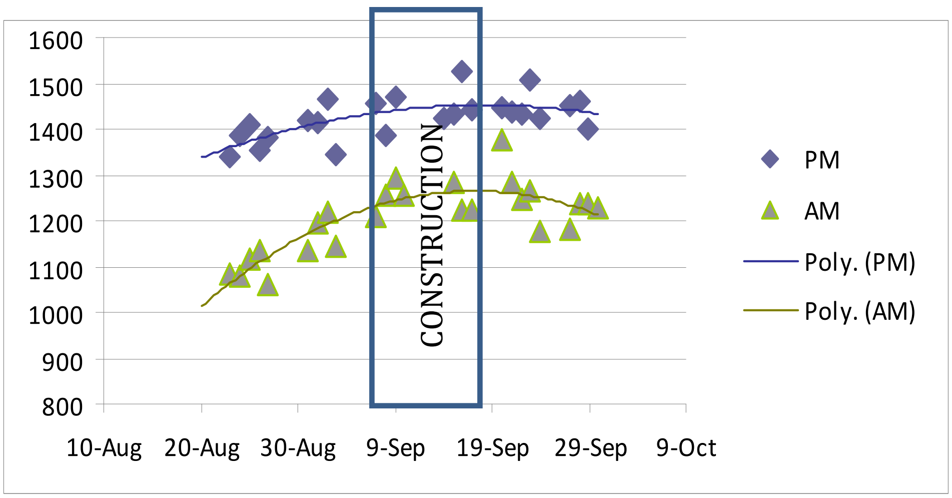


Figure 7: Volume on Riverside Ave



Colchester Avenue Traffic Volumes

Traffic volumes were collected on Colchester Avenue, east of Fletcher Place, during the spring of 2010 (4 travel lanes – before restriping), fall of 2010 (3 travel lanes—shortly after the restriping of the avenue) and spring of 2011 (3 travel lanes—several months after restriping of the avenue). Volume data from all three time periods indicate that the average daily traffic on Colchester Avenue remained to a great extent the same (around 18,000 vehicles/day) under the 4 and 3 travel lane configuration.

Colchester Avenue raw volume data (unadjusted for seasonality) is presented in Figures 8, 9 and 10. Figure 8 shows the variation in raw volumes (both directions) over the course of four different count periods with different Colchester Avenue lane configurations. Figures 9 and 10 show the Colchester Avenue traffic volumes by direction. These figures illustrate that there were no substantial changes in raw volumes on Colchester Avenue due to the restriping project, and they indicate the similarity of traffic patterns on the avenue over the four count periods.

Figure 8: Colchester Avenue Bidirectional (Unadjusted) Traffic Volumes Before and After Demonstration Project

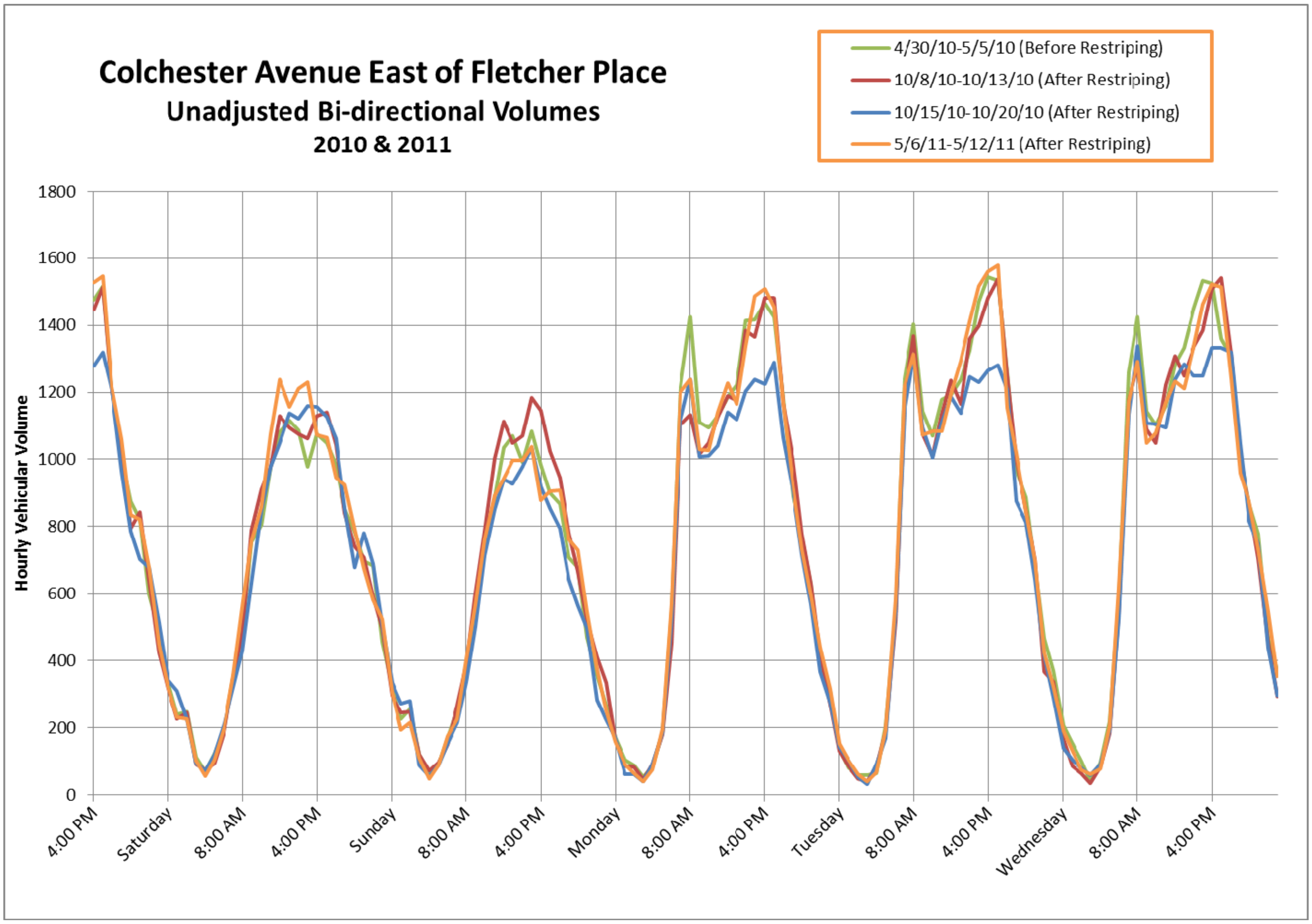


Figure 9: Colchester Avenue Eastbound (Unadjusted) Traffic Volumes Before and After Demonstration Project

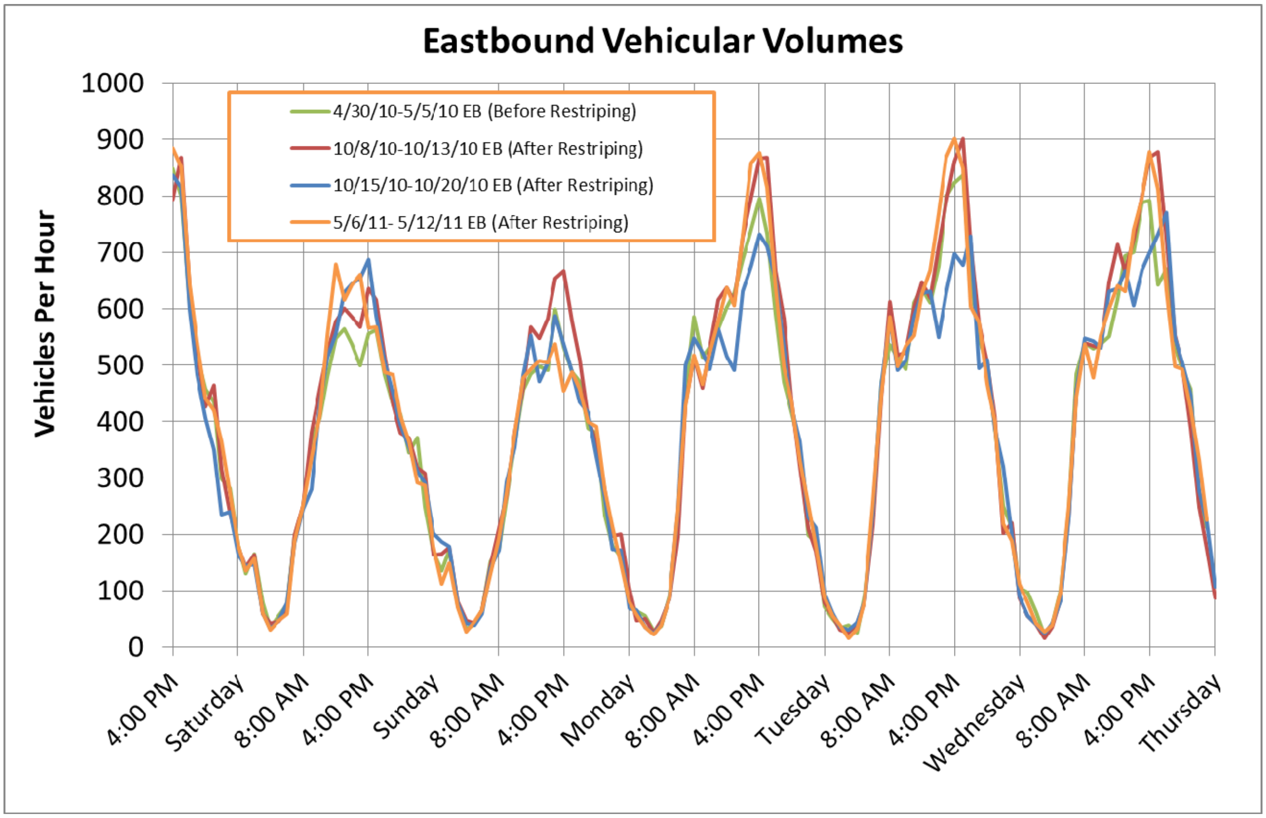
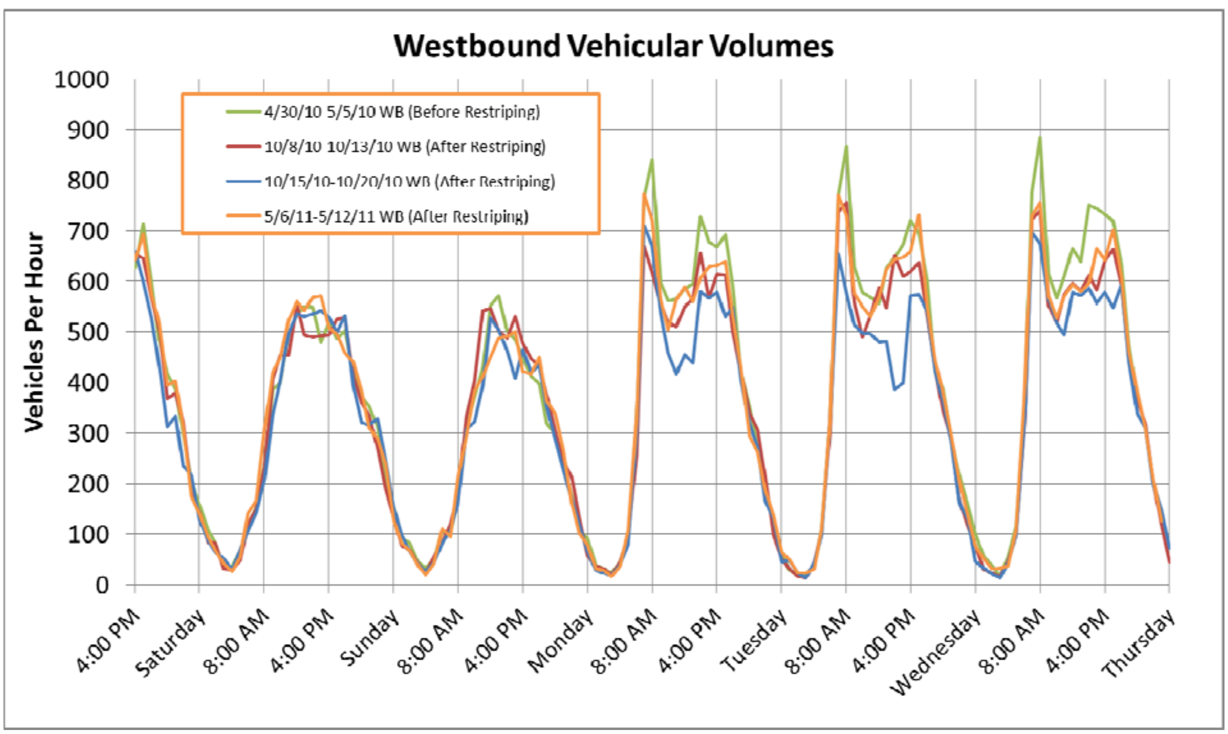


Figure 10: Colchester Avenue Westbound (Unadjusted) Traffic Volumes Before and After Demonstration Project



Queue Counts

Vehicle queuing was observed at the following Colchester Avenue intersections: Pearl Street/South Prospect, Mansfield, FAHC Drive, and East Avenue. Queue counts were collected during AM and PM peak hours of travel during the following time periods: August 31st & September 1st, 2010 (before restriping); September 28th, 29th and 30th, 2010 (immediately after restriping); and May 3rd, 10th and 12th (several months after restriping).

Queue counts at the East Avenue intersection conducted immediately after the restriping of the Avenue were not used in these analyses because the vehicle detectors on the East Avenue approach were not operational after the construction/restriping. Excessive queues that were formed on East Avenue at that time were mainly due to the absence of detection rather than changes to Colchester Avenue. The detectors were fixed at the beginning of November, 2010 and queue counts were again conducted at the East Avenue intersection on November 10th and results presented in this report reflect this updated data.

AM Queuing Results

Figure 11 presents vehicle queue count results gathered during the AM Peak hour of travel at Colchester Avenue intersections. Generally, Figure 11 indicates that spring 2011 queues improved significantly when compared to the fall 2010 results even though traffic on the corridor remained the same. Furthermore, queue results from Figure 11 show that vehicle queues before restriping (summer 2010) are very comparable to queues after restriping (spring 2011) and for some approaches, the max queues decreased after restriping (East Avenue, Colchester Avenue westbound at Prospect and Mansfield). Signal coordination improvements might have contributed to a better traffic progression in the corridor and the addition of an exclusive left turn signal at FAHC decreased the substantial queues for the westbound approach at this intersection.

PM Queuing Results

Directional volume counts (see Figures 9 & 10) indicate that the PM peak hour of travel has the highest traffic volumes and that the predominant movement of traffic in the PM is eastbound. Results from PM peak queue counts are presented in Figure 12. These results indicate that vehicle queues are higher during the PM peak hour of travel when compared to the AM peak, at most corridor approaches.

When comparing queuing results from before and after the restriping of Colchester Avenue we can infer the following:

- Vehicle queues for the Pearl Street approach (EB Pearl) as well as the westbound traffic on Colchester Avenue at the FAHC Drive (WB @ FAHC) remained to a great extent the same for the before and after conditions.
- Vehicle queues decreased after the restriping of the avenue at the following approaches: northbound traffic on South Prospect (NB Prospect); eastbound traffic on Colchester Avenue at the East Avenue intersection (EB @ East); and northbound traffic on East Avenue (NB East).
- Queues of westbound traffic on Colchester Avenue at the Prospect (WB @ Prospect) and Mansfield (WB @ Mansfield) intersections as well as eastbound traffic on Colchester Avenue at the Mansfield intersection (EB @ Mansfield) are longer after the restriping of the avenue.

Figure 11: AM Peak Hour Vehicle Queues – Summer 2010 Before Restriping & Fall 2010/Spring 2011 After Construction

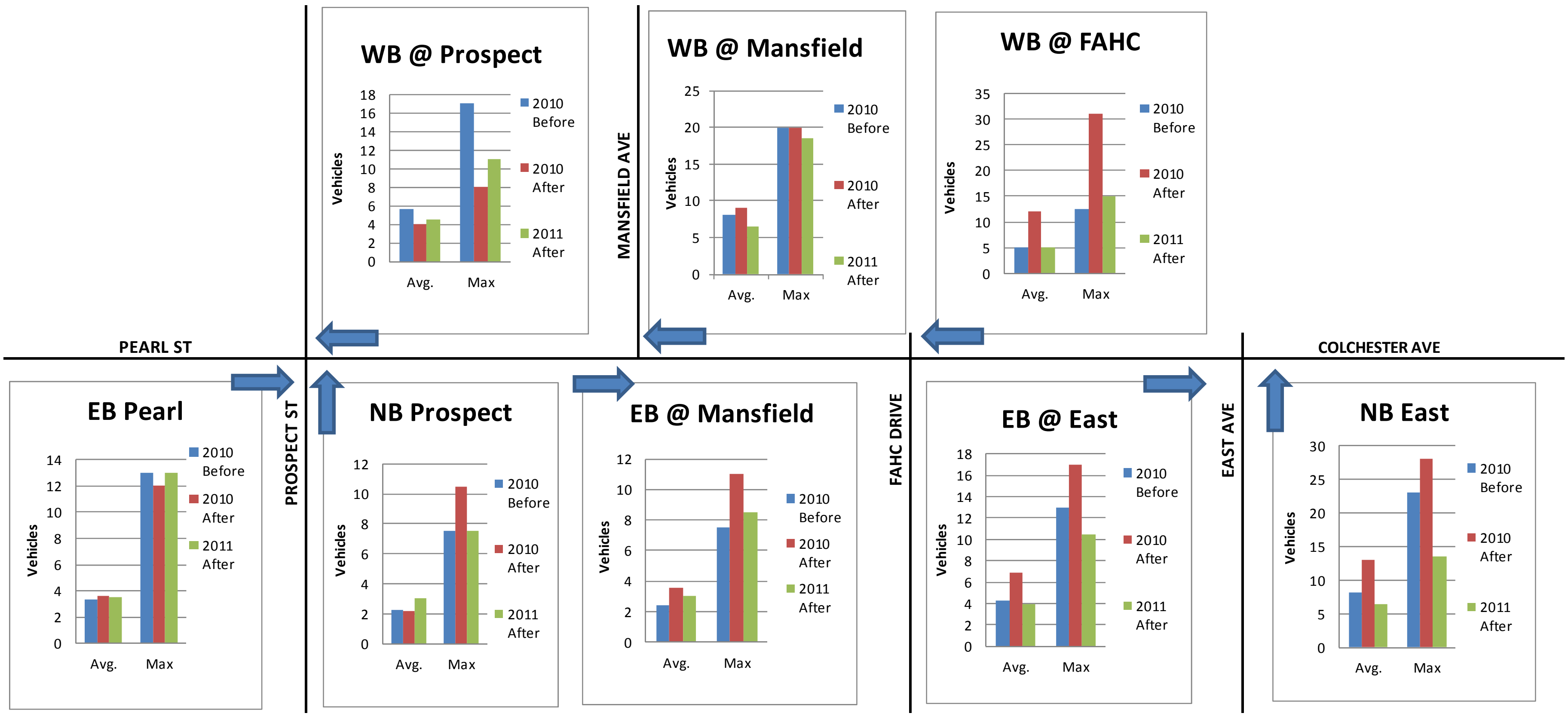
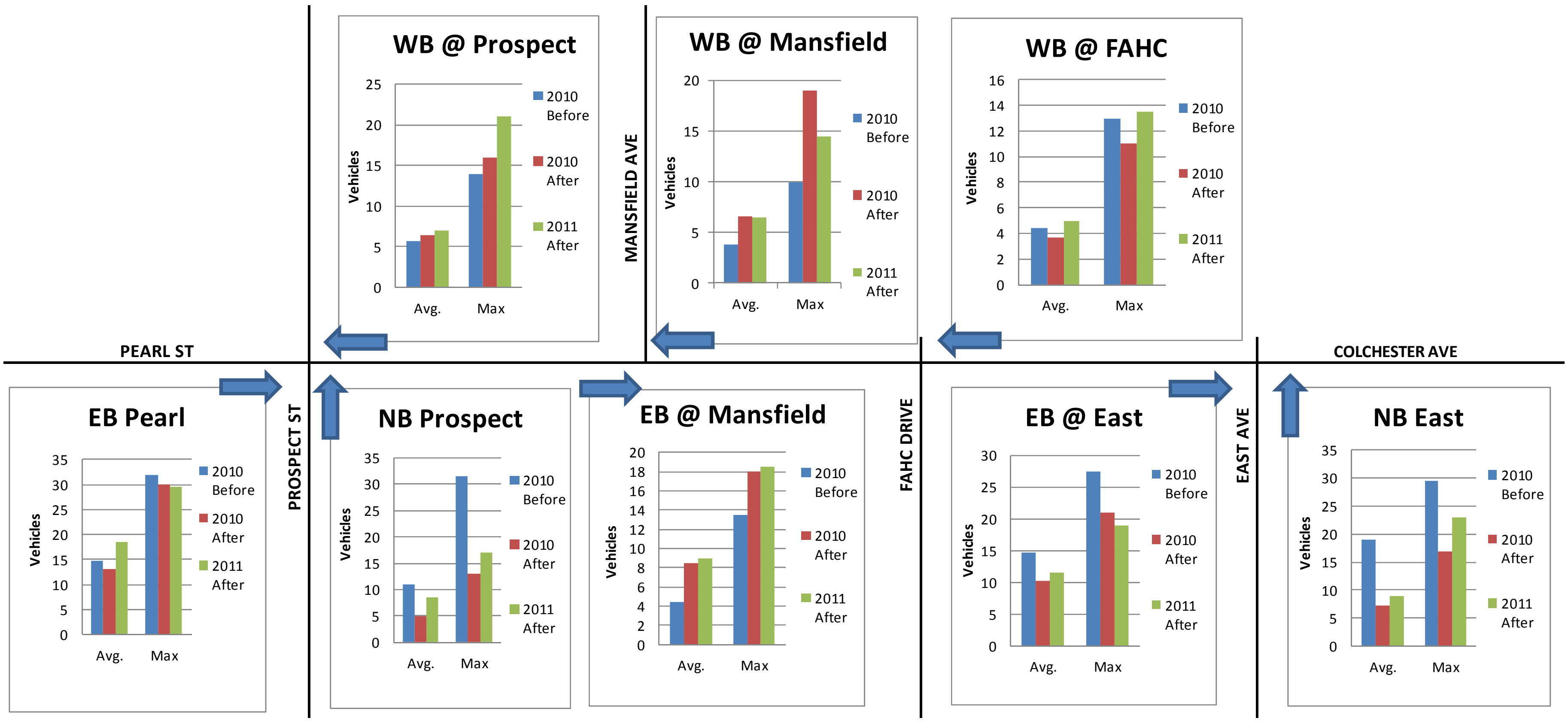


Figure 12: PM Peak Hour Vehicle Queues – Summer 2010 Before Restriping & Fall 2010/Spring 2011 After Restriping



Additional Observations

Additional corridor observations, after the restriping of the avenue was completed, include:

- Small disturbances in traffic flow—such as busses discharging passengers or right turning vehicles—have a noticeable effect on queuing since cars cannot bypass slowed or stopped vehicles in the corridor.
- A substantial number of bicyclists were observed using the new on-road facilities.

Speed Data

Speed data collected east of Fletcher Place show a slight decrease in speeds of vehicles traveling westbound on the corridor. This is especially true of vehicles that are traveling at higher speeds in the 95th percentile bracket, but speed data indicates no significant decrease in overall speeds due to the restriping of the avenue. It is however important to note the roughly eight percent increase in the eastbound percent in pace. This indicates a more uniform traffic flow and is associated with increased driver expectancy and lower crash rates. Detailed speed data from the spring of 2010 (4/30 – 5/5 before restriping), fall 2010 (11/8 – 11/26 after restriping) and spring of 2011 (4/29 – 5/17 after restriping) is presented in Table 1 below.

Table 1: Speed Data (mph) Before and After the Colchester Avenue Restriping

	Eastbound				Westbound			
	April 30th to May 5th 2010	November 8th to 13th 2010	November 13th to 26th 2010	April 29th to May 17th 2011	April 30th to May 5th 2010	November 8th to 13th 2010	November 13th to 26th 2010	April 29th to May 17th 2011
50th Percentile (mph)	29	29	28	29	29	28	26	28
85th Percentile (mph)	34	34	33	34	34	33	32	33
95th Percentile (mph)	36	35	35	37	38	35	35	35
10 mph Pace Speed	26-35	26-35	26-35	26-35	26-35	26-35	21-30	26-35
Percent in Pace	70.8	73.5	71.9	78.0	69.8	66.9	59.6	68.3

Travel Time

Travel time data collected in October of 2010 (a few weeks following restriping of the avenue) and presented in Table 4 in the *Interim Memorandum: Colchester Avenue Complete Streets Demonstration Project* was removed from the final report. The travel data collected in October of 2010 does not reflect current traveling conditions in the corridor as vehicle detector loops on East Avenue have been fixed, signals have been retimed and an exclusive left turn signal at the FAHC Drive has been installed.

Crash Data

Colchester Avenue is a high crash location, based on VTrans' *High Crash Location Report* (2007-2009). VTrans reported[1] crashes in the corridor (from Prospect to East Ave, and within 100 feet on any street approach) totaled 137 over the three calendar years 2007-2009. Crash data for calendar year 2010, received recently from VTrans, indicates that there were 39 reported crashes in the corridor—see Appendix A for 2007 to 2010 crash data from VTrans' Highway Research Section which includes information on crash types and locations. Please note that the 2010 crash data includes only three months of Colchester Avenue data under the "Complete Streets" lane configuration.

Signal Timings

Personnel from the City, CCMPO and RSG conducted a field review of the signals on Colchester Avenue between Prospect/Pearl and East Avenue intersections on Thursday, December 2nd during the AM Peak (7:00 to 9:00 am) and PM Peak (3:30 to 5:30 pm). Observations from the field review as well subsequent recommendations for adjustments to the traffic signal timings are discussed in the following sections.

Field Review

The AM peak was significant just before and after 8:00 am—congestion was similar to previous observations in the corridor. The key road segment in this period appears to be westbound between the Mansfield and FAHC intersections—queues observed in this section sometimes reached from one intersection to the next. The timing offset between signals could play an important role in getting the queue at Mansfield started in advance of a platoon arrival from FAHC. Several variances in this timing offset were tested with mixed results, depending on the degree of saturation in the corridor segment. Changing the offset to zero (simultaneous greens) appeared to have beneficial results. When capacity is exceeded there is little that can be done with the offset, and a longer cycle length may then be necessary. However, longer cycle length for Colchester Avenue will delay the traffic from the side streets. Changing the cycle length will also have implications on signals further east (Willard and Union) which are also coordinated with this system. Dave Garen (DPW Traffic Signal Technician) will weigh these options and will make necessary signal changes on subsequent observations.

The PM peak occurred twice, with a modest one at 4:00 pm, and a more significant one just after 5:00 pm. Congestion during these periods was also consistent with previous observations. However, westbound traffic in the later period (5-5:30 pm) seemed to be unusually heavy (possibly due to Christmas shoppers traveling downtown). The key road segment still appears to be eastbound between Mansfield and FAHC where the field review team spent considerable amount of time considering and testing the signal offset in order to keep traffic moving as much as possible. An optimal offset was less clear in this case, as traffic was highly variable. Dave Garen will continue to monitor the traffic situation and revise signal settings based on further observations.

Signal Recommendations

The following changes to the signal timings and settings are recommended but it should be noted that as traffic varies over the seasons and year, further refinements may be necessary.

AM Peak:

- Set the offset between Mansfield and FAHC to zero. This was implemented in the field and all agreed it was an improvement. It is assumed that this change will be permanent.

[1] A reportable crash has to involve at least $1,000 in property damage or an injury

- Fine tune the Pearl and Prospect offset to ensure progression east. As a starting point, an offset is recommended between 1-3 seconds.
- Implement a longer cycle length for the highest peak half hour (7:45-8:15 am). It is recommended that the cycle be increased from 70 to 80 seconds. Splits should be increased proportionally, except;
- The Mansfield split should be reduced by 1-2 seconds. Even though this may create longer queues for brief periods on Mansfield, it will favor progression on Colchester Avenue and benefit a greater proportion of traffic.

PM Peak:

- Implement a 3 second offset eastbound from Mansfield to FAHC. It was observed in field that this was an improvement, and it is recommended that this change be made permanent.
- Tie the East Avenue signal to the coordinated system. It is surmised that it is more efficient to have the signal as stand alone but the tie in of this signal with the rest of the coordinated system is worth testing in the field.

Signal Update

As of mid January, 2011, Dave Garen has implemented a number of the above recommendations to facilitate traffic flows in the corridor by adjusting signal timings and settings. Dave will continue to monitor the corridor and make the necessary adjustments to the traffic signals in the corridor.

Next Steps

The final paving of the Colchester Avenue has been postponed until the fall of 2011 at which time the City will decide whether the Complete Streets lane configuration—with some minor improvements—will be retained during the final paving of the avenue.

APPENDIX A

Colchester Avenue Crash Data (2007-2010)

Vermont Agency of Transportation

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2010 General Yearly Summaries Information

Route: COLCHESTER AVE., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/10BU26008	Burlington	0	10/21/2010	11:36	Rain	No improper driving	Single Vehicle Crash	1	0		FAU
	VT0040100/10BU26371	Burlington	0	10/26/2010	11:10	Clear	Inattention, No improper driving	Rear End	0	0	W	FAU
	VT0040100/2010-24661	Burlington	0.02	10/5/2010	5:05	Cloudy	No improper driving	Same Direction Sideswipe	0	0		FAU
	VT0040100/2010-11899	Burlington	0.05	5/22/2010	18:45	Clear	Inattention, No improper driving	Same Direction Sideswipe	0	0	E	FAU
	VT0040100/10-20908	Burlington	0.05	8/27/2010	7:16	Clear	No improper driving, Failed to yield right of way	Rear End	0	0	E	FAU
	VT0040100/10-23339	Burlington	0.05	9/20/2010	19:36	Clear	Other improper action, Failure to keep in proper lane, No improper driving	Same Direction Sideswipe	0	0	W	FAU
	VT0040100/10-26327	Burlington	0.05	10/25/2010	18:34	Rain	No improper driving, Made an improper turn, Inattention	Opp Direction Sideswipe	0	0		FAU
	VT0040100/10-472	Burlington	0.06	1/7/2010	8:47	Clear	No improper driving	Other - Explain in Narrative	0	0		FAU
	VT0040100/2010-19405	Burlington	0.09	8/11/2010	17:13	Clear	Unknown	Single Vehicle Crash	0	0		FAU
	VT0040100/2010-3917	Burlington	0.1	2/10/2010	8:37	Cloudy	Disregarded traffic signs, signals, road markings, No improper driving	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0041100/2010-1064	Burlington	0.1	3/15/2010	7:05	Cloudy	Other improper action, No improper driving	Same Direction Sideswipe	0	0	E	FAU
	VT0040100/2010-9756	Burlington	0.1	4/28/2010	13:55	Not Reported	Failed to yield right of way, Made an improper turn, No improper driving	Other - Explain in Narrative	0	0	E	FAU
	VT0040100/2010-19408	Burlington	0.12	8/11/2010	17:56	Clear	Inattention, No improper driving	Rear End	0	0	E	FAU
	VT0040100/10-29773	Burlington	0.16	12/10/2010	16:48	Clear	No improper driving, Followed too closely, Inattention	Rear End	0	0	W	FAU
	VT0040100/2010-9684	Burlington	0.17	4/27/2010	13:27	Snow	No improper driving, Visibility obstructed, Failed to yield right of way	Left Turn and Thru, Broadside v<--	0	0		FAU
	VT0040100/2010-16133	Burlington	0.18	7/8/2010	8:01	Clear	No improper driving	Same Direction Sideswipe	1	0		FAU
	VT0040100/2010-2579	Burlington	0.21	2/3/2010	14:50	Cloudy	Followed too closely, No improper driving	Rear End	0	0	E	FAU
	VT0040100/2010-4519	Burlington	0.21	2/27/2010	19:58	Clear	Failed to yield right of way, Followed too closely, No improper driving	Same Direction Sideswipe	0	0		FAU
	VT0040100/2010-16163	Burlington	0.21	7/8/2010	15:14	Clear	Failed to yield right of way, No improper driving	Left Turn and Thru, Angle Broadside -->v--	0	0	S	FAU
	VT0040100/2010-20820	Burlington	0.21	8/26/2010	9:07	Cloudy	Other improper action, No improper driving	Rear End	0	0		FAU
	VT0040100/2010-21589	Burlington	0.21	9/2/2010	17:27	Clear	Followed too closely, No improper driving	Rear End	0	0		FAU
	VT0040100/10-25267	Burlington	0.21	10/12/2010	16:39	Clear	No improper driving, Other improper action	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU

VT0040100/10-1450	Burlington	0.26	1/19/2010	10:44	Cloudy	Unknown	Same Direction Sideswipe	0	0 W	FAU
VT0040100/10BU19358	Burlington	0.27	8/11/2010	8:07	Clear	Inattention, No improper driving	Rear End	0	0 W	FAU
VT0040100/10-2965	Burlington	0.44	2/8/2010	17:26	Clear	Inattention, No improper driving	Rear End	0	0 E	FAU
VT0040100/2010-6176	Burlington	0.44	3/18/2010	11:00	Cloudy	Operating defective equipment, No improper driving	Opp Direction Sideswipe	0	0 E	FAU
VT0040100/10-06630	Burlington	0.44	3/22/2010	22:59	Rain	No improper driving, Inattention, Failed to yield right of way	Left Turn and Thru, Broadside v<--	0	0	FAU
VT0040100/2010-7118	Burlington	0.44	3/22/2010	22:59	Rain	Inattention, Other improper action	Left Turn and Thru, Broadside v<--	0	0	FAU
VT0040100/10-7347	Burlington	0.44	4/1/2010	17:13	Clear	Other improper action, No improper driving	Rear End	0	0 E	FAU
VT0040100/10-24856	Burlington	0.44	10/7/2010	17:14	Unknown	Inattention, Distracted, No improper driving	Rear End	1	0 W	FAU
VT0040100/10BU26026	Burlington	0.44	10/21/2010	16:30	Cloudy	Technology Related Distraction, Followed too closely, No improper driving	Rear End	0	0 E	FAU
VT0040100/2010-30248	Burlington	0.44	12/17/2010	17:46	Cloudy	Operating defective equipment	Rear End	0	0	FAU

Vermont Agency of Transportation

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2010 General Yearly Summaries Information

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
Route: PEARL ST., BURLINGTON												
	VT0040100/2010-10241	Burlington	0.94	5/3/2010	15:38	Cloudy	Followed too closely, No improper driving	Left Turn and Thru, Angle Broadside -->v--	0	0	E	FAU
	VT0040100/10-13889	Burlington	0.94	6/13/2010	17:40	Clear	No improper driving, Failed to yield right of way, Inattention	Left Turn and Thru, Angle Broadside -->v--	0	0	E	FAU
	VT0040100/2010-26317	Burlington	0.94	10/25/2010	17:15	Rain	Failed to yield right of way, Unknown	Opp Direction Sideswipe	0	0		FAU
	VT0040100/2010-26585	Burlington	0.94	10/28/2010	17:30	Clear	No improper driving	Right Turn and Thru, Same Direction Sideswipe/Angle Crash ^^--	1	0		FAU

Note: THIS DOCUMENT IS EXEMPT FROM DISCOVERY OR ADMISSION UNDER 23 U.S.C 409.

Vermont Agency of Transportation

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2010 General Yearly Summaries Information

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
Route: S PROSPECT ST., BURLINGTON												
	VT0040100/2 010-21998	Burlington	0.3	9/6/2010	15:35	Cloudy	Failed to yield right of way, Inattention, No improper driving	Left Turn and Thru, Angle Broadside -->v--	0	0		FAU

Note: THIS DOCUMENT IS EXEMPT FROM DISCOVERY OR ADMISSION UNDER 23 U.S.C 409.

Vertmont Agency of Transportation

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2010 General Yearly Summaries Information

Route: EAST AVE., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/2010-6945	Burlington	0.67	3/27/2010	2:58	Clear	No improper driving, Disregarded traffic signs, signals, road markings, Under the influence of medication/drugs/alcohol	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0040100/10-15603	Burlington	0.67	7/2/2010	17:06	Clear	Inattention, Distracted, No improper driving	Rear End	0	0	S	FAU

Note: THIS DOCUMENT IS EXEMPT FROM DISCOVERY OR ADMISSION UNDER 23 U.S.C 409.

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2009 General Yearly Summaries Information

Route: COLCHESTER AVE., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/09-02662	Burlington	0	02/07/2009	18:23	Clear	Failed to yield right of way, Inattention, No improper driving	Same Direction Sideswipe	0	0	W	FAU
	VT0040100/09-9208	Burlington	0	04/28/2009	09:20	Clear	No improper driving, Failed to yield right of way	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0040100/09BU9219	Burlington	0	04/28/2009	11:34	Clear	Inattention, No improper driving	Rear End	0	0	E	FAU
	VT0040100/2009-382	Burlington	0.1	01/06/2009	08:52	Clear	Failed to yield right of way, No improper driving	Left Turn and Thru, Same Direction Sideswipe/Angle Crash vv--	0	0	E	FAU
	VT0040100/09-16840	Burlington	0.1	07/22/2009	16:52	Clear	No improper driving	Opp Direction Sideswipe	1	0		FAU
	VT0040100/09-20332	Burlington	0.1	08/28/2009	06:41	Clear	Disregarded traffic signs, signals, road markings, No improper driving	Left Turn and Thru, Angle Broadside -->v--	0	0	E	FAU
	VT0040100/09-6386	Burlington	0.11	03/27/2009	12:31	Unknown	No improper driving	No Turns, Thru moves only, Broadside ^<	1	0		FAU
	VT0040100/09-15401	Burlington	0.16	07/06/2009	09:51	Clear	Inattention, Visibility obstructed, No improper driving	Left Turn and Thru, Angle Broadside -->v--	1	0		FAU
	VT0040100/2009-13229	Burlington	0.21	06/11/2009	15:30	Cloudy	Visibility obstructed	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	VT0040100/09-14434	Burlington	0.21	06/25/2009	12:27	Cloudy	No improper driving, Inattention	Rear End	0	0	E	FAU
	VT0040100/2009-24390	Burlington	0.21	10/08/2009	15:13	Unknown	Unknown	No Turns, Thru moves only, Broadside ^<	1	0		FAU
	VT0040100/2009-29739	Burlington	0.21	12/14/2009	18:10	Cloudy	Inattention, No improper driving	Rear End	0	0	W	FAU
	VT0040100/09-01997	Burlington	0.22	01/29/2009	13:41	Clear	Failure to keep in proper lane or running off road, No improper driving	Rear End	0	0	E	FAU
	VT0040100/2009-0928	Burlington	0.22	03/02/2009	14:21	Snow	No improper driving, Driving too fast for conditions, Operating defective equipment	Rear End	1	0	W	FAU
	VT0040100/09BU11973	Burlington	0.26	05/29/2009	08:30	Rain	Distracted, Inattention, No improper driving	Rear End	0	0	W	FAU
	VT0040100/09-15508	Burlington	0.29	07/07/2009	16:42	Rain	No improper driving, Followed too closely, Inattention	Rear End	0	0	W	FAU
	VT0040100/090BU25314	Burlington	0.31	10/19/2009	08:55	Cloudy	No improper driving, Inattention	Rear End	0	0	W	FAU
	VT0040100/2009BU19221	Burlington	0.42	08/17/2009	07:21	Clear	Unknown, No improper driving	Same Direction Sideswipe	0	0	E	FAU
	VT0040100/09-2797	Burlington	0.43	02/09/2009	15:21	Clear	Failed to yield right of way, Inattention, No improper driving	Left Turn and Thru, Angle Broadside -->v--	0	0		FAU
	VT0040100/2009-11318	Burlington	0.44	05/21/2009	16:57	Clear		Rear End	0	0	E	FAU
	VT0040100/09BU24255	Burlington	0.44	10/07/2009	08:00	Unknown	Inattention, No improper driving	Same Direction Sideswipe	0	0	W	FAU
	VT0040100/09-24705	Burlington	0.44	10/11/2009	16:25	Clear	Failed to yield right of way, Made an improper turn, No improper driving	Left Turn and Thru, Angle Broadside -->v--	0	0		FAU
	VT0040100/09-29306	Burlington	0.44	11/14/2009	03:16	Clear	Under the influence of medication/drugs/alcohol, Inattention	Other	1	0		FAU
	VT0040100/2009-11567	Burlington	0.46	05/24/2009	13:05	Clear	Unknown	No Turns, Thru moves only, Broadside ^<	1	0		FAU
	VT0040100/09-22207	Burlington	0.56	09/16/2009	08:02	Cloudy	Inattention, No improper driving	Rear End	0	0		FAU
	VT0040100/09-9464	Burlington	0.59	05/01/2009	07:08	Clear	Inattention	Other	0	0		FAU
	VT0040100/09-23862	Burlington	0.59	10/03/2009	01:05	Rain	Under the influence of medication/drugs/alcohol	Rear End	1	0		FAU
	VT0040100/09-001243	Burlington	0.63	01/18/2009	09:05	Clear		Same Direction Sideswipe	0	0		FAU
	VT0040100/09BU13884	Burlington	0.63	06/19/2009	03:07	Clear	Under the influence of medication/drugs/alcohol	Rear End	1	0		FAU

**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

Route: COLCHESTER AVE., BURLINGTON Continued ...

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/09-16397	Burlington	0.63	07/17/2009	17:48	Cloudy	No improper driving, Failed to yield right of way, Visibility obstructed	Left Turn and Thru, Angle Broadside -->v--	0	0	W	FAU
	VT0040100/09-25099	Burlington	0.63	10/16/2009	15:42	Clear	Inattention, Distracted, No improper driving	Rear End	0	0	E	FAU
	VT0040100/09BU29532	Burlington	0.65	12/11/2009	16:56	Unknown	No improper driving, Inattention	Rear End	0	0	N	FAU
	VT0040100/09-20787	Burlington	0.66	09/02/2009	08:00	Clear	No improper driving	Same Direction Sideswipe	0	0		FAU
	VT0040100/09BU21907	Burlington	0.66	09/13/2009	21:42	Clear	No improper driving	Same Direction Sideswipe	0	0		FAU
	VT0040100/09-3980	Burlington	0.72	02/25/2009	16:35	Clear	No improper driving, Followed too closely	Rear End	0	0	E	FAU
	VT0040100/09-13032	Burlington	0.81	06/09/2009	17:08	Clear	No improper driving, Followed too closely, Other improper action	Rear End	0	0	E	FAU
	VT0040100/09-16951	Burlington	0.82	07/23/2009	17:24	Clear	Unknown	Single Vehicle Crash	1	0		FAU
	VT0040100/09-14789	Burlington	0.9	06/29/2009	13:14	Rain	No improper driving, Inattention	Left Turn and Thru, Angle Broadside -->v--	0	0	N	FAU
	VT0040100/2009-23441	Burlington	0.9	09/28/2009	16:17	Rain	Failed to yield right of way	No Turns, Thru moves only, Broadside ^<	1	0		FAU
	VT0040500/2009-27508	Burlington	0.9	11/16/2009	15:21	Clear	No improper driving, Inattention	Rear End	0	0	S	FAU
	VT0040100/09-3784	Burlington	0.94	02/22/2009	18:24	Snow	No improper driving, Other improper action	Rear End	0	0		FAU
	VT0040100/09-22771	Burlington	0.96	09/21/2009	09:50	Clear		Other	0	0		FAU
	VT0040100/09-03783	Burlington	1	02/22/2009	18:22	Snow	Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc, No improper driving	Rear End	0	0	N	FAU
	VT0040100/09-6565	Burlington	1	03/28/2009	21:09	Clear	No improper driving, Failed to yield right of way	Left Turn and Thru, Angle Broadside -->v--	0	0	N	FAU
	VT0040100/09-15743	Burlington	1	07/10/2009	08:50	Clear	Failed to yield right of way, No improper driving	Rear End	0	0	W	FAU
	VT0040100/09-25502	Burlington	1	10/21/2009	18:20	Clear	No improper driving, Other improper action	Left Turn and Thru, Angle Broadside -->v--	0	0	N	FAU
	VT0040100/09-15817	Burlington	1.01	07/10/2009	20:19	Clear	Inattention, Failed to yield right of way	Left Turn and Thru, Angle Broadside -->v--	1	0		FAU
	VT0040100/09-22433	Burlington	1.01	09/18/2009	11:50	Clear	Inattention, No improper driving	Rear End	0	0		FAU
	VT0040100/09-25718	Burlington	1.03	10/24/2009	12:30	Cloudy	Failure to keep in proper lane or running off road, No improper driving	Same Direction Sideswipe	0	0		FAU
	VT0040100/2009-26744	Burlington	1.03	11/06/2009	19:23	Cloudy	Failed to yield right of way, Inattention	Single Vehicle Crash	0	0	S	FAU

Route: EAST AVE., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/09BU2413	Burlington	0	02/04/2009	13:44	Clear	Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner, Unknown, No improper driving	Rear End	0	0		FAU
	VT0040300/09SB1052	Burlington	0	02/11/2009	15:42	Rain	Failed to yield right of way, No improper driving	Same Direction Sideswipe	0	0	S	FAU
	VT0040100/09-4636	Burlington	0	03/05/2009	18:12	Clear	Unknown	Left Turn and Thru, Same Direction Sideswipe/Angle Crash vv--	0	0	S	FAU
	VT0040100/09-13731	Burlington	0	06/17/2009	08:25	Clear	No improper driving, Failure to keep in proper lane or running off road	Same Direction Sideswipe	0	0	E	FAU
	VT0040100/2009-16024	Burlington	0	07/13/2009	10:56	Cloudy	No improper driving	Rear End	0	0		FAU
	VT0040100/09-27685	Burlington	0	11/19/2009	08:07	Clear	Failure to keep in proper lane or running off road, No improper driving	Same Direction Sideswipe	0	0	E	FAU

Vermont Agency of Transportation

Date: 05/05/2010

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2009 General Yearly Summaries Information

Route: EAST AVE., BURLINGTON Continued ...

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/09-29130	Burlington	0	12/16/2009	13:45	Cloudy	Driving too fast for conditions, No improper driving	Rear End	1	0		FAU
	VT0040100/2009-30657	Burlington	0	12/28/2009	14:22	Snow	Driving too fast for conditions, No improper driving	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0040100/09-13071	Burlington	0.18	06/10/2009	07:00	Cloudy	Failed to yield right of way, No improper driving	Left Turn and Thru, Angle Broadside -->v--	2	0	E	FAU
	VT0040100/09-18012	Burlington	0.18	08/03/2009	15:55	Clear	No improper driving, Failure to keep in proper lane or running off road, Inattention	Same Direction Sideswipe	0	0	E	FAU
	VT0040100/09-595	Burlington	0.2	01/09/2009	08:58	Cloudy	Failed to yield right of way, No improper driving	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	VT0040100/09-8517	Burlington	0.2	04/21/2009	12:45	Cloudy	Failure to keep in proper lane or running off road	Same Direction Sideswipe	0	0		FAU
	VT0040100/09-10950	Burlington	0.2	05/17/2009	12:36	Clear	Failure to keep in proper lane or running off road, No improper driving	Same Direction Sideswipe	0	0		FAU
	VT0040100/2009-24549	Burlington	0.2	10/09/2009	20:20	Rain	Failed to yield right of way, No improper driving	Left Turn and Thru, Angle Broadside -->v--	0	0		FAU
	VT0040100/09-25650	Burlington	0.2	10/23/2009	18:00	Cloudy	Inattention, Failed to yield right of way	Left Turn and Thru, Angle Broadside -->v--	0	0	N	FAU
	VT0040100/09-12354	Burlington	0.42	06/02/2009	12:05	Clear	Followed too closely, No improper driving	Rear End	0	0	N	FAU
	VT0040100/09-16305	Burlington	0.42	07/16/2009	18:21	Rain	Unknown	Single Vehicle Crash	1	0		FAU
	VT0040100/09-16625	Burlington	0.42	07/20/2009	08:00	Clear	Followed too closely, Unknown	Rear End	0	0	S	FAU
	VT0040100/2009-25417	Burlington	0.44	10/20/2009	15:16	Clear	Made an improper turn, No improper driving	Same Direction Sideswipe	0	0	E	FAU
	VT0040100/2009-8046	Burlington	0.48	04/15/2009	21:07	Clear	No improper driving, Failure to keep in proper lane or running off road, Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc	Rear End	0	0		FAU
	VT0040100/09-19278	Burlington	0.48	08/17/2009	17:31	Clear	No improper driving	Rear End	0	0		FAU
	VT0040100/09BU22756	Burlington	0.62	09/21/2009	07:00	Unknown	Failed to yield right of way, No improper driving	Left Turn and Thru, Angle Broadside -->v--	0	0		FAU
	VT0040100/09-1473	Burlington	0.67	01/22/2009	12:07	Cloudy	Followed too closely, No improper driving	Rear End	0	0	N	FAU
	VT0040100/09BU19062	Burlington	0.67	08/15/2009	03:13	Clear	Inattention, No improper driving	Rear End	0	0	N	FAU
	VT0040100/09-29257	Burlington	0.67	12/08/2009	10:42	Cloudy	No improper driving, Failed to yield right of way	Rear End	0	0		FAU
	VT0040100/09-21609	Burlington	UNK	09/10/2009	08:26	Clear	No improper driving, Technology Related Distraction, Inattention	Head On	0	0		FAU

Route: FLYNN AVE., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/2009-10645	Burlington	0	05/14/2009	10:19	Rain	Followed too closely, No improper driving	Rear End	0	0	W	FAU
	VT0040100/2009-25798	Burlington	0	10/25/2009	13:30	Cloudy	Visibility obstructed, No improper driving	Rear End	0	0	N	FAU
	VT0040100/09-27599	Burlington	0	11/17/2009	22:56	Clear	No improper driving	No Turns, Thru moves only, Broadside ^<	1	0	E	FAU
	VT0040100/09-28026	Burlington	0.04	11/22/2009	20:04	Unknown		Other	0	0		FAU

Route: GROVE ST., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/08-2845	Burlington	0.24	02/10/2009	08:05	Cloudy	Failed to yield right of way	Left and Right Turns, Simultaneous Turn Crash --vv--	0	0	N	FAU
	VT0040100/09-4421	Burlington	0.29	03/02/2009	17:54	Snow	Inattention, Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc	Same Direction Sideswipe	0	0	S	FAU

**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

Vermont Agency of Transportation

Date: 05/05/2010

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2009 General Yearly Summaries Information

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
Route: PEARL ST., BURLINGTON Continued ...												
	VT0040100/09-16750	Burlington	0.8	07/21/2009	17:20	Rain	No improper driving, Inattention, Distracted	Rear End	0	0	W	FAU
	VT0040100/09-9139	Burlington	0.82	04/27/2009	14:50	Clear	Followed too closely, No improper driving	Rear End	0	0	E	FAU
	VT0040100/09BU12001	Burlington	0.88	05/29/2009	16:00	Cloudy	Distracted, No improper driving	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0040100/09-9228	Burlington	0.9	04/28/2009	13:23	Cloudy	Inattention, No improper driving	Rear End	1	0		FAU
	VT0040100/09-10545	Burlington	0.93	05/13/2009	01:06	Clear	Under the influence of medication/drugs/alcohol	Head On	1	0		FAU
	VT0040100/09-28593	Burlington	0.93	11/30/2009	07:36	Clear	Inattention, No improper driving	Rear End	0	0	W	FAU
	VT0040100/2009-29143	Burlington	0.93	12/06/2009	19:00	Cloudy	Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc	Same Direction Sideswipe	0	0	W	FAU
	VT0040100/2009-0383	Burlington	0.94	01/06/2009	08:58	Clear	Inattention, No improper driving	Rear End	0	0	E	FAU
	VT0040100/2009-6623	Burlington	0.94	03/29/2009	17:19	Clear	No improper driving, Failed to yield right of way	Left Turn and Thru, Angle Broadside -->v--	0	0		FAU
	VT0040100/09BU27641	Burlington	0.94	11/18/2009	16:20	Clear	Failed to yield right of way, No improper driving	Left and Right Turns, Simultaneous Turn Crash --vv--	0	0	E	FAU
Route: PINE ST., BURLINGTON												
	VT0040100/09-6252	Burlington	0	03/25/2009	20:35	Clear	No improper driving, Made an improper turn	Left Turn and Thru, Angle Broadside -->v--	0	0	N	FAU
	VT0040100/09-7950	Burlington	0	04/14/2009	16:42	Clear	No improper driving, Failed to yield right of way	Same Direction Sideswipe	0	0	S	FAU
	VT0040100/09-8636	Burlington	0	04/22/2009	21:24	Rain	No improper driving	No Turns, Thru moves only, Broadside ^<	0	0	S	FAU
	VT0040100/09-9647	Burlington	0	05/02/2009	21:10	Clear	Failed to yield right of way, No improper driving	No Turns, Thru moves only, Broadside ^<	1	0	N	FAU
	VT0040100/09-11716	Burlington	0	05/25/2009	19:59	Clear	Unknown	Other	1	0		FAU
	VT0040100/2009-16920	Burlington	0	07/23/2009	13:00	Clear	Inattention, No improper driving	Rear End	0	0	S	FAU
	VT0040100/09-24078	Burlington	0	10/05/2009	12:08	Cloudy	No improper driving, Followed too closely	Rear End	0	0	S	FAU
	VT0040100/09-26656	Burlington	0	11/05/2009	11:04	Clear	Unknown	No Turns, Thru moves only, Broadside ^<	0	0	N	FAU
	VT0040100/09-8116	Burlington	0.11	04/16/2009	17:25	Clear	Unknown	Same Direction Sideswipe	0	0		FAU
	VT0040100/09-9319	Burlington	0.36	04/29/2009	16:25	Clear	No improper driving, Failed to yield right of way	Left Turn and Thru, Broadside v<--	0	0	N	FAU
	VT0040100/2009-29431	Burlington	0.36	12/10/2009	13:19	Sleet, Hail (Freezing Rain or Drizzle)	Driving too fast for conditions, No improper driving	Rear End	0	0	N	FAU
	VT0040100/09-6694	Burlington	0.37	03/30/2009	14:53	Cloudy	No improper driving, Inattention	Rear End	0	0	W	FAU
	VT0040100/2009-28703	Burlington	0.39	12/01/2009	14:55	Cloudy	No improper driving, Failed to yield right of way, Made an improper turn	No Turns, Thru moves only, Broadside ^<	0	0	S	FAU
	VT0040100/09-22312	Burlington	0.4	09/14/2009	09:35	Clear	Technology Related Distraction, No improper driving	Rear End	0	0	S	FAU
	VT0040100/09BU13000	Burlington	0.74	06/09/2009	11:00	Cloudy	Visibility obstructed	Rear End	0	0		FAU
	VT0040100/09-26748	Burlington	0.81	11/06/2009	18:25	Clear	Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc	Same Direction Sideswipe	0	0		FAU
	VT0040100/2009-BU-26895	Burlington	0.81	11/08/2009	14:37	Not Reported	No improper driving	Rear End	1	0		FAU

**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

Vertmont Agency of Transportation

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2009 General Yearly Summaries Information

Route: ST. PAUL ST., BURLINGTON Continued ...

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/09-20464	Burlington	0.39	08/29/2009	05:25	Fog, Smog, Smoke	Under the influence of medication/drugs/alcohol, Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner	Single Vehicle Crash	0	0		FAU
	VT0040100/09-25287	Burlington	0.52	10/18/2009	17:52	Clear	No improper driving, Inattention	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0040100/09-29594	Burlington	0.59	12/12/2009	14:13	Clear	Visibility obstructed, No improper driving	Rear End	0	0	N	FAU
	VT0040100/2009-28477	Burlington	0.6	11/28/2009	00:30	Unknown		Single Vehicle Crash	1	0		FAU

Route: SHERMAN ST., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/09-11013	Burlington	0	05/18/2009	11:43	Clear	No improper driving, Inattention	Rear End	0	0	E	FAU
	VT0040100/09-30179	Burlington	0.07	12/20/2009	11:59	Cloudy	No improper driving, Inattention	Rear End	0	0	S	FAU

Route: S PROSPECT ST., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/2009-000825	Burlington	0	01/12/2009	15:24	Clear	No improper driving, Other improper action	Rear End	0	0	N	FAU
	VT0040100/09-2657	Burlington	0	02/07/2009	16:10	Cloudy	Inattention, No improper driving	Rear End	0	0		FAU
	VT0040100/09-3879	Burlington	0	02/24/2009	08:55	Cloudy	Followed too closely, No improper driving	Rear End	0	0	N	FAU
	VT0040100/09-1044	Burlington	0.09	01/15/2009	17:32	Cloudy	No improper driving, Failure to keep in proper lane or running off road	Rear End	0	0	N	FAU
	VT0040100/09-15969	Burlington	0.09	07/12/2009	14:11	Clear	Unknown	Same Direction Sideswipe	0	0	S	FAU
	VT0040100/09-24770	Burlington	0.3	10/12/2009	16:20	Clear	Inattention, No improper driving	Left Turn and Thru, Same Direction Sideswipe/Angle Crash vv--	0	0	S	FAU

Route: S UNION ST., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/09-30717	Burlington	0.11	12/29/2009	13:41	Clear	Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc	Other	0	0		FAU
	VT0040100/2009-16649	Burlington	0.43	07/20/2009	13:20	Cloudy	No improper driving	Single Vehicle Crash	1	0		FAU
	VT0040100/09-20344	Burlington	0.62	08/28/2009	11:02	Clear	Inattention, Distracted	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	VT0040100/09-25578	Burlington	0.62	10/22/2009	18:53	Rain	No improper driving, Inattention	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0040100/2009-29693	Burlington	0.62	12/14/2009	00:31	Clear	Failed to yield right of way, No improper driving	Opp Direction Sideswipe	0	0	E	FAU
	VT0040100/09-19388	Burlington	0.72	08/18/2009	21:04	Rain	Inattention	Other	0	0		FAU
	VT0040100/09BU20729	Burlington	0.73	09/01/2009	15:57	Clear	Visibility obstructed	Left Turn and Thru, Angle Broadside -->v--	0	0		FAU
	VT0040100/09-2358	Burlington	0.75	02/03/2009	16:33	Unknown	Inattention, No improper driving	Same Direction Sideswipe	0	0	N	FAU
	VT0040100/2009-30865	Burlington	0.75	12/31/2009	18:16	Snow	Inattention, Under the influence of medication/drugs/alcohol	Other	0	0		FAU

Route: E SPRING ST., WINOOSKI CITY

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040400/09WS04660	Winooski City	0	11/01/2009	15:28	Clear	Failed to yield right of way	Other	0	0		FAU
	VT0040400/09WS04728	Winooski City	0	11/06/2009	14:27	Cloudy	Unknown	Other	1	0		FAU
	VT0040400/09WS03433	Winooski City	0.17	08/17/2009	18:10	Clear	No improper driving, Made an improper turn	Other	1	0	E	FAU

**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2008 General Yearly Summaries Information

Route: VT. 127 BELTLINE, BURLINGTON Continued ...

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/08-28453	Burlington	UNK	12/09/2008	01:08	Other	Driving too fast for conditions	Other	0	0	N	FAU
	VT0040100/08BU30061	Burlington	UNK	12/31/2008	15:59	Cloudy	Exceeded authorized speed limit, Driving too fast for conditions	Other	0	0	N	FAU

Route: VT. 127 CONNECTOR

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/08BU21517	Burlington	0.1	04/18/2008	16:18	Clear	Under the influence of medication/drugs/alcohol	Single Vehicle Crash	1	0		FAU
	VT0040100/081881	Burlington	UNK	01/29/2008	13:26	Sleet, Hail (Freezing Rain or Drizzle)	No improper driving	Single Vehicle Crash	0	0	S	FAU

Route: COLCHESTER AVE., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/082365	Burlington	0	02/06/2008	06:55	Snow	No improper driving	Single Vehicle Crash	0	0	W	FAU
	VT0040100/08-20725	Burlington	0	09/10/2008	10:10	Clear	No improper driving, Followed too closely	Rear End	0	0	W	FAU
	VT0040100/0810808	Burlington	0.02	05/29/2008	14:08	Clear	No improper driving, Disregarded traffic signs, signals, road markings, Followed too closely	Same Direction Sideswipe	0	0	E	FAU
	VT0040100/20083489	Burlington	0.05	02/22/2008	13:34	Snow	Inattention	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	VT0040100/0804694	Burlington	0.05	03/12/2008	16:24	Clear	Failed to yield right of way, No improper driving	Rear End	0	0		FAU
	VT0040100/08-17211	Burlington	0.05	08/05/2008	18:34	Clear	No improper driving, Failed to yield right of way	Other	0	0	E	FAU
	VT0040100/08-14828	Burlington	0.1	07/10/2008	22:20	Clear	Inattention, No improper driving	Other	0	0	S	FAU
	VT0040100/2008-15513	Burlington	0.1	07/18/2008	16:50	Rain	No improper driving, Failure to keep in proper lane or running off road, Visibility obstructed	Same Direction Sideswipe	0	0	E	FAU
	VT0040100/08-20945	Burlington	0.1	09/12/2008	18:40	Clear	Inattention, Other improper action, No improper driving	Rear End	0	0		FAU
	VT0040100/08-22293	Burlington	0.1	09/26/2008	15:02	Rain	No improper driving, Failure to keep in proper lane or running off road, Inattention	Same Direction Sideswipe	0	0	E	FAU
	VT0040100/08-24080	Burlington	0.1	10/15/2008	14:58	Clear	No improper driving, Followed too closely	Same Direction Sideswipe	0	0	W	FAU
	VT0040100/08BU24794	Burlington	0.1	10/23/2008	11:50	Clear	No improper driving, Failed to yield right of way	Left Turn and Thru, Head On ^v--	0	0	S	FAU
	VT0040100/08-27171	Burlington	0.1	11/20/2008	16:15	Cloudy	Unknown	Rear End	0	0		FAU
	VT0040100/08-5469	Burlington	0.11	03/24/2008	17:33	Clear	Visibility obstructed, No improper driving	No Turns, Thru moves only, Broadside ^<	0	0	S	FAU
	VT0040100/085098	Burlington	0.15	03/18/2008	17:37	Clear	No improper driving, Failed to yield right of way	Left Turn and Thru, Head On ^v--	2	0	E	FAU
	VT0040100/2008-17100	Burlington	0.18	08/04/2008	12:39	Clear	Failed to yield right of way, Made an improper turn, No improper driving	Left Turn and Thru, Angle Broadside -->v--	0	0	N	FAU
	VT0040100/088993	Burlington	0.19	05/08/2008	17:30	Clear	No improper driving	Same Direction Sideswipe	0	0	W	FAU
	VT0040100/081552	Burlington	0.2	01/24/2008	17:29	Clear	Inattention, No improper driving	Rear End	0	0	E	FAU
	VT0040100/2008-16684	Burlington	0.21	07/30/2008	18:10	Clear	No improper driving, Inattention	Rear End	0	0	W	FAU
	VT0040100/08-24181	Burlington	0.21	10/16/2008	17:35	Cloudy	Inattention, No improper driving	Same Direction Sideswipe	0	0		FAU
	VT0040100/08BU20518	Burlington	0.22	09/08/2008	15:30	Unknown	No improper driving, Unknown	Rear End	0	0	E	FAU
	VT0040100/20082585	Burlington	0.24	02/09/2008	12:35	Snow	Made an improper turn, No improper driving	Right Turn and Thru, Broadside ^<--	0	0		FAU
	VT0040100/08BU2473	Burlington	0.26	02/07/2008	18:25	Sleet, Hail (Freezing Rain or Drizzle)	Unknown	Rear End	0	0	W	FAU

**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

Vermont Agency of Transportation

Date: 10/26/2009

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2008 General Yearly Summaries Information

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
Route: COLCHESTER AVE., BURLINGTON Continued ...												
	VT0040100/08-17173	Burlington	0.26	08/05/2008	08:51	Clear	No improper driving, Failure to keep in proper lane or running off road, Fatigued, asleep	Same Direction Sideswipe	0	0	N	FAU
	VT0040100/08-3354	Burlington	0.27	02/20/2008	16:10	Clear	Failure to keep in proper lane or running off road, Distracted	Single Vehicle Crash	0	0	N	FAU
	VT0040100/087134	Burlington	0.27	04/16/2008	16:04	Unknown	No improper driving, Inattention	Same Direction Sideswipe	0	0	W	FAU
	VT0040100/08-23547	Burlington	0.27	10/09/2008	21:40	Cloudy	No improper driving, Unknown	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0040100/08-21629	Burlington	0.29	09/19/2008	19:15	Clear	No improper driving, Inattention, Failed to yield right of way	Left Turn and Thru, Same Direction Sideswipe/Angle Crash vv--	0	0	W	FAU
	VT0040100/08-6013	Burlington	0.36	04/01/2008	17:42	Clear	Failed to yield right of way, No improper driving	Same Direction Sideswipe	0	0	E	FAU
	VT0040100/200800067	Burlington	0.44	01/01/2008	17:40	Snow	No improper driving, Driving too fast for conditions	Left Turn and Thru, Angle Broadside -->v--	0	0		FAU
	VT0040100/08899	Burlington	0.44	01/14/2008	17:25	Snow	No improper driving, Other improper action	Rear End	0	0	E	FAU
	VT0040100/087639	Burlington	0.44	04/22/2008	10:29	Clear	Visibility obstructed, Unknown	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0040100/0812633	Burlington	0.44	06/18/2008	12:00	Cloudy	Inattention, No improper driving	Rear End	0	0	W	FAU
	VT0040100/2008-13273	Burlington	0.44	06/25/2008	17:56	Clear	Inattention, Other improper action, No improper driving	Rear End	0	0	E	FAU
	VT0040100/08-20040	Burlington	0.44	09/04/2008	11:55	Clear	Followed too closely, No improper driving	Rear End	0	0	E	FAU
	VT0040100/08-26725	Burlington	0.44	11/14/2008	19:35	Cloudy	No improper driving, Inattention	Same Direction Sideswipe	0	0	E	FAU
	VT0040100/08-29528	Burlington	0.44	12/23/2008		Cloudy	No improper driving, Failed to yield right of way	Left Turn and Thru, Broadside v<--	0	0		FAU
	VT0040100/20085122	Burlington	0.46	03/18/2008	21:16	Clear	No improper driving, Distracted, Inattention	Rear End	0	0	E	FAU
	VT0040100/2008-24253	Burlington	0.48	10/17/2008	08:22	Clear	Inattention, No improper driving	Rear End	0	0	W	FAU
	VT0040100/08BU2409	Burlington	0.49	02/06/2008	19:57	Snow	Unknown	Rear End	0	0	E	FAU
	VT0040100/08-15803	Burlington	0.5	07/21/2008	17:25	Clear	Unknown	Rear End	1	0		FAU
	VT0040100/08BU22275	Burlington	0.54	09/26/2008	12:18	Cloudy	Followed too closely, Inattention, No improper driving	Rear End	0	0		FAU
	VT0040100/2008-7114	Burlington	0.58	04/16/2008	10:50	Clear	Other improper action	Other	0	0		FAU
	VT0040100/085504	Burlington	0.59	03/25/2008	07:28	Clear	Inattention, Followed too closely, No improper driving	Rear End	0	0	W	FAU
	VT0040100/08BU1896	Burlington	0.63	01/29/2008	18:05	Clear	No improper driving	Head On	0	0		FAU
	VT0040100/08BU9132	Burlington	0.63	05/10/2008	02:07	Clear	Under the influence of medication/drugs/alcohol, Failure to keep in proper lane or running off road	Same Direction Sideswipe	0	0		FAU
	VT0040100/2008-12377	Burlington	0.63	06/15/2008	17:20	Clear	Inattention, No improper driving	Rear End	0	0		FAU
	VT0040100/08BU5487	Burlington	0.64	03/24/2008	21:58	Unknown	Inattention	Other	0	0		FAU
	VT0040100/08-14832	Burlington	0.65	07/10/2008	23:24	Clear		Same Direction Sideswipe	0	0		FAU
	VT0040100/08973	Burlington	0.66	01/15/2008	22:28	Clear	Under the influence of medication/drugs/alcohol, Inattention	Rear End	0	0		FAU
	VT0040100/08BU2758	Burlington	0.66	02/11/2008	21:36	Clear		Same Direction Sideswipe	0	0		FAU
	VT0040400/08WS00641	Burlington	0.67	02/17/2008		Clear	Under the influence of medication/drugs/alcohol	Same Direction Sideswipe	0	0	N	FAU

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*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
Route: COLCHESTER AVE., BURLINGTON Continued ...												
	VT0040100/08-24290	Burlington	0.67	10/17/2008	15:48	Clear	Inattention	Same Direction Sideswipe	0	0		FAU
	VT0040100/2008-2730	Burlington	0.72	02/11/2008	15:30	Cloudy	Unknown	Rear End	0	0	E	FAU
	VT0040100/0811243	Burlington	0.73	06/03/2008	13:49	Rain	No improper driving, Inattention	Rear End	1	0	W	FAU
	VT0040100/0808802	Burlington	0.82	05/06/2008	14:30	Clear	Followed too closely, No improper driving	Rear End	1	0	N	FAU
	VT0040100/08-29331	Burlington	0.82	10/17/2008	22:04	Clear	Wrong side or wrong way, Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner	Opp Direction Sideswipe	0	0		FAU
	VT0040100/08-28359	Burlington	0.87	12/07/2008	16:45	Snow	Unknown, Driving too fast for conditions	Head On	0	0	W	FAU
	VT0040100/08-28362	Burlington	0.87	12/07/2008	16:50	Snow	Driving too fast for conditions, No improper driving	Same Direction Sideswipe	0	0	W	FAU
	VT0040100/08-18814	Burlington	0.9	08/22/2008	16:49	Clear	Followed too closely, No improper driving	Rear End	0	0		FAU
	VT0040100/2008-28345	Burlington	0.9	12/07/2008	16:00	Snow	No improper driving, Unknown	Same Direction Sideswipe	0	0	N	FAU
	VT0040100/2008-21645	Burlington	0.94	09/19/2008	21:15	Clear	No improper driving, Inattention, Followed too closely	Rear End	1	0	E	FAU
	VT0040100/08-28355	Burlington	0.95	12/07/2008	17:00	Snow	No improper driving	Rear End	0	0	E	FAU
	VT0040100/20081229	Burlington	1	01/19/2008	17:57	Cloudy	No improper driving, Inattention	Left Turn and Thru, Broadside v<--	0	0	E	FAU
	VT0040100/08BU02364	Burlington	1	02/06/2008	06:42	Snow	Other improper action, Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc	Head On	0	0	N	FAU
	VT0040100/0802366	Burlington	1	02/06/2008	07:01	Snow	No improper driving	Rear End	0	0		FAU
	VT0040100/08BU02421	Burlington	1	02/06/2008	07:02	Snow	No improper driving	Rear End	1	0	N	FAU
	VT0040100/084586	Burlington	1	03/10/2008	15:27	Clear	No improper driving	Same Direction Sideswipe	1	0		FAU
	VT0040100/0808767	Burlington	1	05/06/2008	08:12	Clear	No improper driving, Disregarded traffic signs, signals, road markings, Inattention	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0040100/0811287	Burlington	1	06/04/2008	00:31	Rain	Followed too closely, Unknown	Rear End	0	0	N	FAU
	VT0040100/08-13528	Burlington	1	06/28/2008	00:18	Clear	Unknown, Failed to yield right of way	Left Turn and Thru, Angle Broadside -->v--	1	0	N	FAU
	VT0040100/08-19439	Burlington	1	08/29/2008	09:45	Unknown	No improper driving, Unknown	Same Direction Sideswipe	0	0	N	FAU
	VT0040100/08BU22026	Burlington	1	09/23/2008	18:56	Clear	Inattention, No improper driving	Rear End	0	0	N	FAU
	VT0040100/08-22612	Burlington	1	09/29/2008	14:50	Cloudy	Inattention, Distracted, No improper driving	Rear End	1	0	S	FAU
	VT0040100/08-16513	Burlington	1	12/07/2008	16:29	Snow	No improper driving	Rear End	0	0	E	FAU
	VT0040100/08-27227	Burlington	UNK	11/21/2008	16:03	Cloudy	Followed too closely, No improper driving	Rear End	0	0	E	FAU
Route: EAST AVE., BURLINGTON												
	VT0040100/083671	Burlington	0	02/25/2008	07:30	Clear	Followed too closely, No improper driving	Rear End	0	0	E	FAU
	VT0040100/08-5665	Burlington	0	03/27/2008	19:40	Clear	Inattention, No improper driving	Rear End	0	0	S	FAU
	VT0040100/2008-21726	Burlington	0	09/20/2008	15:39	Clear	Inattention, No improper driving	Rear End	0	0	N	FAU

Vermont Agency of Transportation

Date: 10/26/2009

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2008 General Yearly Summaries Information

Route: EAST AVE., BURLINGTON Continued ...

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/08BU25043	Burlington	0	10/25/2008	14:01	Rain	No improper driving, Disregarded traffic signs, signals, road markings	Right Turn and Thru, Same Direction Sideswipe/Angle Crash ^^--	0	0		FAU
	VT0040100/2008-25535	Burlington	0	10/31/2008	16:09	Clear	Failed to yield right of way, No improper driving	Same Direction Sideswipe	0	0	S	FAU
	VT0040100/08-29499	Burlington	0	12/23/2008	17:15	Cloudy	No improper driving, Failed to yield right of way	Same Direction Sideswipe	0	0	S	FAU
	VT0040100/2008-20651	Burlington	0.01	09/09/2008	21:08	Clear	No improper driving, Failure to keep in proper lane or running off road	Same Direction Sideswipe	0	0		FAU
	VT0041100/2008-2909	Burlington	0.02	07/09/2008	23:23	Clear	Exceeded authorized speed limit, Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner	Single Vehicle Crash	1	0	S	FAU
	VT0040100/08-2000	Burlington	0.03	01/31/2008	14:32	Clear	Unknown	Left Turn and Thru, Same Direction Sideswipe/Angle Crash vv--	0	0	S	FAU
	VT0040100/2008-1023	Burlington	0.16	01/16/2008	17:57	Clear	Disregarded traffic signs, signals, road markings, Inattention, No improper driving	No Turns, Thru moves only, Broadside ^<	2	0		FAU
	VT0040100/084049	Burlington	0.17	03/07/2008	12:00	Clear	No improper driving, Failure to keep in proper lane or running off road	Same Direction Sideswipe	0	0		FAU
	VT0040100/08-225	Burlington	0.2	01/04/2008	06:10	Cloudy	Other improper action	Rear End	0	0	N	FAU
	VT0040100/08-893	Burlington	0.2	01/14/2008	15:52	Snow	Made an improper turn, No improper driving	Left Turn and Thru, Angle Broadside -->v--	0	0	E	FAU
	VT0040100/08-6516	Burlington	0.2	04/08/2008	15:31	Clear	Followed too closely, No improper driving	Rear End	0	0	E	FAU
	VT0040100/08BU07664	Burlington	0.2	04/22/2008	16:46	Clear	No improper driving	Other	1	0		FAU
	VT0040100/08-23390	Burlington	0.2	10/08/2008	07:49	Clear	Inattention, No improper driving	Rear End	0	0	E	FAU
	VT0040100/2008-15000	Burlington	0.245	07/12/2008	14:45	Clear	Unknown	Opp Direction Sideswipe	0	0	E	FAU
	VT0040100/08-4110	Burlington	0.35	03/03/2008	14:26	Clear	Inattention, No improper driving	Rear End	0	0	N	FAU
	VT0040100/08BU23827	Burlington	0.37	10/12/2008	09:47	Clear	No improper driving, Inattention	No Turns, Thru moves only, Broadside ^<	0	0	S	FAU
	VT0040100/08-24836	Burlington	0.47	10/23/2008	18:47	Clear	Unknown, No improper driving	Rear End	0	0	S	FAU
	VT0040100/20087013	Burlington	0.55	04/14/2008	17:23	Clear	Distracted, Inattention, No improper driving	Rear End	0	0	S	FAU
	VT0040100/08-21710	Burlington	0.55	09/20/2008	10:36	Clear	Inattention, Followed too closely, No improper driving	Rear End	0	0	N	FAU
	VT0040100/08-15241	Burlington	0.66	07/15/2008	17:30	Clear	No improper driving, Other improper action	Rear End	0	0		FAU
	VT0040100/08BU2465	Burlington	0.67	02/08/2008	16:54	Snow	Failed to yield right of way, No improper driving	Left Turn and Thru, Angle Broadside -->v--	1	0		FAU

Route: FLYNN AVE., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/20084787	Burlington	0	03/14/2008	11:13	Clear	Unknown	Other	0	0	N	FAU
	VT0040100/2008-2798	Burlington	0.02	02/12/2008	16:08	Cloudy	Unknown	Rear End	0	0	E	FAU
	VT0040100/08-24426	Burlington	0.08	10/18/2008	23:39	Clear	No improper driving, Under the influence of medication/drugs/alcohol	Rear End	0	0		FAU
	VT0040100/08-28679	Burlington	0.12	12/12/2008	01:00	Rain	Inattention	Rear End	0	0		FAU
	VT0040100/2008-2991	Burlington	0.28	02/15/2008	11:55	Clear	Inattention	Same Direction Sideswipe	0	0		FAU

Route: GROVE ST., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/08-28436	Burlington	0.24	12/08/2008	07:15	Cloudy	No improper driving	Rear End	0	0	W	FAU
	VT0040100/08-20820	Burlington	0.56	09/11/2008	13:58	Clear	Other improper action	Same Direction Sideswipe	0	0		FAU

**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

Vermont Agency of Transportation

Date: 10/26/2009

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2008 General Yearly Summaries Information

Route: S PROSPECT ST., BURLINGTON Continued ...

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/08-24048	Burlington	0.14	11/18/2008	17:43	Cloudy	Failed to yield right of way	No Turns, Thru moves only, Broadside ^<	1	0		FAU
	VT0040100/08BU12544	Burlington	0.29	06/17/2008	14:40	Cloudy	No improper driving, Inattention	Rear End	0	0		FAU
	VT0040100/2008-239	Burlington	0.3	01/04/2008	15:12	Cloudy	No improper driving, Unknown	Rear End	1	0	N	FAU
	VT0040100/2008-15078	Burlington	0.3	07/13/2008	15:15	Rain	Unknown	Opp Direction Sideswipe	0	0	N	FAU
	VT0040100/2008BU22037	Burlington	0.3	09/23/2008	21:55	Clear	Inattention, No improper driving	Rear End	0	0		FAU
	VT0040100/08-28114	Burlington	0.3	12/04/2008	19:27	Cloudy	No improper driving, Disregarded traffic signs, signals, road markings	No Turns, Thru moves only, Broadside ^<	0	0		FAU

Route: S UNION ST., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/0803491	Burlington	0	02/22/2008	14:06	Snow	No improper driving, Followed too closely	Rear End	0	0	W	FAU
	VT0040100/08-28028	Burlington	0	12/03/2008	16:16	Cloudy	No improper driving	Other	0	0		FAU
	VT0040100/200815484	Burlington	0.04	07/18/2008	09:59	Cloudy	Failure to keep in proper lane or running off road, Fatigued, asleep	Single Vehicle Crash	1	0	N	FAU
	VT0040100/08BU22126	Burlington	0.09	09/24/2008	21:45	Clear	Under the influence of medication/drugs/alcohol	Same Direction Sideswipe	0	0		FAU
	VT0040100/08-22522	Burlington	0.16	09/28/2008	09:46	Unknown		Opp Direction Sideswipe	0	0		FAU
	VT0040100/087299	Burlington	0.17	04/18/2008	13:55	Clear	No improper driving, Failed to yield right of way	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	VT0040100/2008-23280	Burlington	0.17	10/06/2008	17:31	Cloudy	Unknown	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	VT0040100/08-6843	Burlington	0.2	04/12/2008	09:44	Rain		Same Direction Sideswipe	0	0		FAU
	VT0040100/08-5062	Burlington	0.3	03/18/2008	03:04	Clear	Unknown	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	VT0040100/2008-19231	Burlington	0.39	08/27/2008	08:15	Clear	Unknown, Failed to yield right of way	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0040100/08-24618	Burlington	0.47	10/21/2008	11:31	Rain	Failed to yield right of way, No improper driving	Left Turn and Thru, Angle Broadside -->v--	0	0	N	FAU
	VT0040100/08-20957	Burlington	0.51	04/12/2008	20:29	Rain	Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner	Left Turns, Same Direction, Rear End v--v--	0	0		FAU
	VT0040100/08-10898	Burlington	0.7	05/30/2008	15:15	Clear	Inattention, No improper driving	Other	0	0	S	FAU
	VT0040100/08-14510	Burlington	0.86	07/07/2008	20:18	Clear		Rear End	0	0		FAU
	VT0040100/08-25280	Burlington	0.86	10/28/2008	19:20	Sleet, Hail (Freezing Rain or Drizzle)	Followed too closely	Rear End	0	0	N	FAU
	VT0040100/08-29216	Burlington	0.86	12/19/2008	17:05	Snow	No improper driving, Followed too closely	Rear End	0	0	N	FAU
	VT0040100/08-27028	Burlington	0.93	11/18/2008	12:10	Snow	No improper driving, Failed to yield right of way	Same Direction Sideswipe	0	0	N	FAU
	VT0040100/08-10833	Burlington	0.99	05/25/2008	19:25	Clear	No improper driving	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0040100/08-25914	Burlington	0.99	11/03/2008	12:10	Unknown	Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner, Other improper action, Wrong side or wrong way, Visibility obstructed	Head On	0	0	N	FAU
	VT0040100/2008-25337	Burlington	1.02	10/29/2008	15:21	Unknown		Other	0	0		FAU
	VT0040100/08-27795	Burlington	1.02	11/30/2008	02:03	Cloudy	Under the influence of medication/drugs/alcohol	Single Vehicle Crash	1	0		FAU

**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2008 General Yearly Summaries Information

Route: S PROSPECT ST., BURLINGTON Continued ...

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/08-24048	Burlington	0.14	11/18/2008	17:43	Cloudy	Failed to yield right of way	No Turns, Thru moves only, Broadside ^<	1	0		FAU
	VT0040100/08BU12544	Burlington	0.29	06/17/2008	14:40	Cloudy	No improper driving, Inattention	Rear End	0	0		FAU
	VT0040100/2008-239	Burlington	0.3	01/04/2008	15:12	Cloudy	No improper driving, Unknown	Rear End	1	0	N	FAU
	VT0040100/2008-15078	Burlington	0.3	07/13/2008	15:15	Rain	Unknown	Opp Direction Sideswipe	0	0	N	FAU
	VT0040100/2008BU22037	Burlington	0.3	09/23/2008	21:55	Clear	Inattention, No improper driving	Rear End	0	0		FAU
	VT0040100/08-28114	Burlington	0.3	12/04/2008	19:27	Cloudy	No improper driving, Disregarded traffic signs, signals, road markings	No Turns, Thru moves only, Broadside ^<	0	0		FAU

Route: S UNION ST., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	VT0040100/0803491	Burlington	0	02/22/2008	14:06	Snow	No improper driving, Followed too closely	Rear End	0	0	W	FAU
	VT0040100/08-28028	Burlington	0	12/03/2008	16:16	Cloudy	No improper driving	Other	0	0		FAU
	VT0040100/200815484	Burlington	0.04	07/18/2008	09:59	Cloudy	Failure to keep in proper lane or running off road, Fatigued, asleep	Single Vehicle Crash	1	0	N	FAU
	VT0040100/08BU22126	Burlington	0.09	09/24/2008	21:45	Clear	Under the influence of medication/drugs/alcohol	Same Direction Sideswipe	0	0		FAU
	VT0040100/08-22522	Burlington	0.16	09/28/2008	09:46	Unknown		Opp Direction Sideswipe	0	0		FAU
	VT0040100/087299	Burlington	0.17	04/18/2008	13:55	Clear	No improper driving, Failed to yield right of way	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	VT0040100/2008-23280	Burlington	0.17	10/06/2008	17:31	Cloudy	Unknown	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	VT0040100/08-6843	Burlington	0.2	04/12/2008	09:44	Rain		Same Direction Sideswipe	0	0		FAU
	VT0040100/08-5062	Burlington	0.3	03/18/2008	03:04	Clear	Unknown	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	VT0040100/2008-19231	Burlington	0.39	08/27/2008	08:15	Clear	Unknown, Failed to yield right of way	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0040100/08-24618	Burlington	0.47	10/21/2008	11:31	Rain	Failed to yield right of way, No improper driving	Left Turn and Thru, Angle Broadside -->v--	0	0	N	FAU
	VT0040100/08-20957	Burlington	0.51	04/12/2008	20:29	Rain	Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner	Left Turns, Same Direction, Rear End v--v--	0	0		FAU
	VT0040100/08-10898	Burlington	0.7	05/30/2008	15:15	Clear	Inattention, No improper driving	Other	0	0	S	FAU
	VT0040100/08-14510	Burlington	0.86	07/07/2008	20:18	Clear		Rear End	0	0		FAU
	VT0040100/08-25280	Burlington	0.86	10/28/2008	19:20	Sleet, Hail (Freezing Rain or Drizzle)	Followed too closely	Rear End	0	0	N	FAU
	VT0040100/08-29216	Burlington	0.86	12/19/2008	17:05	Snow	No improper driving, Followed too closely	Rear End	0	0	N	FAU
	VT0040100/08-27028	Burlington	0.93	11/18/2008	12:10	Snow	No improper driving, Failed to yield right of way	Same Direction Sideswipe	0	0	N	FAU
	VT0040100/08-10833	Burlington	0.99	05/25/2008	19:25	Clear	No improper driving	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	VT0040100/08-25914	Burlington	0.99	11/03/2008	12:10	Unknown	Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner, Other improper action, Wrong side or wrong way, Visibility obstructed	Head On	0	0	N	FAU
	VT0040100/2008-25337	Burlington	1.02	10/29/2008	15:21	Unknown		Other	0	0		FAU
	VT0040100/08-27795	Burlington	1.02	11/30/2008	02:03	Cloudy	Under the influence of medication/drugs/alcohol	Single Vehicle Crash	1	0		FAU

**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

Route: BATTERY ST., BURLINGTON Continued ...

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	0403/1329-07	Burlington	0.47	01/23/2007	17:06	Clear	Unknown, No improper driving	Rear End	0	0	S	FAU
	0403/10435-07	Burlington	0.47	07/25/2007	14:34	Clear	No improper driving, Inattention, Other improper action	Same Direction Sideswipe	0	0	S	FAU
	0403/10175-07	Burlington	0.47	08/06/2007	17:43	Clear	Disregarded traffic signs, signals, road markings, Inattention, No improper driving	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	0403/13263-07	Burlington	0.47	10/11/2007	16:48	Cloudy	Followed too closely, Inattention, No improper driving	Rear End	2	0	N	FAU
	0403/15483-07	Burlington	0.47	11/08/2007	12:51	Cloudy	Visibility obstructed, No improper driving	Right Turn and Thru, Broadside ^<--	0	0		FAU
	0403/7469-07	Burlington	0.54	05/31/2007	17:45	Clear	No improper driving, Inattention, Distracted	Rear End	0	0	N	FAU
	0403/3318-07	Burlington	0.55	02/15/2007	13:00	Not Reported	Driving too fast for conditions, Made an improper turn, No improper driving	Right Turn and Thru, Broadside ^<--	0	0	N	FAU
	0403/8436-07	Burlington	0.55	06/30/2007	14:21	Cloudy	Unknown, No improper driving	Rear End	0	0		FAU

Route: VT. 127 BELTLINE, BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	0403/6698-07	Burlington	0	05/15/2007	07:59	Cloudy	No improper driving, Inattention	Rear End	0	0	S	FAU
	0403/14824-07	Burlington	0	11/10/2007	13:21	Clear	No improper driving, Under the influence of medication/drugs/alcohol	Opp Direction Sideswipe	1	0		FAU
	0403/16222-07	Burlington	0	11/10/2007	13:24	Clear	Unknown	Rear End	0	0	N	FAU
	0403/2916-07	Burlington	0.01	02/11/2007	04:23	Clear	Driving too fast for conditions, Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner	Single Vehicle Crash	1	0	S	FAU
	0403/11079-07	Burlington	0.67	08/30/2007	07:37	Clear	Fatigued, asleep, No improper driving	Same Direction Sideswipe	3	0		FAU
	0403/3031-07	Burlington	1.42	02/23/2007	09:40	Clear	No improper driving, Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc	Same Direction Sideswipe	0	0	S	FAU
	0403/17671-07	Burlington	1.42	12/26/2007	02:07	Clear	Exceeded authorized speed limit, Under the influence of medication/drugs/alcohol	Single Vehicle Crash	1	0		FAU
	0403/8163-07	Burlington	1.58	06/16/2007	23:05	Cloudy	Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc	Same Direction Sideswipe	0	0		MC (FAS)
	0403/8177-07	Burlington	2.63	06/18/2007	12:57	Clear	Unknown	Single Vehicle Crash	0	0	N	FAU
	0403/16511-07	Burlington	3.29	12/17/2007	21:28	Blowing Sand, Soil, Dirt, Snow	No improper driving, Driving too fast for conditions	Right Turn and Thru, Angle Broadside -->^--	0	0	E	FAU
	0403/4908-07	Burlington	3.32	04/03/2007	16:21	Cloudy	Followed too closely, No improper driving	Rear End	0	0	S	FAU
	0403/4512-07	Burlington	3.43	03/23/2007	23:29	Clear	No improper driving, Other improper action	Other	0	0		FAU
	0403/662-07	Burlington	UNK	01/08/2007	13:00	Clear	No improper driving, Wrong side or wrong way	Opp Direction Sideswipe	0	0		FAU
	0403/1316-07	Burlington	UNK	01/10/2007	08:35	Snow	No improper driving	Rear End	0	0		FAU
	0403/856-07	Burlington	UNK	01/21/2007	15:20	Clear	No improper driving	Single Vehicle Crash	0	0	N	Ramp/Spur
	0403/1161-07	Burlington	UNK	01/26/2007	15:15	Clear	Unknown, No improper driving	Rear End	2	0		FAU
	0403/3035-07	Burlington	UNK	02/23/2007	20:38	Cloudy	Inattention	Single Vehicle Crash	0	0	S	Ramp/Spur
	0403/4398-07	Burlington	UNK	03/18/2007	00:30	Snow	Unknown	Single Vehicle Crash	0	0	N	FAU
	0403/16943-07	Burlington	UNK	12/03/2007	15:35	Snow	Failure to keep in proper lane or running off road	Single Vehicle Crash	0	0		FAU

Route: VT. 127 CONNECTOR

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	0403/10353-07	Burlington	0.11	08/10/2007	16:09	Clear	Unknown	Rear End	0	0		FAU
	0403/14079-07	Burlington	0.37	09/22/2007	21:20	Clear	No improper driving	Single Vehicle Crash	0	0		FAU

Route: COLCHESTER AVE., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	0403/6794-07	Burlington	0	05/16/2007	14:03	Rain	Unknown, Failed to yield right of way	Opp Direction Sideswipe	0	0	E	FAU
	0403/13450-07	Burlington	0	10/12/2007	16:19	Cloudy	Inattention, No improper driving	Rear End	0	0	W	FAU
	0403/15693-07	Burlington	0	12/06/2007	11:55	Clear	No improper driving, Followed too closely	Rear End	0	0		FAU
	0403/6666-07	Burlington	0.01	05/07/2007	07:50	Clear	Unknown	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	0403/1141-07	Burlington	0.02	01/17/2007	14:26	Cloudy	Visibility obstructed, No improper driving	No Turns, Thru moves only, Broadside ^<	0	0	N	FAU
	0403/7855-07	Burlington	0.05	05/31/2007	16:48	Clear	Unknown, No improper driving	Same Direction Sideswipe	0	0	E	FAU
	0403/12762-07	Burlington	0.05	10/02/2007	17:30	Clear	Other improper action, No improper driving	Right Turn and Thru, Angle Broadside -->^--	0	0	E	FAU
	0403/5314-07	Burlington	0.1	02/19/2007	16:45	Unknown	Unknown	Same Direction Sideswipe	0	0	W	FAU
	0403/6155-07	Burlington	0.1	03/15/2007	17:50	Unknown	No improper driving, Followed too closely	Rear End	1	0		FAU
	0403/11479-07	Burlington	0.1	09/05/2007	14:42	Clear	No improper driving, Inattention	Rear End	0	0	N	FAU

**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2007 General Yearly Summaries Information

Route: COLCHESTER AVE., BURLINGTON Continued ...

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	0403/13634-07	Burlington	0.1	09/23/2007	18:05	Clear	No improper driving, Other improper action	Same Direction Sideswipe	0	0	E	FAU
	0403/10778-07	Burlington	0.11	08/14/2007	15:30	Clear	Distracted, Other improper action, No improper driving	Same Direction Sideswipe	0	0	E	FAU
	0403/2044-07	Burlington	0.14	02/05/2007	15:50	Cloudy	No improper driving, Followed too closely	Rear End	0	0	E	FAU
	0403/6653-07	Burlington	0.14	05/01/2007	16:45	Clear	No improper driving, Failed to yield right of way	No Turns, Thru moves only, Broadside ^<	2	0		FAU
	0403/1327-07	Burlington	0.15	01/22/2007	15:06	Cloudy	Followed too closely, Other improper action, No improper driving	Rear End	0	0	E	FAU
	0403/3368-07	Burlington	0.16	03/05/2007	12:03	Clear	No improper driving, Visibility obstructed	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	0403/3334-07	Burlington	0.19	02/16/2007	16:45	Unknown	Unknown, No improper driving	Same Direction Sideswipe	0	0	N	FAU
	0403/10686-07	Burlington	0.19	08/20/2007	16:02	Clear	Inattention	Rear End	0	0	N	FAU
	0403/12062-07	Burlington	0.19	09/09/2007	15:56	Rain	No improper driving, Followed too closely	Rear End	0	0		FAU
	0403/18210-07	Burlington	0.19	12/11/2007	18:16	Snow	Driving too fast for conditions, Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc, No improper driving	Same Direction Sideswipe	0	0	W	FAU
	0403/17638-07	Burlington	0.19	12/31/2007	14:17	Snow	No improper driving	Single Vehicle Crash	0	0	N	FAU
	0403/5336-07	Burlington	0.21	03/30/2007	08:42	Cloudy	Unknown, No improper driving	Rear End	0	0	W	FAU
	0403/7291-07	Burlington	0.24	06/02/2007	13:15	Cloudy	Unknown, Inattention	Rear End	0	0		FAU
	0403/4438-07	Burlington	0.27	03/06/2007	11:06	Clear	Inattention, No improper driving	Rear End	0	0	E	FAU
	0403/5928-07	Burlington	0.27	04/13/2007	09:46	Clear	No improper driving, Unknown	Rear End	0	0		FAU
	0403/6792-07	Burlington	0.27	05/15/2007	13:28	Cloudy	Distracted, No improper driving	Rear End	0	0	W	FAU
	0403/8158-07	Burlington	0.27	06/15/2007	09:39	Clear	No improper driving	Rear End	0	0		FAU
	0403/18027-07	Burlington	0.27	11/20/2007	16:03	Clear	No improper driving, Failed to yield right of way	Opp Direction Sideswipe	0	0	E	FAU
	0403/17865-07	Burlington	0.33	12/07/2007	07:45	Clear	Unknown	Single Vehicle Crash	0	0		FAU
	0403/11528-07	Burlington	0.43	09/04/2007	14:40	Clear	No improper driving, Inattention	Rear End	0	0		FAU
	0403/297-07	Burlington	0.44	01/04/2007	15:40	Clear	Inattention, No improper driving	Rear End	0	0	E	FAU
	0403/489-07	Burlington	0.44	01/14/2007	01:54	Clear	Under the influence of medication/drugs/alcohol, Failed to yield right of way	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	0403/4442-07	Burlington	0.44	03/09/2007	17:57	Clear	Inattention, No improper driving	Rear End	0	0	W	FAU
	0403/5340-07	Burlington	0.44	04/01/2007	08:40	Unknown	No improper driving, Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc	Opp Direction Sideswipe	0	0	N	FAU
	0403/17598-07	Burlington	0.44	11/26/2007	17:25	Rain	Followed too closely, Inattention, No improper driving, Unknown	Rear End	0	0	E	FAU
	0403/2141-07	Burlington	0.46	02/09/2007	18:45	Cloudy		Rear End	0	0		FAU
	0403/13537-07	Burlington	0.62	10/25/2007	10:00	Clear	Failure to keep in proper lane or running off road	Same Direction Sideswipe	1	0		FAU
	0403/17674-07	Burlington	0.63	12/19/2007	12:05	Cloudy	Unknown	Opp Direction Sideswipe	0	0	E	FAU
	0403/5497-07	Burlington	0.66	04/09/2007	14:03	Clear		Same Direction Sideswipe	0	0		FAU
	0403/11452-07	Burlington	0.86	08/27/2007	17:02	Clear	Failure to keep in proper lane or running off road, Under the influence of medication/drugs/alcohol	Single Vehicle Crash	1	0		FAU
	0403/15458-07	Burlington	0.88	11/13/2007	17:46	Clear	Inattention	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	0403/397-07	Burlington	0.9	01/10/2007	10:10	Snow	Driving too fast for conditions, No improper driving	Rear End	0	0	W	FAU
	0403/2482-07	Burlington	0.9	02/09/2007	17:37	Cloudy	Unknown, No improper driving	Rear End	0	0	E	FAU
	0403/9212-07	Burlington	0.9	04/27/2007	20:00	Cloudy	Under the influence of medication/drugs/alcohol, Followed too closely, No improper driving	Rear End	1	0	E	FAU
	0403/184-07	Burlington	0.94	01/03/2007	21:39	Clear	Inattention, No improper driving	Rear End	0	0	N	FAU
	0403/13446-07	Burlington	0.99	10/14/2007	08:02	Cloudy	Inattention, No improper driving	Rear End	0	0	E	FAU
	0403/1012-07	Burlington	1	01/02/2007	21:13	Clear	Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner, Other improper action	Single Vehicle Crash	0	0	E	FAU
	0418/707-07	Burlington	1	01/10/2007	08:38	Snow	Driving too fast for conditions, No improper driving	Rear End	1	0	N	FAU
	0403/2930-07	Burlington	1	02/16/2007	17:15	Snow	No improper driving, Unknown	Rear End	0	0	N	FAU
	0403/3238-07	Burlington	1	03/01/2007	11:41	Clear	Followed too closely, No improper driving	Rear End	0	0		FAU

**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2007 General Yearly Summaries Information

Route: COLCHESTER AVE., BURLINGTON Continued ...

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	0403/4506-07	Burlington	1	03/15/2007	07:45	Unknown	No improper driving	Rear End	0	0		FAU
	0403/8183-07	Burlington	1	06/23/2007	09:50	Clear	Unknown	Same Direction Sideswipe	0	0	W	FAU
	0403/12085-07	Burlington	1	09/17/2007	17:39	Clear	No improper driving, Inattention	Rear End	0	0	N	FAU
	0403/16956-07	Burlington	1	12/17/2007	11:10	Clear	No improper driving, Driving too fast for conditions, Inattention	Rear End	0	0		FAU
	0403/16900-07	Burlington	1	12/23/2007	19:00	Rain	Failed to yield right of way, Made an improper turn, No improper driving	Head On	0	0	E	FAU
	0403/1448-07	Burlington	1.01	01/28/2007	16:50	Clear	Driving too fast for conditions, No improper driving	Rear End	0	0	W	FAU
	0403/651-07	Burlington	1.03	01/16/2007	10:25	Snow	No improper driving	Other	0	0		FAU
	0403/7483-07	Burlington	1.03	06/05/2007	19:56	Clear	Inattention, Followed too closely, No improper driving	Rear End	0	0		FAU
	0403/8466-07	Burlington	1.03	06/19/2007	09:00	Clear	Unknown	Opp Direction Sideswipe	0	0		FAU
	0403/13072-07	Burlington	1.039	09/30/2007	11:17	Clear	No improper driving, Inattention	Rear End	0	0	W	FAU

Route: EAST AVE., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	0403/1617-07	Burlington	0	02/02/2007	16:47	Cloudy	Inattention, No improper driving	Rear End	1	0		FAU
	0403/4495-07	Burlington	0	02/27/2007	09:30	Clear	No improper driving, Inattention, Other improper action	Rear End	0	0	S	FAU
	0403/11282-07	Burlington	0	08/25/2007	19:01	Cloudy	Unknown	Same Direction Sideswipe	0	0		FAU
	0403/14659-07	Burlington	0	11/04/2007	09:42	Cloudy	Unknown	Same Direction Sideswipe	0	0	S	FAU
	0403/15512-07	Burlington	0	11/28/2007	15:45	Cloudy	No improper driving, Inattention	Same Direction Sideswipe	0	0	S	FAU
	0403/17869-07	Burlington	0	12/20/2007	17:32	Clear	No improper driving, Disregarded traffic signs, signals, road markings	Same Direction Sideswipe	0	0		FAU
	0403/4293-07	Burlington	0.01	02/20/2007	18:42	Cloudy	Other improper action	Same Direction Sideswipe	0	0		FAU
	0403/15485-07	Burlington	0.02	11/15/2007	16:58	Rain	No improper driving, Failed to yield right of way	No Turns, Thru moves only, Broadside ^<	0	0	S	FAU
	0403/8840-07	Burlington	0.12	06/23/2007	16:36	Clear	Other improper action, No improper driving	Rear End	0	0	E	FAU
	0403/1399-07	Burlington	0.17	01/30/2007	17:32	Clear	No improper driving, Failed to yield right of way, Inattention	Left Turn and Thru, Angle Broadside -->v--	0	0	N	FAU
	0403/7760-07	Burlington	0.17	06/13/2007	14:25	Clear	Inattention, No improper driving	Rear End	1	0	S	FAU
	0403/9159-07	Burlington	0.17	07/17/2007	17:12	Clear	Unknown, No improper driving	Same Direction Sideswipe	0	0	S	FAU
	0403/10018-07	Burlington	0.17	08/02/2007	17:50	Clear	Inattention, No improper driving	Rear End	1	0	N	FAU
	0403/14648-07	Burlington	0.17	09/28/2007	16:00	Clear	No improper driving, Unknown	Same Direction Sideswipe	0	0	S	FAU
	0403/13716-07	Burlington	0.17	10/16/2007	16:00	Cloudy	No improper driving, Inattention	Rear End	0	0	E	FAU
	0403/14174-07	Burlington	0.17	11/06/2007	16:44	Cloudy	Unknown	Same Direction Sideswipe	0	0	S	FAU
	0403/17875-07	Burlington	0.17	12/11/2007	18:32	Sleet, Hail (Freezing Rain or Drizzle)	Disregarded traffic signs, signals, road markings, Distracted, No improper driving	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	0403/5840-07	Burlington	0.2	04/25/2007	16:39	Unknown	Driving too fast for conditions, Unknown	Head On	0	0	N	FAU
	0403/6696-07	Burlington	0.2	05/14/2007	08:22	Clear	Failure to keep in proper lane or running off road, No improper driving	Same Direction Sideswipe	0	0	E	FAU
	0403/3243-07	Burlington	0.42	03/02/2007	14:53	Snow	Inattention, Followed too closely, No improper driving	Rear End	2	0	S	FAU
	0403/16609-07	Burlington	0.42	12/19/2007	08:35	Clear	Inattention, Operating defective equipment, No improper driving	Rear End	0	0		FAU
	0403/5914-07	Burlington	0.52	04/20/2007	15:28	Clear	No improper driving, Inattention	No Turns, Thru moves only, Broadside ^<	1	0		FAU
	0403/17630-07	Burlington	0.55	11/29/2007	16:38	Cloudy	No improper driving, Unknown	Rear End	0	0		FAU
	0403/8768-07	Burlington	0.65	06/26/2007	16:40	Clear	No improper driving, Unknown, Followed too closely, Distracted	Rear End	3	0	N	FAU
	0403/390-07	Burlington	0.67	01/10/2007	07:53	Snow	Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc, No improper driving	Rear End	0	0	E	FAU
	0403/2314-07	Burlington	0.67	02/13/2007	16:30	Cloudy	No improper driving, Followed too closely	Rear End	0	0	N	FAU
	0403/10351-07	Burlington	0.67	08/09/2007	10:56	Clear	No improper driving, Unknown	Same Direction Sideswipe	0	0		FAU
	0403/15982-07	Burlington	0.67	12/12/2007	09:11	Cloudy	Followed too closely, Unknown, No improper driving	Rear End	0	0	S	FAU

Route: FLYNN AVE., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	0403/4970-07	Burlington	0	01/26/2007	23:18	Clear	Unknown	Single Vehicle Crash	0	0		FAU
	0403/2237-07	Burlington	0	02/15/2007	10:00	Clear	No improper driving, Other improper action	Rear End	0	0	W	FAU

**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2007 General Yearly Summaries Information

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
Route: PEARL ST., BURLINGTON Continued ...												
	0403/5352-07	Burlington	0.69	04/09/2007	12:09	Cloudy	No improper driving, Inattention, Followed too closely	Rear End	1	0	E	FAU
	0403/9238-07	Burlington	0.69	07/03/2007	23:53	Clear	No improper driving	Single Vehicle Crash	1	0		FAU
	0403/10074-07	Burlington	0.69	08/04/2007		Clear	Unknown	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	0403/18196-07	Burlington	0.69	09/25/2007	14:33	Not Reported	No improper driving	Rear End	0	0		FAU
	0403/17872-07	Burlington	0.69	12/11/2007	20:06	Snow	No improper driving, Followed too closely, Operating defective equipment	Rear End	1	0	W	FAU
	0403/12073-07	Burlington	0.7	09/13/2007	18:00	Clear	Unknown	Rear End	0	0		FAU
	0403/9233-07	Burlington	0.71	07/01/2007	08:30	Clear	Made an improper turn	No Turns, Thru moves only, Broadside ^<	0	0	N	FAU
	0403/2374-07	Burlington	0.72	02/16/2007	10:44	Clear	Followed too closely, No improper driving	Rear End	0	0	W	FAU
	0403/5485-07	Burlington	0.72	04/05/2007	16:30	Cloudy	No improper driving, Distracted, Inattention	Rear End	0	0	W	FAU
	0403/3314-07	Burlington	0.74	02/10/2007	13:28	Cloudy	Followed too closely, Unknown, No improper driving	Rear End	0	0	E	FAU
	0403/13241-07	Burlington	0.76	09/05/2007	14:11	Clear	Failed to yield right of way, No improper driving	No Turns, Thru moves only, Broadside ^<	0	0	S	FAU
	0403/6651-07	Burlington	0.78	05/01/2007	07:08	Clear	Inattention	Same Direction Sideswipe	0	0		FAU
	0403/8809-07	Burlington	0.79	05/24/2007	14:09	Clear	Followed too closely, No improper driving	Rear End	1	0		FAU
	0403/4215-07	Burlington	0.8	03/04/2007	18:41	Snow	No improper driving	Rear End	0	0	E	FAU
	0403/4448-07	Burlington	0.8	03/15/2007	07:29	Rain	No improper driving	Same Direction Sideswipe	0	0	W	FAU
	0403/11441-07	Burlington	0.8	08/31/2007	17:02	Clear	No improper driving, Followed too closely	Rear End	0	0		FAU
	0403/14667-07	Burlington	0.8	11/15/2007	17:37	Rain	No improper driving, Driving too fast for conditions, Operating defective equipment	Rear End	0	0	E	FAU
	0403/11285-07	Burlington	0.82	08/28/2007	21:56	Clear	Unknown	Single Vehicle Crash	1	0		FAU
	0403/13029-07	Burlington	0.83	10/11/2007	17:18	Clear	No improper driving, Under the influence of medication/drugs/alcohol, Fatigued, asleep	Rear End	1	0	W	FAU
	0403/1672-07	Burlington	0.88	02/02/2007	07:45	Clear	Operating defective equipment, No improper driving	Rear End	0	0		FAU
	0405/15501-07	Burlington	0.88	11/08/2007	19:27	Rain	Inattention, No improper driving	Rear End	0	0	E	FAU
	0403/11934-07	Burlington	0.89	09/18/2007	13:11	Clear	Unknown	Left Turn and Thru, Angle Broadside -->v--	0	0	E	FAU
	0403/16580-07	Burlington	0.89	12/18/2007	12:44	Clear	No improper driving, Distracted	Rear End	0	0	E	FAU
	0403/15466-07	Burlington	0.9	11/28/2007	17:55	Clear	Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc, No improper driving	Rear End	1	0	W	FAU
	0403/1314-07	Burlington	0.93	01/09/2007	17:59	Clear	Unknown	Left Turn and Thru, Angle Broadside -->v--	0	0		FAU
	0403/1063-07	Burlington	0.93	01/23/2007	17:32	Clear	No improper driving, Followed too closely	Rear End	0	0	W	FAU
	0403/13271-07	Burlington	0.93	10/05/2007	08:50	Clear	Followed too closely, No improper driving	Rear End	0	0	W	FAU
	0403/14099-07	Burlington	0.93	10/12/2007	01:37	Rain	Driving too fast for conditions	Head On	1	0		FAU
	0403/15505-07	Burlington	0.93	11/30/2007	16:37	Clear	Inattention, Other improper action, No improper driving	Rear End	0	0	E	FAU
	0403/1109-07	Burlington	0.94	01/18/2007	18:23	Clear	Made an improper turn, No improper driving	No Turns, Thru moves only, Broadside ^<	0	0	N	FAU
	0403/1677-07	Burlington	0.94	02/02/2007	19:30	Snow	No improper driving, Unknown	Rear End	1	0	E	FAU
	0403/2041-07	Burlington	0.94	02/06/2007	15:33	Clear	Followed too closely, No improper driving	Rear End	0	0	E	FAU
	0403/3046-07	Burlington	0.94	02/21/2007	19:39	Cloudy	No improper driving, Failed to yield right of way	Left Turn and Thru, Angle Broadside -->v--	0	0	E	FAU
	0403/8268-07	Burlington	0.94	06/28/2007	12:25	Cloudy	No improper driving, Failed to yield right of way	Left Turn and Thru, Angle Broadside -->v--	1	0	S	FAU
	0403/13639-07	Burlington	UNK	10/26/2007	08:12	Clear	No improper driving	Same Direction Sideswipe	0	0		FAU
Route: PINE ST., BURLINGTON												
	0403/630-07	Burlington	0	01/17/2007	08:02	Clear	Inattention, No improper driving	Same Direction Sideswipe	0	0	S	FAU
	0403/1287-07	Burlington	0	01/27/2007	08:00	Clear	Failed to yield right of way, No improper driving	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	0403/4172-07	Burlington	0	02/18/2007	00:09	Clear	Failed to yield right of way, Under the influence of medication/drugs/alcohol	No Turns, Thru moves only, Broadside ^<	0	0	N	FAU
	0403/12963-07	Burlington	0	10/11/2007	13:30	Cloudy	No improper driving, Inattention	No Turns, Thru moves only, Broadside ^<	0	0		FAU
	0403/17362-07	Burlington	0	12/16/2007	11:50	Clear	Driving too fast for conditions, No improper driving	No Turns, Thru moves only, Broadside ^<	0	0	S	FAU
	0403/2841-07	Burlington	0.11	02/17/2007	10:30	Unknown	Unknown, No improper driving	Rear End	0	0		FAU
	0403/14339-07	Burlington	0.11	11/12/2007	10:10	Clear	No improper driving, Distracted	Rear End	1	0		FAU
	0403/8862-07	Burlington	0.17	07/07/2007	09:00	Cloudy	Inattention, Failure to keep in proper lane or running off road	Same Direction Sideswipe	0	0	S	FAU
	0403/3756-07	Burlington	0.2	02/28/2007	11:15	Clear	Inattention, No improper driving	Rear End	0	0	N	FAU
	0403/7280-07	Burlington	0.24	05/28/2007	01:35	Clear	No improper driving, Inattention	Rear End	0	0		FAU

**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

2007 General Yearly Summaries Information

Route: SHERMAN ST., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	0403/4868-07	Burlington	0	01/30/2007	15:00	Cloudy	No improper driving, Followed too closely	Rear End	0	0	E	FAU
	0403/13360-07	Burlington	0	10/21/2007	17:05	Cloudy	Unknown	Rear End	0	0		FAU

Route: S PROSPECT ST., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	0403/3676-07	Burlington	0	03/08/2007	14:40	Clear	Followed too closely, No improper driving	Rear End	0	0	S	FAU
	0403/9235-07	Burlington	0	06/27/2007	15:06	Clear	Failed to yield right of way	No Turns, Thru moves only, Broadside ^<	0	0	N	FAU
	0403/13895-07	Burlington	0	10/10/2007	08:06	Clear	No improper driving, Inattention	Rear End	0	0	N	FAU
	0403/3345-07	Burlington	0.06	02/20/2007	12:21	Cloudy	No improper driving		0	0		FAU
	0403/3734-07	Burlington	0.08	03/02/2007	15:58	Snow	Unknown, No improper driving	Rear End	0	0	N	FAU
	0403/2147-07	Burlington	0.09	02/10/2007	18:38	Clear	Other improper action, No improper driving	Same Direction Sideswipe	0	0		FAU
	0403/2492-07	Burlington	0.09	02/16/2007	12:30	Clear	No improper driving	Rear End	0	0	N	FAU
	0403/4907-07	Burlington	0.09	04/03/2007	12:15	Cloudy	Inattention, No improper driving	Rear End	0	0	S	FAU
	0403/13315-07	Burlington	0.23	10/22/2007	11:06	Clear	No improper driving, Failed to yield right of way, Inattention	Same Direction Sideswipe	0	0	S	FAU
	0403/4200-07	Burlington	0.26	03/07/2007	09:15	Clear	No improper driving, Followed too closely	Rear End	0	0	N	FAU
	0403/12517-07	Burlington	0.29	09/24/2007	15:44	Clear	Unknown	Rear End	0	0	N	FAU
	0403/11702-07	Burlington	0.3	09/10/2007	11:10	Clear	No improper driving	Single Vehicle Crash	1	0		FAU
	0403/12505-07	Burlington	0.3	09/14/2007	11:25	Cloudy	No improper driving, Inattention, Other improper action	Same Direction Sideswipe	2	0		FAU
	0403/13439-07	Burlington	0.3	10/17/2007		Clear	No improper driving, Failed to yield right of way	Left Turn and Thru, Broadside v<--	0	0		FAU

Route: S UNION ST., BURLINGTON

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	0403/16833-07	Burlington	0	12/12/2007	00:33	Snow	Failure to keep in proper lane or running off road	Opp Direction Sideswipe	0	0	N	FAU
	0403/16664-07	Burlington	0	12/19/2007	12:10	Cloudy	No improper driving	Right Turn and Thru, Angle Broadside -->^--	0	0		FAU
	0403/3733-07	Burlington	0.4	03/02/2007	07:13	Snow	No improper driving	Rear End	0	0	N	FAU
	0403/17374-07	Burlington	0.5	12/22/2007	16:18	Cloudy		Same Direction Sideswipe	0	0		FAU
	0403/16216-07	Burlington	0.54	10/21/2007	14:28	Clear	Unknown	Other	0	0		FAU
	0403/11440-07	Burlington	0.63	09/04/2007	11:46	Clear	Unknown	Rear End	0	0	N	FAU
	0403/13270-07	Burlington	0.63	10/04/2007	12:25	Clear	No improper driving	Rear End	0	0		FAU
	0403/2496-07	Burlington	0.69	02/16/2007	13:40	Cloudy	No improper driving	Rear End	0	0	N	FAU
	0403/9659-07	Burlington	0.69	07/16/2007	17:35	Unknown	Unknown, Inattention	Rear-to-rear	0	0	N	FAU
	0403/10121-07	Burlington	0.78	08/02/2007	17:00	Unknown	Unknown	Left Turn and Thru, Same Direction Sideswipe/Angle Crash vv--	0	0		FAU
	0403/13045-07	Burlington	0.78	10/12/2007	02:05	Rain	No improper driving, Disregarded traffic signs, signals, road markings, Technology Related Distraction	No Turns, Thru moves only, Broadside ^<	0	0	E	FAU
	0403/10795-07	Burlington	0.86	08/21/2007	02:00	Unknown		Other	0	0		FAU
	0403/2158-07	Burlington	0.88	02/13/2007	21:20	Cloudy		Same Direction Sideswipe	0	0		FAU
	0403/5754-07	Burlington	0.98	03/26/2007	17:33	Clear	Inattention, No improper driving	Rear End	0	0		FAU
	0403/4425-07	Burlington	1.04	02/18/2007	05:00	Snow	Other improper action	Other	0	0		FAU
	0403/364-07	Burlington	1.09	01/07/2007	14:30	Clear	Other improper action, No improper driving	Rear End	0	0	N	FAU
	0403/663-07	Burlington	1.09	01/09/2007	14:37	Unknown	Unknown	Same Direction Sideswipe	0	0		FAU
	0403/11055-07	Burlington	1.09	07/28/2007	22:59	Clear	No improper driving, Under the influence of medication/drugs/alcohol, Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner	Same Direction Sideswipe	0	0		FAU
	0403/10783-07	Burlington	1.09	08/09/2007	21:33	Clear	Failed to yield right of way	Single Vehicle Crash	1	0		FAU
	0403/17284-07	Burlington	1.09	10/26/2007	13:10	Clear	Unknown	Same Direction Sideswipe	0	0		FAU

Route: E SPRING ST., WINOOSKI CITY

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Direction	Road Group
	0418/9006-07	Winooski City	0	07/09/2007	19:06	Not Reported	No improper driving, Failed to yield right of way	Same Direction Sideswipe	0	0	W	FAU
	0418/16970-07	Winooski City	0.06	11/29/2007	19:05	Cloudy	Other improper action	Opp Direction Sideswipe	0	0	E	FAU
	0418/4623-07	Winooski City	0.12	03/27/2007	16:37	Cloudy	No improper driving, Failed to yield right of way	Left Turn and Thru, Angle Broadside -->v--	0	0	N	FAU
	0418/1270-07	Winooski City	0.19	01/01/2007	07:11	Cloudy	Failure to keep in proper lane or running off road	Single Vehicle Crash	0	0	W	FAU
	0418/9827-07	Winooski City	0.21	07/23/2007	21:14	Clear	No improper driving, Under the influence of medication/drugs/alcohol, Inattention	Rear End	0	0		FAU
	0418/2596-07	Winooski City	0.26	02/19/2007	08:20	Rain	Followed too closely, No improper driving	Rear End	0	0	W	FAU

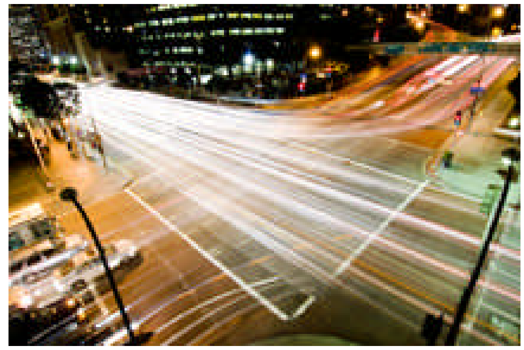
**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

APPENDIX C

EXISTING CONDITIONS REPORT

In partnership with:

LandWorks



Colchester Avenue Corridor Plan

Project Memo 1: Existing Conditions

May 2010

DATA ■ ANALYSIS ■ SOLUTIONS

COLCHESTER AVENUE CORRIDOR PLAN

PROJECT MEMO 1: CURRENT CONDITIONS AND PERFORMANCE

TABLE OF CONTENTS

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1.0 INTRODUCTION

This project memorandum describes and evaluates the current transportation system and land use conditions for the Colchester Avenue corridor in Burlington, VT. It is the first step to developing a multi-modal transportation plan for the corridor. The development of the corridor plan is currently proceeding through a series of seven tasks, as shown in Table 1.

Table 1: Colchester Avenue Corridor Plan Scope of Work

Task 1: Establish Study Goals and Define Corridor Boundaries
Task 2: Analyze Current Conditions and Performance
Task 3: Analyze Future Conditions and Performance
Task 4: Establish Future Vision, Goals and Objectives
Task 5: Identify, Evaluate and Prioritize Strategies
Task 6: Develop Implementation Plan
Task 7: Finalize Corridor Plan

This project memorandum addresses Task 2 and includes the following major sections:

- Project Overview and Study Area
- Review of Previous Plans
- Transportation System Characteristics
- Land Use Characteristics
- Corridor Demographics
- Transportation Demand and System Performance

The Colchester Avenue Corridor Plan is a joint effort of the Chittenden County Metropolitan Planning Organization (CCMPO), the City of Burlington, the Campus Area Transportation Management Association (CATMA), Chittenden County Transportation Authority (CCTA), business owners in the corridor and local residents.

1.1 Study Area and Project Overview

The study area is centered on Colchester Avenue between its intersections with Riverside Avenue near the Winooski River and Prospect Street to the west. Figure 1 presents the study area relative to the surrounding network and Figure 2 presents the core study area.

Colchester Avenue is a major arterial in the City of Burlington that connects the city and its waterfront with areas in the North and East, providing regional connectivity and accommodating a significant amount of through traffic. Colchester Avenue also provides access to the University of Vermont (UVM), Fletcher Allen Health Care (FAHC), area neighborhoods and residences and businesses in the corridor. The multiple functions and multimodal character of this corridor present a challenge on how to balance mobility, access and safety for all corridor users including vehicles, buses, bicyclists and pedestrians.

Sections of the Colchester Avenue corridor have been designed to accommodate a significant amount of through traffic. Arguably, this design serves the adjacent neighborhoods, employees and students as well by providing a connection to other parts of the City and points beyond. However, it can also create a barrier to local circulation and access particularly for those traveling by foot or bike, and the volume and speed of traffic it carries create other negative impacts related to safety, noise and community character. This juxtaposition as a regional route and neighborhood/campus street creates multiple conflicts and opportunities.

Over the last five years, there has been a significant amount of planning that focused on, or addressed to some extent, these issues. The most recent planning efforts, which are summarized in Section 2.0 below, include the recommendations of the Colchester Avenue Task Force and the Draft Burlington Transportation Plan. UVM and FAHC planning efforts are also particularly important and relevant, especially given UVM's acquisition of the Trinity campus on the north side of the corridor and the need for emergency vehicle access to FAHC.

The purpose of this corridor plan is to refine and analyze the existing list of specific recommendations and general strategies, supplement the list with new ideas, and most importantly, provide a launching point from which the City can begin implementing the highest priority projects in partnership with the other stakeholders in the corridor.

Figure 1: Regional context of study area

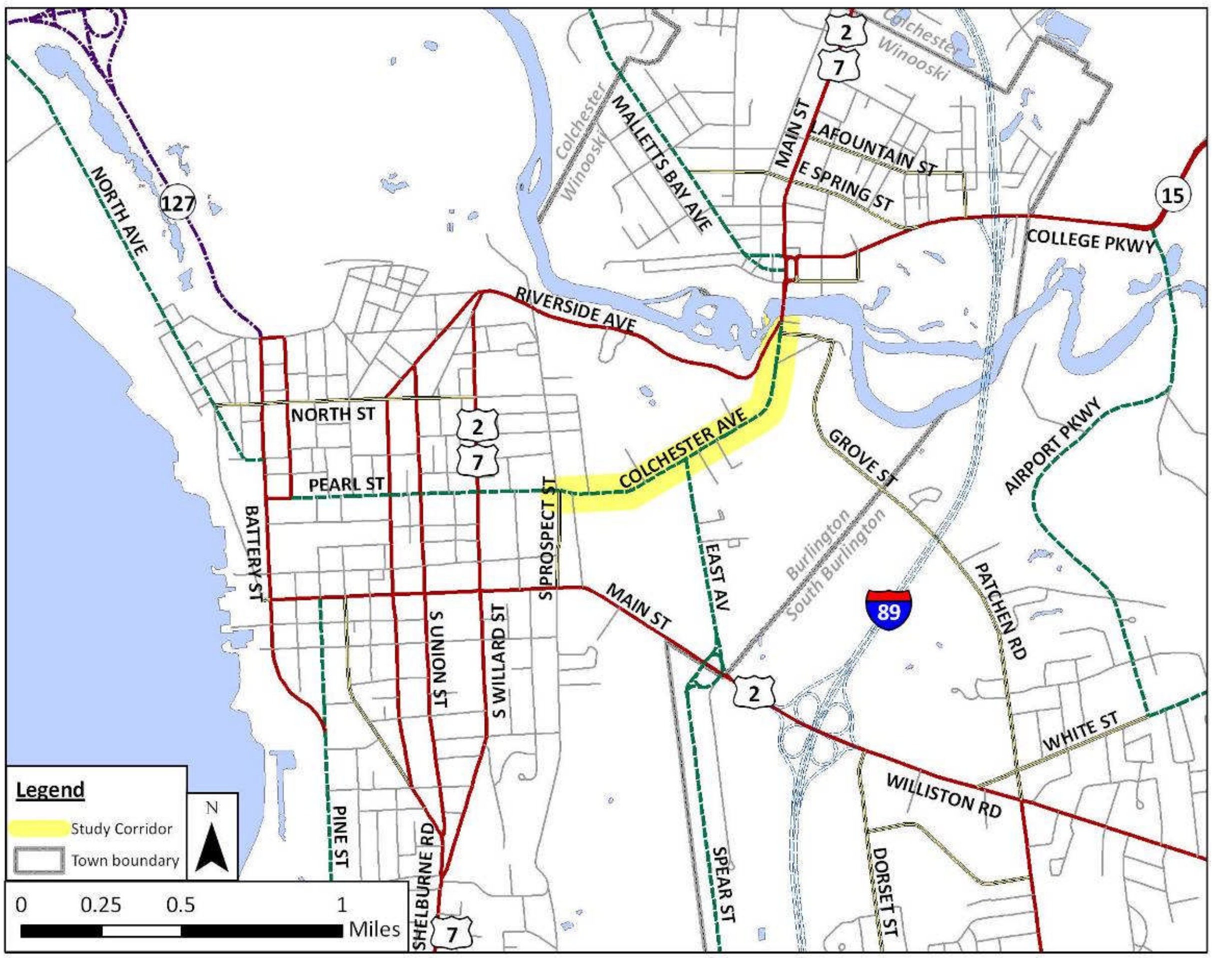
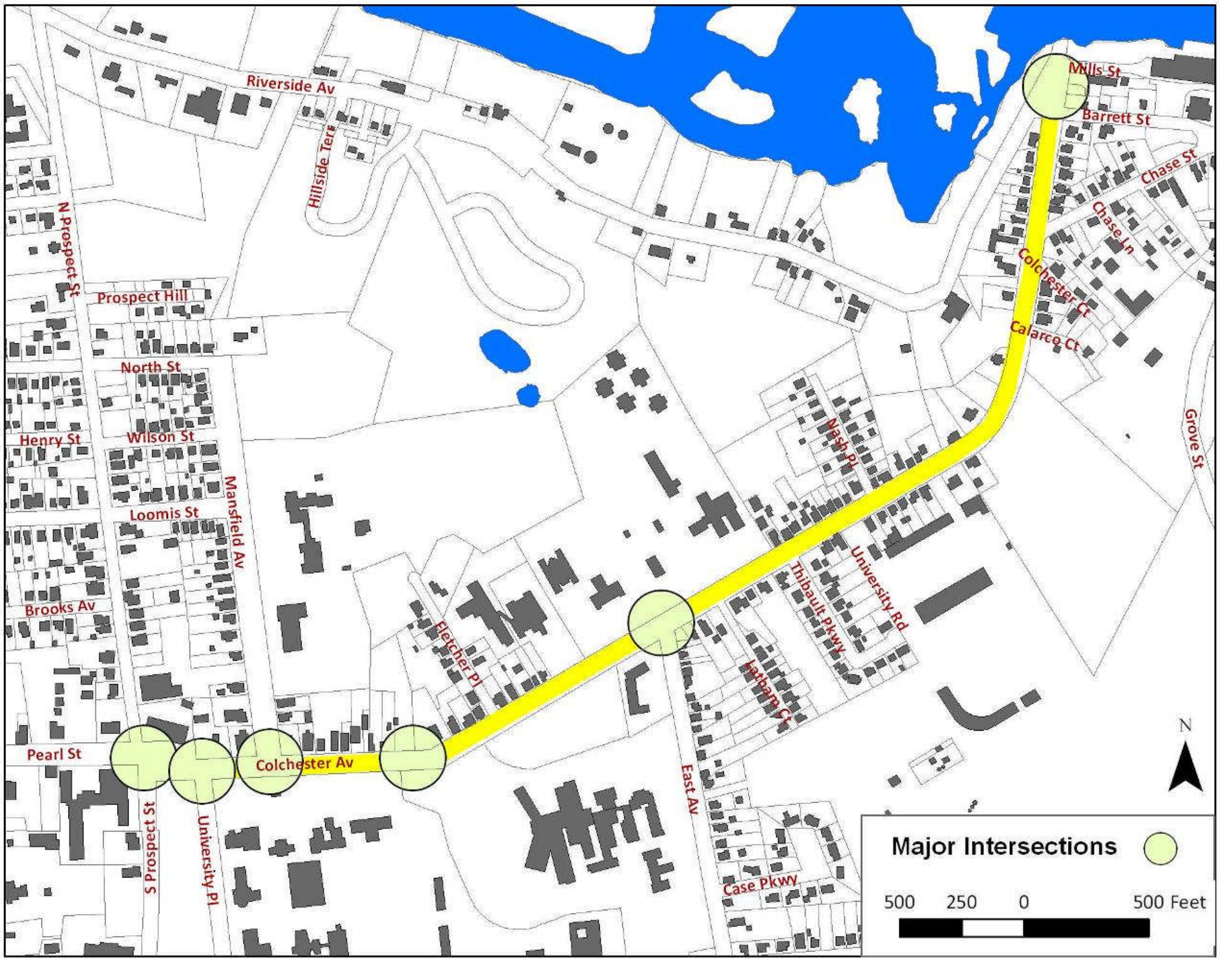


Figure 2: Project study area



2.0 SUMMARY OF PREVIOUS PLANS

Previous work has established the context for this plan with an overall vision for transportation in the City, neighborhood objectives specific to the corridor and progress indicators that can be used in the evaluation of strategies. Most importantly, the Colchester Avenue Task Force Report and the Burlington Transportation Plan, through an extensive public process, developed ideas and recommendations that will be carried forward as we focus even more intently on Colchester Avenue. This section reviews planning documents (in chronological order) that are significant to the Colchester Avenue corridor.

Burlington Area Tri-Center Transit Study (1996)

VTrans, the Chittenden County Regional Planning Commission (CCRPC), Chittenden County Transportation Authority (CCTA), and CATMA studied ways to improve transit linkages between the downtown commercial cores of Burlington, South Burlington, and Winooski, as shown in

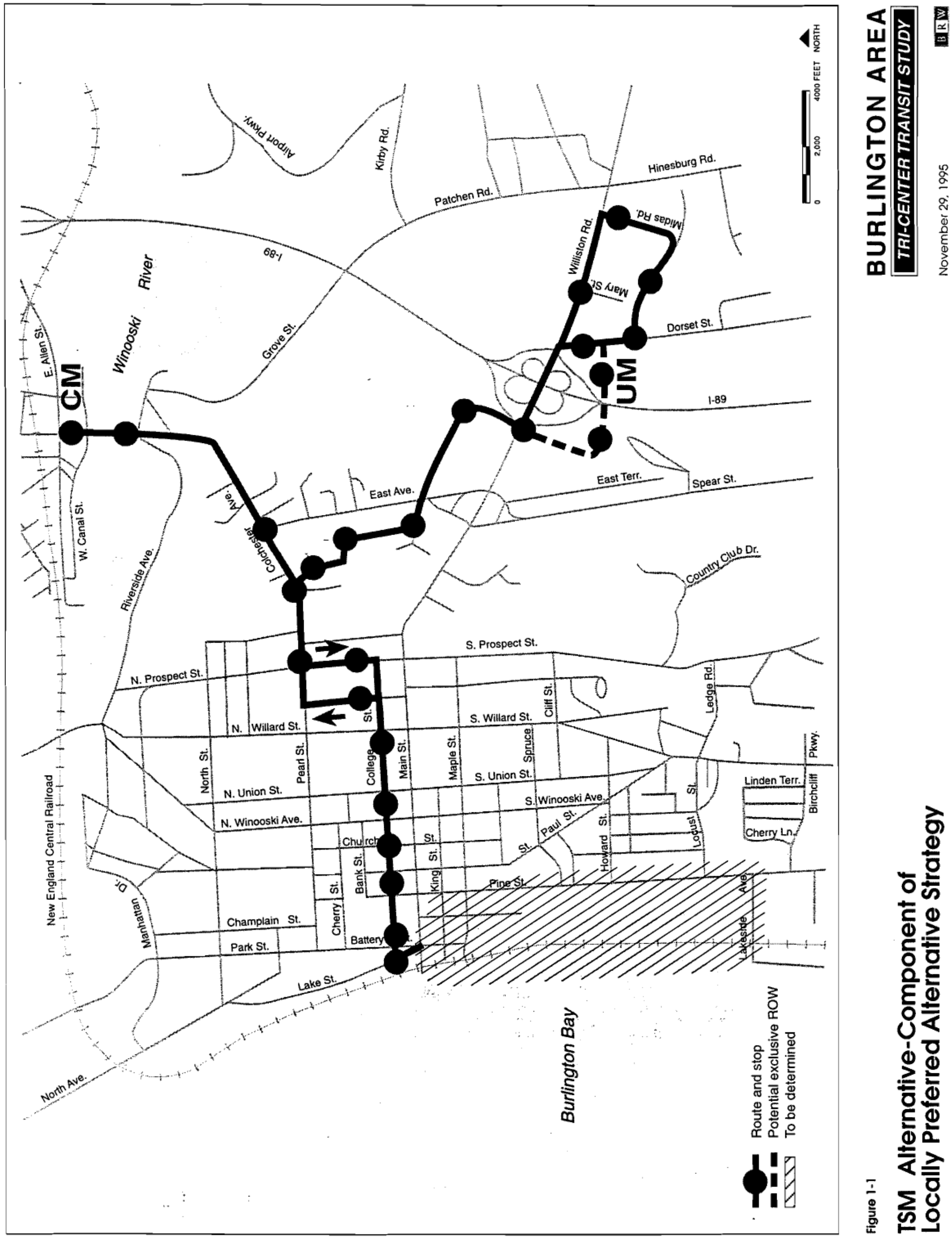
. The alternatives evaluation resulted in a recommended action plan of four phases:

- Phase 1- Implement enhanced CCTA short-term plan, increasing service frequencies from 30 to 15 minutes and eventually from 15 to 10 minutes.

- Phase 2- Implement corridor transit improvements, including:
  - development of a multimodal transit spine along College Street through the UVM/Fletcher Allen campuses
  - increasing service frequency to ten minutes
  - linking transit center in Burlington, South Burlington, and Winooski
  - connecting with Park and Rides
  - implementing transit priority systems at key signalized intersections
  - continuing TDM strategies
- Phase 3- Develop College Street Corridor Transitway and South Burlington Busway
- Phase 4- Implement corridor-wide, high capacity system with dedicated right-of-way for the following prioritized segments:
  - UVM/Fletcher Allen to Waterfront (via College Street and Colchester Avenue)
  - Winooski segment (via Colchester Avenue)
  - South Burlington
  - Southern/Lakeside Extension

The Tri-Center Transit Study is directly relevant to this corridor plan because Colchester Avenue is one of the major links in the system. Many of these strategies are reiterated in other plans, such as the Green Mountain Walkway in the UVM Campus Master Plan and the transit enhancements in the CCTA Transit Development Plan but progress on implementation has been mixed. Frequencies have been increased to 15 minutes during peak periods for the CCTA Essex Route which travels along Colchester Avenue (Phase I); and CATMA has established temporary intercept facilities along the VT 15 Corridor at Winooski Falls and Fanny Allen and has expanded its TDM program (part of Phase II). There has been no action related to the long-term recommendation in Phase IV to provide a dedicated right-of-way for the Burlington to Winooski link along Colchester Avenue.

Figure 3: Preferred alternative of the Tri-Center Transit Study



Burlington North/South Bicycle & Pedestrian Route Study (2002)

This study is the result of a 1999 Burlington City Council Resolution to address bicycle and pedestrian connections to the downtown from neighborhoods in the north and south. The three route options put forward by the study are 1) a one-way loop using Union Street (northbound) and Winooski Avenue (southbound); 2) a Pine-Battery Street corridor; and 3) a hybrid of the two, connecting the Union-Winooski loop with Pine Street at Locust Street.

Although the study focuses on north-south corridors centered on Downtown, it recognizes the shared use path adjacent to Riverside Avenue as a valuable east-west connection. Further, the existing facilities on East and Mansfield Avenues are among the few north-south linkages in the existing bike-ped network. However, Colchester Avenue presents a critical gap between the two due to its nonexistent bicycle facilities. The study notes that the Colchester Avenue between Prospect Street and the Winooski Bridge is included in the CCMPO's 2003 update to the Regional Bicycle-Pedestrian Plan for a proposed on-road facility. The MTP further suggests investigating Pearl Street between Champlain and Prospect Streets for an eastbound bike lane.

2025 Chittenden County Metropolitan Transportation Plan (MTP) (2005)

The federal government requires all Metropolitan Planning Organizations (MPOs) to develop a long range transportation plan to be updated every five years. It is a multi-modal, system-level plan with a 20-year planning horizon that acts as "the region's principal transportation planning document and sets regional transportation priorities." As such, it identifies transportation policies, strategies, and projects for the region.

The MTP recognizes Colchester Avenue as one of four primary corridors to the Regional Core, noting that by 2025 it will have a volume-to-capacity ratio over one during the PM peak hour. However, the MTP says that due to the corridor's urban surroundings, it is imperative that measures to expand capacity focus on multi-modal solutions (including developing intercept and Park and Ride facilities) rather than increasing capacity for single occupant vehicles. Moreover, maintaining low vehicle speeds for the safety and comfort of other modes will be important, and traffic calming in adjacent neighborhoods will be necessary to minimize cut-through traffic. The MTP also stresses the importance of improvements to the bicycle and pedestrian networks, as well as higher frequency levels and longer service hours for transit. Finally, the MTP recommends pursuing $0.2 million for a shared use path on Colchester Avenue between UVM and the Winooski River Bridge.

Report of the Colchester Avenue Task Force (2006)

The Colchester Avenue Task Force was created to address issues in the Colchester Avenue corridor such as: the UVM acquisition of the Trinity campus, institutional and background growth, and impacts on Ward 1 neighborhoods. A City Council Resolution was passed to formally create the Task Force, to be facilitated by CATMA. The purpose of the Task Force was to identify short-term (two-year) and long-term (ten –year) goals to address circulation, transit, bicycle facilities, safety, signage, and aesthetics. Recommendations from the Task Force include the following:

- Neighborhood Objectives
  - Remove truck traffic
  - Integrate traffic calming
  - Provide safe pedestrian travel up hill
  - Linkages among neighborhoods and campuses
- Design Objectives

- Multimodal corridor
- High quality landscaping
- Underground utilities

▪ Bicycle and Pedestrian Improvements
  - Construct bike path on south side of Colchester Avenue
  - Install crosswalks at Chase Street and Fletcher Place
  - Install a mid-block crosswalk to Delehanty Hall on the Trinity Campus
  - Create a pedestrian street, perhaps the Green Mountain Walkway identified in the UVM Campus Master Plan
  - Increase enforcement of moving violations and pedestrian crossings
  - Improve light visibility by trimming trees
  - Install bike-friendly storm drains

▪ Public Transportation

▪ Traffic Calming
  - Should on-street parking be provided?
  - Improvements to intersection of Colchester & East Avenues

▪ Traffic signal recommendations
  - "No Right Turn on Red" at various intersections
  - Pedestrian accommodations
  - Consider closing Chase Street to force traffic to signalized Barrett Street intersection

▪ Satellite Parking

UVM Campus Master Plan (2006)

The Campus Master Plan provides the vision for campus development through 2015 and identifies the capital projects necessary to achieve it. Guiding principles include open space, connectivity, quality of campus life and services, and sustainability. The master plan projects that by 2015, undergraduate enrollment will be approximately 9,500 (compared to the 2003 enrollment of 7,400) and the university facilities will grow by approximately 600,000 square feet. It is noted that first and second-year students are required to live on campus and improvements and expansions to housing are necessary to support the guiding principle of quality of campus life.

The plan divides the university into campus districts: the Central District (to the west of and abutting Fletcher Allen) includes the campus' historic core and is mainly academic and administrative in function—it is also part of the Institutional Core Overlay per city zoning; the Trinity District (acquired by the University in 2002) is both academic and residential and includes the Trinity Campus Overlay per city zoning; and the Centennial District is athletic, residential (for faculty/staff), and open space. Colchester Avenue bypasses the Central, Trinity, and Centennial Districts as it runs east.

The campus master plan has several items of significance for the Colchester Avenue Corridor:

▪ Two of the campus' four primary gateways are on Colchester Avenue: one at the Prospect Street intersection and the other between East Avenue and Centennial Field.[1]

▪ The master plan identifies how commuters access campus: 6% of UVM commuters access the campus via the Colchester Avenue corridor.[2]

---

[1] Page 68 of the UVM Master Plan.

[2] Page 84.

- Approximately 30% of the core campus parking is accessed from Colchester Avenue.[3]
- The campus master plan includes a Property Acquisition and Disposition Plan which notes that if the following properties were to become available, UVM would consider acquiring them:

  Mansfield Avenue properties:

  - the Mater Christi School
  - Sisters of Mercy Convent
  - Red Cross
  - Planned Parenthood

  North Prospect Street properties:

  - Red Cross
  - fraternity house (northwest corner of the Colchester-Prospect intersection)

  If these properties were acquired, it would roughly double the University's current holdings on the north side of Colchester Avenue.
- The master plan identifies primary, secondary, and tertiary pedestrian routes, as well as bicycle facilities and conflict points and vehicular and campus shuttle circulation.[4] An overlay of the three systems shows five major conflict points, two of which are within the Colchester Avenue Corridor: 1) the Prospect Street intersection and 2) between the UVM and Trinity campuses. The plan notes that:

  > *The difficulty of crossing heavy traffic at Colchester Avenue to get from the Central District to the Trinity District has a strong impact on the overall perception on the lack of connectivity and accessibility of the Trinity District with the whole campus. Pedestrian circulation must become a priority in the ongoing efforts to upgrade streetscape elements and traffic signals on Colchester Avenue.*[5]
- One of the most significant aspects of the master plan relevant to Colchester Avenue is the Green Mountain Walkway (Figure 4), a north-south pedestrian corridor connecting the Redstone District through the campus core to the Trinity Campus.[6]
- The plan also recommends striped bike lanes on Colchester Avenue.[7]
- The City of Burlington owns and maintains University Place the connection between Colchester Avenue and Main Street just east of Prospect Street, but is working with UVM to transfer ownership to the campus. The long-term vision is to close the street to vehicular through traffic and make it a pedestrian area.

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[3] Page 55.

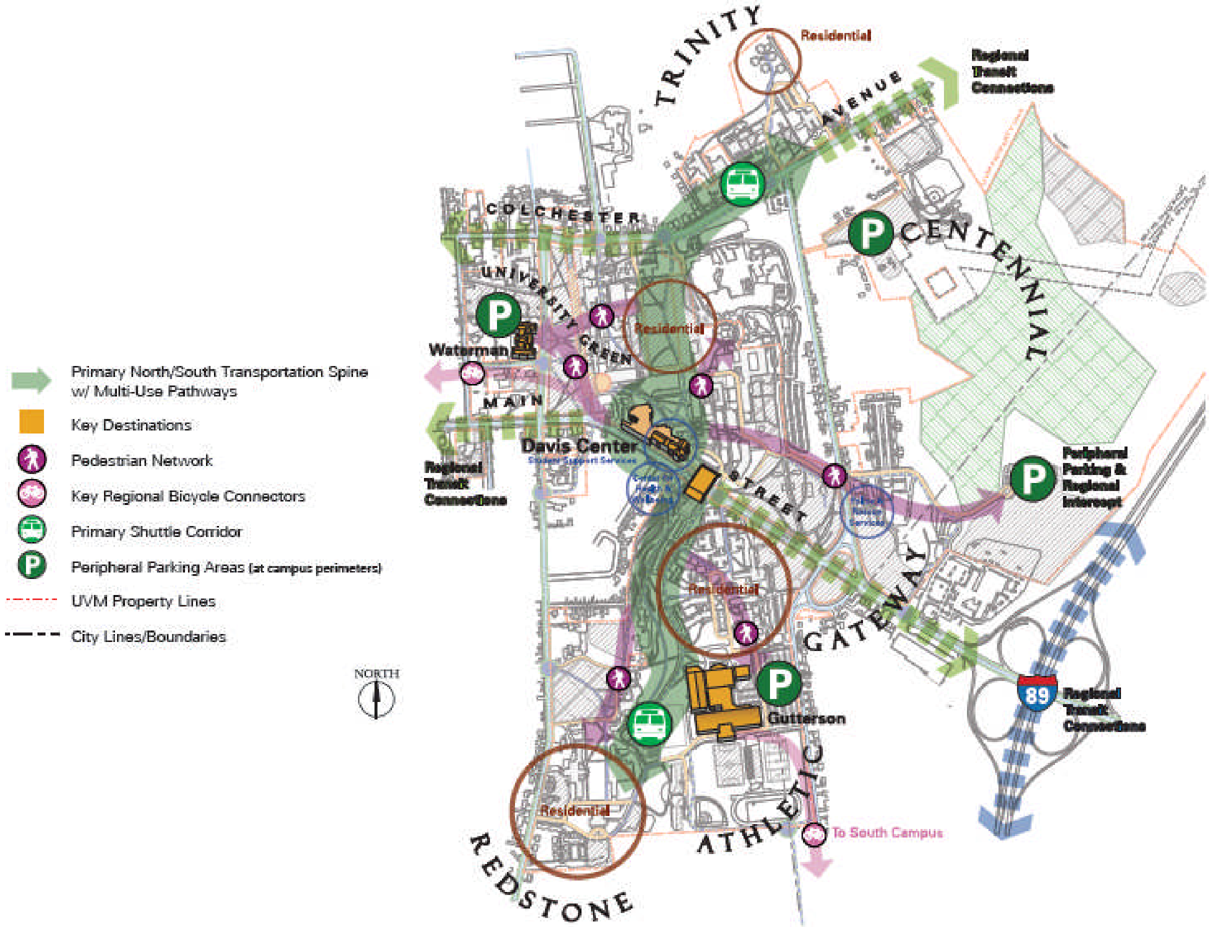
[4] Pages 49, 50, and 52.

[5] Page 54.

[6] Page 74.

[7] Page 77.

Figure 4: Green Mountain Walkway Concept Plan from the UVM Campus Master Plan



Burlington Transportation Plan (BTP) (2007)

The BTP follows the transportation vision established by the 2006 Municipal Development Plan, recommends mid-term strategies and presents a five-year plan to be updated annually. The three main themes of the plan are:

1. Strong and Healthy City
   - Economic, Physical, Environmental, Safety, Aging Population
2. Transportation Choices
   - Cars, transportation systems management, transit, pedestrians, bicycles, access, transportation demand management
3. Great Streets
   - Complete Streets (see cross-section in Figure 5 below)
   - Transit Street
   - Bicycle Street
   - Slow Street
   - US Truck Routes

- Neighborhood Street

The following indicators (14 total) were established to monitor progress and reflect the BTP goals:

- 100% completion of the Complete Streets
- Priority transit system
- Transit ridership
- Traffic Volumes into and out of the City
- Accumulation of parked cars
- Total public and private Downtown/Waterfront parking spaces
- Downtown on-street parking utilization
- Parking revenue
- Maintenance expense
- Number of Burlington employees covered by TMAs
- TMA employee mode shares
- Mode shares for students at Burlington city schools
- Traffic crashes
- Energy use/greenhouse gas emissions

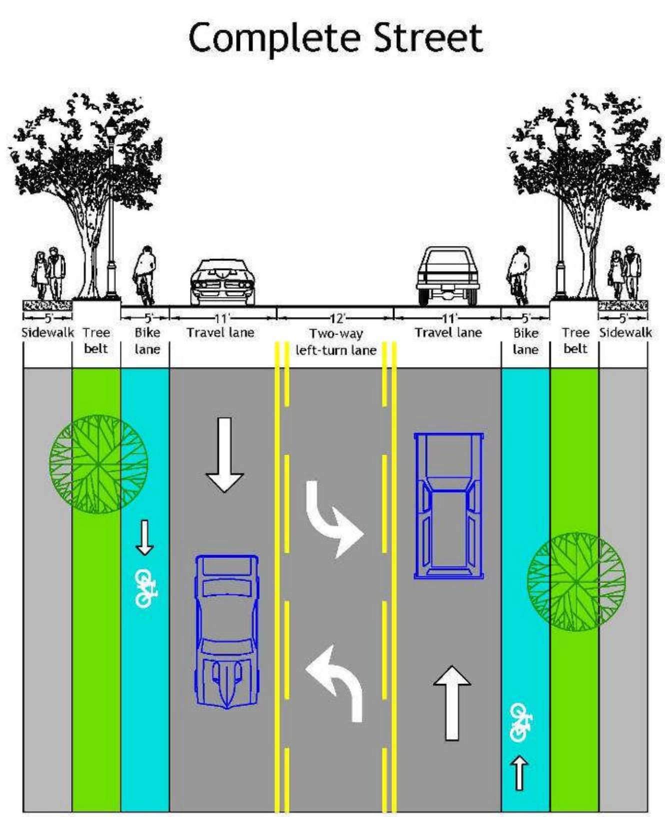
The BTP proposes a possible redesign of Colchester Avenue as a Complete Street between the Prospect Street and East Avenue intersections. This change would entail converting the existing four-lane cross-section to two-through lanes, a two-way left-turn lane, and two bicycle lanes.[8]

The BTP cites benefits including improved visibility, reduced vehicle conflict points, reduction in crashes, safer pedestrian crossings, slower traffic speeds, and a more attractive streetscape through landscaping opportunities. Initial results of a comparison of the existing and proposed configurations suggest an increase in vehicle travel time through the corridor and a decrease in average speed. However, there was a corresponding decrease in vehicle stops, reducing fuel used and emissions.[9]

Further analysis will be needed to determine whether Colchester Avenue is an appropriate candidate for conversion to a Complete Street, or if the elimination of two through-lanes will reduce capacity so much as to worsen transportation network performance.

The BTP also notes that the Colchester/Riverside intersection is a constriction point for this major city gateway and recommends improvements to the intersection as part of the overall corridor study.

Figure 5: Complete Street cross-section considered for Colchester Avenue in Burlington Transportation Plan



[8] See pages 73-79 of Appendix 1 of the BTP. Pages 5-25 of Appendix 2 of the BTP offer specific design guidelines for the Complete Street.

[9] Appendix 6 of the BTP.

VT 15 Corridor Study (2008)

The corridor was studied to address capacity issues and mitigate congestion on VT 15 between the Circulator in Winooski and the Essex-Jericho town line. The study recommends:

- Continuous and consistent bicycle and pedestrian facilities
- Improved intermodal connectivity
- Complete Street road profile for specific sections of the corridor
- Improvements to transit, such as higher frequency, longer service hours and more direct routes
- Continued concentration of growth in village centers

CCMPO Regional Bicycle-Pedestrian Plan Update (2008)

The Regional Bicycle/Pedestrian Plan comprises the bike/ped portion of the CCMPO MTP. The plan presents vision and goals for the bike/ped network, an overview of existing conditions, recommendations, and an implementation plan. Among the goals of the plan are closing existing gaps in the system, improving bike/ped connectivity, and developing a seamless multimodal transportation network.

Colchester Avenue is identified as a route that is “commonly used for on-road bicycle travel, but may not have adequate shoulder or be signed for bicycle travel.” The plan notes that the Winooski Main Street Bridge at northern end of the Colchester Avenue corridor is a Category C critical crossing (meaning that it is in “close proximity to high volume vehicular traffic”). A 2003 scoping report recommended developing a separate, shared use bridge adjacent to the existing vehicular bridge.

Burlington Wayfinding Plan (2003 and 2009 update)

Figure 6: Hairpin sign used in the wayfinding system

This plan was developed to create a comprehensive wayfinding system for pedestrians, bicyclists, vehicles, and other users in downtown Burlington. The plan identifies distinct city districts and decision-making points to provide direction in a cohesive and consistent system. The system involves a hierarchy of signs that:

- Delineates gateways
- Includes directional signs for vehicles, including parking
- Integrates transit signage
- Includes signage for pedestrians and bicycles
- Provides interpretation and aesthetic elements (e.g. public art)

The Colchester Avenue corridor is in the CATMA/Campus District and uses the hairpin signs to provide direction (Figure 6). The northeastern end of the corridor at the Riverside intersection is identified as a minor decision making point. There are currently two signs on Colchester Avenue (one on the southeast corner of the Prospect Street intersection and one on the north side of Colchester across from the Fletcher Allen entrance). The 2009 update does not discuss the signs in the Colchester corridor.

2009-2014 Joint Institution Parking Management Plan (JIPMP) (2009)

Article 8 of Burlington’s Comprehensive Design Ordinance requires institutions to maintain a comprehensive parking management plan to:

a. Ensure that city streets in nearby neighborhoods are not unfairly burdened by parking demands from post-secondary educational or medical institutions; and

b. Recognize the unique ability of institutions to manage their own parking resources in a comprehensive and creative way.[10]

> ***CATMA RESOLUTION***
>
> *That on the 5th day of February, 2002, the CATMA Strategic Plan for 2005-2010 shall be to further, jointly expand CATMA's TDM programs and share in the planning, development and investment in three, strategically located new parking facilities to the South, to the East and to the North, each of which is to be served by a single and shared shuttle system.*

CATMA prepares the JIPMP on behalf of Champlain College, FAHC, and UVM in order to form a cohesive approach to managing transportation and parking demands of the institutions. The JIPMP addresses each institution's 1) existing and planned parking inventory, 2) parking supply as required by the ordinance, and 3) parking demand (which is influenced by CATMA's TDM programs). The main conclusion of the JIPMP is that the institutions should continue to pursue TDM with CATMA and share resources when appropriate (for example, UVM leasing surplus parking to FAHC). The JIPMP does not address specific sites such as Colchester Avenue, but rather approaches each institution's transportation and parking system as a whole. The JIPMP highlights the 2002 resolution from the CATMA Board of Directors which calls for expansion of TDM programs and supports establishment of intercept parking facilities on the major approaches to the City served by a single shared shuttle system. This resolution is relevant to Colchester Avenue because expanding TDM programs supported by intercept facilities along the VT 15 corridor will help off-set growth in single occupancy vehicle use, and a shared shuttle system will help reduce the number of buses in the corridor, while still serving passengers.

CCMPO Park and Ride Plan (in progress)

The purpose of the Chittenden County Park and Ride Plan is to build off previous Park and Ride planning efforts and provide a more comprehensive approach to assessing and satisfying the need for improved and additional park and ride facilities. Goals and objectives will be developed based on an assessment of current conditions and the needs of park and ride users. The study area extends beyond Chittenden County to the neighboring counties to account for the reality of today's commuting patterns. The plan will identify upgrades to existing park and ride facilities, assess the need for and location of new facilities, update and apply a prioritization process, and include an implementation plan.

CCTA Transit Development Plan (TDP) (update in progress)

The TDP guides CCTA's future growth and is expected to go before the CCTA Board for approval in June. In the meantime, potential strategies relevant to the Colchester Avenue corridor include the following[11]:

- Potential interregional services
  - Cambridge-Burlington via VT 15
  - Grand Isle-Burlington (intermodal link to Plattsburgh ferry)
  - Extension of St. Albans LINK to Swanton
- Potential regional commuter services
  - Hinesburg-Burlington
- Expansion of Essex Junction route to include evening and Sunday service
- Incorporation of Bus Rapid Transit (BRT) elements on VT 15, such as
  - 10-minute peak service

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[10] Burlington CDO Section 8.3.1.

[11] Based on "TDP Detailed Strategies" as presented in January 2010; presentation available at: http://www.cctaride.org/pdf/Documents/TDPDetailedStrategies.pdf.

- 15-minute mid-day service
- enhanced shelters
- transit signal priority
- queue jumping
- real-time passenger info via web, cell phone, and at stops

▪ Potential expansion of College St Shuttle between Fletcher Allen and University Mall or a future intercept/park-and-ride facility at Exit 14

▪ Plans for vehicle fleet
  - Continue aggressive fleet replacement plan
  - Diversify the fleet
    + Suburban 41-foot coaches for express routes
    + Urban 40-foot and 35-foot buses
    + Small 29-foot buses
  - Use of biodiesel and ultra low sulfur diesel
    + Clean engine technology
  - Accommodations for bicycles

▪ Support needed from communities
  - Encourage development on existing bus routes
  - Priority for buses via traffic laws and enforcement
  - Pedestrian improvements and maintenance
  - Safe bicycle and pedestrian access

3.0 TRANSPORTATION SYSTEM CHARACTERISTICS

This section provides an inventory of the corridor's existing transportation system, including:

▪ Roadway characteristics (classification, cross section, intersection configuration, and parking)

▪ Pedestrian and bicycle facilities

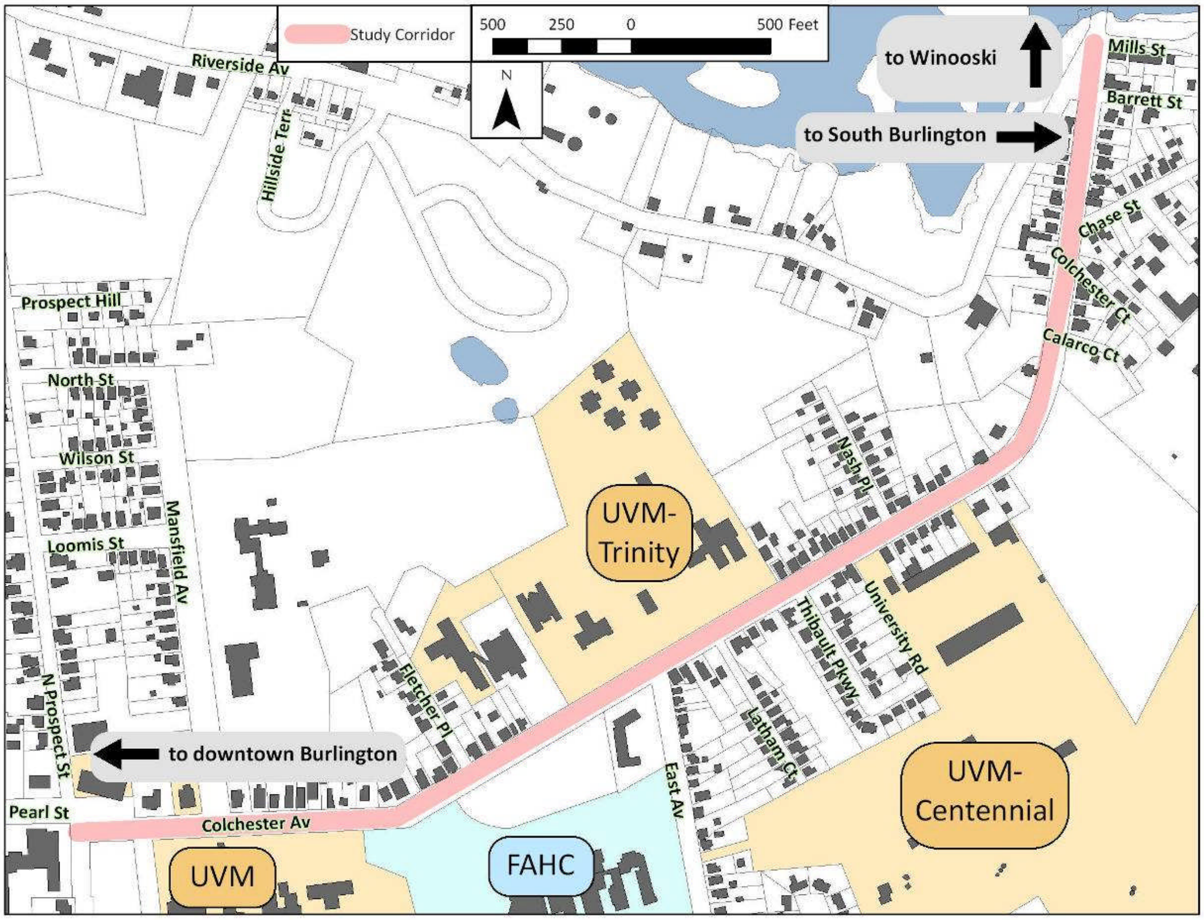
▪ Transit

▪ Transportation demand management

Roadway Characteristics

Colchester Avenue is a major route that connects Burlington and points to the north and east. At the west end of the study area (the Prospect Street intersection), the Avenue crests the Pearl Street hill and then continues east at a relatively flat grade. After it passes the UVM core (see Figure 7), it intersects the northern FAHC driveway (also the Emergency Department access) and bends to the northeast. After passing UVM's Trinity Campus, the intersection of East Avenue, and the Centennial area, it curves to the north and descends somewhat sharply down to Winooski. Chase and Barrett Streets (on the east side of the Avenue) provide an alternative route to South Burlington via Grove Street and Patchen Road. Riverside Avenue/US 7/US 2 is another primary route that connects Burlington and points to the northeast, intersecting Colchester Avenue at the bottom of the hill immediately before the Winooski Bridge. The speed limit in the one-mile study area is 30 mph. Burlington DPW is planning to pave Colchester Avenue in the summer of 2010.

Figure 7: Colchester Avenue Corridor context in the greater influence area



3.1 Roadway Classification

Functional Classification

The Federal Highway Administration's roadway functional classification system is organized as a hierarchy of facilities, based on the degree to which the roadway serves mobility for through traffic and access to adjacent land uses. Freeways and interstate highways, at the top of the hierarchy, are devoted exclusively to vehicle mobility with no direct access to adjacent land. Arterials and collectors provide both some level of mobility for through traffic and access to adjacent land uses. The primary purpose of local roads is to provide local access.

Figure 8 shows the functional classifications of the roadways in the study area. Colchester Avenue is classified as a Minor Arterial. The function of the roadway should be reflected in its design, so VTrans has developed the Vermont State Design Standards to provide guidelines for design elements such as lane and shoulder widths. Although Colchester Avenue is not a state road, the Design Standards offer guidance for its specifications, and suggest lane widths of 10 to 12 feet for urban Minor Arterials. The Design Standards do not recommend specific shoulder widths, but note that an appropriate width will depend on the context of the area, vehicle speeds, whether bicycles are to be accommodated, drainage systems, and snow plow operations.

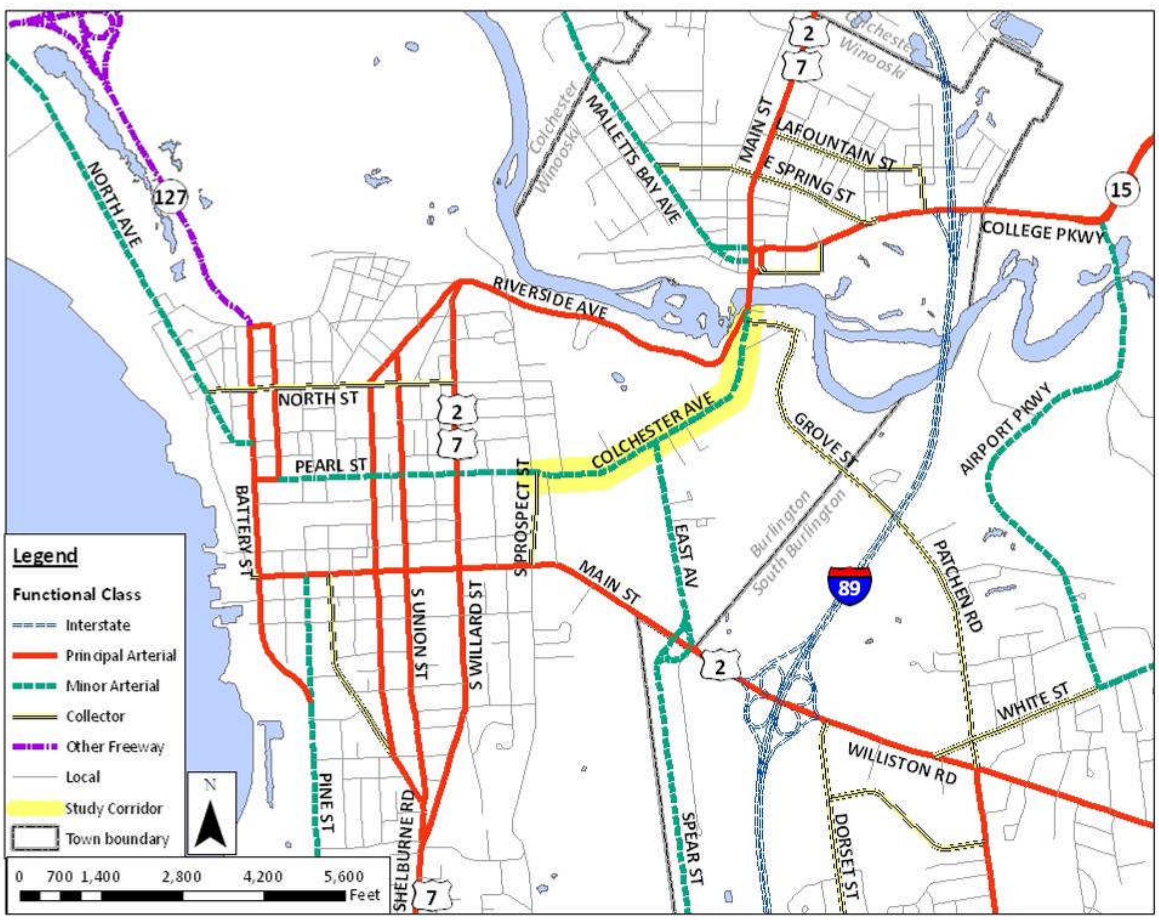
Any roadway that is classified as a major urban collector or above is part of the federal-aid highway system. As a minor arterial, Colchester Avenue is part of the federal-aid highway system and is therefore eligible for a variety of federal funding programs which are allocated annually through the CCMPO Transportation Improvement Program (TIP). Additional information on federal funding programs and requirements will be discussed as part of the implementation phase of this plan.

Jurisdiction

Colchester Avenue is owned and maintained by the City and is a class 2 town highway. The town highway classification system consists of classes 1 to 4 which are defined in the Vermont State Statues. It is similar to the federal functional classification system in that a town highway class suggests the role of a roadway in the highway network. For example, the purpose of a class 2 town highway such as Colchester Avenue is to connect one or more municipalities. A class 1 town highway carries a state or US route designation (for example Main Street is US 2). A class 3 town highway is typically a residential street. A class 4 town highway is all other roadways not classified and is typically not plowed in winter and may not be passable at other times of the year (there are no class 4 town highways in Burlington).

More importantly, the mileage of class 1, 2 and 3 town highways is used to determine the amount of money a municipality will receive through an annual appropriation from the Town Highway State Aid Program approved by the Legislature each year. The funds are distributed quarterly with no application required and may be used for construction, improvements, and maintenance purposes, sidewalks and bike paths, or for the non-federal share of public transportation. The funds are distributed to various projects throughout the City and are incorporated into the annual municipal budget. The state also offers a Town Highway Class 2 Roadway Program which provides up to $175,000 grants for specific resurfacing and reconstruction projects. These programs do not include federal funds and therefore have fewer strings attached.

Figure 8: Functional class (source: VTrans)



3.2 Street Cross-Section

Typical cross sections in the corridor are shown in Figure 9 through Figure 16.

There are four travel lanes between Prospect and East Avenue, while there are two travel lanes and on-street parking from East Avenue to Barrett Street (a more precise description of parking is provided below). There are sidewalks on each side of the street except for the segment adjacent to Greenmount Cemetery (on the south/east side of Colchester Avenue as it bends to the north). The City of Burlington is finalizing construction designs for a new sidewalk that will close that gap between Centennial Field and Calarco Court. Utility poles are located in the green strip along the south side of the roadway throughout the corridor. The right-of-way between Prospect Street and University Place is double that of the rest of the corridor (10 rods versus 5 rods).

Observations

In some sections of Colchester Avenue, the curb is barely visible. The photo to the right shows the curb just east of the FAHC driveway, on the south side of Colchester Ave.

Figure 9: Typical roadway cross section between Prospect Street and University Place

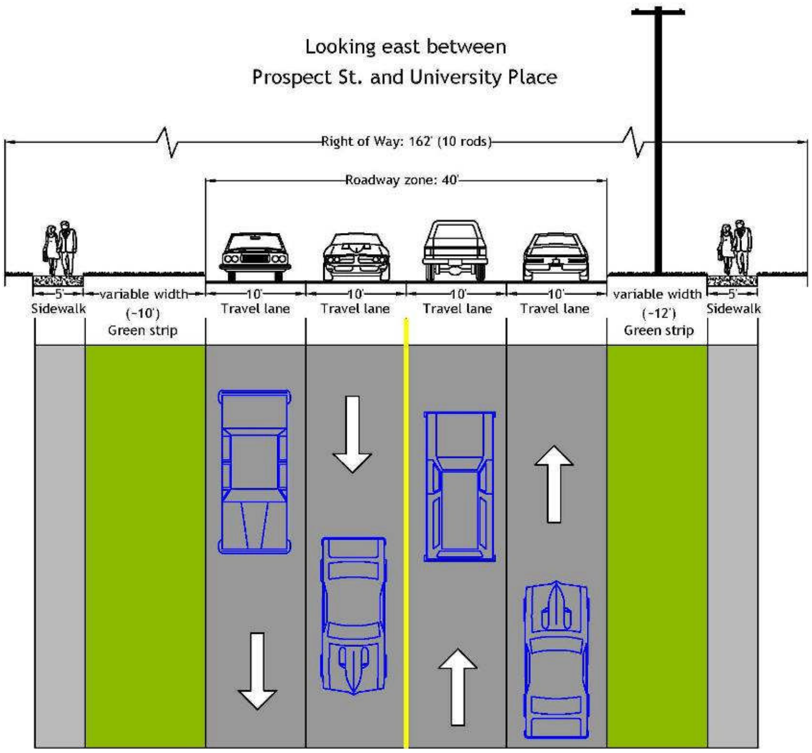


Figure 10: Typical roadway cross section between University Place and Mansfield Ave

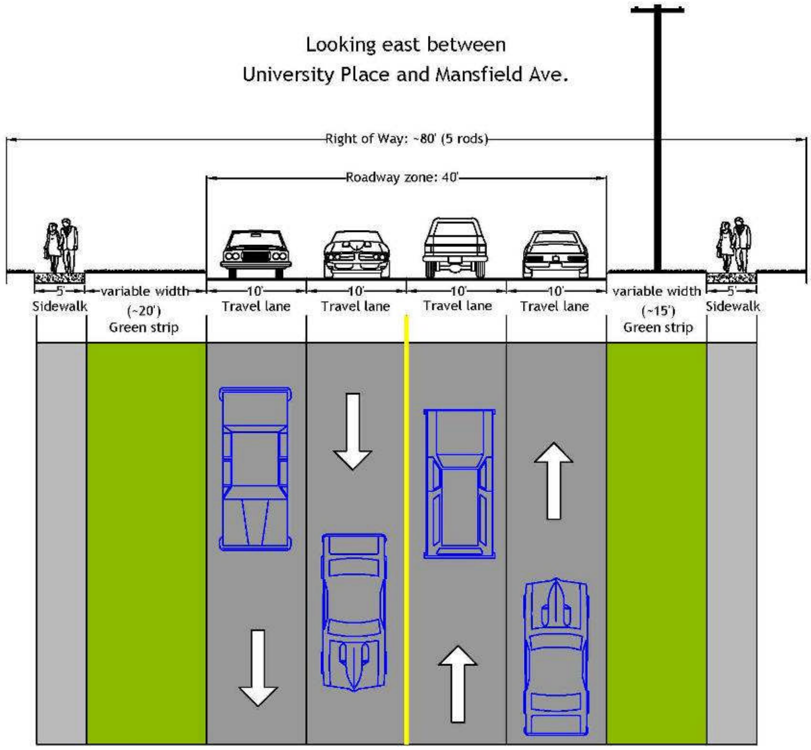


Figure 11: Typical roadway cross section between Mansfield Ave and FAHC

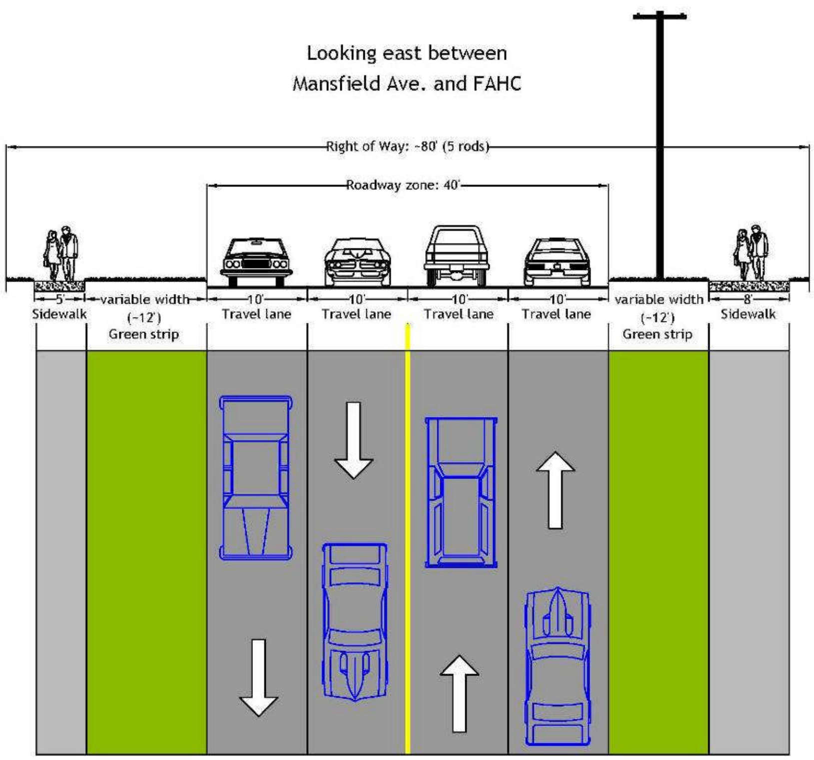


Figure 12: Typical roadway cross section between FAHC and East Ave

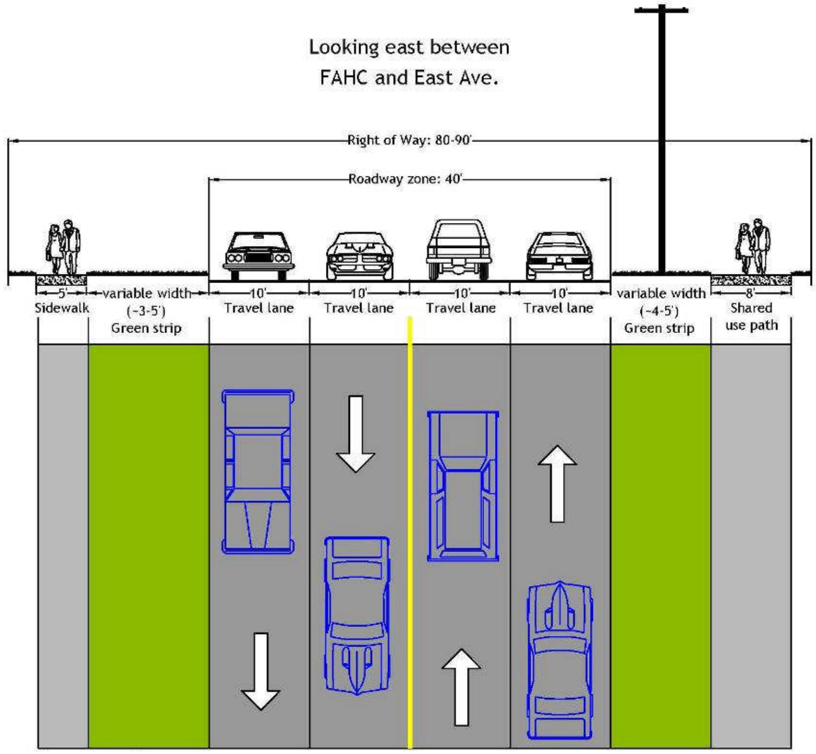


Figure 13: Typical roadway cross section between East Ave and Thibault Parkway

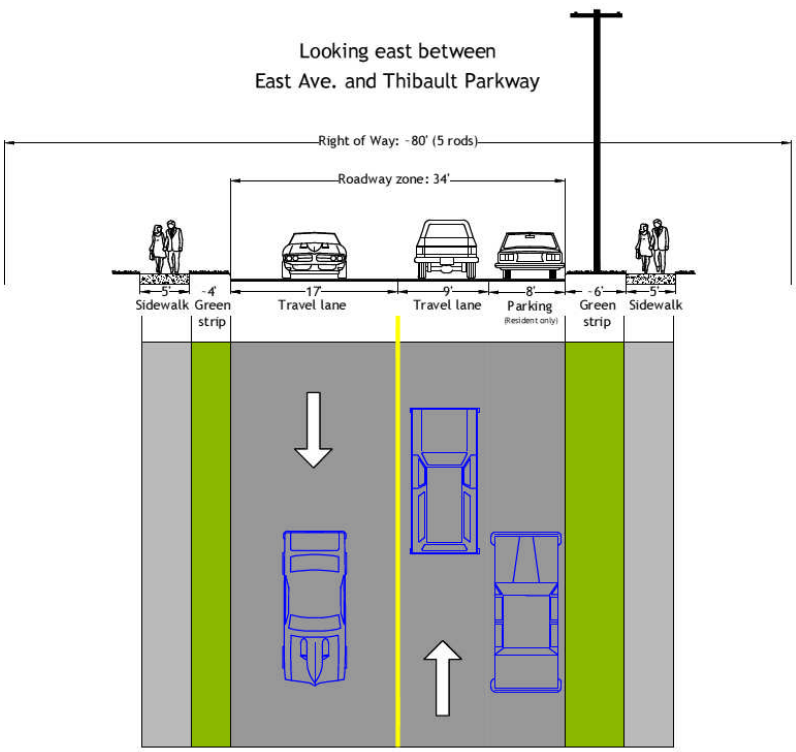


Figure 14: Typical roadway cross section between Thibault Parkway and cemetery driveway

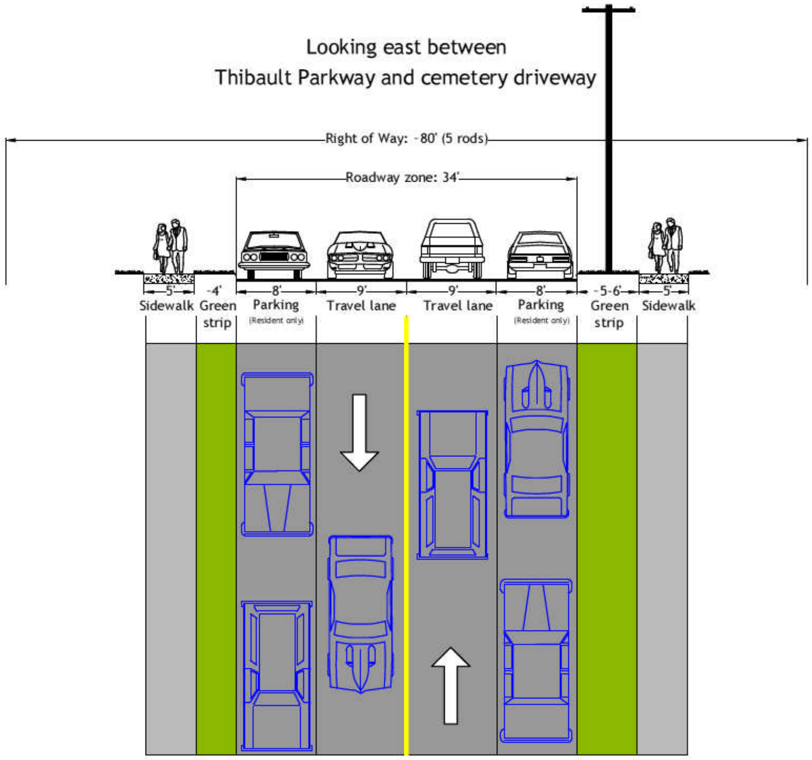


Figure 15: Typical roadway cross section between cemetery driveway and Calarco Court

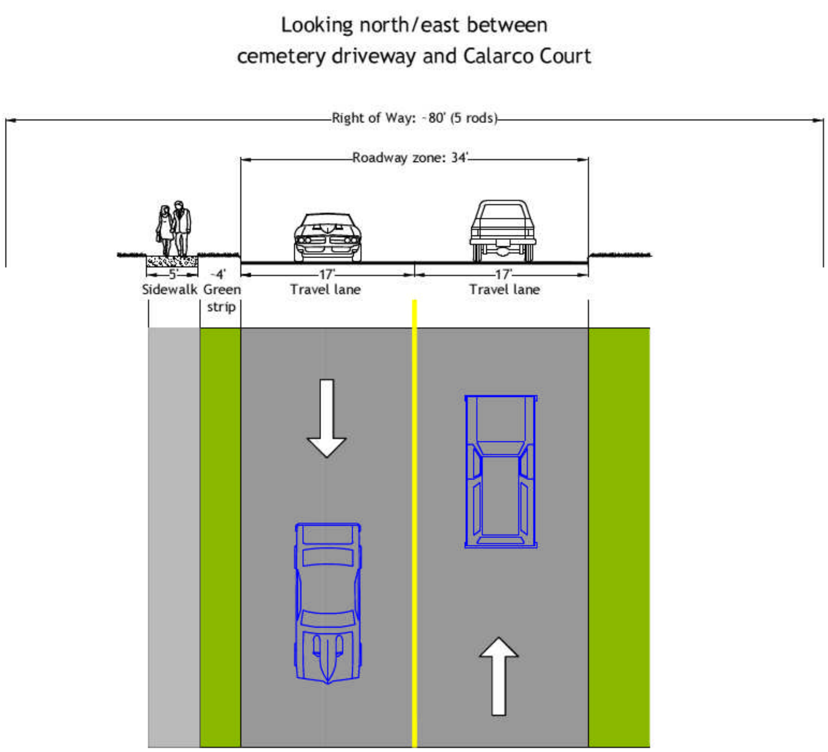
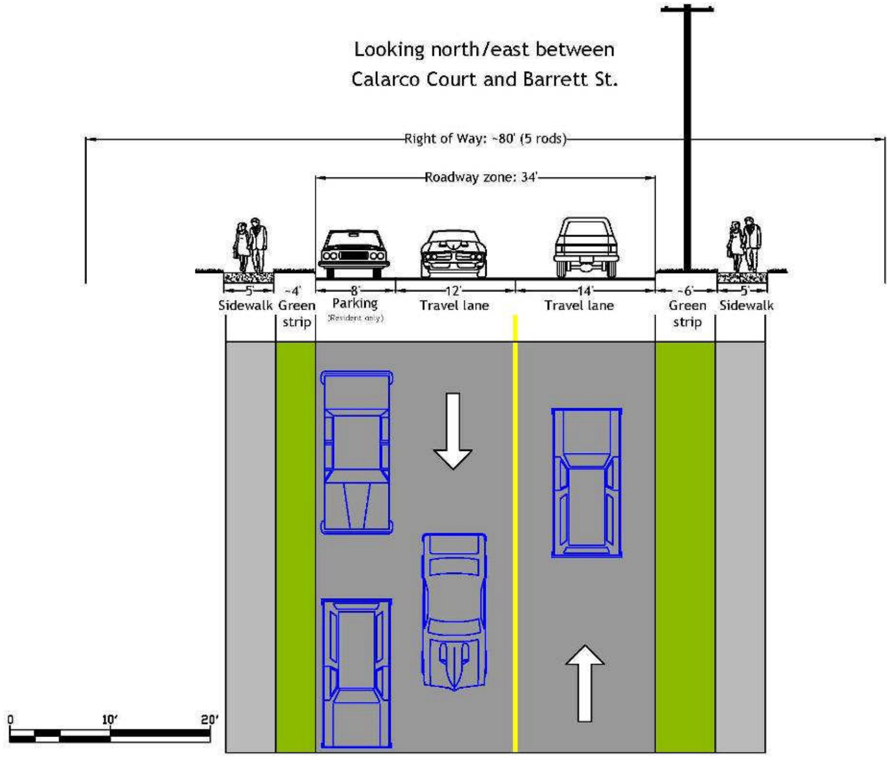


Figure 16: Typical roadway cross section between Calarco Court and Barrett Street



3.3 Intersection Control and Configuration

Figure 17 presents a schematic that shows the lane configurations and crosswalks on the intersection approaches. Figure 18 summarizes the pedestrian crossing facilities at each intersection.

Observations

Signal mounts vary throughout the corridor: some are on mast arms, some are on span wires, and others are on pedestals.

The lens diameters on the westbound approach of the Prospect signal vary in size (see photo right). The 2009 MUTCD requires all new signal faces to be 12" in diameter.[12]

[12] Section 4D-07.

Figure 17: Intersection configuration and control schematic

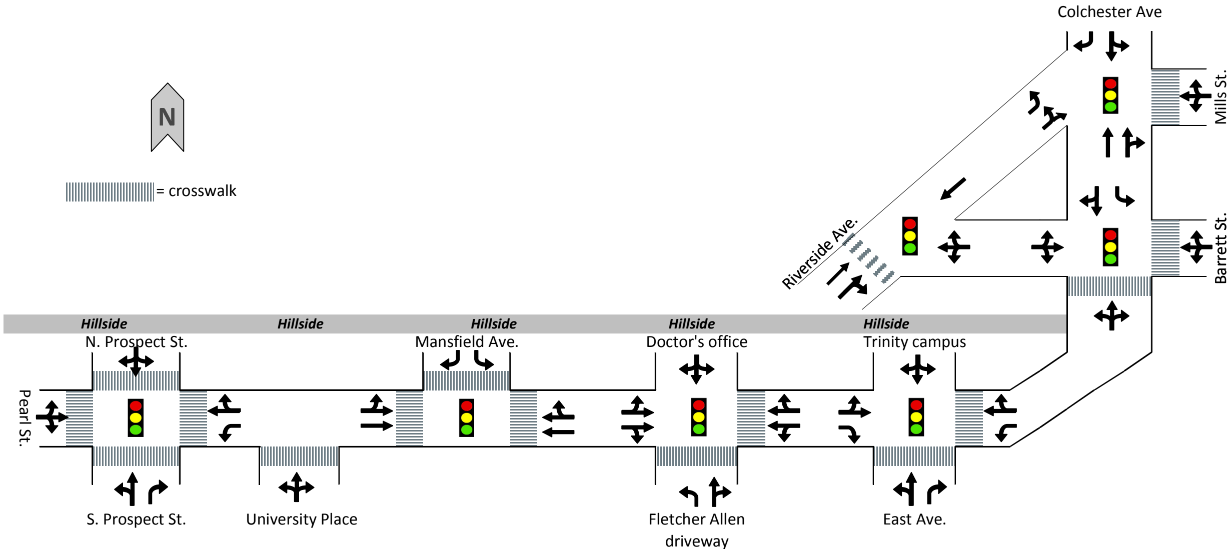


Figure 18: Pedestrian crossing facilities

Colchester Avenue intersection	**Pedestrian Facilities by Approach**			
	Eastbound	*Westbound*	*Northbound*	*Southbound*
Prospect Street	crosswalk, actuated ped signals w/ countdown timers	crosswalk, actuated ped signals w/ countdown timers	crosswalk, ped signals w/ countdown timers	crosswalk, ped signals w/ countdown timers
University Place	nothing	nothing	crosswalk	
Mansfield Avenue	crosswalk, actuated ped signals	crosswalk, actuated ped signals		crosswalk, ped signals
FAHC driveway	nothing	crosswalk, actuated ped signals	crosswalk	
East Avenue	No Turn on Red for EBR	crosswalk, actuated ped signals	crosswalk, actuated ped signals	
Barrett Street	nothing	crosswalk	crosswalk	nothing
Riverside Avenue/ Mills Street	nothing	crosswalk	nothing	nothing

3.4 Parking

Figure 19 shows the location of regional park-and-ride and intercept facilities relative to the Colchester Avenue study area. The Exit 17, Essex, Fanny Allen, and Winooski Park & Rides/intercept lots help to alleviate traffic volumes in the Colchester Avenue corridor.

Figure 19: Existing Park and Ride and Intercept Facilities relative to the Study Area

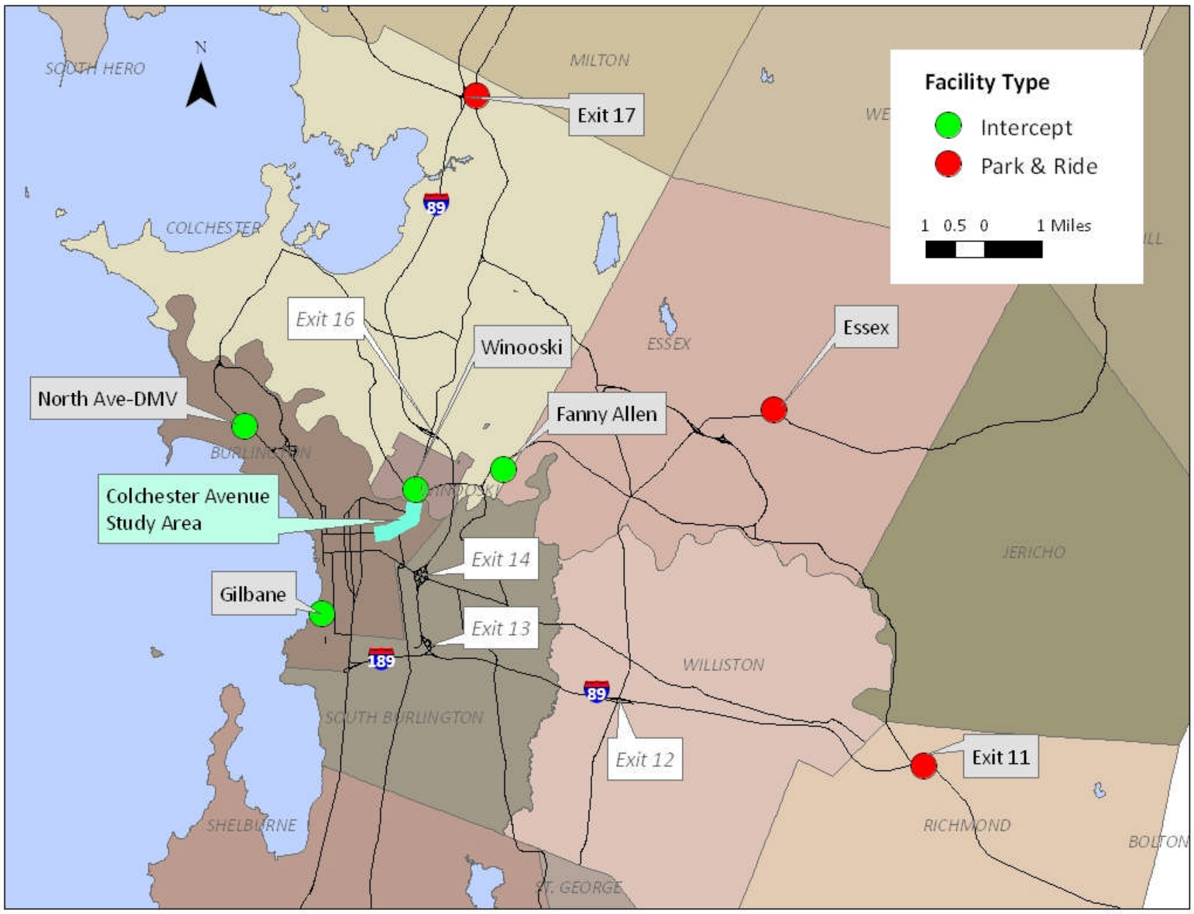
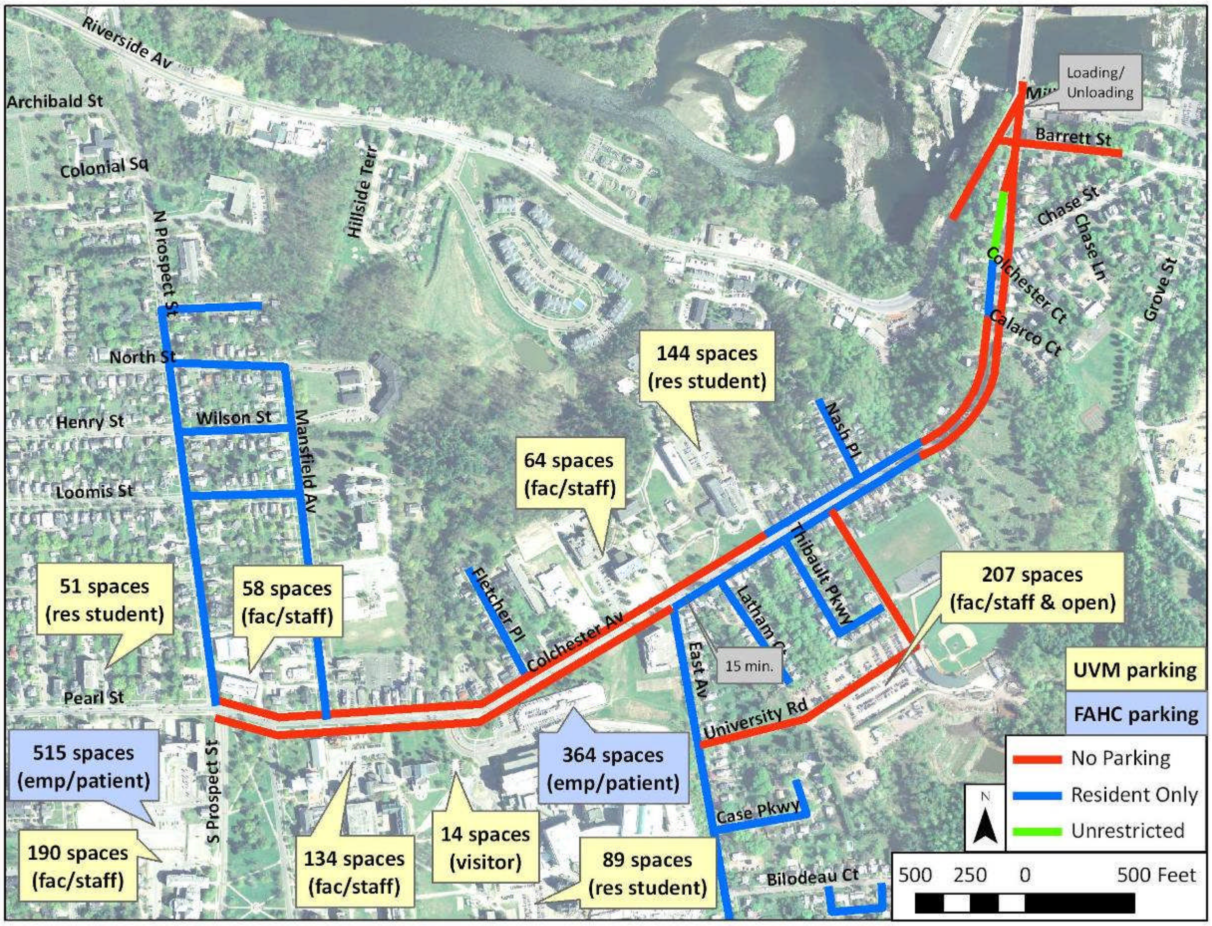


Figure 20 shows the location and restrictions for parking in the study area. The map shows off-street parking for UVM and FAHC that have direct access to Colchester Avenue[13]. Assuming an on-street space is 20' long, there are approximately 120 spaces on Colchester Avenue for those holding residential permits from the City. There is one section of about 15 spaces on the west side of the street in the northeastern end of the corridor that allows unrestricted on-street parking.

Residential parking permits are required to park on-street for all of the residential side-streets along Colchester Avenue; and along Colchester Avenue generally between East Avenue and the entrance to Greenmount Cemetery. Residential parking permits are issued by the Police Department to persons with proof of residency along the designated street, small businesses, and carshare organizations. Residential permits are available to full time residents, and to students living in off-campus apartments, fraternities and sororities. Two guest passes are issued to each household with a valid residential parking permit.

[13] Figure 20 only shows the location and number of off-street parking facilities for UVM and FAHC that have direct access along or near to Colchester Avenue. UVM has over 5,100 off-street parking spaces, the FAHC-MCHV campus has 2,075 off-spaces and the FAHC-UHC campus has 515 off=street spaces. See the 2009-2014 Joint Institutional Parking Management Plan for a complete description.

Figure 20: Parking (source: 2009-2014 JIPMP)



3.5 Pedestrian and Bicycle Facilities

Pedestrians

In addition to the pedestrian crossings summarized in Figure 18, Figure 21 maps the overall pedestrian infrastructure in the study area. There is one unsignalized mid-block crosswalk between the Kampus Kitchen convenience store and Nash Place, as shown Figure 22.

Given that UVM's main campus is on the south side of Colchester Avenue and the Trinity campus is on the north, there is a pedestrian desire line (and informal paths) extending from the area east of the FAHC driveway towards Trinity (see Figure 23). There are no pedestrian signals at the three signals by the Winooski Bridge, nor across the northbound approach of the FAHC driveway.

The City of Burlington has received a Sidewalk Program Grant from the CCMPO to construct a sidewalk on Colchester Avenue next to the cemetery (between Centennial Field and Calarco Court). Construction designs are anticipated to be finalized in 2010.

Figure 21: Pedestrian facilities

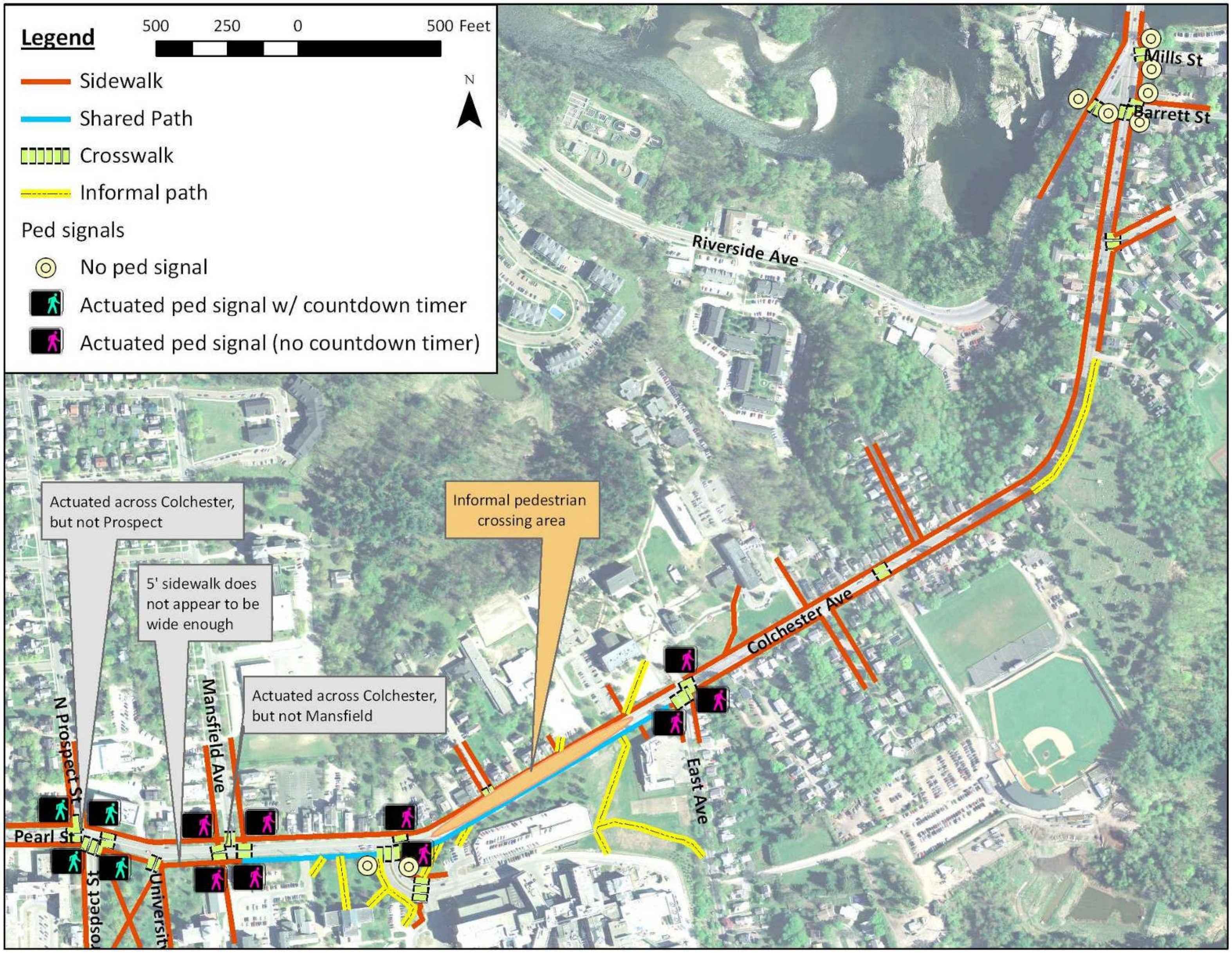


Figure 22: Mid-block crosswalk at Kampus KItchen

Figure 23: Pedestrian desire lines are indicated by informal paths

Path on south side of Colchester between FAHC driveway and parking garage.

Path on north side of Colchester heading towards Trinity Campus, just west of East Ave.

Observations

The eastbound crosswalk warning sign at the midblock crosswalk (near Kampus Kitchen/Nash Place) is missing.

The 5' sidewalk on the south side of Colchester between Mansfield and University Place should be widened (see photo right).

Sidewalk connections across the green strip that do not connect with a crosswalk may implicitly encourage jaywalking.

Curb cuts do not match up with crosswalks in other areas either. The photo to the right shows the crosswalk across the northbound approach at the Prospect Street intersection. While the crosswalk meets one curb cut, there is another that is unmatched.

Bicycles

There is a bike lane for northbound travel on Mansfield Avenue and one for southbound travel on East Avenue. Although there is a shared path along Colchester Avenue between East Avenue and Mansfield Avenue (as shown in Figure 21 above), it is only a posted bicycle route between the FAHC driveway and East Avenue. Therefore, although the infrastructure is present on Colchester Avenue to connect the north-south routes on Mansfield and East Avenues, the designation of a bike route is not complete for that entire east-west segment.

Figure 24 and Figure 25 show existing and recommended on-road bicycle and shared use facilities in the Chittenden region. According to on-road facility map, Colchester Avenue is not a designated bicycle corridor, yet the 2008 CCMPO Regional Bicycle/Pedestrian Plan suggests that it is commonly used for on-road bicycle travel. A shared use path is recommended along the corridor and would close a gap in the regional bicycle network by providing a more direct route from downtown Burlington to points northeast.

Figure 24: Existing and recommended on-road bicycle facilities (source: 2008 CCMPO Regional Bicycle/Pedestrian Plan Update)

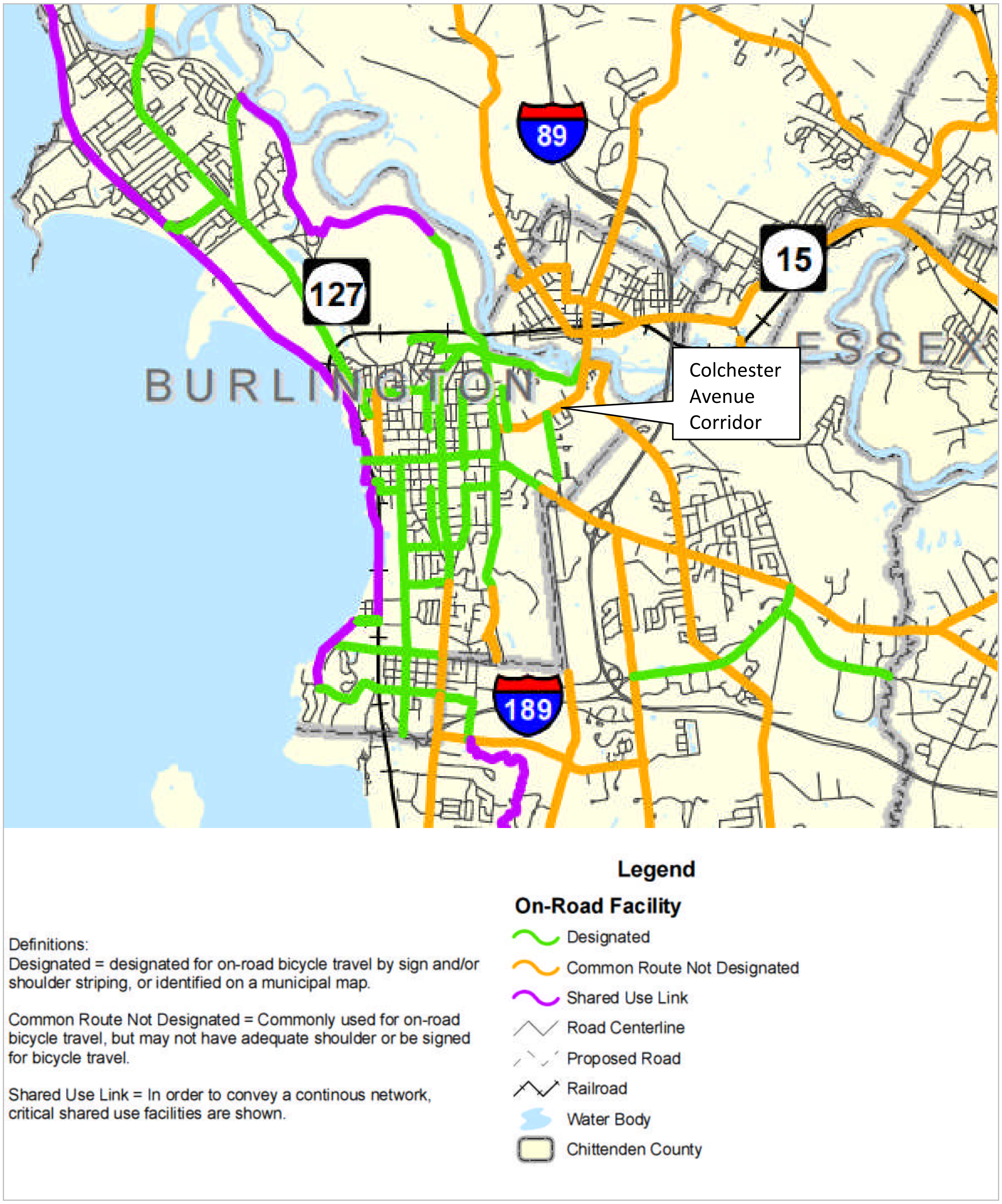
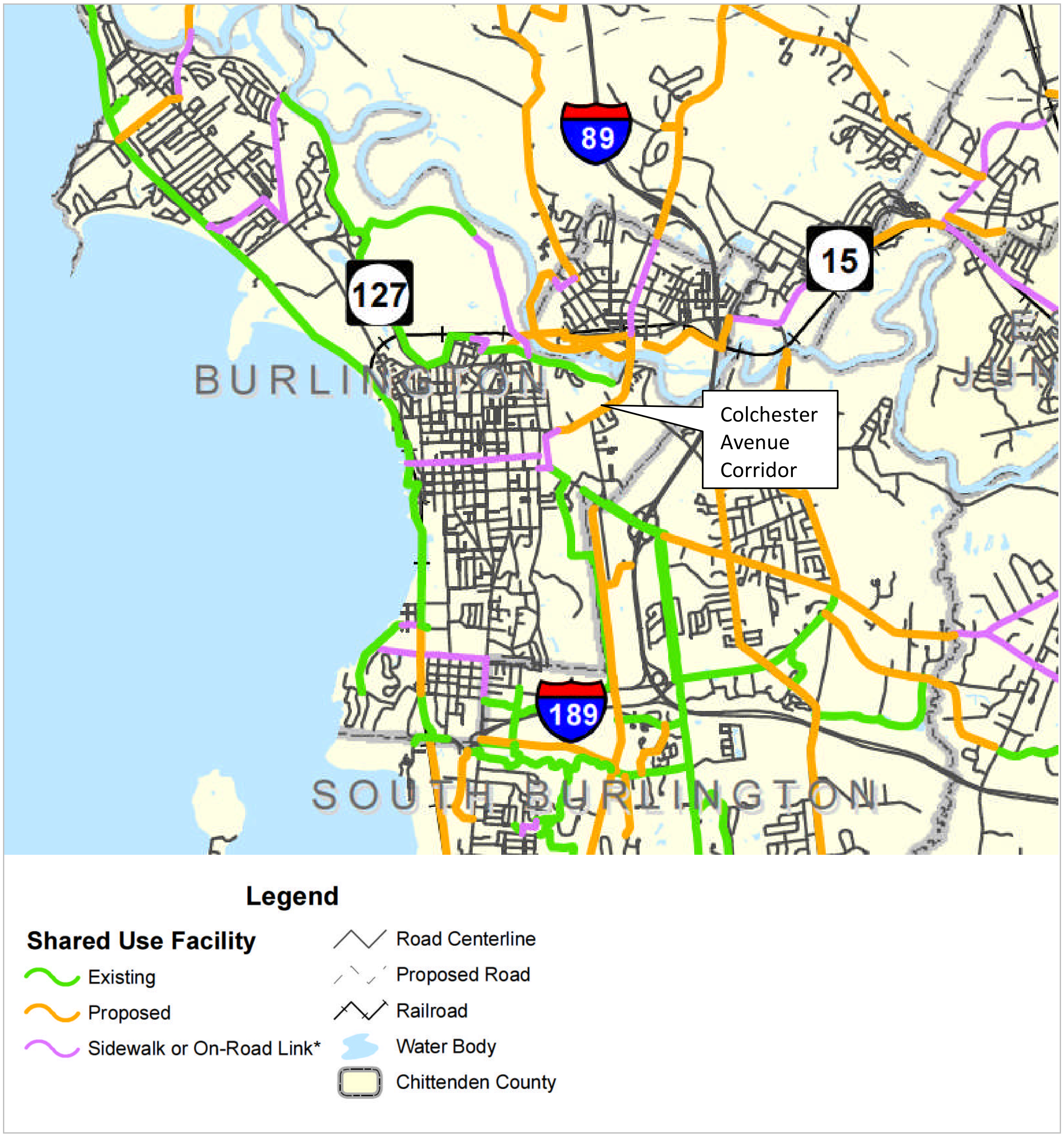


Figure 25: Existing and recommended shared use bicycle facilities (source: 2008 CCMPO Regional Bicycle/Pedestrian Plan Update)



Observations

The standard catch basins used in the corridor make on-street bicycling more challenging (see photo right).

Drainage inlets such as this one on the FAHC driveway are bicycle-friendly.

3.6 Transit

Colchester Avenue is a very significant corridor for transit. Numerous transit routes serve or pass through the corridor as indicated in Table 2. The services range from express commuter routes that run during the AM and PM peak hours, regular fixed route service that runs throughout the day to employee and student specific services. Table 3 shows which transit services are in operation for each hour of the day along the corridor. During the morning rush hour there are ten different transit routes traveling along the corridor. Transit in the corridor is provided by several different operators including CCTA, CATMA, FAHC, UVM and Champlain College.

Bus stops are shown in Figure 26. There are two bus shelters (Figure 27) in the study area located near the Prospect Street intersection and at the Trinity Campus. All of the other official bus stops are at curb-side areas identified by signs (Figure 28).

Table 2: Basic characteristics of transit in corridor

Operator	Route	Origin	Destination	Fare (one-way)	Riders	Schedule	Frequency
CCTA	**#2-Essex Junction**	Downtown Burlington	Essex Junction	$1.25	Public	M-F 5:45AM to 9:30PM SAT 6:10AM to 7:15PM	M-F 15 minutes peak period, 30 minutes non-peak SAT 30 minutes peak period, 1 hour non-peak
	#11-College Street Shuttle	Union Station	FAHC	Free	Public	M-F 6:30AM to 7:00PM	15 minutes
	#56-Milton Commuter	Burlington (Pine St. PARC lot via Downtown and FAHC)	Milton (Husky)	$2	Public	M-F 5:55AM, 6:55AM, 12:15PM, 4:20PM, 5:20PM, 9:30PM	See Schedule (AM & PM service only)
	#76-Middlebury LINK	Middlebury	Burlington (Pine St./ Cumberland Farms via FAHC & Downtown)	$4	Public	M-F 5:05AM, 6:05AM, 4:20PM, 5:20PM to Middlebury M-F 6:10AM, 7:10AM, 5:55PM, 6:35PM to Burlington	See Schedule (AM & PM service only)
	#86-Montpelier LINK	Montpelier	Downtown Burlington (via FAHC & Pine St. PARC lot)	$4	Public	M-F 6:05AM, 6:15AM,7:00AM, 7:45AM and 4:00PM, 4:45PM, 5:15PM and 6:15PM to Montpelier M-F 5:42AM, 6:40AM, 7:00AM, 7:22AM and 4:02PM, 5:02PM, 5:27PM, and 5:57PM to Burlington	See Schedule (AM & PM service only)
	#96-St. Albans LINK	Highgate	Downtown Burlington (via FAHC)	$4	Public	M-F 6:30AM, 7:30AM, 5:47PM and 6:21PM to Burlington M-F 5:45AM, 6:40AM, 4:50PM and 5:30PM to St. Albans	See Schedule (AM & PM service only)
Champlain College[1]	**Spinner Place-Late Night/Weekend Shuttle[2]**	Pine St. PARC lot (Gilbane)	Winooski (Spinner Place via Champlain College)	Free	Champlain College	Mon -Thursday 9:10 PM to midnight and Sat-Sunday 9:00AM to 6:00PM	40 minutes
FAHC[3]	**Champlain Mill**	Champlain Mill	McClure entrance (Colchester Ave.)	Free	FAHC-MCHV staff	M-F 4:30AM to9:20PM	10-15 minutes
	Centennial	Centennial parking	No information found.		FAHC-UHC & Trinity staff		
	Fanny Allen	Fanny Allen	McClure entrance (Colchester Ave.)	Free	FAHC-MCHV staff	M-F 4:15AM to 9:20PM; with stops at Champlain Mill between 9AM and 2PM	15 minutes
UVM-CATS	**Redstone Express**	Redstone Campus	Dewey Hall (intersection of Colchester & Prospect)	Free	UVM	M-F 7:45AM to 3:45PM	15 minutes
	On Campus Daytime	Redstone Campus	Trinity Campus	Free	UVM	M-F 7:20AM to 6:30PM	10 minutes
	On Campus Evening	Redstone Campus	Trinity Campus	Free	UVM	M-Th 6:15PM to 11:45AM	30 minutes
	Weekend Daytime	Redstone Campus	Trinity Campus	Free	UVM	Sat 11:30AM to 6:30PM and Sunday 11:30AM to 9:30PM	30 minutes
	Weeknight Off-Campus	Redstone Campus	Downtown via Trinity	Free	UVM	Sun-Thurs 6:30PM to midnight	30 minutes
	Weekend Evening	Redstone Campus	Downtown via Trinity	Free	UVM	Friday and Saturday 6:30PM to 10PM	30 minutes
	Weekend Late Night	Redstone Campus	Downtown via Trinity	Free	UVM	Friday and Saturday 10PM to 2:30AM	10 minutes
	Patrick Gym Daytime	Patrick Gym	Harris Millis (next to Patrick Gym) via Colchester Avenue	Free	UVM	M-F 7:15AM to 10AM	15 minutes

Local Route
Regional Route

[1] Operated by Mountain Transit for Champlain College.
[2] Spinner Place Shuttle uses Riverside Ave during weekday daytime hours.
[3] No weekend FAHC shuttles b/c weekend shifts park on-site.

Table 3: Weekday transit service in the corridor

Operator	Route	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM
CCTA	#2-Essex Junction																		
	#11-College Street																		
	#56-Milton Commuter																		
	#76-Middlebury LINK																		
	#86-Montpelier LINK																		
	#96-St. Albans LINK																		
Champlain College	Spinner Place-Late Night/Weekend																		
FAHC	Champlain Mill																		
	Centennial	*No schedule information found.																	
	Fanny Allen																		
UVM-CATS	Redstone Express																		
	On Campus Daytime																		
	On Campus Evening																		
	Weekend Daytime	** Serves Colchester Aveune on the weekends.																	
	Weeknight Off-Campus																		
	Weekend Evening	** Serves Colchester Aveune on the weekends.																	
	Weekend Late Night	** Serves Colchester Aveune on the weekends.																	
	Patrick Gym Daytime																		

Public
Champlain only
FAHC only
UVM only

Figure 26: Bus stops in the corridor

Figure 27: CCTA bus shelter

Figure 28: CCTA bus stop sign

3.7 Transportation Demand Management (TDM) and CATMA

TDM refers to programs that reduce single occupancy vehicle trips between home and work such as rideshare matching, cash incentives for car-pool, encouraging walking and biking, telecommuting and employer subsidized transit passes. The most effective TDM programs are managed by transportation management associations (TMA). TMAs are non-profit organizations established by private and public employers in a particular geographic area such as a downtown, mall, hospital, or industrial park. They provide an institutional framework for implementing TDM programs and are usually more cost effective than programs managed by individual employers.

The Campus Area Transportation Management Association (CATMA) is the TMA for the Hill Institutions in Burlington (Fletcher Allen Health Care, UVM, Champlain College and the Red Cross). CATMA is a nonprofit, employer-based organization formed in 1992 to enable its members to share resources as well as jointly plan, develop, and manage all transportation and parking programs, infrastructure, and associated facilities. CATMA's TDM programs include:

- Bike/Walks Bucks Reward
- Emergency Ride Home via Commute Smart Card
- Unlimited Access on CCTA transit network (All faculty/staff and students at UVM and Champlain College can use the entire CCTA route system for free by swiping an ID cards)
- RidesWork Carpooling (carpool matching service)
- CATMA Express Shuttle (15-minute shuttle between intercept parking at Gilbane/General Dynamics lot on Lakeside Avenue and Champlain College, UVM, and FAHC; free for CATMA members)

The TDM programs offered through CATMA have been successful at reducing the amount of single occupancy vehicle trips for employees and students traveling to the UVM and FAHC campuses. Results from the annual CATMA employee and student surveys are discussed below.

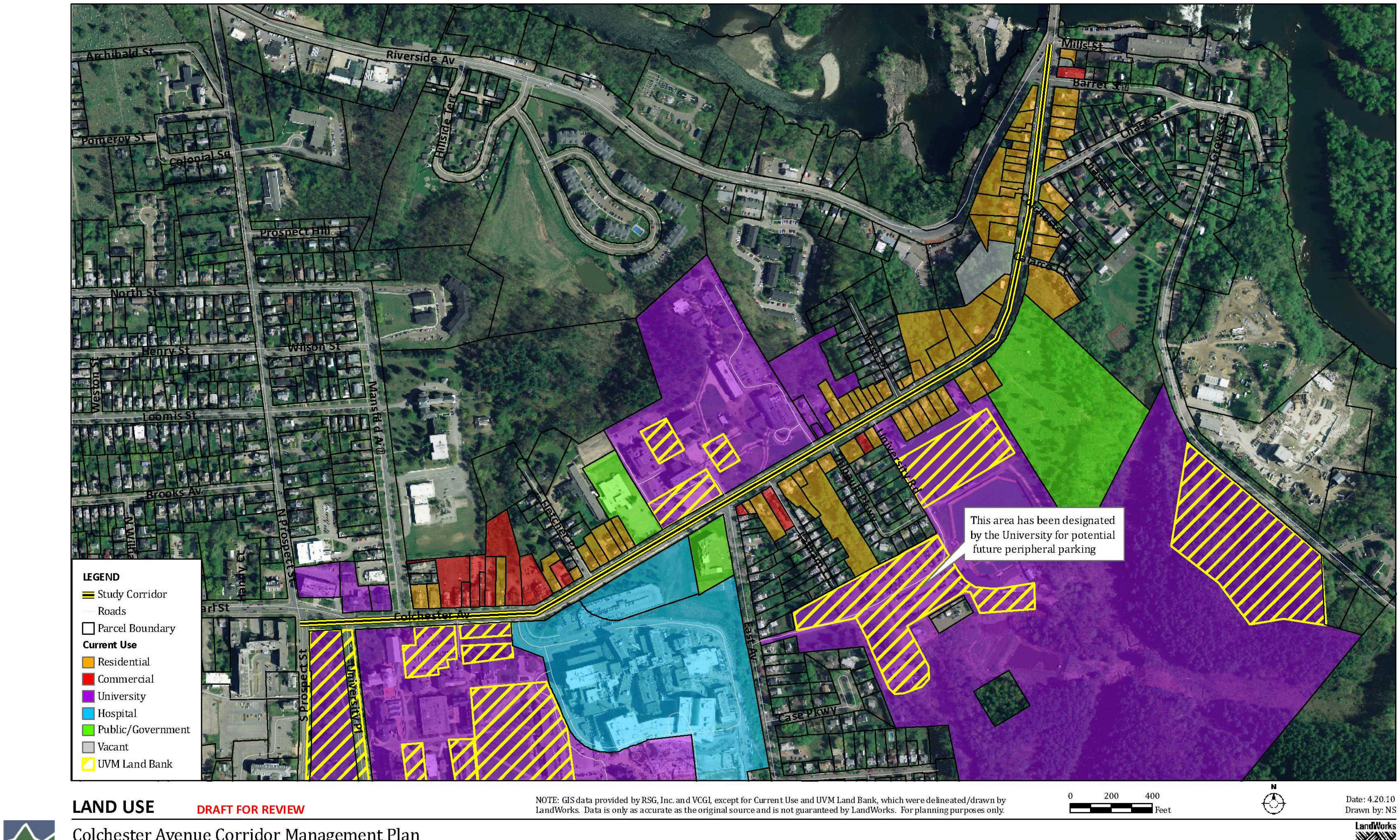
4.0 LAND USE CHARACTERISTICS

Colchester Avenue is a major access point to and from the City, the University of Vermont (UVM) and Fletcher Allen Health Care (FAHC). It accommodates a significant amount of through traffic and serves adjacent neighborhoods, employees and students. Therefore, it can be a very busy, noisy and congested area for pedestrians, bicyclists and vehicles. This memorandum provides an inventory and overview of existing land use and streetscape conditions adjacent to Colchester Avenue, as well as a review and summary of applicable planning and zoning documents related to the corridor. Existing conditions were inventoried during one on-site visit, as well as through analysis of available GIS data, aerial photography and review of relevant documents such as the University of Vermont Master Plan. A photo inventory is included in Appendix A.

4.1 Land Use

Colchester Avenue is defined by a mix of land uses, which include residential, commercial, institutional (university and hospital), and government/public (see Figure 29). Beginning at the eastern end of the study area, it is primarily residential with a limited number of commercial retail businesses at the Colchester/Riverside Avenue intersection. As one travels from Winooski up the hill, the residential land use pattern continues, which is typically defined by a concentrated mix of single-family, duplexes and multi-family housing, primarily occupied by university students. Lot sizes range from around 3,500-6,000 square feet and there is no potential for infill. Towards the top of the hill there is a cemetery which is the only area along the corridor that can be defined as public greenspace. Continuing west past the cemetery, residential uses carry on but are less densely concentrated, with lots as large as 1-acre, until you reach the University of Vermont Trinity Campus. At this point, commercial retail, professional offices, and institutional buildings become more dominant, with a few residences interspersed or located on the second story. Between Mansfield Avenue and Fletcher Place, there are a series of medical and professional offices located within converted homes (see photo 9 in Photo Inventory). In some cases, residential units are located on the second story and above. Parking for these facilities is located along the side or in the rear of the building (see photos 23 & 24). Infill development is limited within the non-university parcels, and, even if a few additional units were constructed (i.e. conversion of single-family to multi-family), there would be no significant impact to the character or function of the corridor. The remainder of the corridor is in institutional use, either owned by the hospital or university. This is the predominant and established use for more than half the study area and has the most influence on development and transportation patterns. The university has identified areas for possible future development, called Land Banks. These areas are highlighted on the Land Use map. While these areas are part of the university's long-range goals, development of these Land Banks could have a significant impact on the transportation system, namely parking and access, and should be considered in the development of the corridor management plan.

Figure 29: Land use map



4.2 Review of City Land Use Plans and Ordinance

There is a strong connection between land use and transportation, which is greatly impacted by any number of external influences. Characteristics of density, concentration and mix of uses, streetscape, amenities and accessibility, employment opportunities, housing availability, layout, design and timing of land development all play a significant role in the transportation system. Thus, one goal of this study is to address how the City plans for land use now and in the future. This is accomplished by reviewing relevant municipal documents, in particular, the Municipal Development Plan and Zoning Ordinance.

The City of Burlington adopted its **Municipal Development Plan** (Plan) on May 22, 2006. The Plan provides many recommendations for land use and development, and highlights the importance of neighborhoods, mixed-use development, institutions, and open space, all of which describe the general character of the Colchester Avenue Study Area. As a land use policy, the City would like to "encourage mixed-use development patterns, at a variety of urban densities, which limit the demand for parking and unnecessary automobile trips, and support public transportation" (p. I-2). Another goal is to "target new and higher density development into the…Neighborhood Activity Centers (NAC)," which includes Colchester Avenue (p. I-2). The purpose of the NAC is to "encourage small-scale commercial and mixed-use development in convenient neighborhood locations…The intent is to take underutilized commercial areas within a residential area, and transform them into higher-density, compact mixed-use settlements…The City will draw infill development into these areas through revised zoning that promotes neighborhood-scale mixed uses, increased density, smaller setbacks, additional parking waivers, and height bonuses for shared and below-ground parking" (p. I-20).

The list of Action Items to implement these goals is limited, particularly with regard to the Colchester Avenue Study Area. Of relevance to land use development in the corridor, may be the suggestion to "undertake an analysis to better understand the physical capacity of specific parts of the city to accommodate additional development" or "examine opportunities for increasing allowable densities along selected portions of major transit corridors" or "monitor the expansion of FAHC to ensure issues regarding traffic, historic buildings and stormwater runoff are carefully addressed" (p. I-31). While these directives help to encourage and reinforce the concentration of high-density development, create a pedestrian friendly environment, enhance access opportunities, and ultimately reduce vehicle trips, none of these items provide clear directives on how to improve and develop the Colchester Avenue corridor. They are abstract and advisory in effect and do not provide guidance for consistent decision-making by municipal officials.

The Plan does include a section entitled *Built Environment*, which helps to broaden these land use goals. The City's "built environment" is defined as all the buildings and structures and how they relate to land use and history (p. III-3). Through this section of the Plan, the City seeks to "retain its moderate scale and urban form in its most densely developed areas, while creating opportunities for increased densities" and to "encourage new land uses and housing designs that serve changing demographics and benefit from new technologies where appropriate" (p. III-1). In order to maintain this scale and character, several land use strategies are identified in the Plan that are relevant to the Colchester Avenue Study Corridor:

- Mixed-use development should occur in concentrated areas within walking distance of higher densities.
- In higher density areas, buildings should be closer to the street, with uses and entrances at the street level that invite pedestrian activity. Transitions between high density and low-density areas should be gradual. Access to light and air is maintained, while care is taken not to cast large shadows over nearby buildings and alter wind patterns.
- Adequate green space and amenities should be provided to encourage people to be outside enjoying the city year round. This includes the creation of rooftop gardens, a system of trails and paths, and a network of publicly conserved open spaces. (p. III-4)

A few Action Items are identified to help implement these strategies and include:

- Evaluate the options and opportunities for increased development density and building height within the Downtown Area, Neighborhood Activity Centers and other city growth centers to enable significant future growth without harming the scale and character of the city and its historic resources and scenic views.
- Extend the use of floor area ratio (FAR) as a measure of development density.
- Amend Article 30 of the Burlington Zoning Ordinance to include a definition of "Buildable Area" for the purposes of calculating allowable density in certain parts of the city.
- Revise Burlington's Subdivision Ordinance and street design standards to ensure that the width and design of each street fit its function and location. (p. III-11)

This leads into the *Transportation* section of the Plan, which, as a matter of policy seeks to:

- Focus on the User
- Address Community-Level Needs
- Offer Transportation Choices
- Build Upon Existing Resources and Infrastructure
- Implement Coordinated Transportation and Land Use Policies (p. V-1)

The City recognizes the importance of this last policy and the interrelationship of transportation and land use. Thus, two specific land use strategies are identified and include promoting transit-oriented development (TOD) and supporting growth management policies (p. V-2). The Plan provides a comprehensive review of the City's transportation system and outlines a variety of goals and strategies to ensure that transportation functions as an interconnected system. As a major commercial and business hub, the City continues to experience high traffic volumes. Each day approximately 29,000 vehicles travel over the Winooski River Bridge (p. V-4), and no new highways are being considered to alleviate this congestion. The Plan states that "increases in future capacity can only be realized through greater system efficiencies, a greater shift to alternative modes such as transit, and an emphasis on demand management strategies" (p. V-5). To facilitate planning and decision-making, the Plan classifies Burlington's streets. Colchester Avenue is considered a "major street," which serves as a principal access in and out of the City, and a primary connection to residential areas. According to the Plan, major streets "provide mobility over access" and "curb cuts are discouraged and only allowed where absolutely necessary" (p. V-6).

The Plan reinforces a multi-modal transportation approach, which is a key principle of growth management, and offers a variety of objectives to achieve this, some of which include:

- Providing safe and convenient pedestrian and bicycle routes
- Creating strong links within and between neighborhoods
- Ensuring roads are appropriate in scale and support and expand the existing street grid
- Integrating transit, cycling and walking
- Implementing and enhancing landscaping, lighting, and amenities
- Undergrounding utilities (p. V-8)

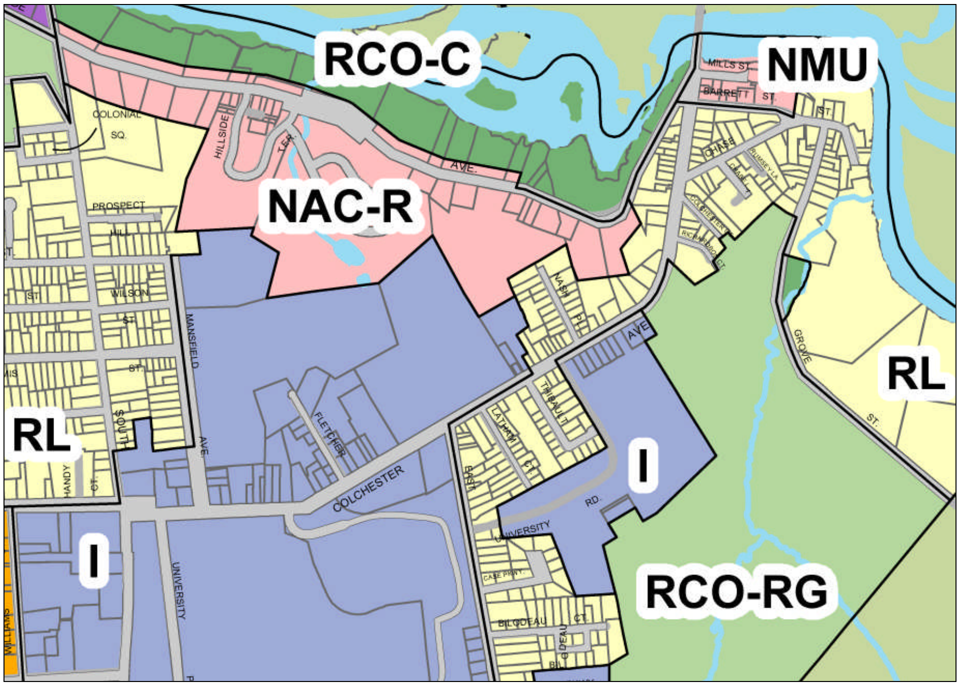
The City also stresses the importance of improving the pedestrian experience through an ambitious traffic calming program, the goal of which is to "return neighborhood streets to residents, offer more balanced use of public streets, and reduce the dominating influence of motor vehicles" (p. V-18). Likewise, the Plan emphasizes the value of promoting bicycles as a mode of travel and developing enhancements whenever possible. As the Plan states "the Dept. of Public Works commits 2% of its Streets and Sidewalks Capital Budget to develop and enhance the bicycle transportation network" (p. V-17). This is an important consideration for the Colchester Avenue corridor due to the high amount of bicycle traffic on and off the road. Transportation Action Plan Items associated with these various elements and relevant to Colchester Avenue include:

- Complete a comprehensive parking study and plan
- Re-examine the current street classification system to more accurately reflect street function and objectives, ensure continuity between streets of similar classification, and guarantee compatibility with state/federal functional classifications
- Link future street improvements and maintenance, pedestrian, bicycle, and public transit performance standards and objectives, streetscape design, and land use development standards to the revised street classification
- Consider the following new reconstruction projects…Colchester Avenue
- Reconsider establishment of commuter rail service to Winooski, Essex Junction, and possibly beyond
- Actively advocate strategies to ensure Chittenden County transportation projects are consistent with the goal of limiting sprawl
- Develop Level of Service (LOS) standards for bicycles and pedestrians
- Develop and implement a Bicycle and Pedestrian Safety Education Program
- Continue Transportation Demand Management Programs
- Develop a bicycle and pedestrian hazards reporting program
- Continue and expand the College Street Shuttle connecting the university, hospital, downtown, and waterfront
- Determine the remaining highway network capacity, and calculate the amount of traffic each new development can add to the road system
- Develop shared ride and subscription service options for city-wide taxi services
- Re-evaluate the effectiveness of the City's Residential Parking Program (p. V-22-23)

In conclusion, the Burlington Municipal Development Plan provides a comprehensive overview of land use, transportation and development. It presents many relevant goals for maintaining and improving the transportation system, as well as linking land use decision-making with transportation function. The Plan offers meaningful and effective policies for achieving multi-modal options while applying growth management strategies. It realizes the interdependence of land use and transportation and attempts to provide a safe, attractive, and functional system that sustains and promotes the historic development patterns of the City. As is common for many long-range planning documents, the Plan sets out a variety of recommended goals for what **should** be done, but most of these items do not provide clear directives on **how** or **when** to implement such actions. In particular, there are no specific standards for improving and developing the Colchester Avenue corridor. Thus, it is important to review the Burlington Zoning Ordinance, which should provide clearer guidelines and standards for development, and how such standards will influence transportation in the corridor.

The **Burlington Zoning Ordinance** (Ordinance) was adopted January 7, 2008 and most recently amended April 13, 2009. The Ordinance clearly defines the four planning districts along Colchester Avenue, which include: (I) Institutional, (RCO-RG) Recreation/Greenspace, (RL) Residential Low Density, and (NMU) Neighborhood Mixed Use (see Figure 30).

Figure 30: City-defined Zoning Districts along Colchester Avenue



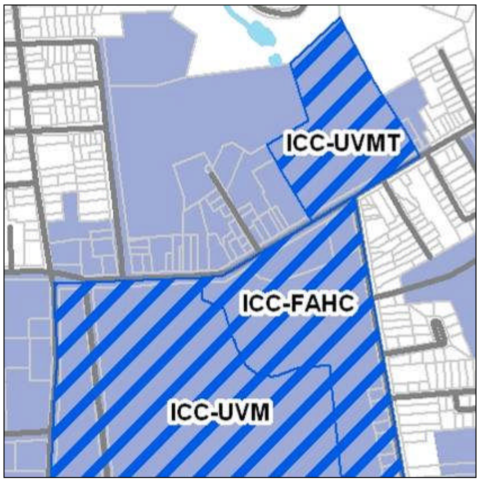
The NMU District represents the smallest area of land use (based on road frontage), and is "intended to preserve and enhance historically commercial areas while reinforcing the compact scale and development patterns within the city's older neighborhoods" (p. 4-26). Permitted uses include neighborhood oriented goods and services within walking or biking distance to nearby residences. This district allows zero setbacks with maximum lot coverage of 80%. There is one vacant lot within this area (see photo 21). Its development potential is limited, with less than 3,000 sq. ft. available.

The next largest district within the corridor is the RCO-RG, since only about 380 feet of this district fronts Colchester Avenue. It contains the cemetery and is intended to "provide a diversity of passive and active recreational opportunities and other urban green spaces that provide for public use and enjoyment" (p. 4-47) as well as to protect the function and integrity of its current use. In the case of this parcel, no development infill or redevelopment is likely.

The RL District encompasses a large portion of the study area and is "intended primarily for low-density residential development in the form of single detached dwellings and duplexes. The district is typically characterized by a compact and cohesive residential development pattern reflective of the respective neighborhoods' development history" (p. 4-36). Indeed, the residential development along Colchester Avenue and its side streets exhibit this pattern. There are a few single-family residences interspersed throughout the study area, but the majority of dwellings are homes converted into either duplexes or multi-family units and generally house university students. Lot sizes range from a minimum of 6,000-10,000 square feet with a maximum residential density of 7 units/acre. As applicable, density bonuses can increase this density up to 20 units/acre. Front yard setbacks are typically 20 feet or less and emphasize a pedestrian friendly environment. There is the potential for some infill development, primarily in the form of additions to legal multi-family residences or conversion of homes to neighborhood commercial uses.

The I District covers the remaining and largest portion of the study area and is "intended to support continued growth and flexibility within the city's major educational and health care institutions…" while respecting "the sensitive historic development patterns" of the surrounding neighborhoods (p. 4-33). Maximum density for this district is 20 density units/acre, and up to 24 du/acre with an inclusionary requirement. As an added measure for growth and development in this district, the City has established the Institutional Core Campus Overlay (ICC) districts, which allow for increased development than would typically be found in the underlying district (p. 4-56). There are three ICC Districts along the Colchester Avenue corridor (see Figure 31) and include:

Figure 31: ICO Overlay District Map excerpted from the Burlington Ordinance



- *Fletcher Allen Health Care Medical Center Campus (ICC-FAHC)* – "on-site parking is expected to play a larger role…to accommodate the needs of patients and visitors…the overall development of the campus would be expected to emphasize the needs of internal circulation and functions in order to meet patient care requirements" (p. 4-56). Lot coverage may not exceed 60%, with exceptions, and no new surface parking is permitted. A transitional buffer has been established for this area, which begins at the centerline of Colchester Avenue and extends 150 feet into the overlay district. No housing unit within this buffer may be demolished or converted to nonresidential use (p. 4-59). There are currently no residential units located within this buffer along Colchester Avenue.
- *UVM Central Campus (ICC-UVM)* – "this core campus would be expected to be dominantly pedestrian-oriented, with all but the most essential parking provided off-site. Development within this core campus should reflect the institution's core educational values in both design and quality" (p. 4-56). Lot coverage may not exceed 65%, with exceptions, and no new outdoor surface parking is permitted. The same transitional buffer runs through this district, but again, no residential uses exist. Additional permitted uses for this overlay district include post-secondary schools and community colleges.
- *UVM Trinity Campus (ICC-UVMT)* – "is intended to provide reasonable future use of the Trinity College campus and to preserve the residential character of the existing neighborhoods adjacent to the district. This overlay district shall in no manner whatsoever affect the dimensional requirements of the underlying I district" (p. 4-57). Lot coverage may not exceed 40% and no new outdoor surface parking is permitted. In addition, "no development of…new structures, except for ancillary structures no larger than 200 square feet, shall be permitted within a setback of 115 feet from the front property line on Colchester Avenue" (p. 4-63). Limited permitted or conditional uses are allowed in this district such as single detached dwellings or dormitories.

The I District along Colchester Avenue has the highest potential for infill development and redevelopment. Such future development areas have been recognized by the university and are identified on the Land Use Map as UVM Land Banks. Although these areas are part of the university's long-range goals, development of these Land Banks could have a significant impact on the transportation system, namely parking and access, and should be considered in the development of the corridor management plan.

The City has extensive requirements for parking, and has delineated two parking districts along Colchester Avenue, which include a Shared Use Parking District and a Neighborhood Parking District (p. 8-2). The Shared Use Parking District "reduces the requirements from the baseline standards recognizing that opportunities exist to share parking demand between related nearby land uses, and that travel to and between these uses may not be strictly automobile dependent." The Neighborhood Parking District "establishes the baseline of parking requirements throughout the city where the demand for offsite parking is largely dependent on the needs and characteristics of an individual site or land use." Likewise, the Ordinance specifically identifies minimum off-street parking requirements for each parking district (p. 8-5). The maximum number of parking spaces in all districts may not exceed 125% of the minimum number of spaces required for the Neighborhood Parking District for any given use, with some exemptions (e.g. public parking or alternative fueled vehicle parking). In addition, no more than 50% of the total required parking shall be provided greater than 600 feet from the use in the Neighborhood Parking District, and 1,000 feet in the Shared Parking District unless such parking is provided as part of a Parking Management Plan (p. 8-11). For facilities in the Institution District, the Ordinance requires the preparation, maintenance, and monitoring of a comprehensive parking management plan. Such a plan must be reviewed and approved by the DRB to ensure it adequately serves existing and proposed development by the institution(s). This is the CATMA Joint Institutional Parking Management Plan. The Ordinance also includes requirements for bicycle parking to encourage alternative modes of travel and enhance the visual quality of the city (p. 8-15). Bicycle requirements apply to all new development, building expansions, or occupancy changes, and specifically identify the minimum number of bicycle parking spaces that must be provided at each site in addition to location and design standards.

A final, key component of the Ordinance is the inclusion of Site Plan and Conditional Use Review (p. 3-21), which "provide for the consideration of site features and their location and arrangement so as to…ensure the adequacy of parking and circulation, provide for necessary landscaping and screening, and protect and maintain the character and development pattern of the surrounding area." Site Plan Design Standards have been outlined in Article 6 (p. 6-1) for projects requiring site plan review, and include specific standards for vehicular and pedestrian access as well as parking and circulation. The Standards also regulate the frequency of curb cuts and size of residential driveways. It also encourages shared parking between neighboring properties and requires shade trees in parking areas greater than 720 square feet. For conditional use review, approval shall only be granted if "the proposed conditional use and associated development [does] not result in an undue adverse effect" on a variety of factors, including but not limited to the character of the area affected, traffic and circulation, signs and present and future growth patterns (p. 3-24 – 3-26).

In conclusion, the Burlington Zoning Ordinance does an effective job of addressing and managing growth and development along Colchester Avenue, specifically addressing development related to the hospital and university. Transportation and parking are also adequately managed through site plan and conditional use review as well as specific parking standards. The Ordinance also provides special methods for promoting alternative modes of transportation, such as the bicycle parking standards.

4.3 Streetscape Aesthetics

> *"The City's public investment in its infrastructure includes thousands of small details: street lighting, manhole covers, catch basins, curb and ramp details, sidewalk paving textures, street trees, utility lines, benches, fire alarm boxes and hydrants, traffic signs and signals, fencing, parking meters, and many more. The cumulative effect of these details, in conjunction with more substantial investments in public buildings and spaces, defines the standard of quality for Burlington's built environment."*
>
> ~ 2006 Burlington Municipal Development Plan III-5

Being a major transportation route to and from downtown Burlington, with access to both the University of Vermont and Fletcher Allen Health Care, the aesthetic character of Colchester Avenue is of great importance. As a gateway for vehicles entering the city from the north and east, the streetscape should set an appropriate tone that reflects the best qualities of the city. In addition to just aesthetics, the design of the road, sidewalk, and associated streetscape components should support a safe environment for all transportation modes, including automobiles, buses, bicycles, and pedestrians. Ideally, there would be a continuity of streetscape details, including ornamental street lights, bus shelters, and curbing/paving details throughout Burlington's major transportation corridors. Given all these criteria, Colchester Avenue currently falls short of providing a multi-modal travel experience that is fully functional and equal to the aesthetic standards established elsewhere in Burlington.

Many of the aesthetic issues with the existing streetscape also entail issues for safety and functionality. For example the current sidewalk network is in poor condition in many locations, thereby making a poor impression visually and creating tripping hazards and challenges for people with disabilities. Likewise the street lighting, consisting of cobra heads on utility poles, present a very utilitarian image and does not provide adequate lighting levels or qualities for safe pedestrian and vehicular movement. The maze of overhead utility wires and utility poles is a highly negative visual element in the corridor and presents challenges for street tree planting.

In terms of landscaping, the majority of Colchester Avenue does not have a green strip that is of adequate width to support street trees. Aside from enhancing/softening the visual environment, street trees have multiple benefits: support the urban forest, provide shade to pedestrians, and contribute to traffic-calming. The visual enhancement provided by street trees planted in a wide green strip (without overhead utilities) is readily apparent along the northern side of Colchester Avenue between University Place and the FAHC entrance drive. Across the street, however, overhead utilities limit opportunities for street trees in an otherwise comparable green strip. In other areas trees outside the city ROW contribute to Colchester Avenue's designation as an 'Urban Forest primary street tree corridor,'[14] yet gaps in these 'setback plantings' also exist.

Despite the wide green strip, overhead utility lines along the south side of Colchester Avenue limit opportunities for street tree planting.

This generous tree belt with full-size street trees enhances the aesthetics of Colchester Avenue and contributes to the urban forest.

In summary there are numerous opportunities for streetscape enhancement within the corridor. An intelligently designed plan for the streetscape would provide multiple benefits- in terms of functionality/safety, aesthetics, and the environment- for the wide range of users on Colchester Avenue's street and sidewalks. A future vision that explores these solutions will be addressed in the next phases of this study.

4.3.1 Summary of Key Aesthetic and Functional Streetscape Issues

Lighting

- Inconsistent street light spacing results in uneven light distribution, which affects both safety and aesthetics.
- Poor color rendition due to high-pressure sodium lamps affects both safety and aesthetics.
- Street lights (located only on south/east side of street) provide very poor lighting for pedestrians in sidewalk zones, therefore affecting safety.

[14] The delineation of Urban Forest tree corridors is defined in the City of Burlington Open Space Protection Plan.

- Cobra head fixtures on utility poles are aesthetically substandard for a gateway road to the downtown and do not match ornamental light standards on newer lighting projects (Riverside Ave., University Green, etc.).
- Cobra head fixtures are not cut-off fixtures and thereby result in light pollution.

Sidewalk

- The sidewalk is in poor condition in many locations- cracks, heaves, holes, etc.
- There are gaps in the sidewalk (i.e. gravel driveway to Centennial Field interrupts the sidewalk, lack of sidewalk along cemetery).
- Curb ramps are not provided in all locations.
- Bike route on sidewalk needs improved delineation, including sidewalk marking.
- Sidewalk width is inadequate in some heavily traveled locations, as indicated by damage to adjacent lawn areas.

Landscape

- Green strip condition is poor in many locations (ruts, loss of soil, poor lawn cover)- in some cases due to vehicular damage, in other cases due to excessive pedestrian traffic.
- Lack of curb in many locations contributes to green strip damage from vehicles.
- Much of the green strip is too narrow to accommodate street trees (3' or less), which calls into question its value given ongoing maintenance issues.
- Many trees outside the ROW function somewhat as street trees due to their proximity to the sidewalk/road but are not maintained by the city.
- Some lawn areas outside the ROW could accommodate more trees to function as street trees.
- The green strip on the east side of Colchester Ave. north of the cemetery is wide enough to accommodate street trees, but the overhead utility lines above require the use of small tree species.

Overhead Utilities / Visual Clutter

- Overhead utilities and power poles negatively impact the aesthetics of the corridor by contributing to visual chaos, interfering with positive views.
- Overhead utilities present a poor impression upon entering the city from the Winooski Bridge 'gateway'.
- Street trees planted under overhead utility lines must be small species, which have less visual impact and value.
- Signs on individual posts (as opposed to consolidated on street lights) contribute to visual clutter.

Bus Stops

- Where shelters are not provided, bus stops are often located at lawn areas, which can result in excessive wear and tear on the lawn.
- Bus stop signs are not highly visible.

City Documents

A number of City documents applicable to streetscape and aesthetics were also reviewed. Relevant excerpts from those plans include:

2006 BURLINGTON MUNICIPAL DEVELOPMENT PLAN

Gateways

"You never get a second chance to make a good first impression." Gateways create a sense of arrival for those entering the city or neighborhood within it, and set the tone for what's to come. This feeling can be created with appropriate signs and landmarks, plantings, burying utility lines, protecting important views, and using distinctive pavement and architectural elements at intersections. Each gateway to the city or its neighborhoods should reflect the particular characteristics of its setting and provide a welcoming introduction. The City should take active steps to enhance the primary gateways into the city.

From 2006 Burlington Municipal Development Plan III-5

Streetscape Design

One of the most important factors affecting the quality of urban life is the character of city streets. Crucial to a street's character are such things as building heights and setbacks, the planting of street trees, presence of overhead utilities, quality of street lighting, and the design quality of the "street furniture."

From 2006 Burlington Municipal Development Plan III-7

Streets as Public Places

While not all streets can be as inviting and accessible to the public as the Church Street Marketplace, the pattern of streets, paths and pedestrian amenities should make walking safe and easy in all areas of the city.

From 2006 Burlington Municipal Development Plan III-8

Overhead Utilities

Overhead utilities - including electric, telephone, and cable - present a dominant visual element throughout many parts of the city. This is especially concerning where street trees and other streetscape improvements are desired to make parts of the city more inviting for development and pedestrians or to preserve or enhance important viewsheds… While too expensive to accomplish everywhere, there are parts of the city where placing overhead utilities underground, or relocating them behind buildings, must be an important design consideration. In addition to all new development, priority should be given to undergrounding overhead utilities in the Downtown Waterfront, the North Street Commercial District, Riverside Avenue, North Winooski Avenue, streets that offer important view corridors to Lake Champlain, and the main approaches into the city.

From 2006 Burlington Municipal Development Plan III-9

Street Trees

An essential feature of a healthy and attractive urban environment is the presence of trees- along the streets and in public parks and private yards. More than simply an aesthetic amenity, trees in the urban environment stabilize soils, provide a filter for surface runoff and air pollutants, shade summer sun, block winter winds, muffle sounds and provide habitat and refuge to birds and other small animals…

The Department of Parks and Recreation has a *Street Tree Planting Plan* as a component of an *Urban Forest Master Plan*. In addition to inventorying assessing the condition of existing trees, the Plan articulates city-wide objectives for public trees, identifies future planting sites, lists appropriate species for re-planting, establishes site planning guidelines, and explores opportunities and mechanisms for planting on private property to expand possible planting sites within the streetscape. Most importantly, it outlines a plan for maintaining the existing street tree population with annual budget recommendations and proposed work schedules for pruning.

From 2006 Burlington Municipal Development Plan III-9

Street Lighting

Recognizing these issues are common in other areas, and pose impacts regionally, the City participated in a site lighting study in cooperation with the Chittenden County Regional Planning Commission. The purposes of the study were to develop information on lighting issues and technology, and to establish a set of lighting guidelines that will help Burlington and other communities in the review of new lighting installations. Issues of particular importance in Burlington include:

- Overall illumination levels are too high.
- Concern about the visual quality and color distorting properties of high pressure sodium lights.
- Glare from unshielded or misdirected fixtures.
- Improving the quality of outdoor lighting to improve public safety and perceptions of security.
- Unnecessary illumination of building facades.
- Design quality of fixtures and poles.
- Desire for complementary fixture designs in different types of settings and neighborhoods.

From 2006 Burlington Municipal Development Plan III-10

2009 BURLINGTON ZONING ORDINANCE

Outdoor Lighting Performance Standards

All outdoor lighting shall be designed to provide no more than the minimum lighting necessary to ensure adequate vision and safety for the intended task to be performed in the lighted area. Light levels shall be compatible with or have gradual transitions with lighted public streets and sidewalks, and to not cause glare or cast direct illumination onto adjacent properties or streets.

Key standards:

- All outdoor lighting fixtures shall comply with the *Outdoor Lighting Manual for Vermont Municipalities*
- All outdoor lighting fixtures shall be 'Full Cut-off' or 'Cut-off' as defined by the IESNA.
- All illumination shall be of a white light, such as a fluorescent, metal halide, incandescent, or a combination of lamps having a color rendering index greater than seventy (70).

From Article 5: Burlington Zoning Ordinance, Sec. 5.5.2 Outdoor Lighting

STREET DESIGN GUIDELINES: BURLINGTON TRANSPORTATION PLAN, 2007

Tree Belt

At a minimum, tree belts should be five feet wide. Wider belts provide better growing conditions and will result in improved health and vigor of street trees. *(Street Design Guidelines: Burlington Transportation Plan, 2007 p. 6)*

Street Trees

Street trees provide scale and definition to the street and tremendously improve pedestrian comfort. In addition to the benefits described above, mature street trees reduce the apparent width of the street and contribute economic value to adjoining properties. *(Street Design Guidelines: Burlington Transportation Plan, 2007 p. 6)*

Street Lighting

Street lights provide general illumination for all street users. Due to the expense of light fixtures, most street lighting is utilitarian in nature, with luminaries mounted high on the pole (i.e., 20+ feet) for more coverage per light, and lights are typically scaled and oriented to the motorway. This approach accomplishes the task of lighting the street with fewer fixtures, but does not contribute to the pedestrian-friendliness of the area. On the Complete Street, ornamental light fixtures are recommended at gateways and within high-volume pedestrian zones. Currently, ornamental light fixtures provide an attractive entry image at the heavily-traveled Main Street gateway to Burlington. Extending this treatment to other gateways into the city is recommended. *(Street Design Guidelines: Burlington Transportation Plan, 2007 p. 6)*

5.0 CORRIDOR DEMOGRAPHICS

This section describes the social and economic characteristics for the residents and students that live within or near Colchester Avenue. The primary sources of data are the 2000 US Census. Census data are available in a number of different geographies including Chittenden County and the City of Burlington. The City is further divided into census tracts. Census Tract 6 is shown in Figure 34 and is the geographic unit on which most of the data below are based. Although Census Tract 6 extends beyond Colchester Avenue to Riverside Avenue in the north and South Willard Street in the west, it is the unit of geography most associated with the study area.

While Burlington's total population did not change significantly between 1990 and 2008, the population (Table 4**Error! Reference source not found.**) and number of occupied housing units (Table 5) did increase within the study area (Census Tract 6). The increase may be due in large part to the construction of multi-family housing along Riverside Avenue, which is within Census Tract 6, but is not located directly within the study area.

Table 4: Population Change in Burlington and in Census Tract 6[15]

Area	1990	2000	2008
Burlington	39,127	38,889	38,897
Census Tract 6	4,092	4,392	Not Available

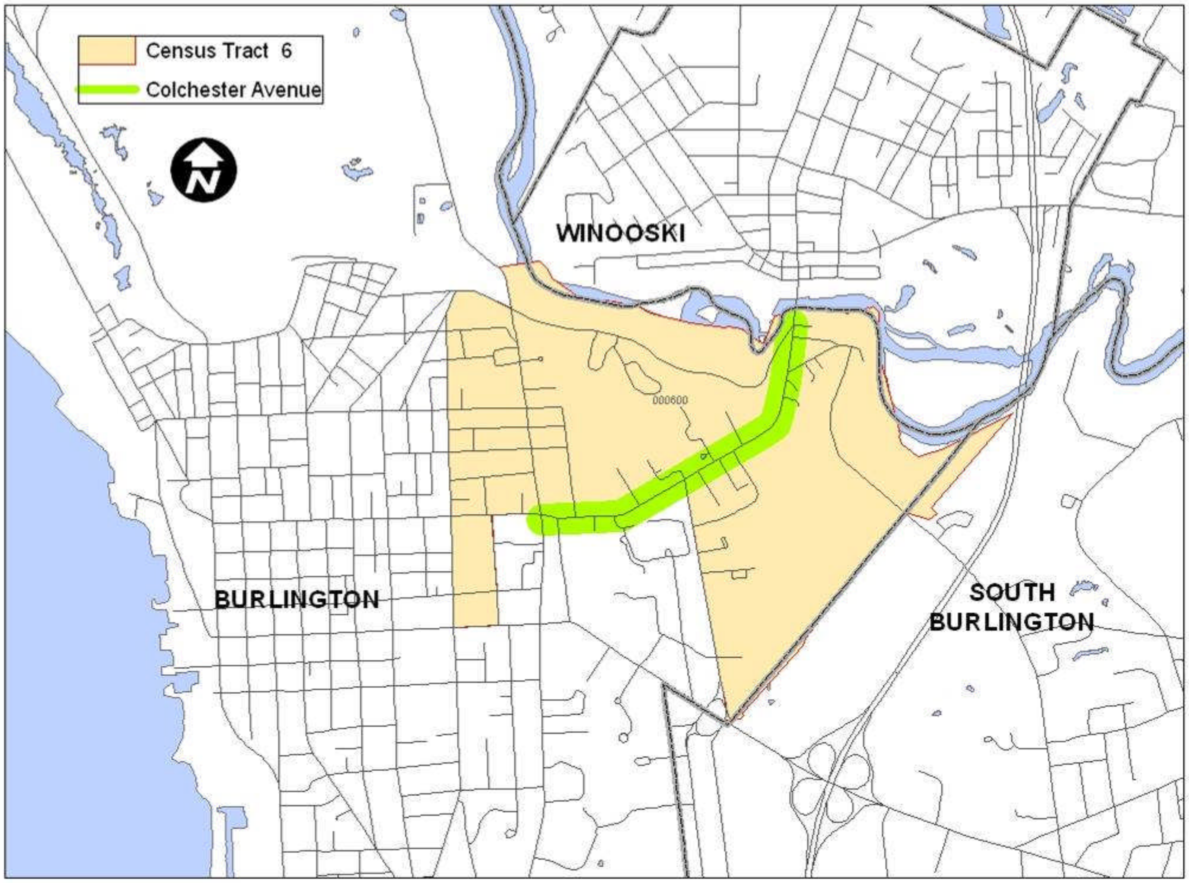
Table 5: Occupied Housing Units in Burlington and Census Tract 6

Area	1990	2000
Burlington	14,680	15,885
Census Tract 6	1,463	1,827

The average household size in the study area was 2.20 people per household in 2000, which decreased slightly from 2.3 in 1990. The study area's household size is consistent with the rest of the City (2.19); and both are lower than the average household size in Chittenden County (2.47).

[15] The Census provides a population update for 2008 for the entire City but not the census tract.

Figure 32: Census Tract 6 Boundary and Colchester Avenue Study Area



The median age of study area residents was 25.5 in 2000 compared with 29.1 for the entire City and 34.2 for Chittenden County. The study area has a higher percentage of people within the 18-64 years old age cohort than the City as a whole and the County (Table 6). This proportion is most likely driven by the number of students living off-campus in the study area.

It has been widely acknowledged that the percentage of the population over the age of 65 will increase significantly during the next twenty years as the baby boomer generation moves into its next age cohort. While the population in the Colchester Avenue study area will always be younger on average than almost everywhere else, consideration should still be given to the transportation needs of older people living in the corridor. A common misperception is that older people will shift from automobile travel to transit or walking. However, the baby boomer generation is expected to bring their culture of "automobility" forward and their aging will not necessarily increase demand or use of other modes. Broad strategies to provide safe mobility (and the independence it creates) for older people include programs to evaluate driver skills, senior citizen driver education, vehicle design and advanced technology that must be addressed on the regional, statewide and national levels and are therefore not applicable to this corridor plan. However, roadway design features to enhance safety for older drivers and pedestrians will benefit all users and should be considered in this plan.[16]

[16] "Key Issues in Transportation and Aging, Ensuring Safe Mobility for Older Adults", TR News Number 264, September-October 2009.

Table 6: Population Age Distribution

Age Cohort	**Colchester Ave. Study Area (**Census Tract 6)		**City of Burlington**	**Chittenden County**
	Number	Percent of Total		
Younger than 18	432	10%	16%	24%
18-64	3,573	81%	73%	67%
65 years and over	387	9%	11%	9%

The total number of students enrolled at UVM and Trinity (until it closed in 2000) remained relatively flat over the last two decades. Although total enrollment has remained flat, the number of undergraduate students at UVM has increased between 2000 and 2009 (Table 7).

Table 7: Enrollment at UVM and Trinity[17]

Year	University of Vermont			Trinity	Totals
	Under Graduate	Graduate / Medical	Non-Degree/ Continuing Ed		
1991	7,922	1,487	1,610	719	11,738
1995	7,496	1,577	1,158	629	10,860
2000	7,406	1,500	1,212	0	10,118
2006	8,784	1,738	1,075	0	11,597
2009	9,829	1,335	430	0	11,594

The total number of people employed at the institutions increased between 1991 and 2009 by approximately 16% (Table 8). Most of the increase in employment has occurred at the MCHV campus of FAHC.

Table 8: Employment at Institutions in Study Area[17]

Year	FAHC[1]	UVM	Trinity	Totals
1991	3,415	3,101	238	6,754
1995	3,763	3,048	283	7,094
2000	3,542	3,332	0	6,874
2006	3,926	3,606	0	7,532
2009	4,546	3,313	0	7,859

1. Includes MCHV and UHC only.

About 30% of the housing units are owner occupied in the study area and the balance, 70% are renter occupied (Table 9). As noted in the City's comprehensive plan, Burlington's home ownership rate has not topped 50% since the 1960s. The percentage of renters is particularly high in the Colchester Avenue study area presumably due to demand created by the students that choose to live off campus.

Table 9: Home Ownership

Description	Colchester Ave. Study Area		City of Burlington	Chittenden County
	Number	Percent of Total		
Owner-occupied housing units	543	29.7%	41.5%	66.1%
Renter-occupied housing units	1,284	70.3%	58.5%	33.9%

[17] Source: Joint Institutional Parking Plans for the stated years published by CATMA.

Residents in zero-vehicle household depend on non-auto modes to meet daily transportation needs. Eleven percent of the households in the study area did not own a vehicle in 2000 (Table 10).This proportion of zero-vehicle households is less than proportions in the City and greater than the proportions in Chittenden County and may be driven to some extent by the high percentage of renters. According to the 2001 National Household Transportation Survey, almost 18% of rented households nationwide do not have a vehicle[18].

Table 10: Vehicle Ownership

Vehicles per Household	Colchester Ave. Study Area (Census Tract 6)		City of Burlington	Chittenden County
	Households	*Percent of Total*		
None	194	11%	15%	7%
1	781	43%	42%	33%
2	567	31%	33%	45%
3 or more	285	16%	10%	15%

Driving alone is the most common means of traveling to work for residents within the study area. Walking to work is also significant in the study area. A higher percentage of study area residents walk to work compared to the entire City and Chittenden County. The use of public transportation and carpooling was slightly less for residents in the study area, probably due to the higher percentage of people that walk to work (Table 11).

Table 11: Means of Travel to Work for Corridor Residents

Travel Mode	**Colchester Ave. Study Area** (Census Tract 6)	**City of Burlington**	**Chittenden County**
Car, truck, or van -- drove alone	64%	62%	76%
Car, truck, or van -- carpooled	9%	12%	11%
Public transportation (including taxicab)	3%	4%	2%
Walked	20%	17%	7%
Other means	2%	2%	1%
Worked at home	2%	3%	4%

The largest employers in the study area are UVM and FAHC. CATMA conducts annual employee and student surveys of its members' constituents. Figure 33 shows the mode split in 2003 versus 2008 for various user groups as suggested by the survey results. The results indicate that the drive alone mode share has declined since 2003, as TDM has increased the incentives to use alternatives such as bus/shuttle, biking and walking. The surveys also indicated the dominance of walking as a mode of travel for students living on campus and those that live within ½ mile of campus. Transit is the second most use mode for students.

[18] Highlights of the 2001 National Household Travel Survey; Bureau of Transportation Statistics

Figure 33: Mode split for Hill Institution Employees[19]

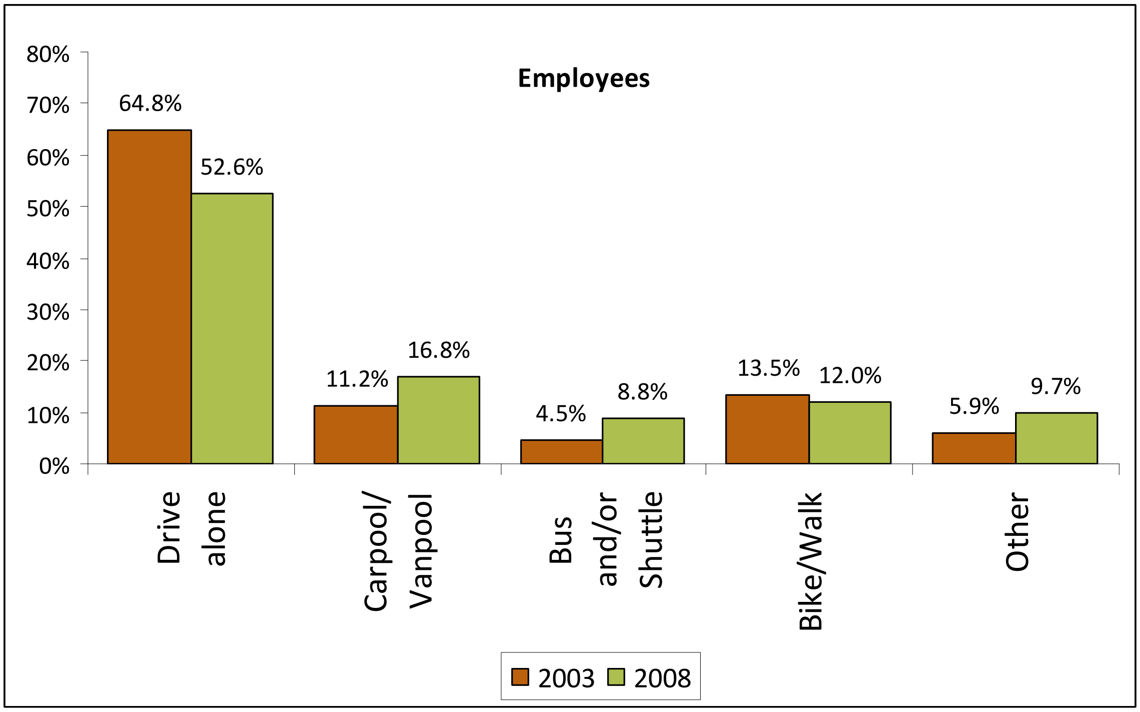
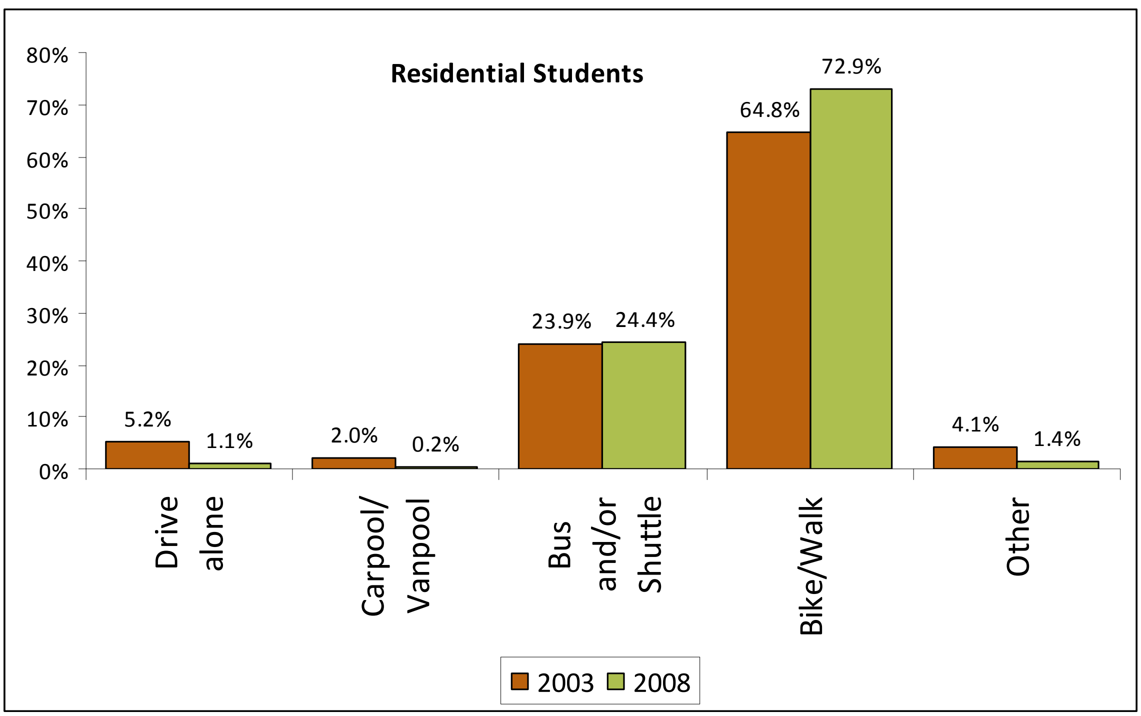


Figure 34: Mode split by for Students Living on Campus[20]



[19] Source: 2008 Annual CATMA Employee Survey as presented in the *2009-2014 Joint Institution Parking Management Plan*

[20] Ibid.

Figure 35: Mode split by for Students that Live w/in a ½ mile of Campus[20]

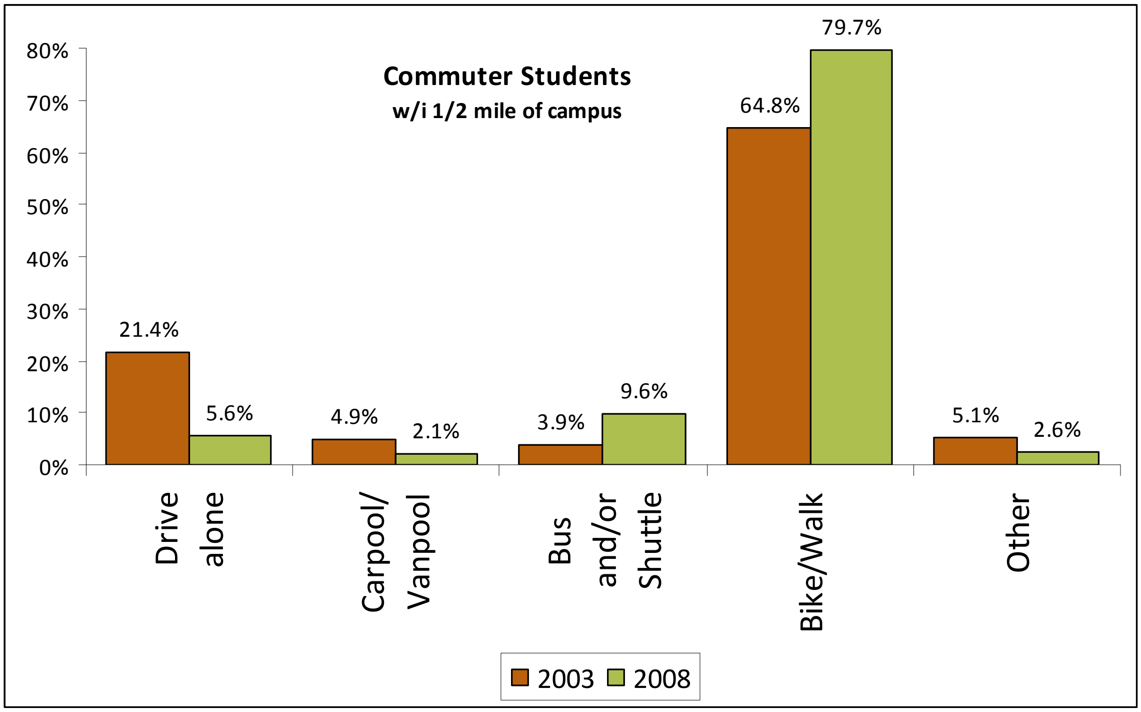
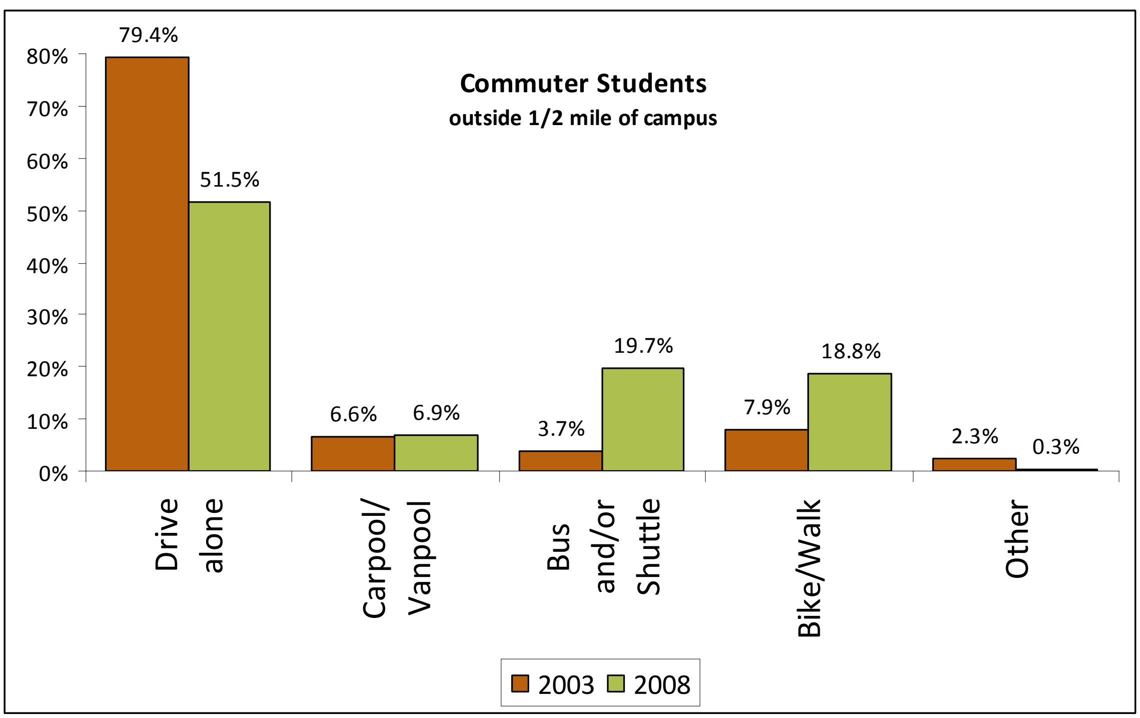


Figure 36: Mode split for Students that Live more than a ½ mile from Campus[21]



[21] Source: 2008 Annual CATMA Employee Survey as presented in the *2009-2014 Joint Institution Parking Management Plan*

Median income for households and families is consistent between the study area and the rest of the City; and both are significantly lower than median income for all of Chittenden County (Table 12). The study area's relatively low median income may be explained to some degree by the number of students that live in rental units off campus, who don't necessarily earn a significant income. This observation is further supported by comparing the number of families and individuals below the poverty level (Table 13). The percentage of families in the study area below the poverty line is much less than the City-wide proportion and consistent with the County-wide proportion. However, the percentage of individuals below the poverty line is much higher than the City and County proportions. As observed in the City's Municipal Plan, the high percentage of individuals below the poverty line is likely due to the number of students living in the area.

Table 12: Median Income in 2000

Description	**Colchester Ave. Study Area** (Census Tract 6)	City of Burlington	Chittenden County
All Occupied Households	$32,852	$33,070	$47,673
Owner Occupied	$52,212	$53,138	$61,028
Renter Occupied	$24,149	$22,730	$28,261
Family	$48,705	$46,012	$59,460

Table 13: Poverty Status

Description	**Colchester Ave. Study Area (**Census Tract 6)		City of Burlington	Chittenden County
	Number	Percent of Total		
Families below poverty level	30	5%	10%	5%
Indivuduals below poverty level	1,197	30%	20%	9%

The study area does not have a notably high concentration of minority groups compared to the rest of the City; but the City and study area each have populations that are somewhat more diverse than the rest of Chittenden County (Table 14). However, the study area, City and County are considerably less diverse than the rest of the United States where minority groups constitute 25% of the total population compared with 7% to 8% within the study area and City. Over the next forty years, most of the population growth in the United States will occur in the current minority groups. In general, minorities depend more on transit, own less vehicles, have higher vehicle occupancy rates, and make less vehicle trips.[22] Although the change may not be as significant as the rest of the Country, it is reasonable to assume that the study area's population will continue to diversify further increasing demand for transit and other non-automobile modes in the corridor.

[22] "Travel Demand in the Context of Growing Diversity, Considerations for Policy, Planning and Forecasting", TR News Number 264, September-October 2009.

Table 14: Racial Diversity in 2000

Race	Colchester Ave. Study Area (Census Tract 6)		City of Burlington	Chittenden County
	Number	*Percent of Total*		
White	4,071	92.7%	92.3%	95.1%
Black or African American	84	1.9%	1.8%	0.9%
American Indian and Alaska Native	14	0.3%	0.5%	0.3%
Asian	125	2.8%	2.7%	2.0%
Native Hawaiian and Other Pacific Islander	2	0.0%	0.0%	0.0%
Hispanic or Latino (of any race)	47	1.1%	1.2%	1.0%
Two or More Races and Other Races	49	1.1%	1.5%	0.7%

6.0 Transportation Demand and System Performance

This section provides information on travel demand in the study area and the transportation system's response to it. Subsections include:

- Traffic volumes (Annual Average Daily Traffic, hourly variations)
- Origins and destinations
- Performance during 2010 AM and PM peak hours (roadway congestion/delay and queuing)
- Transit ridership
- Pedestrian and bicycle traffic
- Safety (high crash locations)

6.1 Traffic Volumes

Annual Average Daily Traffic (AADT)

AADT is the amount of traffic in a 24-hour period averaged over 365 days; it therefore includes weekends as well as weekdays. Figure 37 provides the 2007 AADT for the area and shows that Colchester Avenue is one of five major corridors into Burlington. Along with Riverside Avenue, it carries traffic to/from the northeast gateway at the Winooski Bridge. The intersection of East Avenue contributes to Colchester Avenue's traffic volumes, as demand on Colchester Avenue west of that intersection is higher than the rest of the corridor.

Figure 38 presents historical AADT data for the corridor between 1985 and 2005 for years during which traffic counts were collected. Traffic volumes along the western section of Colchester Avenue (measured between Mansfield Avenue and the FAHC entrance) varied between 19,000 and 20,000 vehicles per day between 1989 and 2005. Traffic volumes along the western section have not change much in the last twenty years and the growth appears to be flat.

Traffic volumes on the eastern/northern segment of the corridor (measured between Nash Place and Chase Street) varied from 12,450 to 11,600 vehicles per day between 1985 and 2005. Traffic volumes have been consistently, although slowly, decreasing along this segment since 1989 by a total of seven percent.

Figure 37: 2007 AADT (source: VTrans)

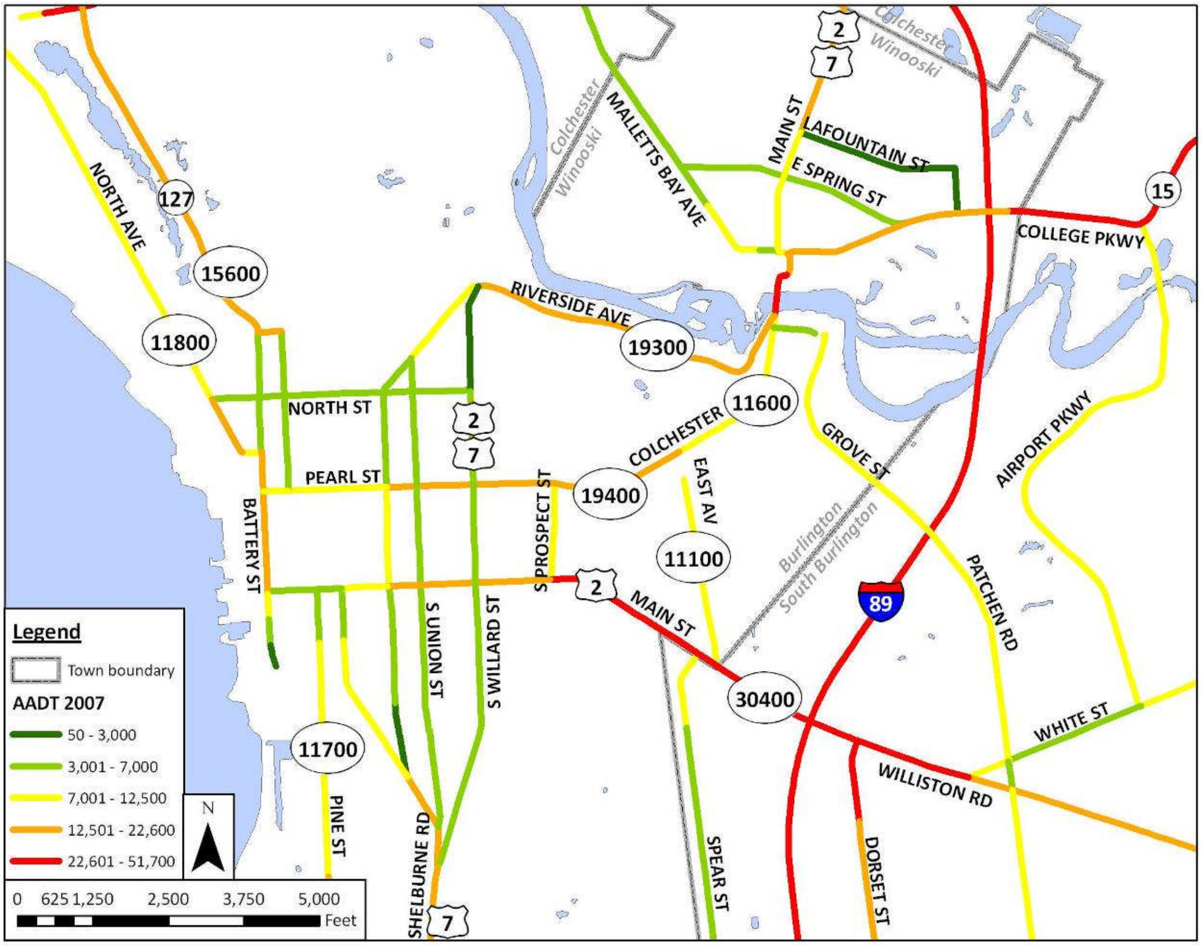
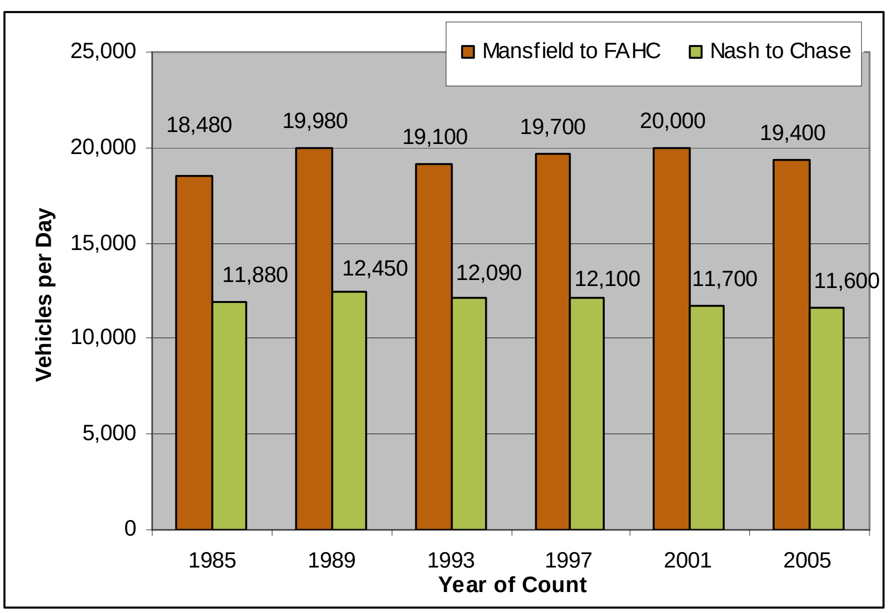


Figure 38: Average Annual Daily Traffic Volumes on Colchester Avenue



Hourly Variations

Figure 39 and Figure 40 show the hourly variation in daily traffic volumes at the Prospect Street and East Avenue intersections, respectively. Volumes appear to be relatively steady throughout the day, although the morning, midday, and evening peaks are discernable. At the Prospect Street intersection, there is roughly the same amount of traffic during all three peaks. For the East Avenue intersection, the PM peak is larger than the AM and midday ones.

Figure 39: Hourly variation at Colchester Ave-Pearl St-Prospect St intersection (source: VTrans turning movement count, June 2009)

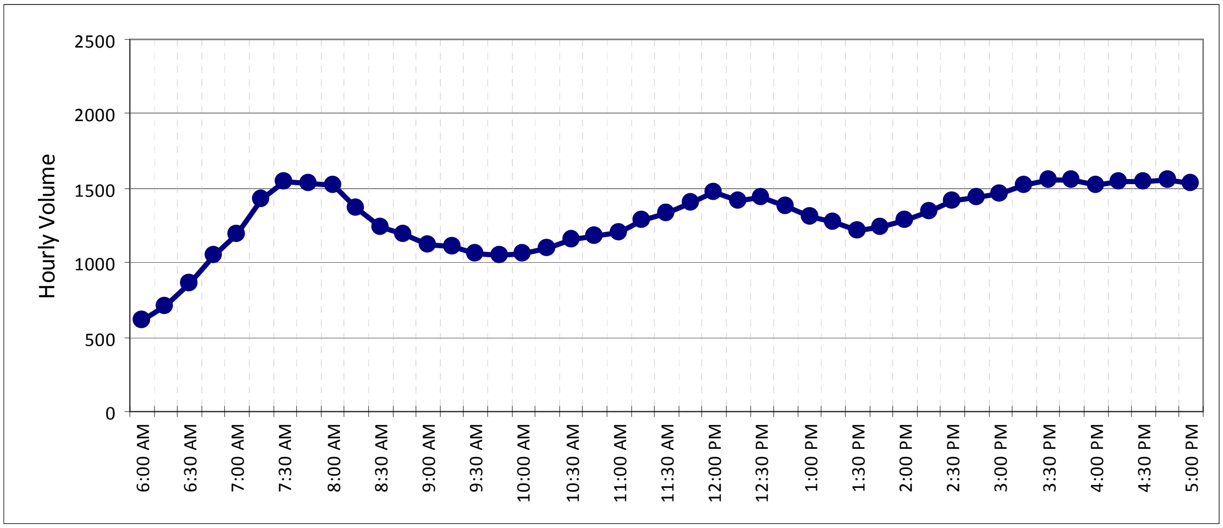
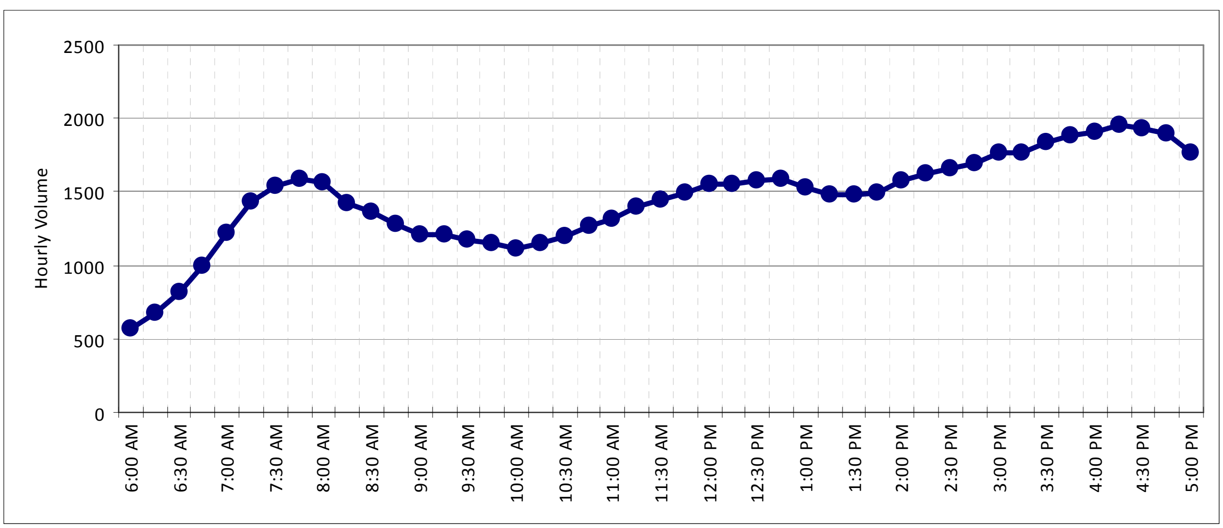


Figure 40: Hourly variation at Colchester Ave-East Ave intersection (source: VTrans turning movement count, June 2009)



6.2 Origins and Destinations

The Chittenden County Regional Transportation Model was used to estimate and map the origins and destinations of traffic on the western and eastern segments of Colchester Avenue during the PM peak hour. East Avenue was chosen as the dividing line for these two segments because it provides a major connection to the Main Street corridor. The results are shown graphically in Figure 41 and Figure 42.

The origin and destination analysis clearly demonstrates that Colchester Avenue is a gateway and funnel for traffic between the north and northeast portions of Chittenden County and Burlington. Traffic to and from the north has origins and destinations along the US 2/7 and I-89 corridors. Traffic to and from the northeast has origins and destination along the VT 15 corridor. Inbound traffic concentrates along Colchester Avenue and is dispersed to the City's street network once past South Prospect Street. For outbound traffic, the reverse happens. Traffic from the City's street network collects at the Colchester Avenue/Prospect Street intersection and is funneled through Colchester Avenue to points north and northeast.

Both segments also serve origins and destinations to and from the south and east via East Avenue. As shown in Figure 41, East Avenue connects the western segment of Colchester Avenue to origins and destinations from I-89 south of Exit 14 and from Spear Street. As shown in Figure 42, the eastern segment of Colchester Avenue in combination with East Avenue provides a connection between origins and destinations along Spear Street to points north.

The results of the analysis also provide data that has been used to estimate the amount of through versus local traffic. Local traffic is defined as any vehicle trip that begins or ends at a land use along the corridor including all residential areas, the UVM and FAHC campuses, and any other businesses. The results of the analysis indicate that:

- 66% of the traffic along the western segment of Colchester Avenue is through traffic and 34% has an origin or destination somewhere along the corridor; and
- 78% of the traffic along the eastern segment of Colchester Avenue is through traffic and 22% has an origin or destination somewhere along the corridor.

Figure 41: Origins and Destinations for the Western Section of Colchester Avenue between East Avenue and Prospect Street

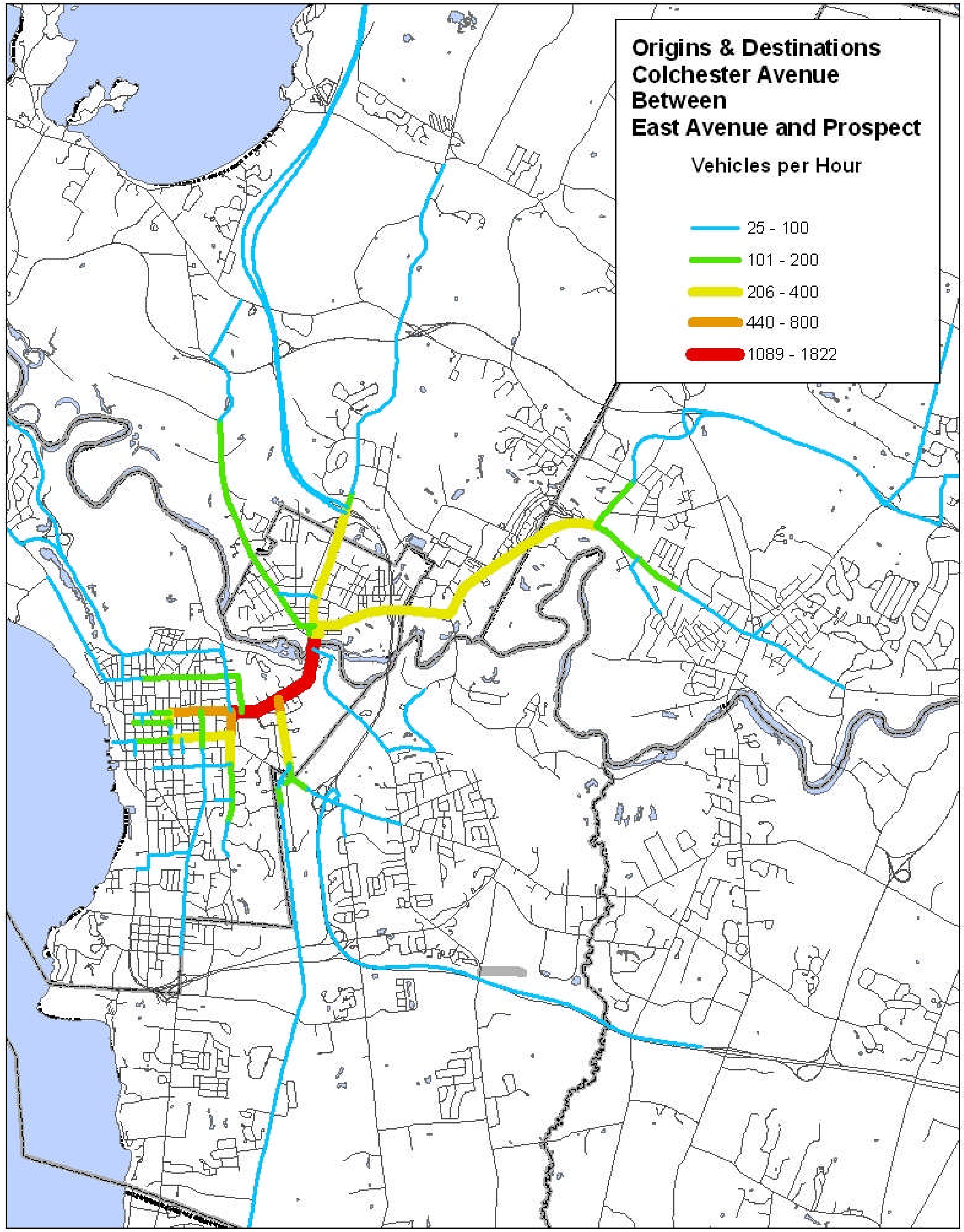
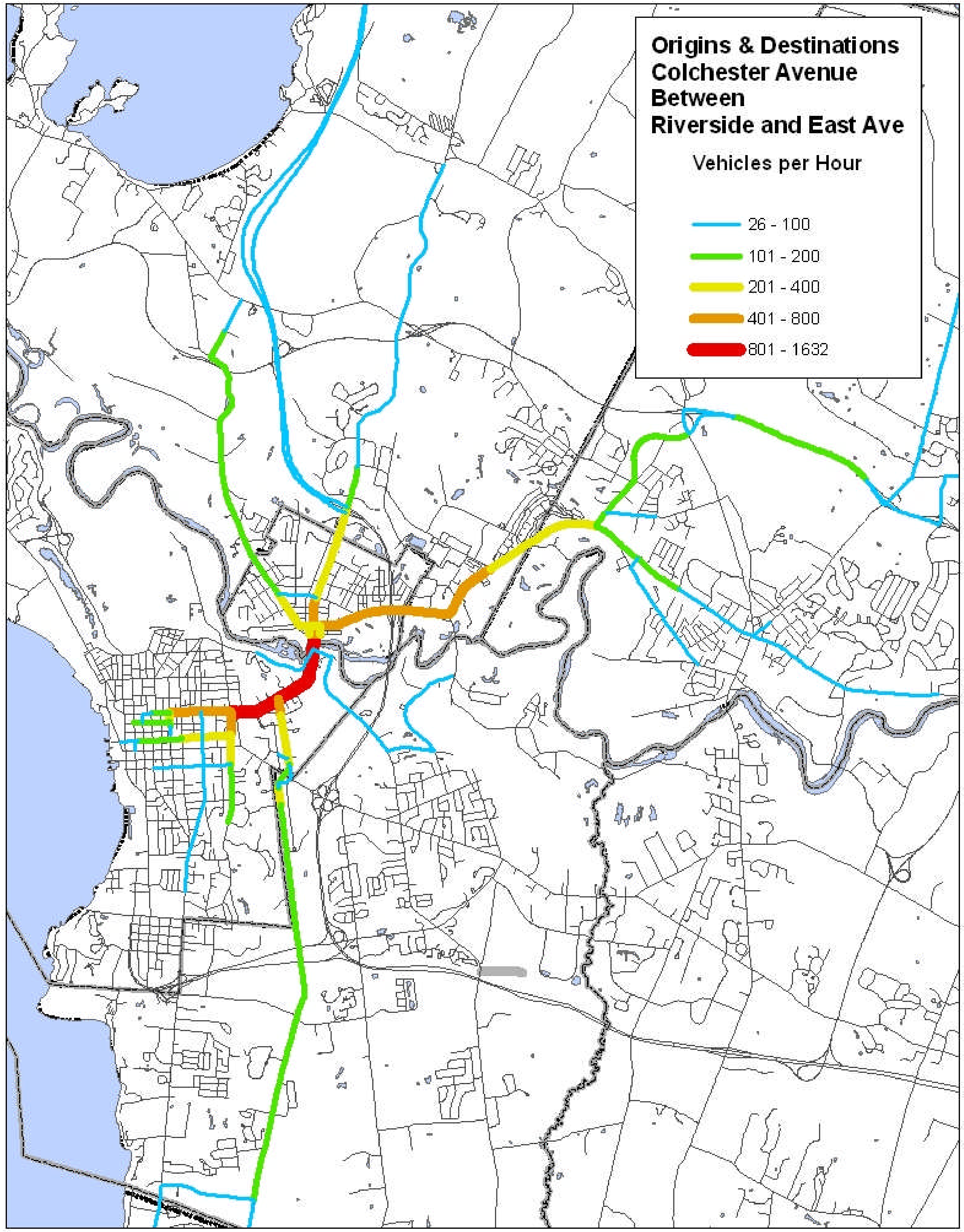


Figure 42: Origins and Destinations for the Eastern Section of Colchester Avenue between Riverside and East Avenue



6.3 Performance: Congestion and Delay

This section describes the methodology and results for the congestion and queuing analyses.

6.3.1 Study Area Traffic Volumes

For the purposes of the congestion and queuing analyses below, turning movement counts were obtained from VTrans and the CCMPO, as shown in Table 15.

Table 15: Turning movement counts

Colchester Ave Intersection	*Data Source*	*Date of Count*	*Type of Count*
Prospect St.	VTrans	6/10/2009	12 hours
University Place	RSG	4/1/2010	AM & PM peaks
Mansfield Ave	CCMPO	7/14/2003	AM & PM peaks
FAHC driveway	CCMPO	8/2/2006	12 hours
East Ave	VTrans	6/11/2009	12 hours
Barrett St	VTrans	6/11/2009	12 hours
Riverside Ave/Mills St	VTrans	6/11/2009	12 hours

However, none of the VTrans and CCMPO counts were conducted when UVM and Champlain College were in session. RSG conducted AM and PM peak hour counts along Colchester Avenue at its intersection with University Place in April 2010 and used those volumes to adjust the CCMPO and VTrans turning movement counts to reflect 2010 conditions during the academic year. It is standard practice in Vermont to adjust ground counts to a design hour volume (DHV) using procedures developed by VTrans[23]. Table 16 compares DHV adjustment factors based on the VTrans methodology for urban roads to the adjustment factors RSG developed based on the April 2010 count at the Colchester Avenue intersection with University Place. In most cases, the adjustment factor based on the April 2010 count is higher than the adjustment factor based on the VTrans methodology. When deciding between factors, we chose the higher one to be more conservative.

Table 16: DHV adjustment factors (AFs) for PM peak hour

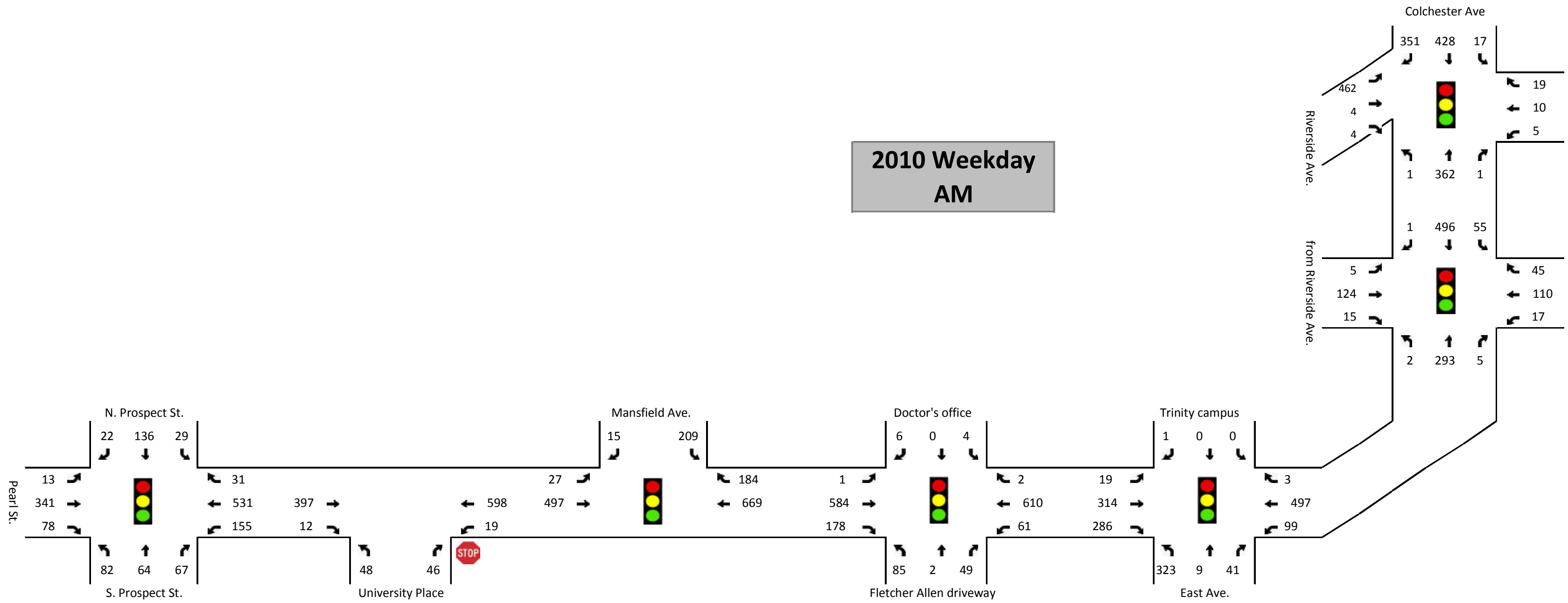
	AF Based on 4-1-2010 Count	AF Based on AADT and "k" Factor	Adjustment Factor Used	Notes
Colchester Ave/Pearl St/Prospect St	1.32	1.28	1.32	
Colchester Ave/Mansfield Ave	1.13	Not Possible to Calculate	1.13	AADT count is not available on any approach
Colchester Ave/Fletcher Allen entrance	1.03	Not Possible to Calculate	1.03	AADT count is notavailable on any approach
Colchester Ave/East Ave/Trinity Campus	1.04	0.91	1.04	
Colchester Ave/Barrett St	Not appropriate	1.18	1.18	Too far from East Ave intersection to balance. Therefore, use factor based on AADT and K factor
Colchester Ave/Riverside Ave/Mills St	Not appropriate	1.02	1.02	Balanced to Barrett Street. Too far from East Ave intersection to balance

No DHV adjustment factor is applied to the AM peak hour counts since traffic volumes in PM peak hour are higher. However, comparing the AM turning movement counts to the one taken at University Place in April 2010 suggested adjustment factors of less than 1.00; therefore, a factor of 1.00 was used to be conservative.

Figures 43 and 44 present the AM and PM Peak Hour Volumes respectively at major intersections in the corridor.

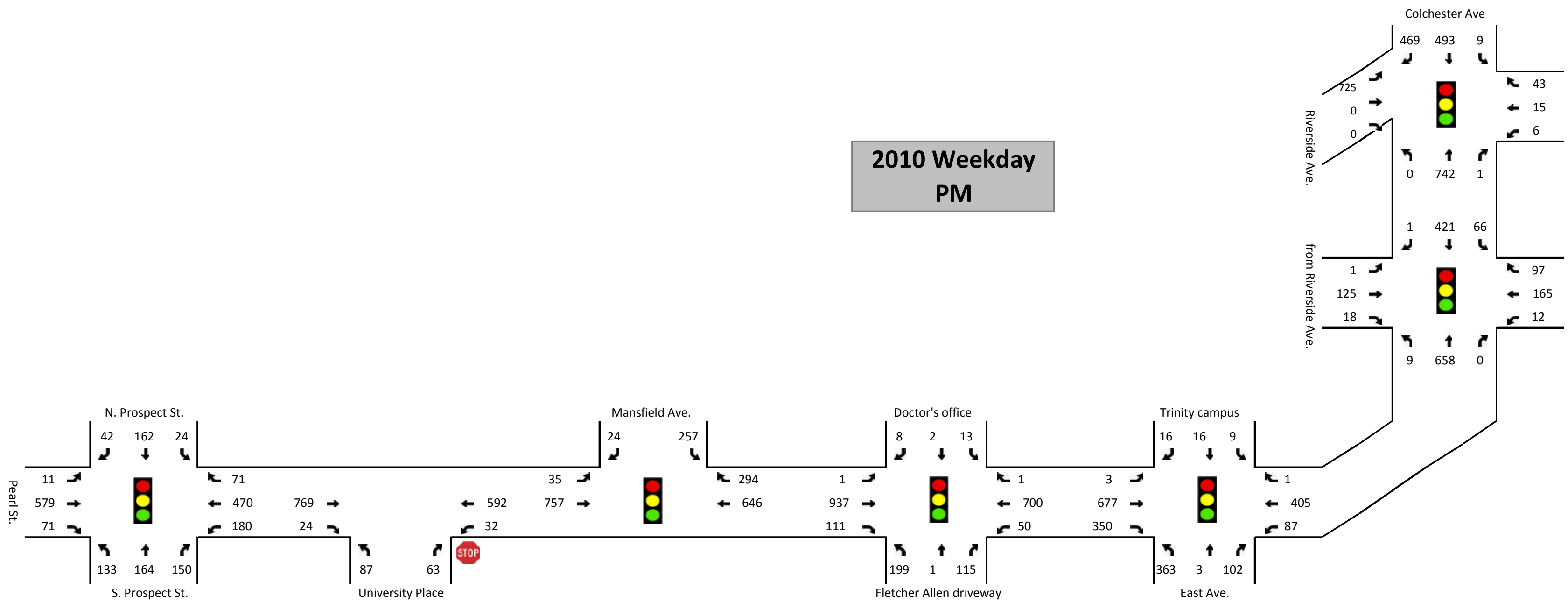
[23] As described in the 2008 VTrans *Traffic Impact Study Guidelines* and *Continuous Traffic Counter Grouping Study and Regression Analysis Report* (the "Red Book").

Figure 43: 2010 AM peak hour volumes[24]



[24] Adjusted to 2010; not adjusted to DHV.

Figure 44: 2010 PM peak hour volumes[25]



25 Adjusted to 210 DHV.

6.3.2 Congestion Analysis

Level-of-Service Definition

Level-of-service (LOS) is a qualitative measure describing the operating conditions as perceived by motorists driving in a traffic stream. LOS is estimated using the procedures outlined in the 2000 Highway Capacity Manual. In addition to traffic volumes, key inputs include the number of lanes at each intersection and the traffic signal timing plans. The LOS results are based on the existing lane configurations and control types (signalized or unsignalized) at each study intersection.

The 2000 Highway Capacity Manual defines six qualitative grades to describe the level of service at an intersection. LOS is based on the average control delay per vehicle. Figure 45 shows the various LOS grades and descriptions for signalized and unsignalized intersections.

Figure 45: LOS criteria for signalized and unsignalized intersections

LOS	Characteristics	Unsignalized Total Delay (sec)	Signalized Total Delay (sec)
A	Little or no delay	≤ 10.0	≤ 10.0
B	Short delays	10.1-15.0	10.1-20.0
C	Average delays	15.1-25.0	20.1-35.0
D	Long delays	25.1-35.0	35.1-55.0
E	Very long delays	35.1-50.0	55.1-80.0
F	Extreme delays	> 50.0	> 80.0

The delay thresholds for LOS at signalized and unsignalized intersections differ because of the driver's expectations of the operating efficiency for the respective traffic control conditions. According to HCM procedures, an overall LOS cannot be calculated for two-way stop-controlled intersections because not all movements experience delay. In signalized and all-way stop-controlled intersections, all movements experience delay and an overall LOS can be calculated.

The VTrans policy on level of service is:

- Overall LOS C should be maintained for state-maintained highways and other streets accessing the state's facilities.
- Reduced LOS may be acceptable on a case-by-case basis when considering, at minimum, current and future traffic volumes, delays, volume to capacity ratios, crash rates, and negative impacts as a result of improvement necessary to achieve LOS C.
- LOS D should be maintained for side roads with volumes exceeding 100 vehicles/hour for a single lane approach (150 vehicles/hour for a two-lane approach) at two-way stop-controlled intersections.

Establishing target levels of service is a policy decision and should be made by the Colchester Avenue Technical Committee and Task Force.

Level-of-Service Results

Level of service was estimated according to the methodologies established in the 2000 Highway Capacity Manual using the traffic engineering software package Synchro (version 7). Figure 46 presents the LOS results during the 2010 weekday AM and PM peak hours.

Figure 46: 2010 Peak Hour LOS Results

Signalized Intersections	2010 AM Peak Hour LOS	Delay	v/c	2010 PM Peak Hour LOS	Delay	v/c
Colchester Ave/Pearl St/Prospect St						
Overall	F	>100	0.83	F	>100	1.18
EB (Pearl St)	B	19	-	D	38	-
WB (Colchester Ave)	F	>100	-	F	>100	-
NB (S. Prospect St)	C	32	-	D	54	-
SB (N. Prospect St)	C	29	-	C	31	-
Colchester Ave/Mansfield Ave						
Overall	A	8	0.43	B	10	0.48
EB (Colchester Ave)	A	4	-	A	7	-
WB (Colchester Ave)	A	4	-	A	5	-
SB (Mansfield Ave)	C	29	-	D	39	-
Colchester Ave/FAHC						
Overall	A	7	0.36	B	13	0.53
EB (Colchester Ave)	A	6	-	B	10	-
WB (Colchester Ave)	A	4	-	A	7	-
NB (FAHC)	C	31	-	D	36	-
SB (Doctors' offices)	C	26	-	C	28	-
Colchester Ave/Trinity/East Ave						
Overall	E	70	0.73	D	47	0.76
EB (Colchester Ave)	D	36	-	E	57	-
WB (Colchester Ave)	F	>100	-	B	16	-
NB (East Ave)	E	59	-	D	54	-
SB (Trinity)	D	39	-	E	64	-
Colchester Ave/Barrett St						
Overall	B	17	0.54	D	49	0.68
EB (from Riverside Ave)	A	3	-	C	30	-
WB (Barrett St)	D	48	-	F	>100	-
NB (Colchester Ave)	C	20	-	C	34	-
SB (Colchester Ave)	A	9	-	A	3	-
Riverside Ave/Barrett St						
Overall	C	25	0.51	D	38	0.71
WB (from Colchester Ave/Barrett St)	B	11	-	B	18	-
NB (Riverside Ave)	C	30	-	D	50	-
SB (Riverside Ave)	C	21	-	C	24	-
Colchester Ave/Riverside Ave						
Overall	B	10	0.46	B	11	0.58
EB (Riverside Ave)	A	5	-	B	11	-
WB (Mills St)	D	35	-	D	40	-
NB (Colchester Ave)	A	5	-	A	5	-
SB (Colchester Ave)	B	15	-	B	15	-

Unsignalized Intersections	2010 AM Peak Hour LOS	Delay	v/c	2010 PM Peak Hour LOS	Delay	v/c
STOP **Colchester Ave/University Place**						
WB Left/Through (Colchester Ave)	A	1	0.02	A	2	0.04
NB Left/Right, exiting University Place	B	15	0.20	E	38	0.58

6.3.3 Queuing Analysis

Synchro also estimates the 95th percentile queues. Queues are lines of vehicles that form on approaches to traffic signals while the traffic light is red; and at the stop-controlled approaches at unsignalized intersections. The longest queue for each approach are shown in Figure 47 for the 2010 AM and PM peak hours. Storage lane lengths and distances to upstream intersections are shown to identify problem areas where queues are so long that they extend beyond the capacity of the storage lane or block the upstream intersection. These problem areas are highlighted.

Figure 47: 2010 peak hour queuing results

	95th percentile queue		Length of storage bay	Distance to upstream intersection
Signalized Intersections	2010 AM Peak Hour	2010 PM Peak Hour		
Colchester Ave/Pearl St/Prospect St				
EB-LTR (Pearl St)	254	#758	-	640
WB-L (Colchester Ave)	#256	#434	135	-
NB-LT (S. Prospect St)	#140	#455	90	-
SB-LTR (N. Prospect St)	141	249	-	265
Colchester Ave/Mansfield Ave				
EB-LT (Colchester Ave)	52	187	-	200
WB-TR (Colchester Ave)	83	96	-	200
SB-L (Mansfield Ave)	151	227	100	-
Colchester Ave/FAHC				
EB-TR (Colchester Ave)	116	360	-	235
WB-LT (Colchester Ave)	107	188	-	320
NB-L (FAHC)	79	184	160	-
Colchester Ave/Trinity/East Ave				
EB-T (Colchester Ave)	154	682	-	1075
EB-R (Colchester Ave)	#329	#517	200	-
WB-T (Colchester Ave)	#482	253	155	-
NB-L (East Ave)	#364	#504	-	625
Colchester Ave/Barrett St				
EB-LTR (from Riverside Ave)	m8	m#236	-	30
WB-LTR (Barrett St)	#248	#429	-	630
NB-LTR (Colchester Ave)	231	#709	-	430
SB-L (Colchester Ave)	m14	m4	100	100
Riverside Ave/Barrett St				
WB-L (from Colchester Ave/Barrett St)	m32	m35	-	30
NB-T (Riverside Ave)	291	#520	-	760
SB-R (Riverside Ave)	287	409	-	150
Colchester Ave/Riverside Ave				
EB-L (Riverside Ave)	21	m56	-	150
WB-L (Mills St)	45	63	-	250
NB-T (Colchester Ave)	38	m77	100	-
SB-T (Colchester Ave)	372	436	-	550
Unsignalized Intersections				
Colchester Ave/University Place				
WB Left/Through (Colchester Ave)	1	3	-	200
NB Left/Right, exiting University Place	19	97	-	600

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.

m Volume for 95th percentile queue is metered by upstream signal.

6.4 Transit Ridership

Table 17 shows annual ridership for each of the CCTA routes that use Colchester Avenue. Figure 48 shows CCTA boardings and de-boardings in the Corridor. According to CCTA data, the Fletcher Allen main entrance is by far the main stop for CCTA routes in the Corridor: roughly 60% to 80% of Essex Junction and College Street Shuttle passengers (respectively) boarding or de-boarding on Colchester Avenue use this stop. Figure 49 shows that there is a mid-day peak on CCTA's Essex Junction route.

Table 17: Annual (FY 2009) transit ridership for CCTA routes that use Colchester Avenue (source: CCTA)

Route	Annual Ridership
#2-Essex Junction	402,494
#11-College Street Shuttle	193,531
#56-Milton Commuter	Not available- service began February 2010
#76-Middlebury LINK	22,846
#86-Montpelier LINK	75,248
#96-St. Albans LINK	19,292

Figure 48: Percentage of route ridership that boards or de-boards in the Colchester Ave Corridor (source: CCTA, spring 2009)

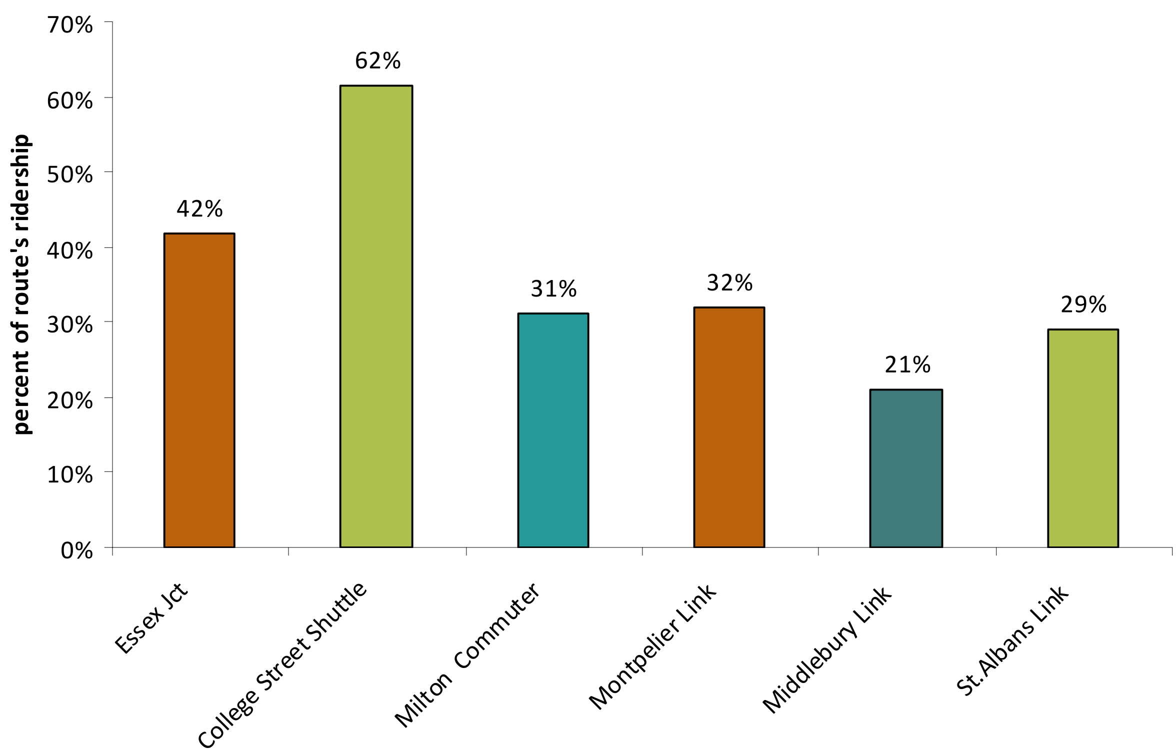
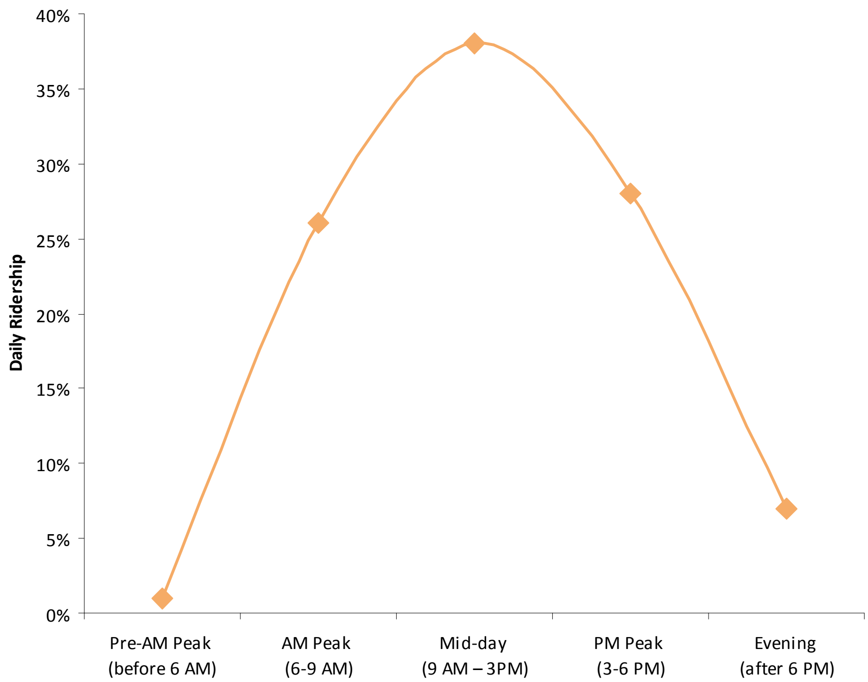


Figure 49: Daily ridership by time of day on the CCTA #2 Essex Junction route (source: CCTA March 2010, FY 2010 year-to-date)



FAHC shuttles that travel in the corridor serve Champlain Mill, Centennial, and Fanny Allen parking facilities. According to the *2009-2014 Joint Institutions Parking Management Plan*, FAHC issued 665 day parking permits for Champlain Mill, and 603 shuttle permits for Fanny Allen. There are 160 parking spaces at Centennial.

The Champlain College shuttle connects the college's leased facilities in Winooski (272 beds at Spinner Place and the Emergent Media Center) with the main campus in Burlington. While students can arrange to park at Spinner Place, they are required to take the shuttle rather than drive to the main campus.

The UVM CATS service circulates around the campus (and connects UVM with downtown on nights and weekends) to prevent vehicle trips. Although ridership data is not collected, the six high-frequency routes help to reduce transportation demand on and around campus.

6.5 Pedestrian and Bicycle Traffic

Pedestrians

As shown by the informal paths discussed in Section 3.5 there are evident pedestrian desire lines across Colchester Avenue from the UVM/FAHC areas extending northeast towards the Trinity campus and residential neighborhoods in the eastern part of the corridor. The only designated pedestrian crossing locations in this area are at the FAHC and East Ave intersections and the mid-block crosswalk near Nash Place, none of which are the most direct or convenient location for this desire line. Therefore, a substantial amount of jaywalking occurs. As shown in Figure 21 on page 24, the section between FAHC and East Ave is the longest segment (over 1,100') without a Colchester Ave crossing—except for the segment between the midblock crosswalk and Winooski, which does not experience the same pedestrian crossing traffic that the area adjacent to UVM and FAHC does. Moreover, this desire line occurs in the four-lane section of Colchester Avenue, which adds to the challenge of crossing.

Bicycles

Given its position between bike routes on Mansfield and East Avenue, the Colchester Avenue might attract more bicycle traffic if sufficient facilities were provided. While there is a shared use path on the southern side of Colchester Avenue between East Avenue and FAHC, the bike route designation does not extend as far as Mansfield Avenue.

During data collection at the University Place intersection, several on-street bicyclists were observed. However, they appeared to be extremely advanced riders who knew how to ride in motor vehicle traffic and were able to ride aggressively enough to be able to maneuver in heavy traffic. Field observations farther east at the shared use path suggested that more riders stay on the road rather than use the path. Still, deteriorating pavement conditions, drainage grate placement, and lack of a shoulder or bike lane make on-street bicycle riding very challenging in the corridor.

6.6 Safety

This section reviews VTrans crash data to identify patterns and summarize High Crash Locations (HCLs). A reportable crash is a collision with at least one of the following results:

- property damage exceeding $1,000
- personal injury
- fatality

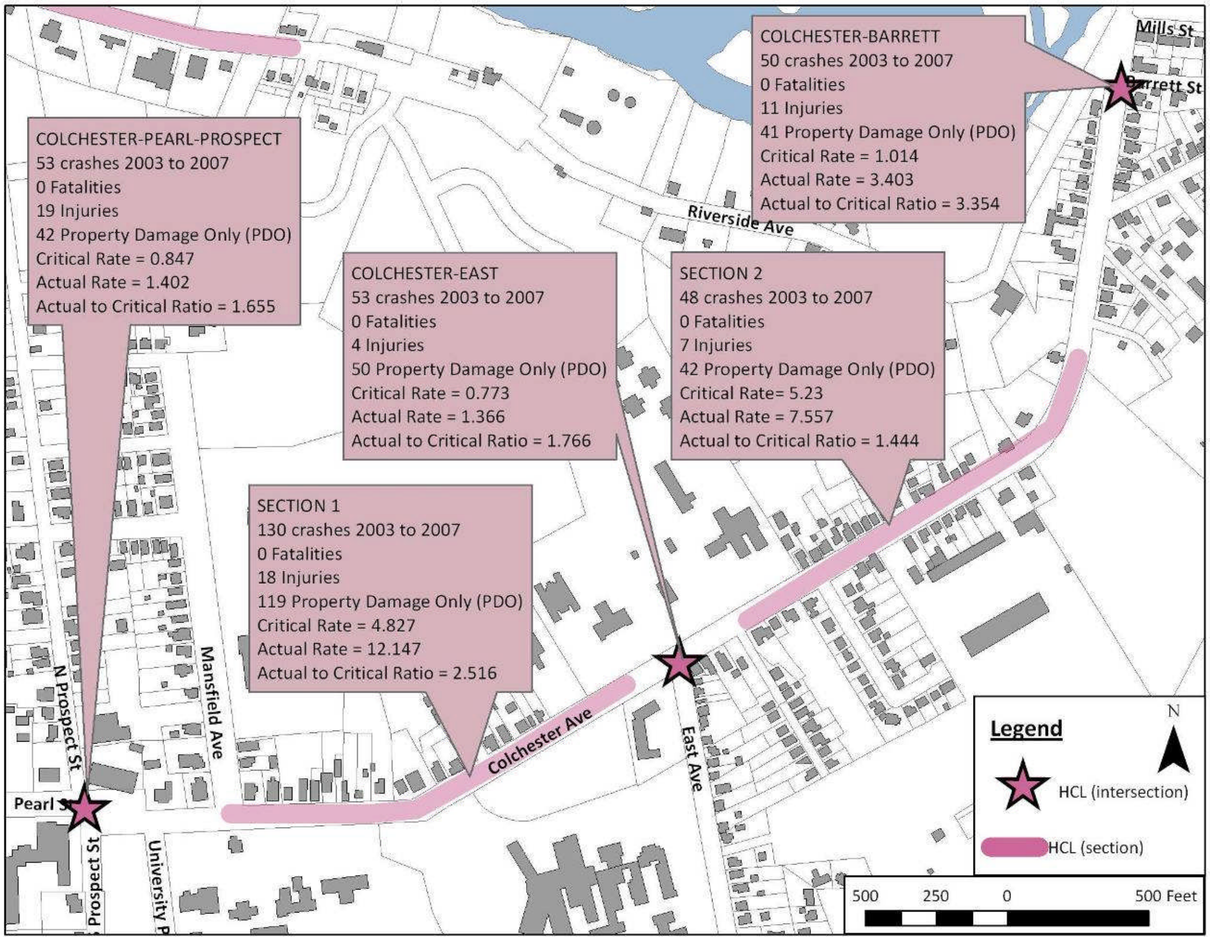
High Crash Locations

Crashes occur on all segments of the road system. A High Crash Location (HCL) is a section of roadway or an intersection where the number of crashes is significantly greater than the expected number of crashes for a similar type of facility (such as an arterial or local road) and areas (urban or rural). In order to be classified as a HCL, an intersection or road section (0.3 mile section) must meet the following two conditions:

1. It must have at least 5 crashes over a 5-year period
2. The Actual Crash Rate must exceed the Critical Crash Rate.

Based on the most current crash data available from VTrans (2003-2007), there are two sections and three intersections in the study area that are HCLs, as shown in Figure 50. The Colchester-Barrett intersection has the highest Actual/Critical ratio in the state for intersections.

Figure 50: High Crash Locations (source: VTrans High Crash Location Report 2003-2007[26])



There were 448 crashes in the corridor for the five-year period between 2003 and 2007; 54 of these involved injuries. There were no fatalities.

Crash Types and Causes

Figure 52, Figure 53 and Table 18 summarize the types of crashes in the corridor for each High Crash Location. Distraction/inattention was the most commonly reported factor contributing to crashes, as shown in Table 19. Failure to yield right of way and following too closely were also significant contributing factors. Speeding ("Driving too fast for conditions" or "Exceeding authorized speed limit") contributed to 7% of crashes.

- The Prospect Street intersection had several head-on and left versus through crashes. This may be due to the negatively offset northbound and southbound approaches. There were also several sideswipes and T-bone/broadside crashes, many of which involved disregard for traffic signs/signals/road markings, failure to yield right-of-way, or obstructed visibility.
- The East Avenue intersection had a large proportion of sideswipes, which may be due to the reduction of an eastbound through lane at this point.

[26] This data is exempt from discover or admission under 23 USC 409.

- The analysis for the Barrett Street area includes the Riverside and Mills intersections since these three are in such close proximity to each other. This is a very active area that can be confusing to drivers. There were many sideswipes and T-bone/broadside crashes. Contributing factors included driver disregard of traffic signs, signals, and/or road markings, so any improvements that can simplify this area and make it easier to navigate would likely help.
- The HCL section between Mansfield Ave and the VT Health Department (west of the East Ave intersection) included many sideswipes, most of which involved driver inattention and/or failure to keep in proper lane or yield right-of-way. Like the East Ave intersection, this may be due to the reduction of an eastbound through lane. There were also several left and right versus through and T-bone/broadside crashes caused by failure to yield right-of-way, which may be attributable to the greater number of driveways in this section.
- The HCL section between Latham Court and the cemetery had the highest proportion of sideswipes (both same direction and opposite direction). There does not appear to be a pattern in cited contributing factors, but the presence of on-street parking on both sides of Colchester Avenue may have something to do with the crash pattern. During data collection, it was observed that several parked vehicles in this area were oriented opposite the direction of travel (that is, cars were aimed eastbound while parked adjacent to the westbound travel lane; Figure 51).

Figure 51: Parked cars in the wrong direction between Latham Court and the cemetery

Figure 52: Crash types for HCL intersections (source: VTrans[27])

[27] This data is exempt from discover or admission under 23 USC 409.

Figure 53: Crash types for HCL sections (source: VTrans[28])

Table 18: Crash types 2003-2007 (source: VTrans[29])

	HCL Intersections			HCL Sections	
	#1	**#2**	**#3**	**#1**	**#2**
Crashes 2003-2007	Colchester-Pearl-Prospect	Colchester-East	Colchester-Barrett	Mansfield-State Health Dept.	Latham Ct to cemetery
Head On	4	3	2	5	2
Rear End	24	32	61	49	19
Sideswipe	7	11	19	40	19
Left vs. Through	8	1	4	10	3
Right vs. Through	0	0	3	7	0
Opposing Lefts	0	0	0	0	0
Simultaneous Left- and Right-turns	1	0	0	0	0
T-bone	6	5	11	10	3
Single Vehicle Crash	2	0	3	4	1
Rear-to-rear	0	1	0	3	0
Other	2	0	2	3	2

[28] This data is exempt from discover or admission under 23 USC 409.

[29] Ibid.

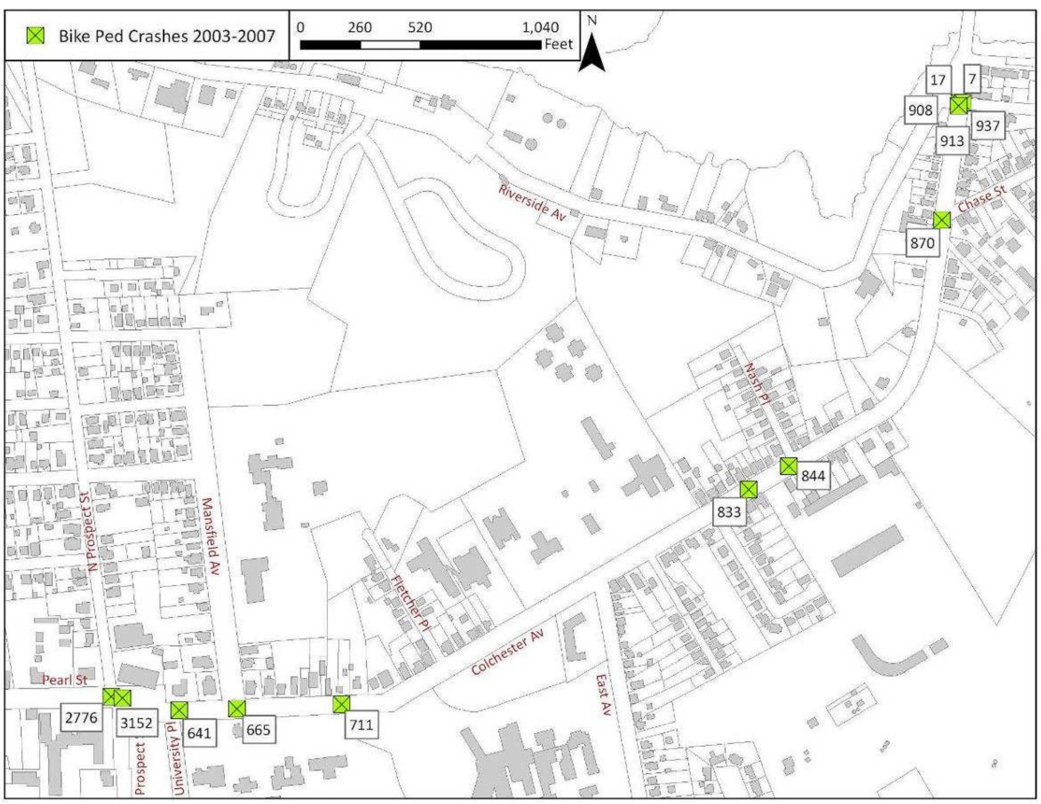
Table 19: Contributing factors to crashes (source: VTrans[30])

Contributing Factors	# of crashes	% of crashes
Distracted/Inattention	148	33%
Driving too fast for conditions/ Exceeded authorized speed limit	30	7%
Visibility Obstructed	18	4%
Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc	9	2%
Disregarded traffic signs signals road markings	17	4%
Failure to keep in proper lane or running off road	17	4%
Followed too closely	54	12%
Failed to yield right of way	65	15%

Bicycle & Pedestrian Crashes

Out of the 448 total crashes described above, 13 involved bicycles or pedestrians, as shown in Figure 54 and Table 20. Five of the crashes took place at the Barrett/Riverside intersection, while five others occurred in the segment between the FAHC driveway and Prospect Street. There were a total of nine injuries and no fatalities. There do not appear to be any discernable patterns in the contributing factors or types of these crashes, as shown in Table 20.

Figure 54: Bike-ped crashes 2003-2007 (source: VTrans[31]; Labels correspond to crash IDs in Table 5 below.



[30] Ibid.

[31] Ibid.

Table 20: Bike-ped crashes 2003-2007 (source: VTrans[32])

ID	WEATHER	CONTRIBUTING FACTORS	CRASH TYPE	# OF INJURIES	# OF FATALITIES
2776	Rain	Driving too fast for conditions	Head On	1	0
844	Clear	Failed to yield right of way	Left Turn and Thru, Angle Broadside	0	0
17	Unknown	Failed to yield right of way	Single Vehicle Crash	0	0
913	Cloudy	Failed to yield right of way, Made an improper turn	Left Turn and Thru, Angle Broadside	1	0
870	Clear	Inattention, Distracted	Same Direction Sideswipe	0	0
7	Clear	No improper driving	Right Turn and Thru, Broadside	2	0
908	Unknown	No improper driving	Right Turn and Thru, Broadside	1	0
3152	Clear	No improper driving	Single Vehicle Crash	1	0
833	Rain	Other improper action	Same Direction Sideswipe	1	0
937	Cloudy	Other improper action	Single Vehicle Crash	1	0
711	Unknown	Unknown	Head On	0	0
665	Unknown	Unknown	Same Direction Sideswipe	0	0
641	Rain	Unknown	Single Vehicle Crash	1	0

7.0 SUMMARY OF ISSUES

- Colchester Avenue is one of five major corridors that connect the City with areas to the north, east and south; the corridor provides mobility for through traffic as well as access to institutions and neighborhoods in the study area; traffic volumes in the study area are higher between Prospect Street and East Avenue than between East Avenue and Winooski.
- Previous studies have noted the need to:
  - Maintain Colchester Avenue as a vital transit corridor
  - Focus on multimodal solutions for improving performance
  - Calm traffic
  - Close gaps in the bicycle and pedestrian networks.
- There is significant pedestrian movement across Colchester Avenue extending northeast from FAHC to the Trinity campus. This area requires safety improvements so that pedestrians can cross safely and to improve predictability for drivers.
- The impacts of making Colchester Ave a Complete Street, as delineated in the Burlington Transportation Plan, need to be identified.
- Continued use of TDM must be pursued to maintain a high mode share for alternative transportation and reduce pressure on limited parking facilities in the corridor.
- Study area demographics indicate growing travel demand for alternative modes of transportation, especially walking and transit:
  - The population in the study area grew by about 7% between 1990 and 2000. A larger population increases density and contributes directly to more travel within the study area.
  - Eleven percent of the households in the study area do not own a vehicle and are therefore dependent on non-auto modes of transportation to meet daily needs.
  - Single occupancy vehicles provide for the highest percentage of work trips for residents. Walking to work is also significant in the study area.

[32] Ibid.

  - Walking and transit are the most common modes of transportation for students living in the corridor.
  - It is reasonable to assume that the study area's population will continue to diversify, further increasing demand for transit and other non-automobile modes in the corridor.
- The intersections at Prospect Street and East Avenue are the most congested in the corridor.
  - The Prospect Street intersection is overall LOS F in both the AM and PM peak hours. The westbound Colchester Avenue approach is also LOS F in both peak hours, with queues extending past the length of the westbound left-turn lane.
  - The East Avenue intersection is overall LOS E in the AM peak and D in the PM peak. The westbound Colchester Avenue approach in the PM is the best performing of the intersection with LOS B, although it is the worst in the AM with LOS F and a delay of over 100 seconds. This reflects the directionality of traffic in the AM and PM peak hours. Queues at this intersection are worst on the eastbound right-turn lane and the westbound through lane.
  - The intersections by the Winooski Bridge function relatively well, although Barrett Street has overall LOS D and the westbound approach in the PM peak hour is LOS F. The northbound queues from Colchester Avenue in the PM peak hour extend past the upstream intersection with Chase Street.
- There are five High Crash Locations (HCLs) in the corridor: two sections and three intersections.
  - The Prospect Street intersection had several head-on and left versus through crashes. This may be due to the offset of the northbound and southbound approaches.
  - The East Avenue intersection had a large proportion of sideswipes, which may be due to the reduction of an eastbound through lane at this point.
  - The Barrett Street area (which includes the Riverside and Mills intersections) is a very active area that can be confusing to drivers. There were many sideswipes and T-bone/broadside crashes.
  - The HCL section between Mansfield Ave and the VT Health Department (west of the East Ave intersection) included many sideswipes, most of which involved driver inattention and/or failure to keep in proper lane or yield right-of-way. Like the East Ave intersection, this may be due to the reduction of an eastbound through lane.
  - The HCL section between Latham Court and the cemetery had the highest proportion of sideswipes. There does not appear to be a trend in contributing factors, but the presence of on-street parking on both sides of Colchester Avenue may have something to do with the crash pattern.
  - Out of the 448 total crashes in the corridor from 2003 to 2007, 13 involved bicycles or pedestrians. There were a total of nine injuries and no fatalities. There do not appear to be any discernable patterns in the contributing factors or types of these crashes.

8.0 NEXT STEPS

The next step in the corridor plan development is a public meeting and workshop to gather feedback from residents and other corridor stakeholders on current issues. An analysis of future conditions and corridor performance will also be prepared. Comments from the public will be combined with previous and new recommendations to develop specific strategies to improve travel conditions in the study area.

APPENDIX A

LandWorks Photo Inventory

PHOTO INVENTORY - LAND USE

Draft for Review

Colchester Avenue Corridor Study

1. Multi-family residential development, predominately student housing, east of Fletcher Place and across the street from the MCHV parking garage. Note scale and setback pattern of these buildings.

2. Typical Residential Low Density (RL) development along Nash Place. Lot sizes range from 6,000-10,000 sq. ft.

3. Looking east down Chase Street at the single-family dwellings and duplexes reflective of the development patterns here. One and a half to three story buildings are typical.

4. A few single-family lots, a bit larger than the average lot size in this area (more than 10,000 sq. ft.), are located in the vicinity of the cemetery.

5. Apartment housing just south of the Winooski Bridge.

6. Residential side yard setbacks range from 5 to 20 feet, eliminating any possibility for infill, along this section of Colchester Avenue.

LandWorks

7. One of the few commercial retail establishments located along Colchester Avenue, at the intersection with East Avenue.

8. The Kampus Kitchen, a popular deli and market for students, is located within a converted residential dwelling on Colchester Avenue.

9. A series of adjacent professional offices, mostly medical, with second story residential, is located between Mansfield Avenue and Fletcher Place.

10. Trinity Campus represents one of the established land uses along the corridor.

11. Several residential dwellings have been converted for university operations.

12. Looking across the north end of the University Green toward the Ira Allen Chapel, one of the university's signature buildings at the heart of the historic campus.

13. Entrance to Centennial Field. The University has identified this area for potential future development, including parking, as part of its long-term vision, although only 2 R.O.W.s access the Centennial Field complex from Colchester Avenue.

14. Looking south towards one of the historic buildings on the Fletcher Allen campus. A large, open green area, belonging to the hospital, fronts roughly 200 feet of Colchester Avenue.

15. A view towards the State Health Department, with its front lawn.

16. Burlington School District building and offices.

17. The cemetery at the eastern end of the corridor is located within the City's RCO-Recreation/Greenspace (RCO-RG) District, and represents the only land use within the study area designated (in the ordinance) for open space, public use and enjoyment.

18. The University has identified areas, called Land Banks, where future development may be located. The Green has been identified as one such area, although the designation only allows for development below ground, as the Green itself is an historic site/resource.

19. Three Land Bank areas have been identified for the Trinity Campus of UVM.

20. Another key university Land Bank area located west of Mansfield House.

21. A vacant lot (less than 3,000 sq. ft.) located adjacent to Domino's Pizza and in the Neighborhood Mixed Used (NMU) District may have the potential for a small commercial establishment.

22. This 1.25-acre vacant lot is currently listed for sale and has the potential for 6-9 new units, as site conditions and permitting would allow.

23. Parking areas along the corridor are typically located along the side or rear of buildings, reducing any potential for future infill development.

24. A short stretch of residential development at the eastern end of the corridor provides head in parking in front of the buildings, a safety hazard for pedestrians and vehicles alike.

LIGHTING

25. Gateway to Burlington: Colchester Avenue's cobra head lights on power poles are aesthetically inferior to Riverside Avenue's ornamental street lights.

26. The ornamental light fixtures along the University Green create an aesthetic character not matched by the cobra head fixtures seen in the distance.

SIDEWALK

27. Sidewalk damage is evident in numerous locations.

28. Details such as this concrete barrier detract visually.

29. The sidewalk is interrupted by a gravel driveway at the Centennial Field entry.

30. Detail of sidewalk damage.

Draft for Review

LANDSCAPE

31. Due to a lack of curbing, this narrow green strip receives a lot of vehicular damage.

32. Although the green strip is too narrow for street trees, this stretch of open road would benefit from front yard 'setback plantings'.

33. Wear patterns in some lawn areas indicate where pedestrian traffic warrants a paved surface.

34. Only small tree species can be utilized in this wide green strip due to overhead utility conflicts.

OVERHEAD UTILITIES & VISUAL CLUTTER

35. Power poles and lines dominate the visual experience.

36. A maze of overhead utility lines detracts from views of UVM's historic campus.

LandWorks

Draft for Review


37. Opportunities for street tree plantings in green strips with overhead utilities are limited.


38. Individual signs, often askew, add to the visual clutter.

LandWorks

APPENDIX B

Synchro LOS & Queuing Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	341	78	155	531	31	82	64	67	29	136	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		4.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.99		1.00	1.00			1.00	1.00		1.00	
Flpb, ped/bikes		1.00		0.99	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.99			1.00	0.85		0.98	
Flt Protected		1.00		0.95	1.00			0.97	1.00		0.99	
Satd. Flow (prot)		1804		1727	1810			1740	1524		1796	
Flt Permitted		0.98		0.29	1.00			0.65	1.00		0.93	
Satd. Flow (perm)		1771		519	1810			1162	1524		1680	
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)	13	341	78	155	531	31	82	64	67	29	136	22
RTOR Reduction (vph)	0	12	0	0	3	0	0	0	55	0	7	0
Lane Group Flow (vph)	0	420	0	155	559	0	0	146	12	0	180	0
Confl. Peds. (#/hr)	4		10	10		4	2					2
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	6%	6%	6%	3%	3%	3%
Turn Type	Perm			custom			custom		custom	Perm		
Protected Phases		2			6						8	
Permitted Phases	2			1	6		4	4	4	8		
Actuated Green, G (s)		29.1		14.0	47.1			12.9	12.9		12.9	
Effective Green, g (s)		29.1		14.0	47.1			12.9	12.9		12.9	
Actuated g/C Ratio		0.42		0.20	0.67			0.18	0.18		0.18	
Clearance Time (s)		5.0		4.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		4.0		2.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		736		104	1218			214	281		310	
v/s Ratio Prot					0.31							
v/s Ratio Perm		c0.24		c0.30				c0.13	0.01		0.11	
v/c Ratio		0.57		1.49	0.46			0.68	0.04		0.58	
Uniform Delay, d1		15.7		28.0	5.4			26.6	23.5		26.1	
Progression Factor		1.00		1.19	0.60			1.00	1.00		1.00	
Incremental Delay, d2		3.2		930.8	1.2			9.0	0.1		2.6	
Delay (s)		18.9		964.2	4.4			35.7	23.5		28.7	
Level of Service		B		F	A			D	C		C	
Approach Delay (s)		18.9			211.9			31.9			28.7	
Approach LOS		B			F			C			C	

Intersection Summary			
HCM Average Control Delay	111.2	HCM Level of Service	F
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	27	497	669	184	209	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.98		1.00	0.94
Flpb, ped/bikes		1.00	1.00		0.99	1.00
Frt		1.00	0.97		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3426	3304		1734	1475
Flt Permitted		0.89	1.00		0.95	1.00
Satd. Flow (perm)		3072	3304		1734	1475
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	497	669	184	209	15
RTOR Reduction (vph)	0	0	22	0	0	12
Lane Group Flow (vph)	0	524	831	0	209	3
Confl. Peds. (#/hr)	23			23	5	23
Heavy Vehicles (%)	5%	5%	4%	4%	3%	3%
Turn Type	D.Pm					custom
Protected Phases			2			
Permitted Phases	2	2	2		4	4
Actuated Green, G (s)		46.2	46.2		13.8	13.8
Effective Green, g (s)		46.2	46.2		13.8	13.8
Actuated g/C Ratio		0.66	0.66		0.20	0.20
Clearance Time (s)		5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2028	2181		342	291
v/s Ratio Prot			c0.25			
v/s Ratio Perm		0.17			c0.12	0.00
v/c Ratio		0.26	0.38		0.61	0.01
Uniform Delay, d1		4.9	5.4		25.7	22.6
Progression Factor		0.74	0.69		1.00	1.00
Incremental Delay, d2		0.3	0.5		3.3	0.0
Delay (s)		3.9	4.2		28.9	22.6
Level of Service		A	A		C	C
Approach Delay (s)		3.9	4.2		28.5	
Approach LOS		A	A		C	

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	584	178	61	610	2	85	2	49	4	0	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.0	5.0			5.0	
Lane Util. Factor		0.95			0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00			1.00		1.00	0.98			0.95	
Flpb, ped/bikes		1.00			1.00		0.93	1.00			1.00	
Frt		0.97			1.00		1.00	0.86			0.92	
Flt Protected		1.00			1.00		0.95	1.00			0.98	
Satd. Flow (prot)		3340			3487		1381	1320			1616	
Flt Permitted		0.95			0.83		0.75	1.00			0.90	
Satd. Flow (perm)		3188			2913		1091	1320			1477	
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)	1	584	178	61	610	2	85	2	49	4	0	6
RTOR Reduction (vph)	0	28	0	0	0	0	0	42	0	0	5	0
Lane Group Flow (vph)	0	735	0	0	673	0	85	9	0	0	5	0
Confl. Peds. (#/hr)			1	1			36		3	3		36
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	21%	21%	21%	0%	0%	0%
Turn Type	custom			custom			custom			custom		
Protected Phases												
Permitted Phases	2	2		2	2		4	4		8	8	
Actuated Green, G (s)		50.4			50.4		9.6	9.6			9.6	
Effective Green, g (s)		50.4			50.4		9.6	9.6			9.6	
Actuated g/C Ratio		0.72			0.72		0.14	0.14			0.14	
Clearance Time (s)		5.0			5.0		5.0	5.0			5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			1.5	
Lane Grp Cap (vph)		2295			2097		150	181			203	
v/s Ratio Prot												
v/s Ratio Perm		0.23			c0.23		c0.08	0.01			0.00	
v/c Ratio		0.32			0.32		0.57	0.05			0.02	
Uniform Delay, d1		3.6			3.6		28.3	26.2			26.1	
Progression Factor		1.43			1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.4			0.4		4.9	0.1			0.0	
Delay (s)		5.5			4.0		33.2	26.3			26.2	
Level of Service		A			A		C	C			C	
Approach Delay (s)		5.5			4.0			30.6			26.2	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	314	286	99	497	3	323	9	41	0	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	4.0	5.0			5.0	4.0		4.0	
Lane Util. Factor		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	1.00		1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt		1.00	0.85	1.00	1.00			1.00	0.85		0.86	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)		1787	1524	1696	1791			1776	1583		1644	
Flt Permitted		1.00	1.00	0.56	1.00			0.95	1.00		1.00	
Satd. Flow (perm)		1786	1524	1000	1791			1776	1583		1644	
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)	19	314	286	99	497	3	323	9	41	0	0	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	11	0	1	0
Lane Group Flow (vph)	0	333	286	99	500	0	0	332	30	0	0	0
Confl. Peds. (#/hr)			8	8								
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	2%	2%	2%	0%	0%	0%
Turn Type	pm+pt		custom	pm+pt			custom		Over	custom		
Protected Phases	5	2	4	1	6		4	4	1	8	8	
Permitted Phases	2	2	4	6	6		4	4		8	8	
Actuated Green, G (s)		48.6	16.6	28.1	21.9			16.6	6.2		0.8	
Effective Green, g (s)		48.6	16.6	28.1	21.9			16.6	6.2		0.8	
Actuated g/C Ratio		0.61	0.21	0.35	0.27			0.21	0.08		0.01	
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	4.0		4.0	
Vehicle Extension (s)		4.0	3.0	3.0	4.0			3.0	3.0		2.0	
Lane Grp Cap (vph)		1085	316	405	490			369	123		16	
v/s Ratio Prot		c0.09	c0.19	0.02	c0.28			0.19	0.02		c0.00	
v/s Ratio Perm		0.10		0.07								
v/c Ratio		0.31	0.91	0.24	1.02			0.90	0.24		0.00	
Uniform Delay, d1		7.6	30.9	17.9	29.1			30.9	34.7		39.2	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.7	37.4	0.3	102.5			30.8	1.0		0.0	
Delay (s)		8.3	68.4	18.2	131.6			61.7	35.7		39.2	
Level of Service		A	E	B	F			E	D		D	
Approach Delay (s)		36.1			112.8			58.8			39.2	
Approach LOS		D			F			E			D	

Intersection Summary			
HCM Average Control Delay	70.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	124	15	17	110	45	2	293	5	55	496	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frt		0.99			0.96			1.00		1.00	1.00	
Flt Protected		1.00			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1816			1737			1771		1703	1792	
Flt Permitted		0.96			0.96			1.00		0.50	1.00	
Satd. Flow (perm)		1744			1668			1768		896	1792	
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)	5	124	15	17	110	45	2	293	5	55	496	1
RTOR Reduction (vph)	0	4	0	0	12	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	140	0	0	160	0	0	299	0	55	497	0
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	7%	7%	7%	6%	6%	6%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			4			6			2	
Permitted Phases	3			4			6			2		
Actuated Green, G (s)		27.7			13.0			38.3		38.3	38.3	
Effective Green, g (s)		27.7			13.0			38.3		38.3	38.3	
Actuated g/C Ratio		0.29			0.14			0.41		0.41	0.41	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		5.0			3.0			4.0		4.0	4.0	
Lane Grp Cap (vph)		514			231			720		365	730	
v/s Ratio Prot											c0.28	
v/s Ratio Perm		c0.08			c0.10			0.17		0.06		
v/c Ratio		0.27			0.69			0.42		0.15	0.68	
Uniform Delay, d1		25.4			38.6			19.9		17.6	22.8	
Progression Factor		0.08			1.00			1.00		0.32	0.28	
Incremental Delay, d2		0.5			9.0			0.5		0.2	2.7	
Delay (s)		2.7			47.6			20.4		5.9	9.1	
Level of Service		A			D			C		A	A	
Approach Delay (s)		2.7			47.6			20.4			8.7	
Approach LOS		A			D			C			A	

Intersection Summary			
HCM Average Control Delay	16.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	60		

c Critical Lane Group

Movement	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	NER2
Lane Configurations												
Volume (vph)	5	10	19	1	362	1	17	428	351	462	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0	5.0	5.0		
Lane Util. Factor		1.00			0.95			1.00	1.00	0.97		
Frt		0.92			1.00			1.00	0.85	1.00		
Flt Protected		0.98			1.00			1.00	1.00	0.95		
Satd. Flow (prot)		1671			3537			1859	1583	3436		
Flt Permitted		0.98			0.95			0.98	1.00	0.96		
Satd. Flow (perm)		1671			3376			1825	1583	3442		
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)	5	10	19	1	362	1	17	428	351	462	4	4
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	86	1	0	0
Lane Group Flow (vph)	0	18	0	0	364	0	0	445	265	469	0	0
Heavy Vehicles (%)	2%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	custom			custom			custom		custom			
Protected Phases									3 2			
Permitted Phases	4	4		6	6		2	2	2	3		
Actuated Green, G (s)		13.0			38.3			38.3	71.0	27.7		
Effective Green, g (s)		13.0			38.3			38.3	71.0	27.7		
Actuated g/C Ratio		0.14			0.41			0.41	0.76	0.29		
Clearance Time (s)		5.0			5.0			5.0		5.0		
Vehicle Extension (s)		3.0			4.0			4.0		5.0		
Lane Grp Cap (vph)		231			1376			744	1196	1014		
v/s Ratio Prot									0.17			
v/s Ratio Perm		c0.01			0.11			c0.24		c0.14		
v/c Ratio		0.08			0.26			0.60	0.22	0.46		
Uniform Delay, d1		35.3			18.5			21.8	3.4	27.1		
Progression Factor		1.00			0.27			1.00	1.03	0.17		
Incremental Delay, d2		0.1			0.1			1.5	0.2	0.6		
Delay (s)		35.4			5.1			23.4	3.7	5.3		
Level of Service		D			A			C	A	A		
Approach Delay (s)		35.4			5.1			14.7		5.3		
Approach LOS		D			A			B		A		

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	60		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	397	12	19	598	48	46
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	397	12	19	598	48	46
Pedestrians	1			2	29	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	221			281		
pX, platoon unblocked					0.95	
vC, conflicting volume			438		770	236
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			438		647	236
tC, single (s)			4.2		7.0	7.1
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.4
p0 queue free %			98		86	94
cM capacity (veh/h)			1084		352	726

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	265	144	218	399	94
Volume Left	0	0	19	0	48
Volume Right	0	12	0	0	46
cSH	1700	1700	1084	1700	471
Volume to Capacity	0.16	0.08	0.02	0.23	0.20
Queue Length 95th (ft)	0	0	1	0	19
Control Delay (s)	0.0	0.0	0.9	0.0	14.5
Lane LOS			A		B
Approach Delay (s)	0.0		0.3		14.5
Approach LOS					B

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	60		

Intersection Sign configuration not allowed in HCM analysis.

Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	113	0	470	144	0	362
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0			5.0
Lane Util. Factor	1.00		0.95			1.00
Frt	1.00		0.96			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	1770		3415			1863
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	1770		3415			1863
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	113	0	470	144	0	362
RTOR Reduction (vph)	0	0	25	0	0	0
Lane Group Flow (vph)	113	0	589	0	0	362
Turn Type						
Protected Phases	4		3			
Permitted Phases						2
Actuated Green, G (s)	13.0		27.7			38.3
Effective Green, g (s)	13.0		27.7			38.3
Actuated g/C Ratio	0.14		0.29			0.41
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		5.0			4.0
Lane Grp Cap (vph)	245		1006			759
v/s Ratio Prot	c0.06		c0.17			
v/s Ratio Perm						c0.19
v/c Ratio	0.46		0.59			0.48
Uniform Delay, d1	37.3		28.3			20.5
Progression Factor	0.27		1.00			0.99
Incremental Delay, d2	1.1		1.4			0.6
Delay (s)	11.0		29.6			20.8
Level of Service	B		C			C
Approach Delay (s)	11.0		29.6			20.8
Approach LOS	B		C			C

Intersection Summary			
HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	597	367	386
Sign Control	Stop			Yield	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	0	597	367	386
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	734	0	734	734	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	734	0	734	734	0	
tC, single (s)	6.5	6.2	7.1	*4.0	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.5	4.0	2.2	
p0 queue free %	100	100	100	0	77	
cM capacity (veh/h)	269	1085	277	449	1623	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	597	367	386
Volume Left	0	367	0
Volume Right	0	0	386
cSH	449	1623	1700
Volume to Capacity	1.33	0.23	0.23
Queue Length 95th (ft)	2111	22	0
Control Delay (s)	635.2	7.9	0.0
Lane LOS	F	A	
Approach Delay (s)	635.2	3.8	
Approach LOS	F		

Intersection Summary			
Average Delay	283.0		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	60		

* User Entered Value

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	677	287	0	0	0	624
Sign Control	Free		Stop			Yield
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	677	287	0	0	0	624
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		1641	0	1354	1354
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1641	0	1354	1354
tC, single (s)	4.1		6.5	6.2	7.1	*10.0
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	58		100	100	100	0
cM capacity (veh/h)	1623		58	1085	85	24

Direction, Lane #	WB 1	WB 2	SB 1
Volume Total	677	287	624
Volume Left	677	0	0
Volume Right	0	287	0
cSH	1623	1700	24
Volume to Capacity	0.42	0.17	26.49
Queue Length 95th (ft)	53	0	Err
Control Delay (s)	8.8	0.0	Err
Lane LOS	A		F
Approach Delay (s)	6.2		Err
Approach LOS			F

Intersection Summary			
Average Delay	3932.8		
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	60		

* User Entered Value

Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	432	155	562	146	67	187
v/c Ratio	0.58	1.49	0.46	0.68	0.20	0.59
Control Delay	18.7	966.5	4.9	43.6	8.0	32.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	966.5	5.0	43.6	8.0	32.2
Queue Length 50th (ft)	132	~89	44	59	0	70
Queue Length 95th (ft)	254	#256	125	#140	34	141
Internal Link Dist (ft)	1739		141	1697		1512
Turn Bay Length (ft)					100	
Base Capacity (vph)	758	104	1220	274	410	403
Starvation Cap Reductn	0	0	50	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	1.49	0.48	0.53	0.16	0.46

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.

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	524	853	209	15
v/c Ratio	0.26	0.39	0.61	0.05
Control Delay	4.5	4.4	32.9	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.5	4.4	32.9	10.6
Queue Length 50th (ft)	31	52	83	0
Queue Length 95th (ft)	52	83	151	15
Internal Link Dist (ft)	201	485	1546	
Turn Bay Length (ft)				100
Base Capacity (vph)	2026	2201	718	620
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.26	0.39	0.29	0.02

Intersection Summary

Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	763	673	85	51	10
v/c Ratio	0.32	0.31	0.49	0.20	0.04
Control Delay	5.7	4.7	35.7	10.1	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	4.7	35.7	10.1	17.0
Queue Length 50th (ft)	61	46	34	1	2
Queue Length 95th (ft)	116	107	79	31	14
Internal Link Dist (ft)	485	1050		989	195
Turn Bay Length (ft)			250		
Base Capacity (vph)	2412	2182	296	394	415
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.32	0.31	0.29	0.13	0.02

Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	333	286	99	500	332	41	1
v/c Ratio	0.29	0.90	0.20	0.89	0.90	0.26	0.00
Control Delay	7.6	75.7	8.8	51.1	69.0	29.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	75.7	8.8	51.1	69.0	29.9	0.0
Queue Length 50th (ft)	60	139	15	231	162	14	0
Queue Length 95th (ft)	154	#329	46	#482	#364	48	0
Internal Link Dist (ft)	1050			2785	1803		302
Turn Bay Length (ft)			150			25	
Base Capacity (vph)	1156	324	483	582	378	158	434
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.88	0.20	0.86	0.88	0.26	0.00

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	144	172	300	55	497
v/c Ratio	0.28	0.71	0.42	0.15	0.68
Control Delay	3.5	56.4	22.1	6.8	11.5
Queue Delay	1.0	0.1	0.3	0.0	0.1
Total Delay	4.5	56.5	22.4	6.8	11.6
Queue Length 50th (ft)	4	101	133	6	58
Queue Length 95th (ft)	m8	#248	231	m14	84
Internal Link Dist (ft)	42	1160	2785		132
Turn Bay Length (ft)					
Base Capacity (vph)	553	284	962	487	975
Starvation Cap Reductn	229	0	0	0	32
Spillback Cap Reductn	0	3	231	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.44	0.61	0.41	0.11	0.53

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	WBL	NBT	SBT	SBR	NEL
Lane Group Flow (vph)	34	364	445	351	470
v/c Ratio	0.14	0.27	0.60	0.27	0.47
Control Delay	24.9	5.5	26.1	0.9	6.4
Queue Delay	2.1	0.1	0.0	0.0	0.2
Total Delay	27.0	5.7	26.1	1.0	6.5
Queue Length 50th (ft)	9	27	218	0	15
Queue Length 95th (ft)	45	38	372	27	21
Internal Link Dist (ft)	1002	132	541		169
Turn Bay Length (ft)					
Base Capacity (vph)	289	1836	992	1306	1086
Starvation Cap Reductn	0	693	0	0	123
Spillback Cap Reductn	183	0	4	141	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.32	0.32	0.45	0.30	0.49

Intersection Summary

Lane Group	WBL	NET	SWT
Lane Group Flow (vph)	113	614	362
v/c Ratio	0.46	0.60	0.48
Control Delay	15.9	31.3	22.8
Queue Delay	2.3	0.0	0.7
Total Delay	18.2	31.3	23.5
Queue Length 50th (ft)	9	176	167
Queue Length 95th (ft)	m32	291	287
Internal Link Dist (ft)	33	1663	137
Turn Bay Length (ft)			
Base Capacity (vph)	289	1102	1013
Starvation Cap Reductn	89	0	351
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.56	0.56	0.55

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	579	71	180	470	71	133	164	150	24	162	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		4.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.99		1.00	1.00			1.00	1.00		1.00	
Flpb, ped/bikes		1.00		0.99	1.00			1.00	1.00		1.00	
Frt		0.99		1.00	0.98			1.00	0.85		0.98	
Flt Protected		1.00		0.95	1.00			0.98	1.00		0.99	
Satd. Flow (prot)		1822		1716	1784			1787	1553		1755	
Flt Permitted		0.99		0.25	1.00			0.65	1.00		0.94	
Satd. Flow (perm)		1805		443	1784			1188	1553		1666	
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)	11	579	71	180	470	71	133	164	150	24	162	42
RTOR Reduction (vph)	0	4	0	0	5	0	0	0	76	0	7	0
Lane Group Flow (vph)	0	657	0	180	536	0	0	297	74	0	221	0
Confl. Peds. (#/hr)	13		22	22		13						
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	4%	4%	4%	5%	5%	5%
Turn Type	Perm			custom			custom		custom	Perm		
Protected Phases		2			6						8	
Permitted Phases	2			1	6		4	4	4	8		
Actuated Green, G (s)		44.1		16.3	64.4			30.4	30.4		30.4	
Effective Green, g (s)		44.1		16.3	64.4			30.4	30.4		30.4	
Actuated g/C Ratio		0.42		0.16	0.61			0.29	0.29		0.29	
Clearance Time (s)		5.0		4.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		4.0		2.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		760		69	1096			345	450		483	
v/s Ratio Prot					0.30							
v/s Ratio Perm		c0.36		c0.41				c0.25	0.05		0.13	
v/c Ratio		0.86		2.61	0.49			0.86	0.16		0.46	
Uniform Delay, d1		27.6		44.2	11.1			35.2	27.7		30.4	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		11.6		2937.4	0.3			22.9	0.2		0.7	
Delay (s)		39.2		2981.6	11.5			58.1	27.9		31.1	
Level of Service		D		F	B			E	C		C	
Approach Delay (s)		39.2			753.0			48.0			31.1	
Approach LOS		D			F			D			C	

Intersection Summary			
HCM Average Control Delay	290.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	104.8	Sum of lost time (s)	14.0
Intersection Capacity Utilization	109.9%	ICU Level of Service	H
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	35	757	646	294	257	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.94
Flpb, ped/bikes		1.00	1.00		0.95	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3496	3293		1674	1485
Flt Permitted		0.88	1.00		0.95	1.00
Satd. Flow (perm)		3080	3293		1674	1485
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	35	757	646	294	257	24
RTOR Reduction (vph)	0	0	37	0	0	19
Lane Group Flow (vph)	0	792	903	0	257	5
Confl. Peds. (#/hr)	8			8	20	19
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%
Turn Type	D.Pm					custom
Protected Phases			2			
Permitted Phases	2	2	2		4	4
Actuated Green, G (s)		60.6	60.6		19.4	19.4
Effective Green, g (s)		60.6	60.6		19.4	19.4
Actuated g/C Ratio		0.67	0.67		0.22	0.22
Clearance Time (s)		5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2074	2217		361	320
v/s Ratio Prot			c0.27			
v/s Ratio Perm		0.26			c0.15	0.00
v/c Ratio		0.38	0.41		0.71	0.02
Uniform Delay, d1		6.5	6.6		32.7	27.8
Progression Factor		1.00	0.67		1.00	1.00
Incremental Delay, d2		0.5	0.5		6.7	0.0
Delay (s)		7.0	4.9		39.4	27.8
Level of Service		A	A		D	C
Approach Delay (s)		7.0	4.9		38.5	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	937	111	50	700	1	199	1	115	13	2	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.0	5.0			5.0	
Lane Util. Factor		0.95			0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00			1.00		1.00	0.96			0.99	
Flpb, ped/bikes		1.00			1.00		0.97	1.00			0.98	
Frt		0.98			1.00		1.00	0.85			0.95	
Flt Protected		1.00			1.00		0.95	1.00			0.97	
Satd. Flow (prot)		3477			3527		1643	1446			1718	
Flt Permitted		0.95			0.82		0.74	1.00			0.86	
Satd. Flow (perm)		3319			2892		1284	1446			1514	
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)	1	937	111	50	700	1	199	1	115	13	2	8
RTOR Reduction (vph)	0	6	0	0	0	0	0	52	0	0	6	0
Lane Group Flow (vph)	0	1043	0	0	751	0	199	64	0	0	17	0
Confl. Peds. (#/hr)			11	11			10		12	12		10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	0%	0%	0%
Turn Type	custom			custom			custom			custom		
Protected Phases												
Permitted Phases	2	2		2	2		4	4		8	8	
Actuated Green, G (s)		60.3			60.3		19.7	19.7			19.7	
Effective Green, g (s)		60.3			60.3		19.7	19.7			19.7	
Actuated g/C Ratio		0.67			0.67		0.22	0.22			0.22	
Clearance Time (s)		5.0			5.0		5.0	5.0			5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			1.5	
Lane Grp Cap (vph)		2224			1938		281	317			331	
v/s Ratio Prot												
v/s Ratio Perm		c0.31			0.26		c0.16	0.04			0.01	
v/c Ratio		0.47			0.39		0.71	0.20			0.05	
Uniform Delay, d1		7.1			6.6		32.5	28.7			27.8	
Progression Factor		1.31			1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.7			0.6		8.3	0.3			0.0	
Delay (s)		10.0			7.2		40.8	29.1			27.8	
Level of Service		B			A		D	C			C	
Approach Delay (s)		10.0			7.2			36.4			27.8	
Approach LOS		B			A			D			C	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	677	350	87	405	1	363	3	102	9	16	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	4.0	5.0			5.0	5.0		4.0	
Lane Util. Factor		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	1.00		0.98	
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt		1.00	0.85	1.00	1.00			1.00	0.85		0.95	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.99	
Satd. Flow (prot)		1844	1568	1735	1826			1792	1599		1742	
Flt Permitted		1.00	1.00	0.14	1.00			0.95	1.00		0.99	
Satd. Flow (perm)		1842	1568	249	1826			1792	1599		1742	
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)	3	677	350	87	405	1	363	3	102	9	16	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	17	0	16	0
Lane Group Flow (vph)	0	680	350	87	406	0	0	366	85	0	25	0
Confl. Peds. (#/hr)	2		13	13		2	4					4
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	1%	1%	1%	0%	0%	0%
Turn Type	pm+pt		Over	pm+pt			Split		Prot	Split		
Protected Phases	1	6	4	5	2		4	4	4	8	8	
Permitted Phases	6			2	2							
Actuated Green, G (s)		50.5	28.9	74.4	73.4			28.9	28.9		3.2	
Effective Green, g (s)		50.5	28.9	74.4	73.4			28.9	28.9		3.2	
Actuated g/C Ratio		0.42	0.24	0.62	0.61			0.24	0.24		0.03	
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		4.0	
Vehicle Extension (s)		4.0	3.0	3.0	4.0			3.0	3.0		2.0	
Lane Grp Cap (vph)		778	379	390	1122			433	387		47	
v/s Ratio Prot			c0.22	0.04	c0.22			0.20	0.05		c0.01	
v/s Ratio Perm		c0.37		0.10								
v/c Ratio		0.87	0.92	0.22	0.36			0.85	0.22		0.54	
Uniform Delay, d1		31.6	44.2	31.9	11.4			43.2	36.3		57.4	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		12.4	39.0	1.3	0.9			16.0	0.3		6.8	
Delay (s)		44.0	83.2	33.2	12.3			59.1	36.6		64.2	
Level of Service		D	F	C	B			E	D		E	
Approach Delay (s)		57.3			16.0			54.2			64.2	
Approach LOS		E			B			D			E	

Intersection Summary			
HCM Average Control Delay	46.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	119.5	Sum of lost time (s)	14.0
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	125	18	12	165	97	9	658	0	66	421	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frt		0.98			0.95			1.00		1.00	1.00	
Flt Protected		1.00			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1762			1787			1861		1736	1826	
Flt Permitted		1.00			0.98			0.99		0.27	1.00	
Satd. Flow (perm)		1754			1759			1851		497	1826	
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)	1	125	18	12	165	97	9	658	0	66	421	1
RTOR Reduction (vph)	0	4	0	0	18	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	140	0	0	256	0	0	667	0	66	422	0
Heavy Vehicles (%)	6%	6%	6%	1%	1%	1%	2%	2%	2%	4%	4%	4%
Turn Type				Perm			Perm			Perm		
Protected Phases		3			4			6			2	
Permitted Phases				4			6			2		
Actuated Green, G (s)		29.1			15.1			46.2		46.2	46.2	
Effective Green, g (s)		29.1			15.1			46.2		46.2	46.2	
Actuated g/C Ratio		0.28			0.14			0.44		0.44	0.44	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		5.0			3.0			4.0		4.0	4.0	
Lane Grp Cap (vph)		484			252			811		218	800	
v/s Ratio Prot											0.23	
v/s Ratio Perm		c0.08			c0.15			c0.36		0.13		
v/c Ratio		0.29			1.02			0.82		0.30	0.53	
Uniform Delay, d1		30.0			45.2			26.0		19.2	21.6	
Progression Factor		1.00			1.00			1.00		0.14	0.13	
Incremental Delay, d2		0.3			129.5			7.5		0.9	0.7	
Delay (s)		30.3			174.6			33.5		3.5	3.4	
Level of Service		C			F			C		A	A	
Approach Delay (s)		30.3			174.6			33.5			3.4	
Approach LOS		C			F			C			A	

Intersection Summary			
HCM Average Control Delay	48.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	105.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	60		

c Critical Lane Group

Movement	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations											
Volume (vph)	6	15	43	0	742	1	9	493	469	725	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0	5.0	5.0	
Lane Util. Factor		1.00			0.95			1.00	1.00	0.97	
Frpb, ped/bikes		0.99			1.00			1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	
Frt		0.91			1.00			1.00	0.85	1.00	
Flt Protected		0.98			1.00			1.00	1.00	0.95	
Satd. Flow (prot)		1648			3504			1861	1583	3433	
Flt Permitted		0.98			1.00			0.99	1.00	0.96	
Satd. Flow (perm)		1648			3504			1835	1583	3451	
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
Adj. Flow (vph)	6	15	43	0	742	1	9	493	469	725	0
RTOR Reduction (vph)	0	37	0	0	0	0	0	0	112	0	0
Lane Group Flow (vph)	0	27	0	0	743	0	0	502	357	725	0
Confl. Peds. (#/hr)			2			1	1				
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	2%	2%
Turn Type	custom						custom		custom		
Protected Phases									3 2		
Permitted Phases	4	4			6		2	2	2	3	
Actuated Green, G (s)		15.1			46.2			46.2	80.3	29.1	
Effective Green, g (s)		15.1			46.2			46.2	80.3	29.1	
Actuated g/C Ratio		0.14			0.44			0.44	0.76	0.28	
Clearance Time (s)		5.0			5.0			5.0		5.0	
Vehicle Extension (s)		3.0			4.0			4.0		5.0	
Lane Grp Cap (vph)		236			1536			804	1206	953	
v/s Ratio Prot									0.23		
v/s Ratio Perm		c0.02			0.21			c0.27		c0.21	
v/c Ratio		0.12			0.48			0.62	0.30	0.76	
Uniform Delay, d1		39.3			21.1			22.9	3.9	35.0	
Progression Factor		1.00			0.21			1.00	1.03	0.27	
Incremental Delay, d2		0.2			0.2			1.7	0.3	1.8	
Delay (s)		39.5			4.7			24.7	4.3	11.3	
Level of Service		D			A			C	A	B	
Approach Delay (s)		39.5			4.7			14.8		11.3	
Approach LOS		D			A			B		B	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	105.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	769	24	32	592	87	63
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	769	24	32	592	87	63
Pedestrians				12	32	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				1	3	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	220			281		
pX, platoon unblocked					0.95	
vC, conflicting volume			825		1173	440
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			825		1084	440
tC, single (s)			4.1		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		53	88
cM capacity (veh/h)			780		187	541

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	513	280	229	395	150
Volume Left	0	0	32	0	87
Volume Right	0	24	0	0	63
cSH	1700	1700	780	1700	258
Volume to Capacity	0.30	0.16	0.04	0.23	0.58
Queue Length 95th (ft)	0	0	3	0	97
Control Delay (s)	0.0	0.0	1.8	0.0	38.0
Lane LOS			A		E
Approach Delay (s)	0.0		0.6		38.0
Approach LOS					E

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	60		

Intersection Sign configuration not allowed in HCM analysis.

Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	175	0	725	144	0	484
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0			5.0
Lane Util. Factor	1.00		0.95			1.00
Frt	1.00		0.98			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	1770		3451			1863
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	1770		3451			1863
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	175	0	725	144	0	484
RTOR Reduction (vph)	0	0	15	0	0	0
Lane Group Flow (vph)	175	0	854	0	0	484
Turn Type						
Protected Phases	4		3			
Permitted Phases						2
Actuated Green, G (s)	15.1		29.1			46.2
Effective Green, g (s)	15.1		29.1			46.2
Actuated g/C Ratio	0.14		0.28			0.44
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		5.0			4.0
Lane Grp Cap (vph)	254		953			817
v/s Ratio Prot	c0.10		c0.25			
v/s Ratio Perm						c0.26
v/c Ratio	0.69		0.90			0.59
Uniform Delay, d1	42.9		36.7			22.5
Progression Factor	0.40		1.00			0.99
Incremental Delay, d2	0.7		13.5			1.3
Delay (s)	18.1		50.2			23.5
Level of Service	B		D			C
Approach Delay (s)	18.1		50.2			23.5
Approach LOS	B		D			C

Intersection Summary			
HCM Average Control Delay	38.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	105.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	597	367	386
Sign Control	Stop			Yield	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	0	597	367	386
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	734	0	734	734	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	734	0	734	734	0	
tC, single (s)	6.5	6.2	7.1	*4.0	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.5	4.0	2.2	
p0 queue free %	100	100	100	0	77	
cM capacity (veh/h)	269	1085	277	449	1623	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	597	367	386
Volume Left	0	367	0
Volume Right	0	0	386
cSH	449	1623	1700
Volume to Capacity	1.33	0.23	0.23
Queue Length 95th (ft)	2111	22	0
Control Delay (s)	635.2	7.9	0.0
Lane LOS	F	A	
Approach Delay (s)	635.2	3.8	
Approach LOS	F		

Intersection Summary			
Average Delay	283.0		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	60		

* User Entered Value

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	677	287	0	0	0	624
Sign Control	Free		Stop			Yield
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	677	287	0	0	0	624
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		1641	0	1354	1354
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1641	0	1354	1354
tC, single (s)	4.1		6.5	6.2	7.1	*10.0
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	58		100	100	100	0
cM capacity (veh/h)	1623		58	1085	85	24

Direction, Lane #	WB 1	WB 2	SB 1
Volume Total	677	287	624
Volume Left	677	0	0
Volume Right	0	287	0
cSH	1623	1700	24
Volume to Capacity	0.42	0.17	26.49
Queue Length 95th (ft)	53	0	Err
Control Delay (s)	8.8	0.0	Err
Lane LOS	A		F
Approach Delay (s)	6.2		Err
Approach LOS			F

Intersection Summary			
Average Delay	3932.8		
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	60		

* User Entered Value

Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	661	180	541	297	150	228
v/c Ratio	0.87	2.61	0.49	0.87	0.29	0.47
Control Delay	43.0	2971.7	13.1	67.8	12.4	34.4
Queue Delay	0.0	0.0	0.5	0.0	0.0	0.0
Total Delay	43.0	2971.7	13.5	67.8	12.4	34.4
Queue Length 50th (ft)	416	~217	200	192	21	122
Queue Length 95th (ft)	#758	#434	337	#453	96	249
Internal Link Dist (ft)	1739		140	1697		1512
Turn Bay Length (ft)					100	
Base Capacity (vph)	969	69	1327	393	586	558
Starvation Cap Reductn	0	0	381	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	2.61	0.57	0.76	0.26	0.41

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.

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	792	940	257	24
v/c Ratio	0.38	0.42	0.71	0.07
Control Delay	7.9	4.9	43.8	10.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.9	4.9	43.8	10.2
Queue Length 50th (ft)	91	66	136	0
Queue Length 95th (ft)	187	96	227	21
Internal Link Dist (ft)	201	485	1546	
Turn Bay Length (ft)				100
Base Capacity (vph)	2073	2253	688	625
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.38	0.42	0.37	0.04

Intersection Summary

Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1049	751	199	116	23
v/c Ratio	0.47	0.39	0.71	0.32	0.07
Control Delay	11.2	8.3	46.7	15.0	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	8.3	46.7	15.0	18.7
Queue Length 50th (ft)	189	87	105	23	7
Queue Length 95th (ft)	360	188	184	72	26
Internal Link Dist (ft)	485	1050		963	117
Turn Bay Length (ft)			250		
Base Capacity (vph)	2231	1938	556	664	662
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.47	0.39	0.36	0.17	0.03

Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	680	350	87	406	366	102	41
v/c Ratio	0.87	0.92	0.22	0.36	0.85	0.25	0.54
Control Delay	46.1	88.2	18.9	12.8	64.6	29.8	66.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.1	88.2	18.9	12.8	64.6	29.8	66.8
Queue Length 50th (ft)	469	261	26	152	267	49	19
Queue Length 95th (ft)	682	#517	54	253	#504	112	#87
Internal Link Dist (ft)	1050			2785	1803		302
Turn Bay Length (ft)			150			25	
Base Capacity (vph)	813	394	402	1135	450	418	76
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.89	0.22	0.36	0.81	0.24	0.54

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	144	274	667	66	422
v/c Ratio	28.80	1.02	0.82	0.30	0.53
Control Delay	50195.2	170.4	36.3	5.7	4.8
Queue Delay	0.0	107.8	2698.1	0.0	0.3
Total Delay	50195.2	278.2	2734.5	5.7	5.1
Queue Length 50th (ft)	~210	~197	384	3	16
Queue Length 95th (ft)	m#236	#429	#709	m4	25
Internal Link Dist (ft)	33	2116	2785		132
Turn Bay Length (ft)					
Base Capacity (vph)	5	269	883	237	871
Starvation Cap Reductn	0	0	0	0	107
Spillback Cap Reductn	0	18	643	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	28.80	1.09	2.78	0.28	0.55

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	WBL	NBT	SBT	SBR	NEL
Lane Group Flow (vph)	64	743	502	469	725
v/c Ratio	0.23	0.48	0.63	0.36	0.76
Control Delay	21.5	5.1	26.8	1.1	12.3
Queue Delay	1187.7	1.0	0.0	0.2	1.6
Total Delay	1209.2	6.1	26.8	1.2	13.9
Queue Length 50th (ft)	13	42	256	0	33
Queue Length 95th (ft)	63	m77	436	32	m56
Internal Link Dist (ft)	1002	132	541		137
Turn Bay Length (ft)					
Base Capacity (vph)	273	1670	875	1317	954
Starvation Cap Reductn	0	622	0	0	95
Spillback Cap Reductn	234	0	0	239	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.64	0.71	0.57	0.44	0.84

Intersection Summary
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	NET	SWT
Lane Group Flow (vph)	175	869	484
v/c Ratio	0.69	0.90	0.59
Control Delay	20.8	52.2	25.4
Queue Delay	136.5	909.0	2.5
Total Delay	157.4	961.1	27.9
Queue Length 50th (ft)	35	305	242
Queue Length 95th (ft)	m35	#520	409
Internal Link Dist (ft)	33	1663	137
Turn Bay Length (ft)			
Base Capacity (vph)	253	969	888
Starvation Cap Reductn	87	0	274
Spillback Cap Reductn	0	392	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.05	1.51	0.79

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.

APPENDIX D

DESIGN OPTIONS CONCEPT PLANS

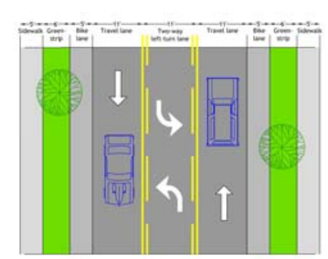
Colchester Avenue
Western Segment: 3-lanes

Legend
- Right-of-way
- Sidewalk
- Bike lane
- Curb/edge of pavement
- Parking

NORTH

CCMPO
Chittenden County Metropolitan Planning Organization

Western segment:
3-lane cross-section with bike lanes



RSG Inc.

LandWorks

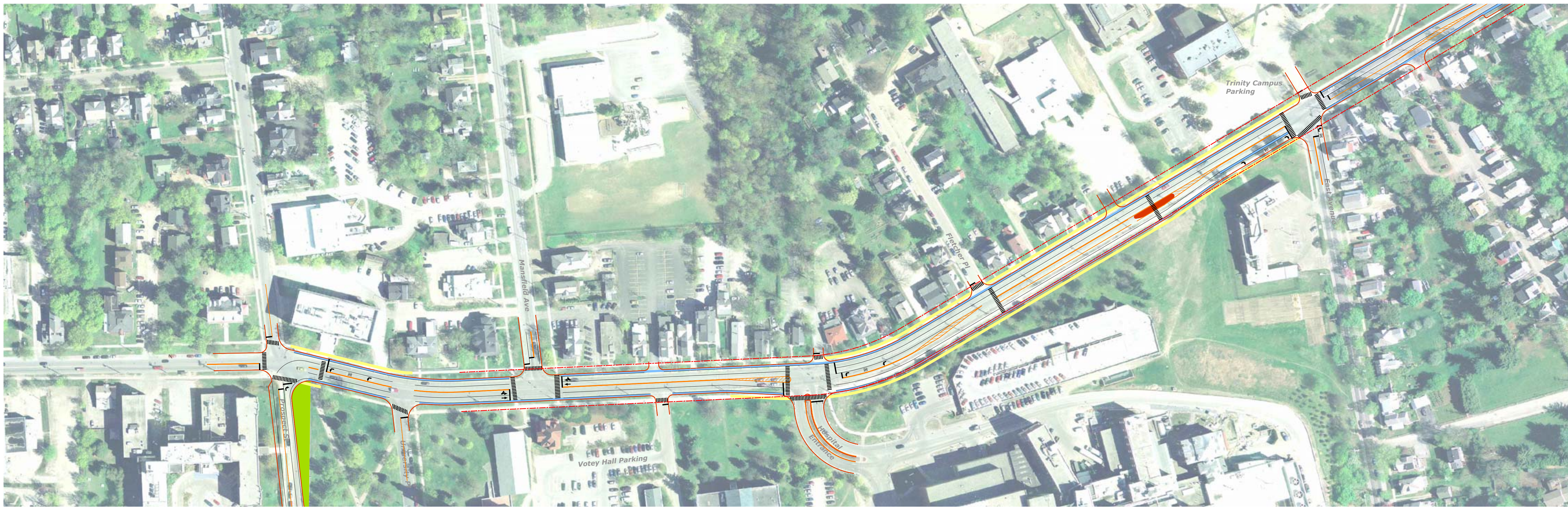
These plans are schematic only and were prepared for use during a public meeting to gather input on possible long-term concepts for the corridor. The concepts demonstrated in this plan are for discussion purposes only.

Colchester Avenue
Western Segment: 4-lanes

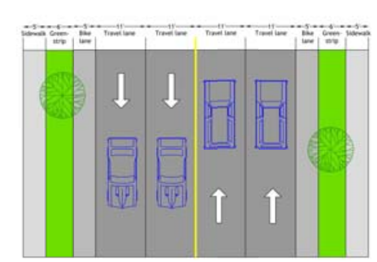
Legend
- Right-of-way
- Sidewalk
- Bike lane
- Curb/edge of pavement

0 50' 100'
SCALE 1" = 50'

NORTH



Western segment:
4-lane cross-section with bike lanes



CCMPO
Chittenden County Metropolitan Planning Organization

RSG INC.

LandWorks

These plans are schematic only and were prepared for use during a public meeting to gather input on possible long-term concepts for the corridor. The concepts demonstrated in this plan are for discussion purposes only.

Colchester Avenue
Eastern Segment

Legend

- Right-of-way
- Sidewalk
- Bike lane
- Curb/edge of pavement
- Parking

NORTH

0 50' 100'
SCALE 1" = 50'

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LandWorks

These plans are schematic only and were prepared for use during a public meeting to gather input on possible long-term concepts for the corridor. The concepts demonstrated in this plan are for discussion purposes only.

APPENDIX E

COST ESTIMATES

Project Cost by Category and Time Fame

Colchester Avenue Corridor Management Plan

August 10, 2011
Prepared by RSG

Receommendation Description			Time Frame				Cost Category			
			One Year	1-5 Years	5-10 Years	More than 10 Years	Total Cost	Rehab/ Maint	Functional	Enhacement
Operations and Maintenance	Corridor-wide	Prune trees on a regular basis to maintain adequate sight lines	1				$0			
Operations and Maintenance	Corridor-wide	City of South Burlington Ambulance should use Beaumont to access the hospital	1				$0			
Operations and Maintenance	Corridor-wide	Clear snow banks from bus stops.	1				$0			
Operations and Maintenance	Corridor-wide	Change speed limit to 25 mph	1				$1,000		$1,000	
Traffic Signals and Intersections	Corridor-wide	Continue to review and optimize traffic signals	1				$0			
Transit	Corridor-wide	Coordinate and consolidate where feasible transit and shuttle operations through the corridor	1	1			$20,000		**$20,000**	
Transit	Corridor-wide	Provide new bus shelters, and eliminate other bus stops		1			$220,000		**$220,000**	
Transit Signal Priority	Corridor-wide	Install equipment that changes traffic signals in real time to provide green lights for buses		1			$70,000		**$70,000**	
Roadway	Prospect to East Avenue	Make the complete street demonstration project roadway layout permanent.	1				$10,000		**$10,000**	
Sidewalks, Bike and Pedestrian Facilities	Prospect Street to East Avenue	Reconstruct existing sidewalks and curbs and fix surface related drainage problems, maintain 3 lane cross-section, restore green strip and include new lighting.		1			$1,600,000	$1,200,000	$0	$400,000
Roadway	Prospect Street to East Avenue	Full implementation of the three Lane Option. Includes upgrading underground stormwater and other utilities.				1	$2,800,000	$2,000,000	$300,000	$500,000
Sidewalks, Bike and Ped Facilities	Trinity to FAHC	Provide mid-block pedestrian crossing with in-pavement LED system, and pedestrian guides.		1			$110,000		**$110,000**	
Traffic Signals and Intersections	Prospect Street Intersection	Reconstruct to align South and North Prospect Street approaches.		1			$980,000		**$980,000**	
Traffic Signals and Intersections	University Place Intersection	**Phase I** - Limit access to right-in / right-out;	1				$1,000		**$1,000**	
Traffic Signals and Intersections	University Place Intersection	**Phase II** - Close University Place to through traffic		1			$50,000		**$50,000**	
Traffic Signals and Intersections	Mary Fletcher Drive	**Phase I:** Prohibit Right-turns-on-red between Colchester Avenue and Mary Fletcher Drive. Install static "No Right Turn on Red Sign" sign.	1				$1,000		**$1,000**	
Traffic Signals and Intersections	Mary Fletcher Drive	**Phase II:** Install pedestrian actuated No Right Turn on Red Sign facing the Mary Fletcher Drive approach.		1			$10,000		$10,000	
Sidewalks, Bike and Ped Facilities	Multi-use Path: at East Avenue	Improve connection between multi-use path on Colchester Ave and bike lane on East Avenue	1				$10,000		$10,000	
Sidewalks, Bike and Ped Facilities	Multi-use Path: at University Place	Improve connection from the multi-use path to Mansfield and across University Place to the UVM Green		1			$10,000		$10,000	
Traffic Signals and Intersections	East Avenue Intersection	Install cross-walk and pedestrian signal equipment on the eastbound approach of Colchester Avenue to East Avenue		1			$10,000		$10,000	
Traffic Signals and Intersections	East Avenue Intersection	Re-align East Ave to the west approach and lengthen right-turn lane.			1		$660,000		$660,000	
Sidewalks, Bike and Ped Facilities	Greenmount Cemetery to Colarco Ct.	Construct Sidewalk		1			$110,000		$110,000	
Roadway	East Avenue to Riverside	Long term full reconstruction with bike lane, on-street parking, green strip bulbouts, street trees, lighting, etc. and underground stormwater and other utilities.			1		$3,200,000	$2,200,000	$500,000	$500,000
Lines/Signs	University Road	Upgrade cross-walk, , Install in-pavement LED lights		1			$60,000		$60,000	
Sidewalks, Bike and Ped Facilities	Kampus Kitchen	Enhance access by improvements to parking and sidewalk.		1			$50,000		$50,000	
Roadway	Chase Street	Narrow Chase Entrance to slow traffic; Install traffic calming devices		1			$20,000		$20,000	
Traffic Signals and Intersections	Riverside-Barrett-Mill St.	Reconstruct to create one signalized intersection at Riverside-Barrett.			1		$1,400,000		$1,400,000	
		Totals	$ 43,000	$ 3,320,000	$ 5,260,000	$ 2,800,000	$ 11,403,000	$ 5,400,000	$ 4,603,000	$ 1,400,000

ORDER OF MAGNITUDE PROJECT COST ESTIMATE

August 10, 2011

Colchester Avenue Western Segment - minimum remove/new curb&sidewalk

Prepared by RSG

based on Vtrans avg. unit prices 2 yr avg 09-11

Vtrans item	Description	Quantity	Units	Unit Cost	Item Total	*Cost Category Allocation* Functional	Rehab/Maint	Enhancement	Notes
201.10	Clearing and Grubbing, tree removal	0.00	ACRE	20,000	$ -		100%		
203.15	common excavation	200	CY	15	$ 3,000		100%		
203.30	common fill (borrow)	-	CY	12	$ -		100%		
203.28	excavation of surfaces and pavement	1,000	CY	20	$ 20,000		100%		remove existing pavement, curbs, sidewalks
210.10	cold plane bituminous	-	SY	4	$ -		100%		
301.26	fine graded crushed gravel	-	CY	42	$ -		100%		
301.35	dense graded crushed stone	-	CY	30	$ -		100%		
406.25	bituminous pavement (road)	250	TON	150	$ 37,500		100%		patch curb install
601.00	drainage pipe include trenching	-	FT	100	$ -		100%		
604.20	precast catchbasin	-	EA	3,000	$ -		100%		
616.21	Vertical Granite Curbing	4,600	FT	26	$ 119,600		100%		Curb on each side of street
618.10	conc. sidewalk, 5 in.	2,600	SY	65	$ 169,000		100%		2556
618.30	ramps + det. warning surf. (truncated domes)	64	SF	80	$ 5,120		100%		
646.xx	pavement markings	5,600	LF	3	$ 16,800		100%		
646.xx	durable markings -stop bars	50	LF	10	$ 500		100%		
646.xx	durable markings, symbols	8	EA	50	$ 400		100%		
646.xx	durable markings, crosswalks	50	LF	6	$ 300		100%		
646.xx	durable markings, bike lane	4,600	LF	10	$ 46,000		100%		
651.00	Landscaping (topsoil, seed, mulch)	2,556	SY	35	$ 89,444		100%		
656.00	Tree	50	EA	250	$ 12,500			100%	46
675.20	Remove/Reset sign	20	EA	100	$ 2,000		100%		25 signs x 6 s.f. per
675.20	new signs	20	EA	240	$ 4,800		100%		25 signs x 6 s.f. per
678.15	new traffic signal system, complete	-	LS	200,000	$ -		100%		assume mast arms
678.20	traffic signal interconnect (wireless)	-	LS	5,000	$ -		100%		
679.21	street lights (base/pole/luminaire)	20	EA	10,000	$ 200,000			100%	
900.xx	segmented precast retaining wall	-	SF	75	$ -		100%		
900.xx	traffic signal, modify (add phase / heads, detectors)	-	LS	50,000	$ -		100%		
900.xx	Relocate utility (W/S/E) allowance	-	LS	10,000	$ -		100%		
900.xx	Landscape furnishings allowance	1	LS	10,000	$ 10,000			100%	
900.xx	Relocate overhead utility pole	10	EA	10,000	$ 100,000		100%		
		CONSTRUCTION TOTAL			$ 836,964	$ -	$ 614,464	$ 222,500	
ADDITIONAL PROJECT COSTS									
635.11	mobilize / demobilize	5%	LS		$ 41,848				
641.10	traffic control	10%	LS		$ 83,696				
	demolition of existing facilities	1%			$ 8,370				
	Stormwater management	20%			$ 167,393				
	Engineering & Permitting	20%			$ 167,393				
	construction engineering	10%			$ 83,696				
	right of way	0%			$ -				
	overhead utility relocation	0%			$ -				
	Contingency	25%			$ 209,241				
					Total	**Functional**	**Rehab/Maint**	**Amentity**	
				GRAND TOTAL:	$ 1,598,602	$ -	$ 1,173,627	$ 424,975	
				Rounding:	$ 1,600,000	$ -	$ 1,200,000	$ 400,000	

ORDER OF MAGNITUDE PROJECT COST ESTIMATE

August 10, 2011

Colchester Avenue Western Segment Long Term Complete Reconstruction

Prepared by RSG

based on Vtrans avg. unit prices 2 yr avg 09-11

						Cost Category Allocation			
Vtrans item	Description	Quantity	Units	Unit Cost	Item Total	Functional	Rehab/Maint	Enhancement	Notes
201.10	Clearing and Grubbing, tree removal	0.00	ACRE	20,000	$ -	20%	80%		
203.15	common excavation	200	CY	15	$ 3,000	20%	80%		
203.30	common fill (borrow)	-	CY	12	$ -	20%	80%		
203.28	excavation of surfaces and pavement	4,000	CY	20	$ 80,000	20%	80%		remove existing pavement, curbs, sidewalks
210.10	cold plane bituminous	14,000	SY	4	$ 56,000	20%	80%		
301.26	fine graded crushed gravel	600	CY	42	$ 25,200	20%	80%		
301.35	dense graded crushed stone	1,200	CY	30	$ 36,000	20%	80%		
406.25	bituminous pavement (road)	2,000	TON	150	$ 300,000	20%	80%		
601.00	drainage pipe include trenching	1,400	FT	100	$ 140,000		100%		
604.20	precast catchbasin	8	EA	3,000	$ 24,000		100%		
616.21	Vertical Granite Curbing	4,600	FT	26	$ 119,600		100%		
618.10	conc. sidewalk, 5 in.	2,600	SY	65	$ 169,000		100%		
618.30	ramps + det. warning surf. (truncated domes)	64	SF	80	$ 5,120		100%		
646.xx	pavement markings	5,600	LF	3	$ 16,800		100%		
646.xx	durable markings -stop bars	50	LF	10	$ 500		100%		
646.xx	durable markings, symbols	8	EA	50	$ 400		100%		
646.xx	durable markings, crosswalks	50	LF	6	$ 300		100%		
646.xx	durable markings, bike lane	2,800	LF	15	$ 42,000	100%	0%		
651.00	Landscaping (topsoil, seed, mulch)	2,600	SY	35	$ 91,000		100%		
656.00	Tree	50	EA	250	$ 12,500			100%	
675.20	Remove/Reset sign	20	EA	20	$ 400		100%		25 signs x 6 s.f. per
675.20	new signs	20	EA	240	$ 4,800		100%		25 signs x 6 s.f. per
678.15	new traffic signal system, complete	-	LS	200,000	$ -		100%		assume mast arms
678.20	traffic signal interconnect (wireless)	-	LS	5,000	$ -		100%		
679.21	street lights (base/pole/luminaire)	20	EA	10,000	$ 200,000			100%	
900.xx	segmented precast retaining wall	-	SF	75	$ -		100%		
900.xx	traffic signal, modify (add phase / heads, detectors)	-	LS	50,000	$ -		100%		
900.xx	Relocate utility (W/S/E) allowance	-	LS	10,000	$ -		100%		
900.xx	Landscape furnishings allowance	1	LS	25,000	$ 25,000			100%	
900.xx	Relocate overhead utility pole	6	EA	10,000	$ 60,000		100%		
		CONSTRUCTION TOTAL			$ 1,411,620	$ 142,040	$ 1,032,080	$ 237,500	
ADDITIONAL PROJECT COSTS									
635.11	mobilize / demobilize	5%	LS		$ 70,581				
641.10	traffic control	10%	LS		$ 141,162				
	demolition of existing facilities	1%			$ 14,116				
	Stormwater management	20%			$ 282,324				
	Engineering & Permitting	20%			$ 282,324				
	construction engineering	10%			$ 141,162				
	right of way	0%			$ -				
	overhead utility relocation	0%			$ -				
	Contingiency	25%			$ 352,905				
					$ -	New	Rehab/Maint	Amentity	
				GRAND TOTAL:	$ 2,696,194	$ 271,296	$ 1,971,273	$ 453,625	
				Rounding:	$ 2,700,000	$ 300,000	$ 2,000,000	$ 500,000	

ORDER OF MAGNITUDE PROJECT COST ESTIMATE

August 10, 2011

Colchester Avenue Eastern Segment Long Term

Prepared by RSG

based on Vtrans avg. unit prices 2 yr avg 09-11

Vtrans item	Description	Quantity	Units	Unit Cost	Item Total	Functional	Rehab/Maint	Enhancement	Notes
						Cost Category Allocation			
201.10	Clearing and Grubbing, tree removal	0.50	ACRE	20,000	$ 10,000	20%	80%		
203.15	common excavation	500	CY	15	$ 7,500	20%	80%		
203.30	common fill (borrow)	500	CY	12	$ 6,000	20%	80%		
203.28	excavation of surfaces and pavement	1,700	CY	20	$ 34,000	20%	80%		remove existing pavement, curbs, sidewalks
210.10	cold plane bituminous	9,000	SY	4	$ 36,000	20%	80%		
301.26	fine graded crushed gravel	750	CY	42	$ 31,500	20%	80%		
301.35	dense graded crushed stone	1,500	CY	30	$ 45,000	20%	80%		
406.25	bituminous pavement (road)	1,700	TON	150	$ 255,000	20%	80%		overlay + new
601.00	drainage pipe include trenching	2,600	FT	100	$ 260,000		100%		
604.20	precast catchbasin	12	EA	3,000	$ 36,000		100%		
616.21	Vertical Granite Curbing	3,500	FT	26	$ 91,000		100%		
618.10	conc. sidewalk, 5 in.	3,000	SY	65	$ 195,000		100%		
618.30	ramps + det. warning surf. (truncated domes)	48	SF	80	$ 3,840		100%		
646.xx	pavement markings	11,000	LF	3	$ 33,000		100%		
646.xx	durable markings -stop bars	200	LF	10	$ 2,000		100%		
646.xx	durable markings, symbols	10	EA	50	$ 500		100%		
646.xx	durable markings, crosswalks	100	LF	6	$ 600		100%		
646.xx	durable markings, bike lane	5,200	LF	10	$ 52,000	100%	0%		
651.00	Landscaping (topsoil, seed, mulch)	1,000	SY	35	$ 35,000		100%		
656.00	Tree	60	EA	250	$ 15,000			100%	
675.20	Remove/Reset sign	10	EA	100	$ 1,000		100%		25 signs x 6 s.f. per
675.20	new signs	10	EA	240	$ 2,400		100%		25 signs x 6 s.f. per
678.15	new traffic signal system, complete	-	LS	200,000	$ -		100%		assume mast arms
678.20	traffic signal interconnect (wireless)	-	LS	5,000	$ -		100%		
679.21	street lights (base/pole/luminaire)	20	EA	10,000	$ 200,000			100%	
900.xx	segmented precast retaining wall	-	SF	75	$ -		100%		
900.xx	traffic signal, modify (add phase / heads, detectors)	-	LS	50,000	$ -		100%		
900.xx	Relocate utility (W/S/E) allowance	1	LS	50,000	$ 50,000		100%		
900.xx	Landscape furnishings allowance	1	LS	25,000	$ 25,000			100%	
900.xx	Relocate overhead utility pole	10	EA	10,000	$ 100,000		100%		
				CONSTRUCTION TOTAL	$ 1,527,340	137000	1150340	240000	
ADDITIONAL PROJECT COSTS									
635.11	mobilize / demobilize	5%	LS		$ 76,367				
641.10	traffic control	10%	LS		$ 152,734				
	demolition of existing facilities	1%			$ 15,273				
	Stormwater management	20%			$ 305,468				
	Engineering & Permitting	20%			$ 305,468				
	construction engineering	10%			$ 152,734				
	right of way	0%			$ -				
	overhead utility relocation	0%			$ -				
	Contingiency	25%			$ 381,835				
					$ -	New	Rehab/Maint	Amentity	
				GRAND TOTAL:	$ 2,917,219	$ 261,670	$ 2,197,149	$ 458,400	
				Rounding:	$ 2,900,000	$ 300,000	$ 2,200,000	$ 500,000	

ORDER OF MAGNITUDE PROJECT COST ESTIMATE

August 10, 2011

Prospect and Pearl Realignment *based on Vtrans avg. unit prices 2 yr avg 09-11* Prepared by RSG

Vtrans item	Description	Quantity	Units	Unit Cost	Item Total	Notes
201.10	Clearing and Grubbing, tree removal	0.40	ACRE	20,000	$ 8,000	
203.15	common excavation	500	CY	15	$ 7,500	
203.30	common fill (borrow)	500	CY	12	$ 6,000	
203.28	excavation of surfaces and pavement	600	CY	20	$ 12,000	remove existing pavement, curbs, sidewalks
210.10	cold plane bituminous	1,400	SY	4	$ 5,600	
301.26	fine graded crushed gravel	300	CY	42	$ 12,600	
301.35	dense graded crushed stone	600	CY	30	$ 18,000	
406.25	bituminous pavement (road)	620	TON	150	$ 93,000	
601.00	drainage pipe include trenching	360	FT	100	$ 36,000	
604.20	precast catchbasin	6	EA	3,000	$ 18,000	
616.21	Vertical Granite Curbing	1,300	FT	26	$ 33,800	
618.10	conc. sidewalk, 5 in.	220	SY	65	$ 14,300	
618.30	ramps + det. warning surf. (truncated domes)	32	SF	80	$ 2,560	
646.xx	pavement markings	1,500	LF	3	$ 4,500	
646.xx	durable markings -stop bars	80	LF	10	$ 800	
646.xx	durable markings, symbols	2	EA	50	$ 100	
646.xx	durable markings, crosswalks	150	LF	20	$ 3,000	
651.00	Landscaping (topsoil, seed, mulch)	100	SY	35	$ 3,500	
656.00	Tree	5	EA	250	$ 1,250	
675.20	Remove/Reset sign	4	EA	100	$ 400	
675.20	new signs	8	EA	240	$ 1,920	
678.15	new traffic signal system, complete	1	LS	200,000	$ 200,000	assume mast arms
678.20	traffic signal interconnect (wireless)	1	LS	5,000	$ 5,000	
679.21	street lights (base/pole/luminaire)	4	EA	10,000	$ 40,000	
900.xx	segmented precast retaining wall	-	SF	75	$ -	
900.xx	traffic signal, modify (add phase / heads, detectors)	-	LS	50,000	$ -	
900.xx	Relocate utility (W/S/E) allowance	1	LS	10,000	$ 10,000	
900.xx	Landscape furnishings allowance	2	LS	25,000	$ 50,000	
900.xx	xx	-	LS	-	$ -	
			CONSTRUCTION TOTAL		$ 579,830	
ADDITIONAL PROJECT COSTS						
635.11	mobilize / demobilize	5%	LS		$ 28,992	
641.10	traffic control	10%	LS		$ 57,983	
	demolition of existing facilities	1%			$ 5,798	
	Stormwater management	5%			$ 28,992	
	final engineering	12%			$ 69,580	
	construction engineering	10%			$ 57,983	
	right of way	0%			$ -	
	overhead utility relocation	0%			$ -	
	Contingiency	25%			$ 144,958	
				GRAND TOTAL:	$ 974,114	
				Rounding:	$ 980,000	

ORDER OF MAGNITUDE PROJECT COST ESTIMATE

August 10, 2011

Prospect and Pearl Realignment *based on Vtrans avg. unit prices 2 yr avg 09-11* Prepared by RSG

Vtrans item	Description	Quantity	Units	Unit Cost	Item Total	Notes
201.10	Clearing and Grubbing, tree removal	0.50	ACRE	20,000	$ 10,000	
203.15	common excavation	100	CY	15	$ 1,500	
203.30	common fill (borrow)	100	CY	12	$ 1,200	
203.28	excavation of surfaces and pavement	400	CY	20	$ 8,000	remove existing pavement, curbs, sidewalks
210.10	cold plane bituminous	1,200	SY	4	$ 4,800	
301.26	fine graded crushed gravel	170	CY	42	$ 7,140	
301.35	dense graded crushed stone	340	CY	30	$ 10,200	
406.25	bituminous pavement (road)	320	TON	150	$ 48,000	
601.00	drainage pipe include trenching	200	FT	100	$ 20,000	
604.20	precast catchbasin	6	EA	3,000	$ 18,000	
616.21	Vertical Granite Curbing	890	FT	26	$ 23,140	
618.10	conc. sidewalk, 5 in.	320	SY	65	$ 20,800	
618.30	ramps + det. warning surf. (truncated domes)	32	SF	80	$ 2,560	
646.xx	pavement markings	1,600	LF	3	$ 4,800	
646.xx	durable markings -stop bars	72	LF	10	$ 720	
646.xx	durable markings, symbols	12	EA	50	$ 600	
646.xx	durable markings, crosswalks	185	LF	20	$ 3,700	
651.00	Landscaping (topsoil, seed, mulch)	200	SY	35	$ 7,000	
656.00	Tree	4	EA	250	$ 1,000	
675.20	Remove/Reset sign	4	EA	100	$ 400	
675.20	new signs & post	4	EA	240	$ 960	
678.15	new traffic signal system, complete	1	LS	200,000	$ 200,000	assume mast arms
678.20	traffic signal interconnect (wireless)	1	LS	5,000	$ 5,000	
679.21	street lights (base/pole/luminaire)	4	EA	10,000	$ 40,000	
900.xx	segmented precast retaining wall	-	SF	75	$ -	
900.xx	traffic signal, modify (add phase / heads, detectors)	-	LS	50,000	$ -	
900.xx	Relocate utility (W/S/E) allowance	1	LS	10,000	$ 10,000	
900.xx	Landscape furnishings allowance	1	LS	10,000	$ 10,000	
900.xx	xx	-	LS	-	$ -	
		CONSTRUCTION TOTAL:			$ 449,520	
ADDITIONAL PROJECT COSTS						
635.11	mobilize / demobilize	5%	LS		$ 22,476	
641.10	traffic control	10%	LS		$ 44,952	
	demolition of existing facilities	1%			$ 4,495	
	final engineering	12%			$ 53,942	
	construction engineering	10%			$ 44,952	
	right of way	0%			$ -	
	overhead utility relocation	0%			$ -	
	Contingiency	10%			$ 44,952	
					$ -	
			GRAND TOTAL:		$ 665,290	
				Rounding:	$ 666,000	

ORDER OF MAGNITUDE PROJECT COST ESTIMATE

August 10, 2011

Trintity MidBlock Crossing — *based on Vtrans avg. unit prices 2 yr avg 09-11* — Prepared by RSG

Vtrans item	Description	Quantity	Units	Unit Cost	Item Total	**Notes**
201.10	Clearing and Grubbing, tree removal	0.00	ACRE	20,000	$ -	
203.15	common excavation	100	CY	15	$ 1,500	
203.30	common fill (borrow)	-	CY	12	$ -	
203.28	excavation of surfaces and pavement	100	CY	20	$ 2,000	remove existing pavement, curbs, sidewalks
210.10	cold plane bituminous	-	SY	4	$ -	
301.26	fine graded crushed gravel	-	CY	42	$ -	
301.35	dense graded crushed stone	-	CY	30	$ -	
406.25	bituminous pavement (road)	20	TON	150	$ 3,000	
601.00	drainage pipe include trenching	-	FT	100	$ -	
604.20	precast catchbasin	-	EA	3,000	$ -	
616.21	Vertical Granite Curbing	200	FT	26	$ 5,200	
618.10	conc. sidewalk, 5 in.	-	SY	65	$ -	
618.30	ramps + det. warning surf. (truncated domes)	32	SF	80	$ 2,560	
646.xx	pavement markings	500	LF	3	$ 1,500	
646.xx	durable markings -stop bars	-	LF	10	$ -	
646.xx	durable markings, symbols	-	EA	50	$ -	
646.xx	durable markings, crosswalks	60	LF	20	$ 1,200	
651.00	Landscaping (topsoil, seed, mulch)	-	SY	35	$ -	
656.00	Tree	-	EA	250	$ -	
675.20	Remove/Reset sign	-	SF	20	$ -	25 signs x 6 s.f. per
675.20	new signs & post	4	EA	240	$ 960	25 signs x 6 s.f. per
678.15	new traffic signal system, complete	-	LS	200,000	$ -	assume mast arms
678.20	traffic signal interconnect (wireless)	-	LS	5,000	$ -	
679.21	street lights (base/pole/luminaire)	-	EA	10,000	$ -	
900.xx	segmented precast retaining wall	-	SF	75	$ -	
900.xx	Pedestrian crossing signal	1	LS	20,000	$ 20,000	Jericho low bid was $16,000. Highest was $35,000
900.xx	Relocate utility (W/S/E) allowance	-	LS	25,000	$ -	
900.xx	Landscape furnishings allowance	1	LS	25,000	$ 25,000	Assume this covers the granit posts and rail for the pedestrian guide
900.xx	Remove traffic signal	-	LS	20,000	$ -	
				CONSTRUCTION TOTAL	$ 62,920	
ADDITIONAL PROJECT COSTS						
635.11	mobilize / demobilize	5%	LS		$ 3,146	
641.10	traffic control	10%	LS		$ 6,292	
	demolition of existing facilities	1%			$ 629	
	final engineering	12%			$ 7,550	
	construction engineering	10%			$ 6,292	
	right of way	0%			$ -	
	overhead utility relocation	0%			$ -	
	Contingiency	25%			$ 15,730	
					$ -	
				GRAND TOTAL:	$ 102,560	
				Rounding:	$ 110,000	

ORDER OF MAGNITUDE PROJECT COST ESTIMATE

August 10, 2011

Riverside and Barrett

based on Vtrans avg. unit prices 2 yr avg 09-11

Prepared by RSG

Vtrans item	Description	Quantity	Units	Unit Cost	Item Total	Notes
201.10	Clearing and Grubbing, tree removal	0.25	ACRE	20,000	$ 5,000	
203.15	common excavation	500	CY	15	$ 7,500	
203.30	common fill (borrow)	1,000	CY	12	$ 12,000	
203.28	excavation of surfaces and pavement	700	CY	20	$ 14,000	remove existing pavement, curbs, sidewalks
210.10	cold plane bituminous	1,900	SY	4	$ 7,600	
301.26	fine graded crushed gravel	260	CY	42	$ 10,920	
301.35	dense graded crushed stone	520	CY	30	$ 15,600	
406.25	bituminous pavement (road)	600	TON	150	$ 90,000	
601.00	drainage pipe include trenching	1,000	FT	100	$ 100,000	
604.20	precast catchbasin	8	EA	3,000	$ 24,000	
616.21	Vertical Granite Curbing	1,800	FT	26	$ 46,800	
618.10	conc. sidewalk, 5 in.	750	SY	65	$ 48,750	
618.30	ramps + det. warning surf. (truncated domes)	48	SF	80	$ 3,840	
646.xx	pavement markings	3,400	LF	3	$ 10,200	
646.xx	durable markings -stop bars	275	LF	10	$ 2,750	
646.xx	durable markings, symbols	12	EA	50	$ 600	
646.xx	durable markings, crosswalks	255	LF	20	$ 5,100	
651.00	Landscaping (topsoil, seed, mulch)	200	SY	35	$ 7,000	
656.00	Tree	10	EA	250	$ 2,500	
675.20	Remove/Reset sign	10	SF	20	$ 200	25 signs x 6 s.f. per
675.20	new signs & post	4	EA	240	$ 960	25 signs x 6 s.f. per
678.15	new traffic signal system, complete	1	LS	200,000	$ 200,000	assume mast arms
678.20	traffic signal interconnect (wireless)	1	LS	5,000	$ 5,000	
679.21	street lights (base/pole/luminaire)	4	EA	10,000	$ 40,000	
900.xx	segmented precast retaining wall	400	SF	75	$ 30,000	
900.xx	traffic signal, modify (add phase / heads, detectors)	-	LS	50,000	$ -	
900.xx	Relocate utility (W/S/E) allowance	1	LS	25,000	$ 25,000	
900.xx	Landscape furnishings allowance	2	LS	25,000	$ 50,000	
900.xx	Remove traffic signal	1	LS	20,000	$ 20,000	
			CONSTRUCTION 1		$ 780,320	
ADDITIONAL PROJECT COSTS						
635.11	mobilize / demobilize	5%	LS		$ 39,016	
641.10	traffic control	10%	LS		$ 78,032	
	demolition of existing facilities	1%			$ 7,803	
	Stormwater	10%			$ 78,032	
	final engineering	12%			$ 93,638	
	construction engineering	10%			$ 78,032	
	right of way	0%			$ -	
	overhead utility relocation	0%			$ -	
	Contingiency	25%			$ 195,080	
					$ -	
				GRAND TOTAL:	$ 1,349,954	
				Rounding:	$ 1,400,000	

ORDER OF MAGNITUDE PROJECT COST ESTIMATE

August 10, 2011

Bus Shelters *based on Vtrans avg. unit prices 2 yr avg 09-11* Prepared by RSG

Vtrans item	Description	Quantity	Units	Unit Cost	Item Total	**Notes**
201.10	Shlters	5.00	EA	35,000	$ 175,000	
203.15	Misc site work per shelter	5	EA	5,000	$ 25,000	
		CONSTRUCTION TOTAL			$ 200,000	
ADDITIONAL PROJECT COSTS						
635.11	mobilize / demobilize	1%	LS		$ 2,000	
641.10	traffic control	1%	LS		$ 2,000	
	demolition of existing facilities	1%			$ 2,000	
	Stormwater management	0%			$ -	
	Engineering & Permitting	2%			$ 4,000	
	construction engineering	1%			$ 2,000	
	right of way	0%			$ -	
	overhead utility relocation	0%			$ -	
	Contingiency	2%			$ 4,000	
					$ -	
				GRAND TOTAL:	$ 216,000	
				Rounding:	$ 220,000	

ORDER OF MAGNITUDE PROJECT COST ESTIMATE

August 10, 2011

New Sidewalk Greenmount Cemetert to Calarco Ct. *based on Vtrans avg. unit prices 2 yr avg 09-11* Prepared by RSG

Vtrans item	Description	Quantity	Units	Unit Cost	Item Total	Notes
201.10	Clearing and Grubbing, tree removal	0.00	ACRE	20,000	$ -	
203.15	common excavation	204	CY	15	$ 3,056	
203.30	common fill (borrow)	-	CY	12	$ -	
203.28	excavation of surfaces and pavement	-	CY	20	$ -	remove existing pavement, curbs, sidewalks
210.10	cold plane bituminous	-	SY	4	$ -	
301.26	fine graded crushed gravel	51	CY	42	$ 2,139	
301.35	dense graded crushed stone	51	CY	30	$ 1,528	
406.25	bituminous pavement (road)	-	TON	150	$ -	
601.00	drainage pipe include trenching	-	FT	100	$ -	
604.20	precast catchbasin	-	EA	3,000	$ -	
616.21	Vertical Granite Curbing	550	FT	26	$ 14,300	
618.10	conc. sidewalk, 5 in.	306	SY	65	$ 19,861	
618.30	ramps + det. warning surf. (truncated domes)	64	SF	80	$ 5,120	
646.xx	pavement markings	-	LF	3	$ -	
646.xx	durable markings -stop bars	-	LF	10	$ -	
646.xx	durable markings, symbols	-	EA	50	$ -	
646.xx	durable markings, crosswalks	-	LF	6	$ -	
646.xx	durable markings, bike lane	-	LF	15	$ -	
651.00	Landscaping (topsoil, seed, mulch)	306	SY	35	$ 10,694	
656.00	Tree	-	EA	250	$ -	
675.20	Remove/Reset sign	-	EA	20	$ -	25 signs x 6 s.f. per
675.20	new signs	2	EA	240	$ 480	25 signs x 6 s.f. per
678.15	new traffic signal system, complete	-	LS	200,000	$ -	assume mast arms
678.20	traffic signal interconnect (wireless)	-	LS	5,000	$ -	
679.21	street lights (base/pole/luminaire)	-	EA	10,000	$ -	
900.xx	segmented precast retaining wall	-	SF	75	$ -	
900.xx	traffic signal, modify (add phase / heads, detectors)	-	LS	50,000	$ -	
900.xx	Relocate utility (W/S/E) allowance	-	LS	10,000	$ -	
900.xx	Landscape furnishings allowance	-	LS	25,000	$ -	
900.xx	Relocate overhead utility pole	-	EA	10,000	$ -	
				CONSTRUCTION TOTAL	$ 57,178	
ADDITIONAL PROJECT COSTS						
635.11	mobilize / demobilize	5%	LS		$ 2,859	
641.10	traffic control	10%	LS		$ 5,718	
	demolition of existing facilities	1%			$ 572	
	Stormwater management	20%			$ 11,436	
	Engineering & Permitting	20%			$ 11,436	
	construction engineering	10%			$ 5,718	
	right of way	0%			$ -	
	overhead utility relocation	0%			$ -	
	Contingiency	25%			$ 14,294	
					$ -	
				GRAND TOTAL:	$ 109,210	
				Rounding:	$ 110,000	

ORDER OF MAGNITUDE PROJECT COST ESTIMATE

August 10, 2011

University Road Cross Walk Enhancement *based on Vtrans avg. unit prices 2 yr avg 09-11* Prepared by RSG

Vtrans item	Description	Quantity	Units	Unit Cost	Item Total	
201.10	Clearing and Grubbing, tree removal	0.00	ACRE	20,000	$ -	
203.15	common excavation	-	CY	15	$ -	
203.30	common fill (borrow)	-	CY	12	$ -	
203.28	excavation of surfaces and pavement	100	CY	20	$ 2,000	remove existing pavement, curbs, sidewalks
210.10	cold plane bituminous	-	SY	4	$ -	
301.26	fine graded crushed gravel	-	CY	42	$ -	
301.35	dense graded crushed stone	-	CY	30	$ -	
406.25	bituminous pavement (road)	20	TON	150	$ 3,000	
601.00	drainage pipe include trenching	-	FT	100	$ -	
604.20	precast catchbasin	-	EA	3,000	$ -	
616.21	Vertical Granite Curbing	200	FT	26	$ 5,200	
618.10	conc. sidewalk, 5 in.	-	SY	65	$ -	
618.30	ramps + det. warning surf. (truncated domes)	32	SF	80	$ 2,560	
646.xx	pavement markings	500	LF	3	$ 1,500	
646.xx	durable markings -stop bars	-	LF	10	$ -	
646.xx	durable markings, symbols	-	EA	50	$ -	
646.xx	durable markings, crosswalks	60	LF	20	$ 1,200	
651.00	Landscaping (topsoil, seed, mulch)	-	SY	35	$ -	
656.00	Tree	-	EA	250	$ -	
675.20	Remove/Reset sign	-	SF	20	$ -	25 signs x 6 s.f. per
675.20	new signs & post	4	EA	240	$ 960	25 signs x 6 s.f. per
678.15	new traffic signal system, complete	-	LS	200,000	$ -	assume mast arms
678.20	traffic signal interconnect (wireless)	-	LS	5,000	$ -	
679.21	street lights (base/pole/luminaire)	-	EA	10,000	$ -	
900.xx	segmented precast retaining wall	-	SF	75	$ -	
900.xx	Pedestrian crossing signal	1	LS	20,000	$ 20,000	Jericho low bid was $16,000. Highest was $35,000
900.xx	Relocate utility (W/S/E) allowance	-	LS	25,000	$ -	
900.xx	Landscape furnishings allowance	-	LS	25,000	$ -	
900.xx	Remove traffic signal	-	LS	20,000	$ -	
				CONSTRUCTION TOTAL	$ 36,420	
ADDITIONAL PROJECT COSTS						
635.11	mobilize / demobilize	5%	LS		$ 1,821	
641.10	traffic control	10%	LS		$ 3,642	
	demolition of existing facilities	1%			$ 364	
	final engineering	12%			$ 4,370	
	construction engineering	10%			$ 3,642	
	right of way	0%			$ -	
	overhead utility relocation	0%			$ -	
	Contingiency	25%			$ 9,105	
					$ -	
				GRAND TOTAL:	$ 59,365	
				Rounding:	$ 60,000	

APPENDIX F

LEVEL OF SERVICE WORKSHEETS FOR LONG TERM DESIGN CONCEPTS

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	11	579	180	470	133	164	150	24	162
Turn Type	Perm		pm+pt		Perm		custom	Perm	
Protected Phases		2	1	6		4	4		8
Permitted Phases	2		6	6	4	4	4	8	
Detector Phase	2	2	1	6	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	29.0	29.0	4.0	29.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	39.0	39.0	8.0	39.0	29.0	29.0	29.0	13.0	13.0
Total Split (s)	60.0	60.0	20.0	80.0	39.0	39.0	39.0	39.0	39.0
Total Split (%)	50.4%	50.4%	16.8%	67.2%	32.8%	32.8%	32.8%	32.8%	32.8%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	6.0	6.0	1.0	6.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	10.0	10.0	4.0	10.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes						
Recall Mode	Min	Min	None	Min	None	None	None	None	None
Act Effct Green (s)		45.8	65.5	59.5		33.0	33.0		33.0
Actuated g/C Ratio		0.43	0.61	0.55		0.31	0.31		0.31
v/c Ratio		0.91	0.46	0.57		0.86	0.29		0.46
Control Delay		49.9	13.1	18.1		65.5	12.8		33.7
Queue Delay		0.0	0.0	0.9		0.0	0.0		0.0
Total Delay		49.9	13.1	19.0		65.5	12.8		33.7
LOS		D	B	B		E	B		C
Approach Delay		49.9		17.5		47.8			33.7
Approach LOS		D		B		D			C

Intersection Summary	
Cycle Length: 119	
Actuated Cycle Length: 107.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 36.3	Intersection LOS: D
Intersection Capacity Utilization 122.9%	ICU Level of Service H
Analysis Period (min) 60	

Splits and Phases: 1: Colchester & N. Prospect

Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	695	189	569	312	158	239
v/c Ratio	0.91	0.46	0.57	0.86	0.29	0.46
Control Delay	49.9	13.1	18.1	65.5	12.8	33.7
Queue Delay	0.0	0.0	0.9	0.0	0.0	0.0
Total Delay	49.9	13.1	19.0	65.5	12.8	33.7
Queue Length 50th (ft)	442	55	244	214	27	135
Queue Length 95th (ft)	#854	99	415	#467	101	253
Internal Link Dist (ft)	1739		140	1697		1512
Turn Bay Length (ft)					100	
Base Capacity (vph)	846	484	1175	377	568	538
Starvation Cap Reductn	0	0	330	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.39	0.67	0.83	0.28	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	579	71	180	470	71	133	164	150	24	162	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		10.0		4.0	10.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.99		1.00	1.00			1.00	1.00		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.99		1.00	0.98			1.00	0.85		0.98	
Flt Protected		1.00		0.95	1.00			0.98	1.00		0.99	
Satd. Flow (prot)		1822		1732	1783			1787	1553		1755	
Flt Permitted		0.99		0.27	1.00			0.65	1.00		0.94	
Satd. Flow (perm)		1797		493	1783			1181	1553		1663	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	12	608	75	189	494	75	140	172	158	25	170	44
RTOR Reduction (vph)	0	3	0	0	5	0	0	0	74	0	7	0
Lane Group Flow (vph)	0	692	0	189	564	0	0	312	84	0	232	0
Confl. Peds. (#/hr)	13		22	22		13						
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	4%	4%	4%	5%	5%	5%
Turn Type	Perm			pm+pt			Perm		custom	Perm		
Protected Phases		2		1	6			4	4		8	
Permitted Phases	2			6	6		4	4	4	8		
Actuated Green, G (s)		45.8		59.5	59.5			33.0	33.0		33.0	
Effective Green, g (s)		45.8		59.5	59.5			33.0	33.0		33.0	
Actuated g/C Ratio		0.43		0.55	0.55			0.31	0.31		0.31	
Clearance Time (s)		10.0		4.0	10.0			5.0	5.0		5.0	
Vehicle Extension (s)		4.0		2.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		766		385	987			363	477		511	
v/s Ratio Prot				0.04	c0.32				0.05			
v/s Ratio Perm		c0.38		0.23				c0.26			0.14	
v/c Ratio		0.90		0.49	0.57			0.86	0.18		0.45	
Uniform Delay, d1		28.8		14.8	15.7			35.1	27.3		30.0	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		17.1		0.4	0.8			21.3	0.2		0.6	
Delay (s)		45.9		15.2	16.5			56.3	27.5		30.6	
Level of Service		D		B	B			E	C		C	
Approach Delay (s)		45.9			16.2			46.6			30.6	
Approach LOS		D			B			D			C	

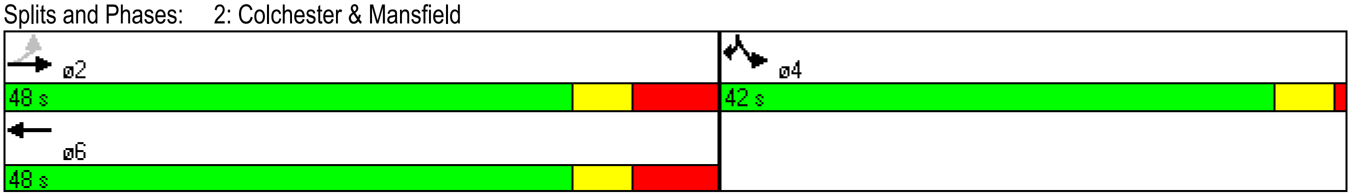
Intersection Summary			
HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	107.5	Sum of lost time (s)	25.0
Intersection Capacity Utilization	122.9%	ICU Level of Service	H
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Volume (vph)	35	757	646	257	24
Turn Type	Perm				custom
Protected Phases		2	6	4	4
Permitted Phases	2	2	6	4	4
Detector Phase	2	2	6	4	4
Switch Phase					
Minimum Initial (s)	14.0	14.0	14.0	8.0	8.0
Minimum Split (s)	24.0	24.0	24.0	21.5	21.5
Total Split (s)	48.0	48.0	48.0	42.0	42.0
Total Split (%)	53.3%	53.3%	53.3%	46.7%	46.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	6.0	6.0	6.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	10.0	10.0	10.0	5.0	5.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Min	C-Min	Min	None	None
Act Effct Green (s)		55.7	55.7	19.3	19.3
Actuated g/C Ratio		0.62	0.62	0.21	0.21
v/c Ratio		0.45	0.48	0.71	0.07
Control Delay		10.9	11.4	43.3	10.2
Queue Delay		0.0	0.0	0.0	0.0
Total Delay		10.9	11.4	43.3	10.2
LOS		B	B	D	B
Approach Delay		10.9	11.4	40.5	
Approach LOS		B	B	D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 75 (83%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 76.5%	ICU Level of Service D
Analysis Period (min) 60	

Splits and Phases: 2: Colchester & Mansfield



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	832	987	270	25
v/c Ratio	0.45	0.48	0.71	0.07
Control Delay	10.9	11.4	43.3	10.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.9	11.4	43.3	10.2
Queue Length 50th (ft)	119	131	143	0
Queue Length 95th (ft)	235	190	235	22
Internal Link Dist (ft)	201	485	1546	
Turn Bay Length (ft)				100
Base Capacity (vph)	1852	2076	728	666
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.45	0.48	0.37	0.04

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	35	757	646	294	257	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		10.0	10.0		5.0	5.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3496	3293		1770	1583
Flt Permitted		0.85	1.00		0.95	1.00
Satd. Flow (perm)		2992	3293		1770	1583
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	37	795	678	309	270	25
RTOR Reduction (vph)	0	0	39	0	0	20
Lane Group Flow (vph)	0	832	948	0	270	5
Confl. Peds. (#/hr)	8			8	20	19
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%
Turn Type	Perm					custom
Protected Phases		2	6		4	4
Permitted Phases	2	2	6		4	4
Actuated Green, G (s)		55.7	55.7		19.3	19.3
Effective Green, g (s)		55.7	55.7		19.3	19.3
Actuated g/C Ratio		0.62	0.62		0.21	0.21
Clearance Time (s)		10.0	10.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1852	2038		380	339
v/s Ratio Prot			c0.29		c0.15	0.00
v/s Ratio Perm		0.28				
v/c Ratio		0.45	0.47		0.71	0.02
Uniform Delay, d1		9.1	9.2		32.8	27.9
Progression Factor		1.00	1.18		1.00	1.00
Incremental Delay, d2		0.8	0.2		6.4	0.0
Delay (s)		9.8	11.0		39.1	27.9
Level of Service		A	B		D	C
Approach Delay (s)		9.8	11.0		38.2	
Approach LOS		A	B		D	

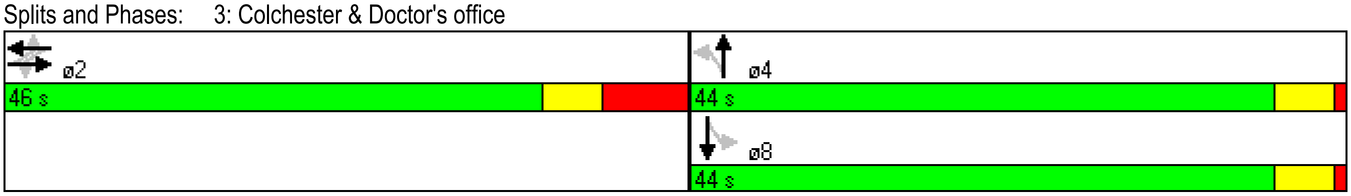
Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	1	937	50	700	199	1	13	2
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		2		2		4		8
Permitted Phases	2	2	2	2	4	4	8	8
Detector Phase	2	2	2	2	4	4	8	8
Switch Phase								
Minimum Initial (s)	14.0	14.0	14.0	14.0	8.0	8.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	15.0	15.0	11.0	11.0
Total Split (s)	46.0	46.0	46.0	46.0	44.0	44.0	44.0	44.0
Total Split (%)	51.1%	51.1%	51.1%	51.1%	48.9%	48.9%	48.9%	48.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	6.0	6.0	6.0	6.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Act Effct Green (s)		54.6		54.6	20.4	20.4		20.4
Actuated g/C Ratio		0.61		0.61	0.23	0.23		0.23
v/c Ratio		0.55		0.47	0.72	0.34		0.07
Control Delay		15.5		12.1	46.4	21.1		18.3
Queue Delay		0.0		0.0	0.0	0.0		0.0
Total Delay		15.5		12.1	46.4	21.1		18.3
LOS		B		B	D	C		B
Approach Delay		15.5		12.1		37.1		18.3
Approach LOS		B		B		D		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 4 (4%), Referenced to phase 2:EBWB, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 17.5	Intersection LOS: B
Intersection Capacity Utilization 90.9%	ICU Level of Service E
Analysis Period (min) 60	

Splits and Phases: 3: Colchester & Doctor's office



Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1102	788	209	122	24
v/c Ratio	0.55	0.47	0.72	0.34	0.07
Control Delay	15.5	12.1	46.4	21.1	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.5	12.1	46.4	21.1	18.3
Queue Length 50th (ft)	227	118	110	40	7
Queue Length 95th (ft)	437	246	191	90	27
Internal Link Dist (ft)	485	1050		963	117
Turn Bay Length (ft)			250		
Base Capacity (vph)	2019	1671	556	648	658
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.55	0.47	0.38	0.19	0.04

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	937	111	50	700	1	199	1	115	13	2	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		10.0			10.0		5.0	5.0			5.0	
Lane Util. Factor		0.95			0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00			1.00		1.00	0.96			0.99	
Flpb, ped/bikes		1.00			1.00		0.97	1.00			0.98	
Frt		0.98			1.00		1.00	0.85			0.95	
Flt Protected		1.00			1.00		0.95	1.00			0.97	
Satd. Flow (prot)		3476			3527		1643	1446			1721	
Flt Permitted		0.95			0.78		0.74	1.00			0.85	
Satd. Flow (perm)		3318			2753		1283	1446			1505	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	1	984	117	52	735	1	209	1	121	14	2	8
RTOR Reduction (vph)	0	7	0	0	0	0	0	29	0	0	6	0
Lane Group Flow (vph)	0	1095	0	0	788	0	209	93	0	0	18	0
Confl. Peds. (#/hr)			11	11			10		12	12		10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			8	
Permitted Phases	2	2		2	2		4	4		8	8	
Actuated Green, G (s)		54.6			54.6		20.4	20.4			20.4	
Effective Green, g (s)		54.6			54.6		20.4	20.4			20.4	
Actuated g/C Ratio		0.61			0.61		0.23	0.23			0.23	
Clearance Time (s)		10.0			10.0		5.0	5.0			5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			1.5	
Lane Grp Cap (vph)		2013			1670		291	328			341	
v/s Ratio Prot								0.06				
v/s Ratio Perm		c0.33			0.29		c0.16				0.01	
v/c Ratio		0.54			0.47		0.72	0.28			0.05	
Uniform Delay, d1		10.4			9.8		32.1	28.8			27.2	
Progression Factor		1.26			1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.0			1.0		8.6	0.5			0.0	
Delay (s)		14.0			10.7		40.7	29.2			27.3	
Level of Service		B			B		D	C			C	
Approach Delay (s)		14.0			10.7			36.5			27.3	
Approach LOS		B			B			D			C	

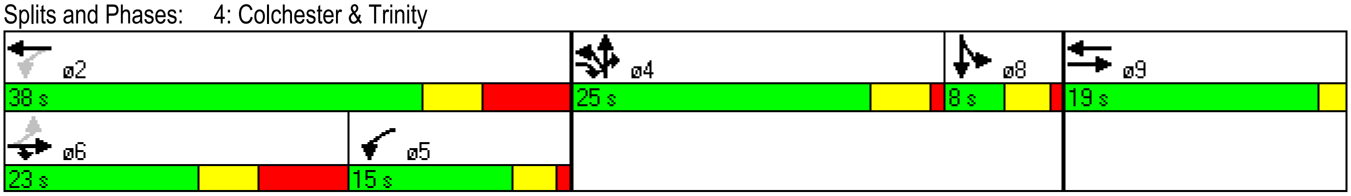
Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT	ø2	ø9
Lane Configurations										
Volume (vph)	3	677	350	87	405	3	102	16		
Turn Type	custom		custom	custom			Prot			
Protected Phases		6 9	6 4	5	2 9	4	4	8	2	9
Permitted Phases	6	6	6	2	2					
Detector Phase	6	6 9	6 4	5	2 9	4	4	8		
Switch Phase										
Minimum Initial (s)	10.0			6.0		8.0	8.0	4.0	10.0	1.0
Minimum Split (s)	20.0			15.0		25.0	25.0	8.0	20.0	19.0
Total Split (s)	23.0	42.0	48.0	15.0	57.0	25.0	25.0	8.0	38.0	19.0
Total Split (%)	25.6%	46.7%	53.3%	16.7%	63.3%	27.8%	27.8%	8.9%	42%	21%
Yellow Time (s)	4.0			3.0		4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	6.0			1.0		1.0	1.0	1.0	6.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	10.0	10.0	10.0	4.0	10.0	5.0	5.0	4.0		
Lead/Lag	Lead			Lag						
Lead-Lag Optimize?										
Recall Mode	Min			None		None	None	None	Min	None
Act Effct Green (s)		32.4	30.4	29.2	40.9	19.9	19.9	4.0		
Actuated g/C Ratio		0.40	0.38	0.36	0.51	0.25	0.25	0.05		
v/c Ratio		0.96	0.62	0.38	0.46	0.87	0.26	0.41		
Control Delay		67.1	20.0	31.9	15.1	56.7	22.3	40.5		
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay		67.1	20.0	31.9	15.1	56.7	22.3	40.5		
LOS		E	C	C	B	E	C	D		
Approach Delay		51.1			18.1	49.2		40.5		
Approach LOS		D			B	D		D		

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 80.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 42.4	Intersection LOS: D
Intersection Capacity Utilization 108.8%	ICU Level of Service G
Analysis Period (min) 60	

Splits and Phases: 4: Colchester & Trinity



Lane Group	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	714	368	91	426	384	107	43
v/c Ratio	0.96	0.62	0.38	0.46	0.87	0.26	0.41
Control Delay	67.1	20.0	31.9	15.1	56.7	22.3	40.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.1	20.0	31.9	15.1	56.7	22.3	40.5
Queue Length 50th (ft)	~414	104	33	143	200	34	14
Queue Length 95th (ft)	#775	#251	75	255	#453	92	#66
Internal Link Dist (ft)	1050			2785	1803		302
Turn Bay Length (ft)			150			25	
Base Capacity (vph)	742	601	330	1081	451	424	105
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.61	0.28	0.39	0.85	0.25	0.41

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	677	350	87	405	1	363	3	102	9	16	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		10.0	10.0	4.0	10.0			5.0	5.0		4.0	
Lane Util. Factor		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	1.00		0.98	
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt		1.00	0.85	1.00	1.00			1.00	0.85		0.95	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.99	
Satd. Flow (prot)		1844	1568	1735	1826			1792	1599		1740	
Flt Permitted		1.00	1.00	0.18	1.00			0.95	1.00		0.99	
Satd. Flow (perm)		1841	1568	323	1826			1792	1599		1740	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	3	711	368	91	425	1	381	3	107	9	17	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	22	0	17	0
Lane Group Flow (vph)	0	714	368	91	426	0	0	384	85	0	26	0
Confl. Peds. (#/hr)	2		13	13		2	4					4
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	1%	1%	1%	0%	0%	0%
Turn Type	custom		custom	custom			Split		Prot	Split		
Protected Phases		6 9	6 4	5	2 9		4	4	4	8	8	
Permitted Phases	6	6	6	2	2							
Actuated Green, G (s)		32.4	33.1	28.0	41.8			19.9	19.9		2.2	
Effective Green, g (s)		30.4	33.1	28.0	39.8			19.9	19.9		2.2	
Actuated g/C Ratio		0.37	0.40	0.34	0.48			0.24	0.24		0.03	
Clearance Time (s)				4.0				5.0	5.0		4.0	
Vehicle Extension (s)				3.0				3.0	3.0		2.0	
Lane Grp Cap (vph)		675	626	201	877			430	384		46	
v/s Ratio Prot			0.23	c0.03	0.23			c0.21	0.05		c0.02	
v/s Ratio Perm		c0.39		0.12								
v/c Ratio		1.06	0.59	0.45	0.49			0.89	0.22		0.58	
Uniform Delay, d1		26.3	19.5	34.3	14.6			30.5	25.3		39.9	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		140.2	1.7	1.6	0.6			25.4	0.3		10.8	
Delay (s)		166.5	21.2	35.9	15.2			55.9	25.6		50.6	
Level of Service		F	C	D	B			E	C		D	
Approach Delay (s)		117.1			18.8			49.3			50.6	
Approach LOS		F			B			D			D	

Intersection Summary			
HCM Average Control Delay	76.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	82.9	Sum of lost time (s)	33.0
Intersection Capacity Utilization	108.8%	ICU Level of Service	G
Analysis Period (min)	60		

c Critical Lane Group

Arterial Level of Service: EB Colchester

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
S. Prospect	III	30	43.8	49.9	93.7	0.34	13.2	E
Mansfield	III	30	13.4	10.9	24.3	0.09	14.1	D
Fletcher Allen	III	30	15.1	15.5	30.6	0.11	12.6	E
East Ave.	III	30	27.2	67.1	94.3	0.21	8.2	F
Total	III		99.5	143.4	242.9	0.76	11.3	E

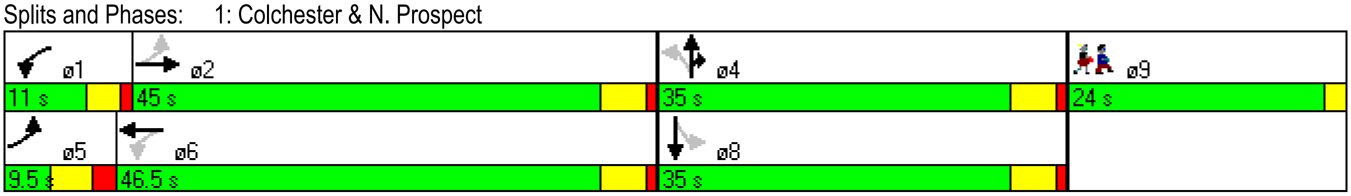
Arterial Level of Service: WB Colchester

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Trinity	III	30	65.1	15.1	80.2	0.54	24.4	B
Doctor's office	III	30	27.2	12.1	39.3	0.21	19.6	C
Mansfield	III	30	15.1	11.4	26.5	0.11	14.5	D
N. Prospect	III	30	13.4	18.1	31.5	0.09	10.8	E
Total	III		120.8	56.7	177.5	0.96	19.4	C

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations										
Volume (vph)	11	579	180	470	133	164	150	24	162	
Turn Type	pm+pt		pm+pt		Perm		custom	Perm		
Protected Phases	5	2	1	6		4	4		8	9
Permitted Phases	2		6	6	4	4	4	8		
Detector Phase	5	2	1	6	4	4	4	8	8	
Switch Phase										
Minimum Initial (s)	4.0	29.0	4.0	29.0	8.0	8.0	8.0	8.0	8.0	1.0
Minimum Split (s)	9.5	34.0	8.0	34.0	21.5	21.5	21.5	13.0	13.0	24.0
Total Split (s)	9.5	45.0	11.0	46.5	35.0	35.0	35.0	35.0	35.0	24.0
Total Split (%)	8.3%	39.1%	9.6%	40.4%	30.4%	30.4%	30.4%	30.4%	30.4%	21%
Yellow Time (s)	3.5	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)	44.1	40.5	52.2	50.0		30.4	30.4		30.4	
Actuated g/C Ratio	0.44	0.40	0.52	0.50		0.30	0.30		0.30	
v/c Ratio	0.04	0.93	0.91	0.64		0.89	0.29		0.48	
Control Delay	17.2	56.6	84.4	26.2		73.6	13.1		33.9	
Queue Delay	0.0	0.0	0.0	2.4		0.0	0.0		0.0	
Total Delay	17.2	56.6	84.4	28.6		73.6	13.1		33.9	
LOS	B	E	F	C		E	B		C	
Approach Delay		55.9		42.5		53.3			33.9	
Approach LOS		E		D		D			C	

Intersection Summary	
Cycle Length: 115	
Actuated Cycle Length: 100.6	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 48.2	Intersection LOS: D
Intersection Capacity Utilization 92.9%	ICU Level of Service F
Analysis Period (min) 60	

Splits and Phases: 1: Colchester & N. Prospect



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	12	683	189	569	312	158	239
v/c Ratio	0.04	0.93	0.91	0.64	0.89	0.29	0.48
Control Delay	17.2	56.6	84.4	26.2	73.6	13.1	33.9
Queue Delay	0.0	0.0	0.0	2.4	0.0	0.0	0.0
Total Delay	17.2	56.6	84.4	28.6	73.6	13.1	33.9
Queue Length 50th (ft)	3	338	49	195	163	20	102
Queue Length 95th (ft)	18	#938	#299	#718	#500	106	266
Internal Link Dist (ft)		1739		140	1697		1512
Turn Bay Length (ft)	125		125			100	
Base Capacity (vph)	284	738	208	889	349	544	493
Starvation Cap Reductn	0	0	0	193	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.93	0.91	0.82	0.89	0.29	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	579	71	180	470	71	133	164	150	24	162	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.0		4.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	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	1.00		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.98		1.00	0.98			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.99	
Satd. Flow (prot)	1767	1823		1735	1783			1787	1553		1755	
Flt Permitted	0.29	1.00		0.10	1.00			0.63	1.00		0.91	
Satd. Flow (perm)	538	1823		191	1783			1154	1553		1610	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	12	608	75	189	494	75	140	172	158	25	170	44
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	76	0	7	0
Lane Group Flow (vph)	12	680	0	189	565	0	0	312	82	0	232	0
Confl. Peds. (#/hr)	13		22	22		13						
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	4%	4%	4%	5%	5%	5%
Turn Type	pm+pt			pm+pt			Perm		custom	Perm		
Protected Phases	5	2		1	6			4	4		8	
Permitted Phases	2			6	6		4	4	4	8		
Actuated Green, G (s)	45.8	45.1		56.2	50.0			30.4	30.4		30.4	
Effective Green, g (s)	45.8	45.1		56.2	50.0			30.4	30.4		30.4	
Actuated g/C Ratio	0.43	0.42		0.53	0.47			0.29	0.29		0.29	
Clearance Time (s)	5.5	5.0		4.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	4.0		2.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	240	773		204	839			330	444		460	
v/s Ratio Prot	0.00	0.37		c0.06	0.32				0.05			
v/s Ratio Perm	0.02			c0.43				c0.27			0.14	
v/c Ratio	0.05	0.88		0.93	0.67			0.95	0.18		0.50	
Uniform Delay, d1	18.6	28.1		21.6	21.8			37.1	28.6		31.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	13.1		64.1	2.2			54.8	0.2		0.9	
Delay (s)	18.7	41.2		85.7	24.0			92.0	28.8		32.5	
Level of Service	B	D		F	C			F	C		C	
Approach Delay (s)		40.8			39.4			70.7			32.5	
Approach LOS		D			D			E			C	

Intersection Summary			
HCM Average Control Delay	45.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	106.3	Sum of lost time (s)	18.7
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR	ø9
Lane Configurations						
Volume (vph)	35	757	646	257	24	
Turn Type	Perm				custom	
Protected Phases		2	2	4	4	9
Permitted Phases	2	2	2	4	4	
Detector Phase	2	2	2	4	4	
Switch Phase						
Minimum Initial (s)	14.0	14.0	14.0	8.0	8.0	1.0
Minimum Split (s)	19.0	19.0	19.0	21.5	21.5	24.0
Total Split (s)	72.0	72.0	72.0	24.0	24.0	24.0
Total Split (%)	60.0%	60.0%	60.0%	20.0%	20.0%	20%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Min	C-Min	C-Min	None	None	None
Act Effct Green (s)	76.2	76.2	76.2	19.4	19.4	
Actuated g/C Ratio	0.64	0.64	0.64	0.16	0.16	
v/c Ratio	0.30	0.68	0.88	0.94	0.09	
Control Delay	22.2	20.5	32.4	115.1	24.2	
Queue Delay	0.0	4.7	56.7	0.0	0.0	
Total Delay	22.2	25.2	89.1	115.1	24.2	
LOS	C	C	F	F	C	
Approach Delay		25.1	89.1	107.4		
Approach LOS		C	F	F		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 66.4 Intersection LOS: E
Intersection Capacity Utilization 78.1% ICU Level of Service D
Analysis Period (min) 60

Splits and Phases: 2: Colchester & Mansfield

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	37	795	987	270	25
v/c Ratio	0.30	0.68	0.88	0.94	0.09
Control Delay	22.2	20.5	32.4	115.1	24.2
Queue Delay	0.0	4.7	56.7	0.0	0.0
Total Delay	22.2	25.2	89.1	115.1	24.2
Queue Length 50th (ft)	15	456	713	210	5
Queue Length 95th (ft)	57	#861	#1244	#448	36
Internal Link Dist (ft)		201	485	1546	
Turn Bay Length (ft)	75				100
Base Capacity (vph)	124	1171	1124	286	270
Starvation Cap Reductn	0	293	160	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.30	0.91	1.02	0.94	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	35	757	646	294	257	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.96		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1751	1845	1752		1770	1583
Flt Permitted	0.11	1.00	1.00		0.95	1.00
Satd. Flow (perm)	196	1845	1752		1770	1583
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	37	795	678	309	270	25
RTOR Reduction (vph)	0	0	12	0	0	14
Lane Group Flow (vph)	37	795	975	0	270	11
Confl. Peds. (#/hr)	8			8	20	19
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%
Turn Type	Perm					custom
Protected Phases		2	2		4	4
Permitted Phases	2	2	2		4	4
Actuated Green, G (s)	75.4	75.4	75.4		19.4	19.4
Effective Green, g (s)	75.4	75.4	75.4		19.4	19.4
Actuated g/C Ratio	0.63	0.63	0.63		0.16	0.16
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	123	1159	1101		286	256
v/s Ratio Prot		0.43	c0.56		c0.15	0.01
v/s Ratio Perm	0.19					
v/c Ratio	0.30	0.69	0.89		0.94	0.04
Uniform Delay, d1	10.2	14.6	18.7		49.8	42.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.3	3.4	12.0		60.1	0.1
Delay (s)	16.5	17.9	30.7		109.9	42.5
Level of Service	B	B	C		F	D
Approach Delay (s)		17.9	30.7		104.2	
Approach LOS		B	C		F	

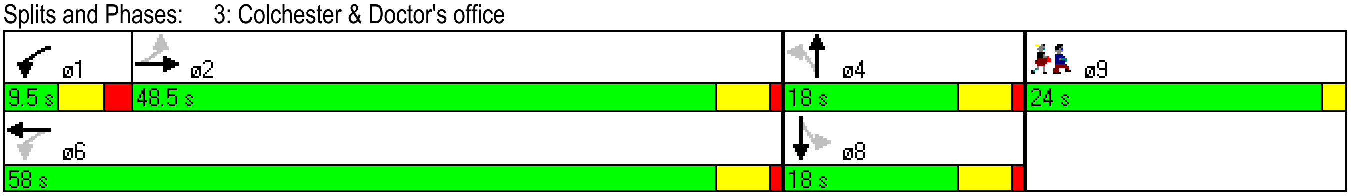
Intersection Summary			
HCM Average Control Delay	35.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.2
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø9
Lane Configurations									
Volume (vph)	1	937	50	700	199	1	13	2	
Turn Type	Perm		pm+pt		Perm		Perm		
Protected Phases		2	1	6		4		8	9
Permitted Phases	2	2	6	6	4	4	8	8	
Detector Phase	2	2	1	6	4	4	8	8	
Switch Phase									
Minimum Initial (s)	14.0	14.0	4.0	14.0	8.0	8.0	6.0	6.0	1.0
Minimum Split (s)	19.0	19.0	9.5	19.0	15.0	15.0	11.0	11.0	24.0
Total Split (s)	48.5	48.5	9.5	58.0	18.0	18.0	18.0	18.0	24.0
Total Split (%)	48.5%	48.5%	9.5%	58.0%	18.0%	18.0%	18.0%	18.0%	24%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.5	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes						
Recall Mode	C-Min	C-Min	None	Min	None	None	None	None	None
Act Effct Green (s)	59.0	59.0	66.9	67.4	13.0	13.0		13.0	
Actuated g/C Ratio	0.59	0.59	0.67	0.67	0.13	0.13		0.13	
v/c Ratio	0.00	1.02	0.32	0.59	1.27	0.42		0.13	
Control Delay	15.0	97.2	14.2	14.3	564.9	12.6		31.0	
Queue Delay	0.0	269.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	15.0	366.2	14.2	14.3	564.9	12.6		31.0	
LOS	B	F	B	B	F	B		C	
Approach Delay		365.9		14.3		361.4		31.0	
Approach LOS		F		B		F		C	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.27	
Intersection Signal Delay: 238.2	Intersection LOS: F
Intersection Capacity Utilization 85.5%	ICU Level of Service E
Analysis Period (min) 60	

Splits and Phases: 3: Colchester & Doctor's office



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1	1101	52	736	209	122	24
v/c Ratio	0.00	1.02	0.32	0.59	1.27	0.42	0.13
Control Delay	15.0	97.2	14.2	14.3	564.9	12.6	31.0
Queue Delay	0.0	269.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	366.2	14.2	14.3	564.9	12.6	31.0
Queue Length 50th (ft)	0	547	7	144	~169	1	9
Queue Length 95th (ft)	4	#1385	40	#643	#360	68	38
Internal Link Dist (ft)		485		1050		963	117
Turn Bay Length (ft)	125		150		250		
Base Capacity (vph)	357	1082	164	1256	165	289	191
Starvation Cap Reductn	0	145	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	1.18	0.32	0.59	1.27	0.42	0.13

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	937	111	50	700	1	199	1	115	13	2	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.5	5.0		5.0	5.0			5.0	
Lane Util. Factor	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	0.94			0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00			0.98	
Frt	1.00	0.98		1.00	1.00		1.00	0.85			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	
Satd. Flow (prot)	1770	1830		1770	1862		1624	1414			1692	
Flt Permitted	0.33	1.00		0.06	1.00		0.74	1.00			0.81	
Satd. Flow (perm)	606	1830		120	1862		1268	1414			1412	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	1	984	117	52	735	1	209	1	121	14	2	8
RTOR Reduction (vph)	0	3	0	0	0	0	0	105	0	0	7	0
Lane Group Flow (vph)	1	1098	0	52	736	0	209	17	0	0	17	0
Confl. Peds. (#/hr)			11	11			10		12	12		10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	0%	0%	0%
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		2		1	6			4			8	
Permitted Phases	2	2		6	6		4	4		8	8	
Actuated Green, G (s)	56.7	56.7		66.2	66.2		13.0	13.0			13.0	
Effective Green, g (s)	56.7	56.7		66.2	66.2		13.0	13.0			13.0	
Actuated g/C Ratio	0.57	0.57		0.66	0.66		0.13	0.13			0.13	
Clearance Time (s)	5.0	5.0		5.5	5.0		5.0	5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			1.5	
Lane Grp Cap (vph)	344	1038		145	1233		165	184			184	
v/s Ratio Prot		c0.60		0.01	c0.40			0.01				
v/s Ratio Perm	0.00			0.22			c0.16				0.01	
v/c Ratio	0.00	1.06		0.36	0.60		1.27	0.09			0.09	
Uniform Delay, d1	9.4	21.6		23.3	9.4		43.5	38.3			38.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	128.9		1.5	0.8		527.2	0.2			0.1	
Delay (s)	9.4	150.5		24.8	10.2		570.7	38.5			38.4	
Level of Service	A	F		C	B		F	D			D	
Approach Delay (s)		150.4			11.2			374.5			38.4	
Approach LOS		F			B			F			D	

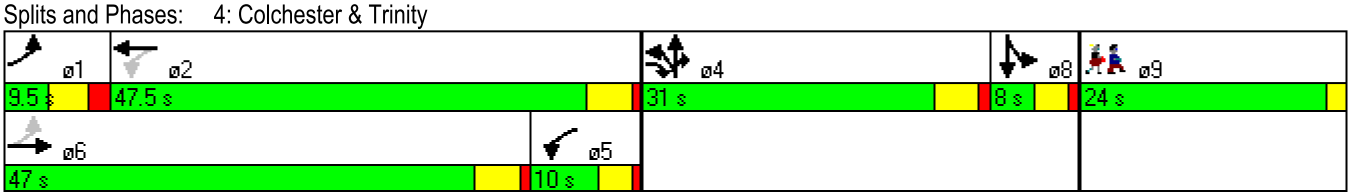
Intersection Summary			
HCM Average Control Delay	133.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	25.8
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT	ø9
Lane Configurations									
Volume (vph)	3	677	350	87	405	3	102	16	
Turn Type	pm+pt		Over	pm+pt			Prot		
Protected Phases	1	6	4	5	2	4	4	8	9
Permitted Phases	6			2	2				
Detector Phase	1	6	4	5	2	4	4	8	
Switch Phase									
Minimum Initial (s)	4.0	10.0	8.0	6.0	10.0	8.0	8.0	4.0	1.0
Minimum Split (s)	9.5	15.0	13.0	10.0	15.0	13.0	13.0	8.0	24.0
Total Split (s)	9.5	47.0	31.0	10.0	47.5	31.0	31.0	8.0	24.0
Total Split (%)	7.9%	39.2%	25.8%	8.3%	39.6%	25.8%	25.8%	6.7%	20%
Yellow Time (s)	3.5	4.0	4.0	3.0	4.0	4.0	4.0	3.0	2.0
All-Red Time (s)	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	4.0	5.0	5.0	5.0	4.0	
Lead/Lag	Lead	Lead		Lag	Lag				
Lead-Lag Optimize?									
Recall Mode	None	Min	None	None	Min	None	None	None	None
Act Effct Green (s)		42.3	26.2	52.4	50.0	26.2	26.2	4.0	
Actuated g/C Ratio		0.46	0.28	0.57	0.54	0.28	0.28	0.04	
v/c Ratio		0.85	0.83	0.36	0.43	0.76	0.23	0.47	
Control Delay		36.1	52.2	22.0	14.6	43.2	23.5	49.2	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		36.1	52.2	22.0	14.6	43.2	23.5	49.2	
LOS		D	D	C	B	D	C	D	
Approach Delay		41.6			15.9	38.9		49.2	
Approach LOS		D			B	D		D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 92.4	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 34.9	Intersection LOS: C
Intersection Capacity Utilization 100.5%	ICU Level of Service G
Analysis Period (min) 60	

Splits and Phases: 4: Colchester & Trinity



Lane Group	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	714	368	91	426	384	107	43
v/c Ratio	0.85	0.83	0.36	0.43	0.76	0.23	0.47
Control Delay	36.1	52.2	22.0	14.6	43.2	23.5	49.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	52.2	22.0	14.6	43.2	23.5	49.2
Queue Length 50th (ft)	389	214	25	147	217	40	16
Queue Length 95th (ft)	#741	#446	54	256	#432	96	#73
Internal Link Dist (ft)	1050			819	1803		302
Turn Bay Length (ft)		600	150			25	
Base Capacity (vph)	843	445	251	991	508	468	91
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.83	0.36	0.43	0.76	0.23	0.47

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	677	350	87	405	1	363	3	102	9	16	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	4.0	5.0			5.0	5.0		4.0	
Lane Util. Factor		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	1.00		0.97	
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt		1.00	0.85	1.00	1.00			1.00	0.85		0.95	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.99	
Satd. Flow (prot)		1844	1568	1735	1826			1792	1599		1724	
Flt Permitted		1.00	1.00	0.15	1.00			0.95	1.00		0.99	
Satd. Flow (perm)		1842	1568	276	1826			1792	1599		1724	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	3	711	368	91	425	1	381	3	107	9	17	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	15	0	16	0
Lane Group Flow (vph)	0	714	368	91	426	0	0	384	92	0	27	0
Confl. Peds. (#/hr)	2		13	13		2	4					4
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	1%	1%	1%	0%	0%	0%
Turn Type	pm+pt		Over	pm+pt			Split		Prot	Split		
Protected Phases	1	6	4	5	2		4	4	4	8	8	
Permitted Phases	6			2	2							
Actuated Green, G (s)		42.3	26.2	51.9	50.9			26.2	26.2		3.1	
Effective Green, g (s)		42.3	26.2	51.9	50.9			26.2	26.2		3.1	
Actuated g/C Ratio		0.45	0.28	0.55	0.54			0.28	0.28		0.03	
Clearance Time (s)		5.0	5.0	4.0	5.0			5.0	5.0		4.0	
Vehicle Extension (s)		4.0	3.0	3.0	4.0			3.0	3.0		2.0	
Lane Grp Cap (vph)		827	436	223	987			498	445		57	
v/s Ratio Prot			c0.23	0.02	c0.23			0.21	0.06		c0.02	
v/s Ratio Perm		c0.39		0.20								
v/c Ratio		0.86	0.84	0.41	0.43			0.77	0.21		0.47	
Uniform Delay, d1		23.3	32.1	31.0	13.0			31.2	26.0		44.7	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		10.6	15.7	1.2	0.4			7.6	0.2		2.2	
Delay (s)		33.9	47.8	32.2	13.4			38.9	26.3		46.9	
Level of Service		C	D	C	B			D	C		D	
Approach Delay (s)		38.7			16.7			36.1			46.9	
Approach LOS		D			B			D			D	

Intersection Summary			
HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	94.2	Sum of lost time (s)	14.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	60		

c Critical Lane Group

Arterial Level of Service: EB Colchester

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
S. Prospect	III	30	43.8	56.6	100.4	0.34	12.4	E
Mansfield	III	30	13.4	20.5	33.9	0.09	10.1	E
Fletcher Allen	III	30	15.1	97.2	112.3	0.11	3.4	F
East Ave.	III	30	27.2	36.1	63.3	0.21	12.2	E
Total	III		99.5	210.4	309.9	0.76	8.8	F

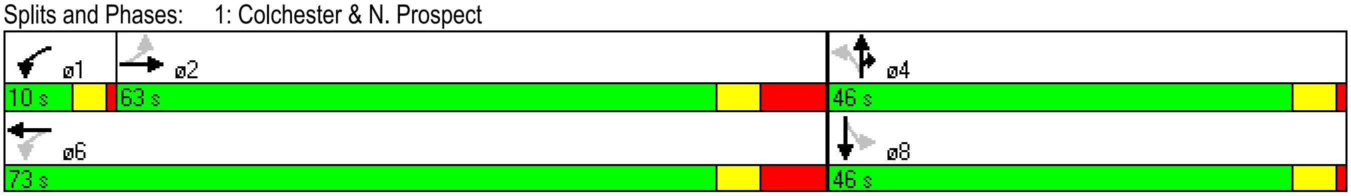
Arterial Level of Service: WB Colchester

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Trinity	III	30	22.8	14.6	37.4	0.17	16.4	D
Doctor's office	III	30	27.2	14.3	41.5	0.21	18.6	C
Mansfield	III	30	15.1	32.4	47.5	0.11	8.1	F
N. Prospect	III	30	13.4	26.2	39.6	0.09	8.6	F
Total	III		78.5	87.5	166.0	0.59	12.7	E

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	11	579	180	470	133	164	150	24	162
Turn Type	Perm		pm+pt		Perm		custom	Perm	
Protected Phases		2	1	6		4	4		8
Permitted Phases	2		6	6	4	4	4	8	
Detector Phase	2	2	1	6	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	29.0	29.0	4.0	29.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	39.0	39.0	8.0	39.0	21.5	21.5	21.5	13.0	13.0
Total Split (s)	63.0	63.0	10.0	73.0	46.0	46.0	46.0	46.0	46.0
Total Split (%)	52.9%	52.9%	8.4%	61.3%	38.7%	38.7%	38.7%	38.7%	38.7%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	6.0	6.0	1.0	6.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	10.0	10.0	4.0	10.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes						
Recall Mode	Min	Min	None	Min	None	None	None	None	None
Act Effct Green (s)		44.0	60.6	54.4		31.1	31.1		31.1
Actuated g/C Ratio		0.44	0.60	0.54		0.31	0.31		0.31
v/c Ratio		0.88	0.49	0.59		0.85	0.28		0.46
Control Delay		43.8	15.7	19.7		59.2	10.2		30.8
Queue Delay		0.0	0.0	0.7		0.0	0.0		0.0
Total Delay		43.8	15.7	20.4		59.2	10.2		30.8
LOS		D	B	C		E	B		C
Approach Delay		43.8		19.2		42.7			30.8
Approach LOS		D		B		D			C

Intersection Summary	
Cycle Length: 119	
Actuated Cycle Length: 101.1	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 33.5	Intersection LOS: C
Intersection Capacity Utilization 122.9%	ICU Level of Service H
Analysis Period (min) 60	

Splits and Phases: 1: Colchester & N. Prospect



Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	695	189	569	312	158	239
v/c Ratio	0.88	0.49	0.59	0.85	0.28	0.46
Control Delay	43.8	15.7	19.7	59.2	10.2	30.8
Queue Delay	0.0	0.0	0.7	0.0	0.0	0.0
Total Delay	43.8	15.7	20.4	59.2	10.2	30.8
Queue Length 50th (ft)	412	54	244	196	20	124
Queue Length 95th (ft)	#851	117	480	#425	88	238
Internal Link Dist (ft)	1739		140	1697		1512
Turn Bay Length (ft)		125			100	
Base Capacity (vph)	981	383	1158	504	722	707
Starvation Cap Reductn	0	0	284	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.49	0.65	0.62	0.22	0.34

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	579	71	180	470	71	133	164	150	24	162	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		10.0		4.0	10.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.99		1.00	1.00			1.00	1.00		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.99		1.00	0.98			1.00	0.85		0.98	
Flt Protected		1.00		0.95	1.00			0.98	1.00		0.99	
Satd. Flow (prot)		1822		1731	1783			1787	1553		1755	
Flt Permitted		0.99		0.28	1.00			0.66	1.00		0.94	
Satd. Flow (perm)		1798		515	1783			1197	1553		1664	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	12	608	75	189	494	75	140	172	158	25	170	44
RTOR Reduction (vph)	0	4	0	0	5	0	0	0	81	0	7	0
Lane Group Flow (vph)	0	691	0	189	564	0	0	312	77	0	232	0
Confl. Peds. (#/hr)	13		22	22		13						
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	4%	4%	4%	5%	5%	5%
Turn Type	Perm			pm+pt			Perm		custom	Perm		
Protected Phases		2		1	6			4	4		8	
Permitted Phases	2			6	6		4	4	4	8		
Actuated Green, G (s)		44.2		54.4	54.4			31.1	31.1		31.1	
Effective Green, g (s)		44.2		54.4	54.4			31.1	31.1		31.1	
Actuated g/C Ratio		0.44		0.54	0.54			0.31	0.31		0.31	
Clearance Time (s)		10.0		4.0	10.0			5.0	5.0		5.0	
Vehicle Extension (s)		4.0		2.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		791		354	965			370	481		515	
v/s Ratio Prot				0.03	c0.32				0.05			
v/s Ratio Perm		c0.38		0.26				c0.26			0.14	
v/c Ratio		0.87		0.53	0.58			0.84	0.16		0.45	
Uniform Delay, d1		25.6		14.3	15.5			32.4	25.2		27.8	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		12.2		0.8	0.9			18.3	0.2		0.6	
Delay (s)		37.8		15.1	16.4			50.7	25.4		28.5	
Level of Service		D		B	B			D	C		C	
Approach Delay (s)		37.8			16.1			42.2			28.5	
Approach LOS		D			B			D			C	

Intersection Summary			
HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.5	Sum of lost time (s)	25.0
Intersection Capacity Utilization	122.9%	ICU Level of Service	H
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Volume (vph)	35	757	646	257	24
Turn Type	Perm				custom
Protected Phases		2	2	4	4
Permitted Phases	2	2	2	4	4
Detector Phase	2	2	2	4	4
Switch Phase					
Minimum Initial (s)	14.0	14.0	14.0	8.0	8.0
Minimum Split (s)	24.0	24.0	24.0	21.5	21.5
Total Split (s)	65.0	65.0	65.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	27.8%	27.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	6.0	6.0	6.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	10.0	10.0	10.0	5.0	5.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Min	C-Min	C-Min	None	None
Act Effct Green (s)	57.5	57.5	57.5	17.5	17.5
Actuated g/C Ratio	0.64	0.64	0.64	0.19	0.19
v/c Ratio	0.21	0.67	0.87	0.78	0.08
Control Delay	11.4	14.7	25.4	52.6	12.5
Queue Delay	0.0	2.9	14.4	0.0	0.0
Total Delay	11.4	17.6	39.8	52.6	12.5
LOS	B	B	D	D	B
Approach Delay		17.3	39.8	49.2	
Approach LOS		B	D	D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 75 (83%), Referenced to phase 2:EBWB, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 32.3	Intersection LOS: C
Intersection Capacity Utilization 82.2%	ICU Level of Service E
Analysis Period (min) 60	

Splits and Phases: 2: Colchester & Mansfield

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	37	795	987	270	25
v/c Ratio	0.21	0.67	0.87	0.78	0.08
Control Delay	11.4	14.7	25.4	52.6	12.5
Queue Delay	0.0	2.9	14.4	0.0	0.0
Total Delay	11.4	17.6	39.8	52.6	12.5
Queue Length 50th (ft)	8	271	417	144	0
Queue Length 95th (ft)	32	535	#918	#292	24
Internal Link Dist (ft)		201	485	1546	
Turn Bay Length (ft)	75				100
Base Capacity (vph)	176	1179	1130	393	370
Starvation Cap Reductn	0	265	123	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.21	0.87	0.98	0.69	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	35	757	646	294	257	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.0	10.0	10.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.96		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1752	1845	1742		1770	1583
Flt Permitted	0.15	1.00	1.00		0.95	1.00
Satd. Flow (perm)	274	1845	1742		1770	1583
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	37	795	678	309	270	25
RTOR Reduction (vph)	0	0	17	0	0	19
Lane Group Flow (vph)	37	795	970	0	270	6
Confl. Peds. (#/hr)	8			8	20	19
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%
Turn Type	Perm					custom
Protected Phases		2	2		4	4
Permitted Phases	2	2	2		4	4
Actuated Green, G (s)	57.5	57.5	57.5		17.5	17.5
Effective Green, g (s)	57.5	57.5	57.5		17.5	17.5
Actuated g/C Ratio	0.64	0.64	0.64		0.19	0.19
Clearance Time (s)	10.0	10.0	10.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	175	1179	1113		344	308
v/s Ratio Prot		0.43	c0.56		c0.15	0.00
v/s Ratio Perm	0.13					
v/c Ratio	0.21	0.67	0.87		0.78	0.02
Uniform Delay, d1	6.8	10.3	13.2		34.5	29.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.8	3.1	10.5		12.1	0.0
Delay (s)	9.5	13.5	23.7		46.5	29.3
Level of Service	A	B	C		D	C
Approach Delay (s)		13.3	23.7		45.1	
Approach LOS		B	C		D	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	1	937	50	700	199	1	13	2
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		2		6		4		8
Permitted Phases	2	2	6	6	4	4	8	8
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	14.0	14.0	14.0	14.0	8.0	8.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	15.0	15.0	11.0	11.0
Total Split (s)	102.0	102.0	102.0	102.0	34.0	34.0	34.0	34.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	6.0	6.0	6.0	6.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Min	C-Min	Min	Min	None	None	None	None
Act Effct Green (s)	94.7	94.7	94.7	94.7	26.3	26.3		26.3
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.19	0.19		0.19
v/c Ratio	0.00	0.86	0.35	0.57	0.88	0.34		0.08
Control Delay	7.0	25.8	17.3	13.0	99.0	10.2		33.0
Queue Delay	0.0	154.6	0.0	0.0	0.0	0.0		0.0
Total Delay	7.0	180.4	17.3	13.0	99.0	10.2		33.0
LOS	A	F	B	B	F	B		C
Approach Delay		180.3		13.3		66.3		33.0
Approach LOS		F		B		E		C

Intersection Summary

Cycle Length: 136
Actuated Cycle Length: 136
Offset: 4 (3%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 103.3 Intersection LOS: F
Intersection Capacity Utilization 89.7% ICU Level of Service E
Analysis Period (min) 60

Splits and Phases: 3: Colchester & Doctor's office

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1	1101	52	736	209	122	24
v/c Ratio	0.00	0.86	0.35	0.57	0.88	0.34	0.08
Control Delay	7.0	25.8	17.3	13.0	99.0	10.2	33.0
Queue Delay	0.0	154.6	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	180.4	17.3	13.0	99.0	10.2	33.0
Queue Length 50th (ft)	0	726	18	323	176	1	11
Queue Length 95th (ft)	2	#1397	63	530	#366	72	42
Internal Link Dist (ft)		485		1050		963	117
Turn Bay Length (ft)	125		150		250		
Base Capacity (vph)	402	1278	149	1298	262	385	317
Starvation Cap Reductn	0	262	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	1.08	0.35	0.57	0.80	0.32	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	937	111	50	700	1	199	1	115	13	2	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.0	10.0		10.0	10.0		5.0	5.0			5.0	
Lane Util. Factor	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	0.90			0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.93	1.00			0.97	
Frt	1.00	0.98		1.00	1.00		1.00	0.85			0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	
Satd. Flow (prot)	1770	1830		1768	1862		1576	1362			1677	
Flt Permitted	0.31	1.00		0.11	1.00		0.74	1.00			0.84	
Satd. Flow (perm)	578	1830		213	1862		1230	1362			1457	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	1	984	117	52	735	1	209	1	121	14	2	8
RTOR Reduction (vph)	0	3	0	0	0	0	0	98	0	0	6	0
Lane Group Flow (vph)	1	1098	0	52	736	0	209	24	0	0	18	0
Confl. Peds. (#/hr)			11	11			10		12	12		10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2	2		6	6		4	4		8	8	
Actuated Green, G (s)	94.7	94.7		94.7	94.7		26.3	26.3			26.3	
Effective Green, g (s)	94.7	94.7		94.7	94.7		26.3	26.3			26.3	
Actuated g/C Ratio	0.70	0.70		0.70	0.70		0.19	0.19			0.19	
Clearance Time (s)	10.0	10.0		10.0	10.0		5.0	5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			1.5	
Lane Grp Cap (vph)	402	1274		148	1297		238	263			282	
v/s Ratio Prot		c0.60			0.40			0.02				
v/s Ratio Perm	0.00			0.24			c0.17				0.01	
v/c Ratio	0.00	0.86		0.35	0.57		0.88	0.09			0.06	
Uniform Delay, d1	6.3	15.7		8.3	10.4		53.3	45.1			44.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	8.5		1.4	0.6		36.9	0.2			0.0	
Delay (s)	6.3	24.2		9.7	10.9		90.2	45.2			44.8	
Level of Service	A	C		A	B		F	D			D	
Approach Delay (s)		24.2			10.9			73.6			44.8	
Approach LOS		C			B			E			D	

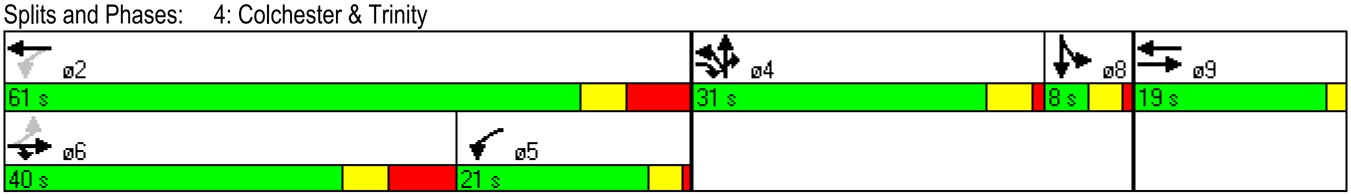
Intersection Summary			
HCM Average Control Delay	27.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	136.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT	ø2	ø9
Lane Configurations										
Volume (vph)	3	677	350	87	405	3	102	16		
Turn Type	custom		custom	custom			Prot			
Protected Phases		6 9	6 4	5	2 9	4	4	8	2	9
Permitted Phases	6	6	6	2	2					
Detector Phase	6	6 9	6 4	5	2 9	4	4	8		
Switch Phase										
Minimum Initial (s)	10.0			6.0		8.0	8.0	4.0	10.0	4.0
Minimum Split (s)	20.0			20.0		25.0	25.0	8.0	20.0	19.0
Total Split (s)	40.0	59.0	71.0	21.0	80.0	31.0	31.0	8.0	61.0	19.0
Total Split (%)	33.6%	49.6%	59.7%	17.6%	67.2%	26.1%	26.1%	6.7%	51%	16%
Yellow Time (s)	4.0			3.0		4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	6.0			1.0		1.0	1.0	1.0	6.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	10.0	10.0	10.0	4.0	10.0	5.0	5.0	4.0		
Lead/Lag	Lead			Lag						
Lead-Lag Optimize?										
Recall Mode	Min			None		None	None	None	Min	None
Act Effct Green (s)		49.2	53.4	47.8	59.5	26.0	26.0	4.0		
Actuated g/C Ratio		0.46	0.50	0.45	0.56	0.24	0.24	0.04		
v/c Ratio		0.84	0.47	0.44	0.42	0.88	0.26	0.52		
Control Delay		39.1	13.1	41.0	15.3	67.9	29.9	61.2		
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay		39.1	13.1	41.0	15.3	67.9	29.9	61.2		
LOS		D	B	D	B	E	C	E		
Approach Delay		30.3			19.9	59.6		61.2		
Approach LOS		C			B	E		E		

Intersection Summary	
Cycle Length: 119	
Actuated Cycle Length: 106.8	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 35.1	Intersection LOS: D
Intersection Capacity Utilization 108.8%	ICU Level of Service G
Analysis Period (min) 60	

Splits and Phases: 4: Colchester & Trinity



Lane Group	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	714	368	91	426	384	107	43
v/c Ratio	0.84	0.47	0.44	0.42	0.88	0.26	0.52
Control Delay	39.1	13.1	41.0	15.3	67.9	29.9	61.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	13.1	41.0	15.3	67.9	29.9	61.2
Queue Length 50th (ft)	451	104	37	166	267	49	18
Queue Length 95th (ft)	#864	180	78	278	#551	117	#88
Internal Link Dist (ft)	1050			819	1803		302
Turn Bay Length (ft)		600	150			25	
Base Capacity (vph)	852	755	345	1208	440	409	82
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.49	0.26	0.35	0.87	0.26	0.52

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	677	350	87	405	1	363	3	102	9	16	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		10.0	10.0	4.0	10.0			5.0	5.0		4.0	
Lane Util. Factor		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	1.00		0.96	
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt		1.00	0.85	1.00	1.00			1.00	0.85		0.95	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.99	
Satd. Flow (prot)		1844	1568	1735	1826			1792	1599		1718	
Flt Permitted		1.00	1.00	0.10	1.00			0.95	1.00		0.99	
Satd. Flow (perm)		1842	1568	183	1826			1792	1599		1718	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	3	711	368	91	425	1	381	3	107	9	17	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	17	0	17	0
Lane Group Flow (vph)	0	714	368	91	426	0	0	384	90	0	26	0
Confl. Peds. (#/hr)	2		13	13		2	4					4
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	1%	1%	1%	0%	0%	0%
Turn Type	custom		custom	custom			Split		Prot	Split		
Protected Phases		6 9	6 4	5	2 9		4	4	4	8	8	
Permitted Phases	6	6	6	2	2							
Actuated Green, G (s)		49.2	56.0	47.3	60.5			26.0	26.0		3.1	
Effective Green, g (s)		47.2	56.0	47.3	58.5			26.0	26.0		3.1	
Actuated g/C Ratio		0.43	0.52	0.44	0.54			0.24	0.24		0.03	
Clearance Time (s)				4.0				5.0	5.0		4.0	
Vehicle Extension (s)				3.0				3.0	3.0		2.0	
Lane Grp Cap (vph)		801	809	184	984			429	383		49	
v/s Ratio Prot			0.23	c0.03	0.23			c0.21	0.06		c0.02	
v/s Ratio Perm		c0.39		0.18								
v/c Ratio		0.89	0.45	0.49	0.43			0.90	0.24		0.54	
Uniform Delay, d1		28.3	16.6	42.9	15.1			40.0	33.3		52.0	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		14.5	0.6	2.1	0.4			25.9	0.3		6.5	
Delay (s)		42.9	17.2	45.0	15.5			65.9	33.6		58.6	
Level of Service		D	B	D	B			E	C		E	
Approach Delay (s)		34.1			20.7			58.9			58.6	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM Average Control Delay	37.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	108.6	Sum of lost time (s)	29.0
Intersection Capacity Utilization	108.8%	ICU Level of Service	G
Analysis Period (min)	60		

c Critical Lane Group

Arterial Level of Service: EB Colchester

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
S. Prospect	III	30	43.8	43.8	87.6	0.34	14.2	D
Mansfield	III	30	13.4	14.7	28.1	0.09	12.2	E
Fletcher Allen	III	30	15.1	25.8	40.9	0.11	9.4	F
East Ave.	III	30	27.2	39.1	66.3	0.21	11.6	E
Total	III		99.5	123.4	222.9	0.76	12.3	E

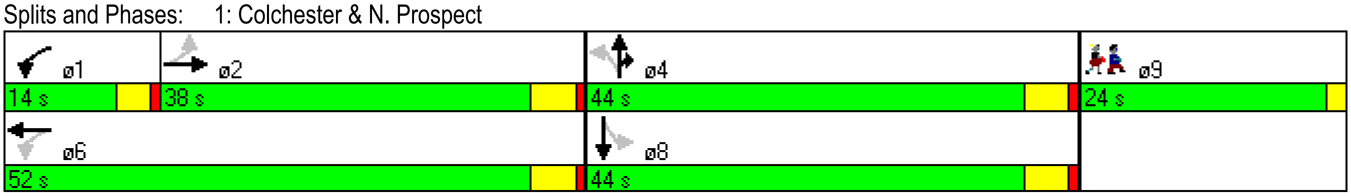
Arterial Level of Service: WB Colchester

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Trinity	III	30	22.8	15.3	38.1	0.17	16.1	D
Doctor's office	III	30	27.2	13.0	40.2	0.21	19.2	C
Mansfield	III	30	15.1	25.4	40.5	0.11	9.5	F
N. Prospect	III	30	13.4	19.7	33.1	0.09	10.3	E
Total	III		78.5	73.4	151.9	0.59	13.9	E

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations										
Volume (vph)	11	579	180	470	133	164	150	24	162	
Turn Type	Perm		pm+pt		Perm		custom	Perm		
Protected Phases		2	1	6		4	4		8	9
Permitted Phases	2		6	6	4	4	4	8		
Detector Phase	2	2	1	6	4	4	4	8	8	
Switch Phase										
Minimum Initial (s)	29.0	29.0	4.0	29.0	8.0	8.0	8.0	8.0	8.0	1.0
Minimum Split (s)	34.0	34.0	8.0	34.0	21.5	21.5	21.5	13.0	13.0	24.0
Total Split (s)	38.0	38.0	14.0	52.0	44.0	44.0	44.0	44.0	44.0	24.0
Total Split (%)	31.7%	31.7%	11.7%	43.3%	36.7%	36.7%	36.7%	36.7%	36.7%	20%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lead							
Lead-Lag Optimize?	Yes	Yes	Yes							
Recall Mode	Min	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)		32.0	46.8	45.8		28.9	28.9		28.9	
Actuated g/C Ratio		0.35	0.50	0.49		0.31	0.31		0.31	
v/c Ratio		0.61	0.54	0.64		0.83	0.28		0.45	
Control Delay		31.7	25.3	26.6		53.3	10.8		29.2	
Queue Delay		0.0	0.0	0.7		0.0	0.0		0.0	
Total Delay		31.7	25.3	27.3		53.3	10.8		29.2	
LOS		C	C	C		D	B		C	
Approach Delay		31.7		26.8		39.0			29.2	
Approach LOS		C		C		D			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 92.7	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 31.3	Intersection LOS: C
Intersection Capacity Utilization 101.3%	ICU Level of Service G
Analysis Period (min) 60	

Splits and Phases: 1: Colchester & N. Prospect



Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	695	189	569	312	158	239
v/c Ratio	0.61	0.54	0.64	0.83	0.28	0.45
Control Delay	31.7	25.3	26.6	53.3	10.8	29.2
Queue Delay	0.0	0.0	0.7	0.0	0.0	0.0
Total Delay	31.7	25.3	27.3	53.3	10.8	29.2
Queue Length 50th (ft)	147	46	185	137	15	87
Queue Length 95th (ft)	#404	#208	#696	#442	94	248
Internal Link Dist (ft)	1739		140	1697		1512
Turn Bay Length (ft)					100	
Base Capacity (vph)	1237	362	960	540	755	747
Starvation Cap Reductn	0	0	149	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.52	0.70	0.58	0.21	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	579	71	180	470	71	133	164	150	24	162	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		4.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		0.95		1.00	1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.99		1.00	1.00			1.00	1.00		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.98			1.00	0.85		0.98	
Flt Protected		1.00		0.95	1.00			0.98	1.00		0.99	
Satd. Flow (prot)		3459		1733	1783			1787	1553		1755	
Flt Permitted		0.94		0.23	1.00			0.66	1.00		0.94	
Satd. Flow (perm)		3264		421	1783			1211	1553		1665	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	12	608	75	189	494	75	140	172	158	25	170	44
RTOR Reduction (vph)	0	7	0	0	4	0	0	0	78	0	7	0
Lane Group Flow (vph)	0	688	0	189	565	0	0	312	80	0	232	0
Confl. Peds. (#/hr)	13		22	22		13						
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	4%	4%	4%	5%	5%	5%
Turn Type	Perm			pm+pt			Perm		custom	Perm		
Protected Phases		2		1	6			4	4		8	
Permitted Phases	2			6	6		4	4	4	8		
Actuated Green, G (s)		32.2		45.8	45.8			28.9	28.9		28.9	
Effective Green, g (s)		32.2		45.8	45.8			28.9	28.9		28.9	
Actuated g/C Ratio		0.34		0.49	0.49			0.31	0.31		0.31	
Clearance Time (s)		5.0		4.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		4.0		2.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		1124		341	873			374	480		515	
v/s Ratio Prot				0.06	c0.32				0.05			
v/s Ratio Perm		0.21		0.21				c0.26			0.14	
v/c Ratio		0.61		0.55	0.65			0.83	0.17		0.45	
Uniform Delay, d1		25.5		15.2	17.8			30.1	23.5		25.9	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		1.1		1.1	1.7			16.7	0.2		0.6	
Delay (s)		26.6		16.3	19.5			46.8	23.7		26.6	
Level of Service		C		B	B			D	C		C	
Approach Delay (s)		26.6			18.7			39.0			26.6	
Approach LOS		C			B			D			C	

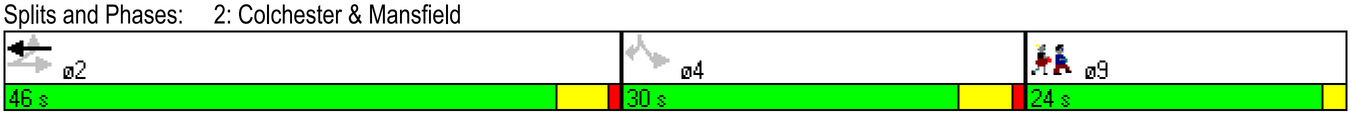
Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	93.5	Sum of lost time (s)	18.8
Intersection Capacity Utilization	101.3%	ICU Level of Service	G
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR	ø9
Lane Configurations						
Volume (vph)	35	757	646	257	24	
Turn Type	D.Pm				custom	
Protected Phases			2			9
Permitted Phases	2	2	2	4	4	
Detector Phase	2	2	2	4	4	
Switch Phase						
Minimum Initial (s)	14.0	14.0	14.0	8.0	8.0	1.0
Minimum Split (s)	19.0	19.0	19.0	21.5	21.5	24.0
Total Split (s)	46.0	46.0	46.0	30.0	30.0	24.0
Total Split (%)	46.0%	46.0%	46.0%	30.0%	30.0%	24%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Min	C-Min	C-Min	None	None	None
Act Effct Green (s)		60.2	60.2	20.2	20.2	
Actuated g/C Ratio		0.60	0.60	0.20	0.20	
v/c Ratio		0.45	0.49	0.77	0.08	
Control Delay		15.6	14.4	54.3	13.8	
Queue Delay		0.0	0.0	0.0	0.0	
Total Delay		15.6	14.4	54.3	13.8	
LOS		B	B	D	B	
Approach Delay		15.6	14.4	50.8		
Approach LOS		B	B	D		

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 20.0	Intersection LOS: B
Intersection Capacity Utilization 72.3%	ICU Level of Service C
Analysis Period (min) 60	

Splits and Phases: 2: Colchester & Mansfield



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	832	987	270	25
v/c Ratio	0.45	0.49	0.77	0.08
Control Delay	15.6	14.4	54.3	13.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.6	14.4	54.3	13.8
Queue Length 50th (ft)	104	113	163	2
Queue Length 95th (ft)	342	381	#277	26
Internal Link Dist (ft)	201	485	1546	
Turn Bay Length (ft)				100
Base Capacity (vph)	1829	2029	432	399
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.45	0.49	0.63	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	35	757	646	294	257	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.96
Flpb, ped/bikes		1.00	1.00		0.97	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3497	3312		1717	1521
Flt Permitted		0.87	1.00		0.95	1.00
Satd. Flow (perm)		3037	3312		1717	1521
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	37	795	678	309	270	25
RTOR Reduction (vph)	0	0	37	0	0	18
Lane Group Flow (vph)	0	832	950	0	270	7
Confl. Peds. (#/hr)	8			8	20	19
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%
Turn Type	D.Pm					custom
Protected Phases			2			
Permitted Phases	2	2	2		4	4
Actuated Green, G (s)		59.0	59.0		20.2	20.2
Effective Green, g (s)		59.0	59.0		20.2	20.2
Actuated g/C Ratio		0.59	0.59		0.20	0.20
Clearance Time (s)		5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1792	1954		347	307
v/s Ratio Prot			c0.29			
v/s Ratio Perm		0.27			c0.16	0.00
v/c Ratio		0.46	0.49		0.78	0.02
Uniform Delay, d1		11.6	11.8		37.8	32.0
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.9	0.9		11.3	0.0
Delay (s)		12.4	12.7		49.1	32.0
Level of Service		B	B		D	C
Approach Delay (s)		12.4	12.7		47.6	
Approach LOS		B	B		D	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.8
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	60		

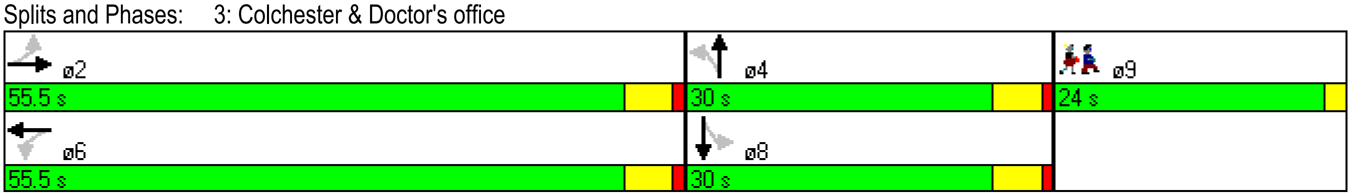
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø9
Lane Configurations									
Volume (vph)	1	937	50	700	199	1	13	2	
Turn Type	Perm		Perm		Perm		Perm		
Protected Phases		2		6		4		8	9
Permitted Phases	2	2	6	6	4	4	8	8	
Detector Phase	2	2	6	6	4	4	8	8	
Switch Phase									
Minimum Initial (s)	14.0	14.0	14.0	14.0	8.0	8.0	6.0	6.0	1.0
Minimum Split (s)	19.0	19.0	19.0	19.0	15.0	15.0	11.0	11.0	24.0
Total Split (s)	55.5	55.5	55.5	55.5	30.0	30.0	30.0	30.0	24.0
Total Split (%)	50.7%	50.7%	50.7%	50.7%	27.4%	27.4%	27.4%	27.4%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	Min	Min	None	None	None	None	None
Act Effct Green (s)		68.2	68.2	68.2	21.7	21.7		21.7	
Actuated g/C Ratio		0.62	0.62	0.62	0.20	0.20		0.20	
v/c Ratio		0.53	0.22	0.33	0.81	0.31		0.08	
Control Delay		16.1	18.7	13.3	69.6	8.6		25.8	
Queue Delay		0.6	0.0	0.0	0.0	0.0		0.0	
Total Delay		16.6	18.7	13.3	69.6	8.6		25.8	
LOS		B	B	B	E	A		C	
Approach Delay		16.6		13.7		47.2		25.8	
Approach LOS		B		B		D		C	

Intersection Summary

Cycle Length: 109.5
Actuated Cycle Length: 109.5
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 20.2 Intersection LOS: C
Intersection Capacity Utilization 70.2% ICU Level of Service C
Analysis Period (min) 60

Splits and Phases: 3: Colchester & Doctor's office



Lane Group	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1102	52	736	209	122	24
v/c Ratio	0.53	0.22	0.33	0.81	0.31	0.08
Control Delay	16.1	18.7	13.3	69.6	8.6	25.8
Queue Delay	0.6	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	18.7	13.3	69.6	8.6	25.8
Queue Length 50th (ft)	160	11	92	139	1	9
Queue Length 95th (ft)	472	65	266	#288	62	35
Internal Link Dist (ft)	485		1050		963	117
Turn Bay Length (ft)		125		250		
Base Capacity (vph)	2083	233	2215	301	433	355
Starvation Cap Reductn	532	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.22	0.33	0.69	0.28	0.07

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	937	111	50	700	1	199	1	115	13	2	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0			5.0	
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	0.97			0.99	
Flpb, ped/bikes		1.00		1.00	1.00		0.99	1.00			0.99	
Frt		0.98		1.00	1.00		1.00	0.85			0.95	
Flt Protected		1.00		0.95	1.00		0.95	1.00			0.97	
Satd. Flow (prot)		3476		1768	3538		1662	1467			1732	
Flt Permitted		0.95		0.20	1.00		0.74	1.00			0.84	
Satd. Flow (perm)		3319		372	3538		1298	1467			1506	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	1	984	117	52	735	1	209	1	121	14	2	8
RTOR Reduction (vph)	0	6	0	0	0	0	0	97	0	0	6	0
Lane Group Flow (vph)	0	1096	0	52	736	0	209	25	0	0	18	0
Confl. Peds. (#/hr)			11	11			10		12	12		10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2	2		6	6		4	4		8	8	
Actuated Green, G (s)		67.0		67.0	67.0		21.7	21.7			21.7	
Effective Green, g (s)		67.0		67.0	67.0		21.7	21.7			21.7	
Actuated g/C Ratio		0.61		0.61	0.61		0.20	0.20			0.20	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			1.5	
Lane Grp Cap (vph)		2031		228	2165		257	291			298	
v/s Ratio Prot					0.21			0.02				
v/s Ratio Perm		c0.33		0.14			c0.16				0.01	
v/c Ratio		0.54		0.23	0.34		0.81	0.09			0.06	
Uniform Delay, d1		12.3		9.6	10.4		42.0	35.8			35.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.0		0.5	0.1		20.0	0.1			0.0	
Delay (s)		13.4		10.1	10.5		62.0	35.9			35.6	
Level of Service		B		B	B		E	D			D	
Approach Delay (s)		13.4			10.5			52.4			35.6	
Approach LOS		B			B			D			D	

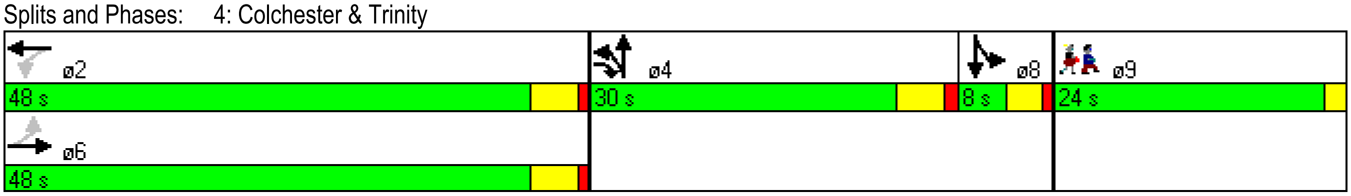
Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	109.5	Sum of lost time (s)	20.8
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	ø9
Lane Configurations									
Volume (vph)	3	677	350	87	405	363	3	16	
Turn Type	Perm		Over	Perm		Split			
Protected Phases		6	4		2	4	4	8	9
Permitted Phases	6			2	2				
Detector Phase	6	6	4	2	2	4	4	8	
Switch Phase									
Minimum Initial (s)	10.0	10.0	8.0	10.0	10.0	8.0	8.0	4.0	1.0
Minimum Split (s)	15.0	15.0	13.0	15.0	15.0	13.0	13.0	8.0	24.0
Total Split (s)	48.0	48.0	30.0	48.0	48.0	30.0	30.0	8.0	24.0
Total Split (%)	43.6%	43.6%	27.3%	43.6%	43.6%	27.3%	27.3%	7.3%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Min	Min	None	Min	Min	None	None	None	None
Act Effct Green (s)		42.7	25.8		42.7	25.8	25.8	4.1	
Actuated g/C Ratio		0.47	0.28		0.47	0.28	0.28	0.05	
v/c Ratio		0.83	0.83		0.57	0.52	0.50	0.45	
Control Delay		35.2	54.2		23.8	36.3	31.2	49.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		35.2	54.2		23.8	36.3	31.2	49.9	
LOS		D	D		C	D	C	D	
Approach Delay		41.6			23.8		33.8	49.9	
Approach LOS		D			C		C	D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 91.1	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 35.7	Intersection LOS: D
Intersection Capacity Utilization 85.1%	ICU Level of Service E
Analysis Period (min) 60	

Splits and Phases: 4: Colchester & Trinity



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	714	368	517	251	240	43
v/c Ratio	0.83	0.83	0.57	0.52	0.50	0.45
Control Delay	35.2	54.2	23.8	36.3	31.2	49.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	54.2	23.8	36.3	31.2	49.9
Queue Length 50th (ft)	300	184	95	118	95	14
Queue Length 95th (ft)	#891	#546	261	#321	265	#84
Internal Link Dist (ft)	1050		747		1803	302
Turn Bay Length (ft)						
Base Capacity (vph)	897	444	948	481	484	96
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.83	0.55	0.52	0.50	0.45

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	677	350	87	405	1	363	3	102	9	16	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0		5.0	5.0			4.0	
Lane Util. Factor		1.00	1.00		0.95		0.95	0.95			1.00	
Frpb, ped/bikes		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	
Frt		1.00	0.85		1.00		1.00	0.93			0.95	
Flt Protected		1.00	1.00		0.99		0.95	0.97			0.99	
Satd. Flow (prot)		1844	1568		3438		1698	1624			1736	
Flt Permitted		1.00	1.00		0.56		0.95	0.97			0.99	
Satd. Flow (perm)		1842	1568		1944		1698	1624			1736	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	3	711	368	91	425	1	381	3	107	9	17	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	25	0	0	17	0
Lane Group Flow (vph)	0	714	368	0	517	0	251	215	0	0	26	0
Confl. Peds. (#/hr)	2		13	13		2	4					4
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	1%	1%	1%	0%	0%	0%
Turn Type	Perm		Over	Perm			Split			Split		
Protected Phases		6	4		2		4	4		8	8	
Permitted Phases	6			2	2							
Actuated Green, G (s)		42.7	25.8		42.7		25.8	25.8			2.2	
Effective Green, g (s)		42.7	25.8		42.7		25.8	25.8			2.2	
Actuated g/C Ratio		0.45	0.27		0.45		0.27	0.27			0.02	
Clearance Time (s)		5.0	5.0		5.0		5.0	5.0			4.0	
Vehicle Extension (s)		4.0	3.0		4.0		3.0	3.0			2.0	
Lane Grp Cap (vph)		837	430		883		466	446			41	
v/s Ratio Prot			c0.23				0.15	0.13			c0.02	
v/s Ratio Perm		c0.39			0.27							
v/c Ratio		0.85	0.86		0.59		0.54	0.48			0.64	
Uniform Delay, d1		22.9	32.3		19.1		29.0	28.5			45.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		9.5	17.7		1.2		1.2	0.8			25.3	
Delay (s)		32.4	50.0		20.3		30.2	29.3			70.9	
Level of Service		C	D		C		C	C			E	
Approach Delay (s)		38.4			20.3			29.8			70.9	
Approach LOS		D			C			C			E	

Intersection Summary			
HCM Average Control Delay	32.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	23.3
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Arterial Level of Service: EB Colchester

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
S. Prospect	III	30	43.8	31.7	75.5	0.34	16.4	D
Mansfield	III	30	13.4	15.6	29.0	0.09	11.8	E
Fletcher Allen	III	30	15.1	16.1	31.2	0.11	12.3	E
East Ave.	III	30	27.2	35.2	62.4	0.21	12.3	E
Total	III		99.5	98.6	198.1	0.76	13.8	E

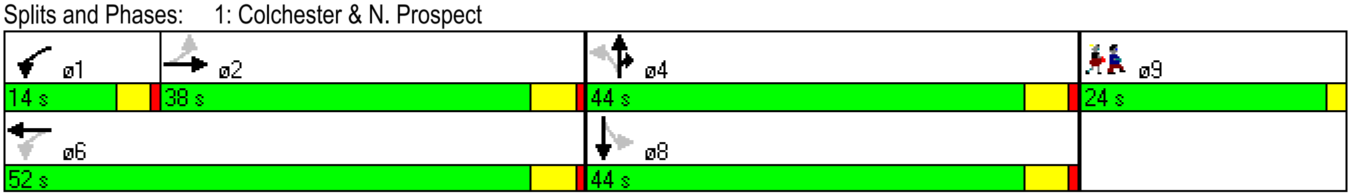
Arterial Level of Service: WB Colchester

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Trinity	III	30	21.0	23.8	44.8	0.16	12.6	E
Doctor's office	III	30	27.2	13.3	40.5	0.21	19.0	C
Mansfield	III	30	15.1	14.4	29.5	0.11	13.1	E
N. Prospect	III	30	13.4	26.6	40.0	0.09	8.5	F
Total	III		76.7	78.1	154.8	0.57	13.3	E

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations										
Volume (vph)	11	579	180	470	133	164	150	24	162	
Turn Type	Perm		pm+pt		Perm		custom	Perm		
Protected Phases		2	1	6		4	4		8	9
Permitted Phases	2		6	6	4	4	4	8		
Detector Phase	2	2	1	6	4	4	4	8	8	
Switch Phase										
Minimum Initial (s)	29.0	29.0	4.0	29.0	8.0	8.0	8.0	8.0	8.0	1.0
Minimum Split (s)	34.0	34.0	8.0	34.0	21.5	21.5	21.5	13.0	13.0	24.0
Total Split (s)	38.0	38.0	14.0	52.0	44.0	44.0	44.0	44.0	44.0	24.0
Total Split (%)	31.7%	31.7%	11.7%	43.3%	36.7%	36.7%	36.7%	36.7%	36.7%	20%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lead							
Lead-Lag Optimize?	Yes	Yes	Yes							
Recall Mode	Min	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)		32.0	46.8	45.8		28.9	28.9		28.9	
Actuated g/C Ratio		0.35	0.50	0.49		0.31	0.31		0.31	
v/c Ratio		0.61	0.54	0.64		0.83	0.28		0.45	
Control Delay		31.7	25.3	26.6		53.3	10.8		29.2	
Queue Delay		0.0	0.0	0.7		0.0	0.0		0.0	
Total Delay		31.7	25.3	27.3		53.3	10.8		29.2	
LOS		C	C	C		D	B		C	
Approach Delay		31.7		26.8		39.0			29.2	
Approach LOS		C		C		D			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 92.7	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 31.3	Intersection LOS: C
Intersection Capacity Utilization 101.3%	ICU Level of Service G
Analysis Period (min) 60	

Splits and Phases: 1: Colchester & N. Prospect



Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	695	189	569	312	158	239
v/c Ratio	0.61	0.54	0.64	0.83	0.28	0.45
Control Delay	31.7	25.3	26.6	53.3	10.8	29.2
Queue Delay	0.0	0.0	0.7	0.0	0.0	0.0
Total Delay	31.7	25.3	27.3	53.3	10.8	29.2
Queue Length 50th (ft)	147	46	185	137	15	87
Queue Length 95th (ft)	#404	#208	#696	#442	94	248
Internal Link Dist (ft)	1739		140	1697		1512
Turn Bay Length (ft)					100	
Base Capacity (vph)	1237	362	960	540	755	747
Starvation Cap Reductn	0	0	149	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.52	0.70	0.58	0.21	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	579	71	180	470	71	133	164	150	24	162	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		4.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		0.95		1.00	1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.99		1.00	1.00			1.00	1.00		1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.98			1.00	0.85		0.98	
Flt Protected		1.00		0.95	1.00			0.98	1.00		0.99	
Satd. Flow (prot)		3459		1733	1783			1787	1553		1755	
Flt Permitted		0.94		0.23	1.00			0.66	1.00		0.94	
Satd. Flow (perm)		3264		421	1783			1211	1553		1665	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	12	608	75	189	494	75	140	172	158	25	170	44
RTOR Reduction (vph)	0	7	0	0	4	0	0	0	78	0	7	0
Lane Group Flow (vph)	0	688	0	189	565	0	0	312	80	0	232	0
Confl. Peds. (#/hr)	13		22	22		13						
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	4%	4%	4%	5%	5%	5%
Turn Type	Perm			pm+pt			Perm		custom	Perm		
Protected Phases		2		1	6			4	4		8	
Permitted Phases	2			6	6		4	4	4	8		
Actuated Green, G (s)		32.2		45.8	45.8			28.9	28.9		28.9	
Effective Green, g (s)		32.2		45.8	45.8			28.9	28.9		28.9	
Actuated g/C Ratio		0.34		0.49	0.49			0.31	0.31		0.31	
Clearance Time (s)		5.0		4.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		4.0		2.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		1124		341	873			374	480		515	
v/s Ratio Prot				0.06	c0.32				0.05			
v/s Ratio Perm		0.21		0.21				c0.26			0.14	
v/c Ratio		0.61		0.55	0.65			0.83	0.17		0.45	
Uniform Delay, d1		25.5		15.2	17.8			30.1	23.5		25.9	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		1.1		1.1	1.7			16.7	0.2		0.6	
Delay (s)		26.6		16.3	19.5			46.8	23.7		26.6	
Level of Service		C		B	B			D	C		C	
Approach Delay (s)		26.6			18.7			39.0			26.6	
Approach LOS		C			B			D			C	

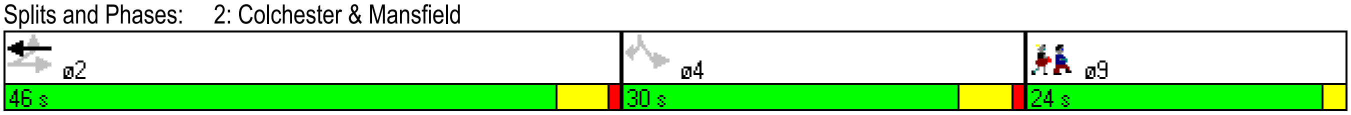
Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	93.5	Sum of lost time (s)	18.8
Intersection Capacity Utilization	101.3%	ICU Level of Service	G
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR	ø9
Lane Configurations						
Volume (vph)	35	757	646	257	24	
Turn Type	D.Pm				custom	
Protected Phases			2			9
Permitted Phases	2	2	2	4	4	
Detector Phase	2	2	2	4	4	
Switch Phase						
Minimum Initial (s)	14.0	14.0	14.0	8.0	8.0	1.0
Minimum Split (s)	19.0	19.0	19.0	21.5	21.5	24.0
Total Split (s)	46.0	46.0	46.0	30.0	30.0	24.0
Total Split (%)	46.0%	46.0%	46.0%	30.0%	30.0%	24%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Min	C-Min	C-Min	None	None	None
Act Effct Green (s)		60.2	60.2	20.2	20.2	
Actuated g/C Ratio		0.60	0.60	0.20	0.20	
v/c Ratio		0.45	0.49	0.77	0.08	
Control Delay		15.6	14.4	54.3	13.8	
Queue Delay		0.0	0.0	0.0	0.0	
Total Delay		15.6	14.4	54.3	13.8	
LOS		B	B	D	B	
Approach Delay		15.6	14.4	50.8		
Approach LOS		B	B	D		

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 20.0	Intersection LOS: B
Intersection Capacity Utilization 72.3%	ICU Level of Service C
Analysis Period (min) 60	

Splits and Phases: 2: Colchester & Mansfield



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	832	987	270	25
v/c Ratio	0.45	0.49	0.77	0.08
Control Delay	15.6	14.4	54.3	13.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.6	14.4	54.3	13.8
Queue Length 50th (ft)	104	113	163	2
Queue Length 95th (ft)	342	381	#277	26
Internal Link Dist (ft)	201	485	1546	
Turn Bay Length (ft)				100
Base Capacity (vph)	1829	2029	432	399
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.45	0.49	0.63	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	35	757	646	294	257	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.96
Flpb, ped/bikes		1.00	1.00		0.97	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3497	3312		1717	1521
Flt Permitted		0.87	1.00		0.95	1.00
Satd. Flow (perm)		3037	3312		1717	1521
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	37	795	678	309	270	25
RTOR Reduction (vph)	0	0	37	0	0	18
Lane Group Flow (vph)	0	832	950	0	270	7
Confl. Peds. (#/hr)	8			8	20	19
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%
Turn Type	D.Pm					custom
Protected Phases			2			
Permitted Phases	2	2	2		4	4
Actuated Green, G (s)		59.0	59.0		20.2	20.2
Effective Green, g (s)		59.0	59.0		20.2	20.2
Actuated g/C Ratio		0.59	0.59		0.20	0.20
Clearance Time (s)		5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1792	1954		347	307
v/s Ratio Prot			c0.29			
v/s Ratio Perm		0.27			c0.16	0.00
v/c Ratio		0.46	0.49		0.78	0.02
Uniform Delay, d1		11.6	11.8		37.8	32.0
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.9	0.9		11.3	0.0
Delay (s)		12.4	12.7		49.1	32.0
Level of Service		B	B		D	C
Approach Delay (s)		12.4	12.7		47.6	
Approach LOS		B	B		D	

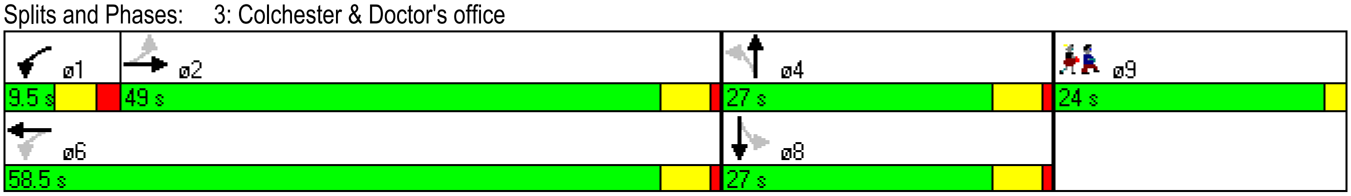
Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.8
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø9
Lane Configurations									
Volume (vph)	1	937	50	700	199	1	13	2	
Turn Type	Perm		pm+pt		Perm		Perm		
Protected Phases		2	1	6		4		8	9
Permitted Phases	2	2	6	6	4	4	8	8	
Detector Phase	2	2	1	6	4	4	8	8	
Switch Phase									
Minimum Initial (s)	14.0	14.0	4.0	14.0	8.0	8.0	6.0	6.0	1.0
Minimum Split (s)	19.0	19.0	9.5	19.0	15.0	15.0	11.0	11.0	24.0
Total Split (s)	49.0	49.0	9.5	58.5	27.0	27.0	27.0	27.0	24.0
Total Split (%)	44.7%	44.7%	8.7%	53.4%	24.7%	24.7%	24.7%	24.7%	22%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.5	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes						
Recall Mode	C-Min	C-Min	None	Min	None	None	None	None	None
Act Effct Green (s)		60.7	68.7	69.2	20.7	20.7		20.7	
Actuated g/C Ratio		0.55	0.63	0.63	0.19	0.19		0.19	
v/c Ratio		0.60	0.20	0.33	0.85	0.32		0.08	
Control Delay		21.5	14.0	12.2	79.8	9.4		27.5	
Queue Delay		0.5	0.0	0.0	0.0	0.0		0.0	
Total Delay		21.9	14.0	12.2	79.8	9.4		27.5	
LOS		C	B	B	E	A		C	
Approach Delay		21.9		12.3		53.8		27.5	
Approach LOS		C		B		D		C	

Intersection Summary	
Cycle Length: 109.5	
Actuated Cycle Length: 109.5	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 23.3	Intersection LOS: C
Intersection Capacity Utilization 70.2%	ICU Level of Service C
Analysis Period (min) 60	

Splits and Phases: 3: Colchester & Doctor's office



Lane Group	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1102	52	736	209	122	24
v/c Ratio	0.60	0.20	0.33	0.85	0.32	0.08
Control Delay	21.5	14.0	12.2	79.8	9.4	27.5
Queue Delay	0.5	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	14.0	12.2	79.8	9.4	27.5
Queue Length 50th (ft)	238	11	95	137	1	9
Queue Length 95th (ft)	#571	45	252	#314	64	37
Internal Link Dist (ft)	485		1050		963	117
Turn Bay Length (ft)		125		250		
Base Capacity (vph)	1845	254	2235	266	396	314
Starvation Cap Reductn	315	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.20	0.33	0.79	0.31	0.08

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	937	111	50	700	1	199	1	115	13	2	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.5	5.0		5.0	5.0			5.0	
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	0.97			0.99	
Flpb, ped/bikes		1.00		1.00	1.00		0.98	1.00			0.99	
Frt		0.98		1.00	1.00		1.00	0.85			0.95	
Flt Protected		1.00		0.95	1.00		0.95	1.00			0.97	
Satd. Flow (prot)		3476		1769	3538		1661	1466			1731	
Flt Permitted		0.95		0.16	1.00		0.74	1.00			0.84	
Satd. Flow (perm)		3319		295	3538		1297	1466			1500	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	1	984	117	52	735	1	209	1	121	14	2	8
RTOR Reduction (vph)	0	7	0	0	0	0	0	98	0	0	6	0
Lane Group Flow (vph)	0	1095	0	52	736	0	209	24	0	0	18	0
Confl. Peds. (#/hr)			11	11			10		12	12		10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	0%	0%	0%
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		2		1	6			4			8	
Permitted Phases	2	2		6	6		4	4		8	8	
Actuated Green, G (s)		58.4		68.0	68.0		20.7	20.7			20.7	
Effective Green, g (s)		58.4		68.0	68.0		20.7	20.7			20.7	
Actuated g/C Ratio		0.53		0.62	0.62		0.19	0.19			0.19	
Clearance Time (s)		5.0		5.5	5.0		5.0	5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			1.5	
Lane Grp Cap (vph)		1770		238	2197		245	277			284	
v/s Ratio Prot				0.01	c0.21			0.02				
v/s Ratio Perm		c0.33		0.13			c0.16				0.01	
v/c Ratio		0.62		0.22	0.34		0.85	0.09			0.06	
Uniform Delay, d1		17.8		11.2	9.9		42.9	36.6			36.4	
Progression Factor		1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.6		0.5	0.1		29.2	0.1			0.0	
Delay (s)		19.4		11.7	10.0		72.1	36.7			36.5	
Level of Service		B		B	B		E	D			D	
Approach Delay (s)		19.4			10.1			59.1			36.5	
Approach LOS		B			B			E			D	

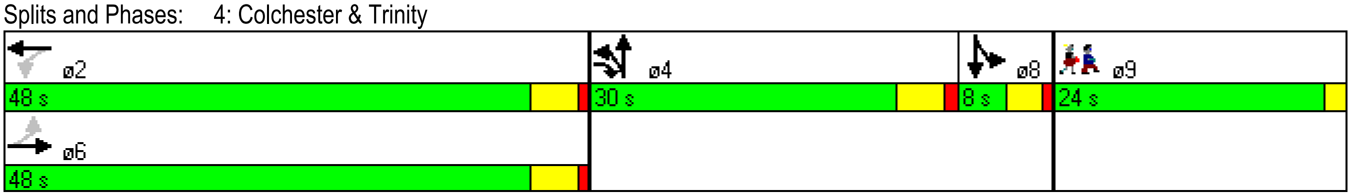
Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	109.5	Sum of lost time (s)	25.8
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	60		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	ø9
Lane Configurations									
Volume (vph)	3	677	350	87	405	363	3	16	
Turn Type	Perm		Over	Perm		Split			
Protected Phases		6	4		2	4	4	8	9
Permitted Phases	6			2	2				
Detector Phase	6	6	4	2	2	4	4	8	
Switch Phase									
Minimum Initial (s)	10.0	10.0	8.0	10.0	10.0	8.0	8.0	4.0	1.0
Minimum Split (s)	15.0	15.0	13.0	15.0	15.0	13.0	13.0	8.0	24.0
Total Split (s)	48.0	48.0	30.0	48.0	48.0	30.0	30.0	8.0	24.0
Total Split (%)	43.6%	43.6%	27.3%	43.6%	43.6%	27.3%	27.3%	7.3%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Min	Min	None	Min	Min	None	None	None	None
Act Effct Green (s)		42.7	25.8		42.7	25.8	25.8	4.1	
Actuated g/C Ratio		0.47	0.28		0.47	0.28	0.28	0.05	
v/c Ratio		0.83	0.83		0.57	0.52	0.50	0.45	
Control Delay		35.2	54.2		23.8	36.3	31.2	49.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		35.2	54.2		23.8	36.3	31.2	49.9	
LOS		D	D		C	D	C	D	
Approach Delay		41.6			23.8		33.8	49.9	
Approach LOS		D			C		C	D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 91.1	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 35.7	Intersection LOS: D
Intersection Capacity Utilization 85.1%	ICU Level of Service E
Analysis Period (min) 60	

Splits and Phases: 4: Colchester & Trinity



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	714	368	517	251	240	43
v/c Ratio	0.83	0.83	0.57	0.52	0.50	0.45
Control Delay	35.2	54.2	23.8	36.3	31.2	49.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	54.2	23.8	36.3	31.2	49.9
Queue Length 50th (ft)	300	184	95	118	95	14
Queue Length 95th (ft)	#891	#546	261	#321	265	#84
Internal Link Dist (ft)	1050		747		1803	302
Turn Bay Length (ft)						
Base Capacity (vph)	897	444	948	481	484	96
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.83	0.55	0.52	0.50	0.45

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	677	350	87	405	1	363	3	102	9	16	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0		5.0	5.0			4.0	
Lane Util. Factor		1.00	1.00		0.95		0.95	0.95			1.00	
Frpb, ped/bikes		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	
Frt		1.00	0.85		1.00		1.00	0.93			0.95	
Flt Protected		1.00	1.00		0.99		0.95	0.97			0.99	
Satd. Flow (prot)		1844	1568		3438		1698	1624			1736	
Flt Permitted		1.00	1.00		0.56		0.95	0.97			0.99	
Satd. Flow (perm)		1842	1568		1944		1698	1624			1736	
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	3	711	368	91	425	1	381	3	107	9	17	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	25	0	0	17	0
Lane Group Flow (vph)	0	714	368	0	517	0	251	215	0	0	26	0
Confl. Peds. (#/hr)	2		13	13		2	4					4
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	1%	1%	1%	0%	0%	0%
Turn Type	Perm		Over	Perm			Split			Split		
Protected Phases		6	4		2		4	4		8	8	
Permitted Phases	6			2	2							
Actuated Green, G (s)		42.7	25.8		42.7		25.8	25.8			2.2	
Effective Green, g (s)		42.7	25.8		42.7		25.8	25.8			2.2	
Actuated g/C Ratio		0.45	0.27		0.45		0.27	0.27			0.02	
Clearance Time (s)		5.0	5.0		5.0		5.0	5.0			4.0	
Vehicle Extension (s)		4.0	3.0		4.0		3.0	3.0			2.0	
Lane Grp Cap (vph)		837	430		883		466	446			41	
v/s Ratio Prot			c0.23				0.15	0.13			c0.02	
v/s Ratio Perm		c0.39			0.27							
v/c Ratio		0.85	0.86		0.59		0.54	0.48			0.64	
Uniform Delay, d1		22.9	32.3		19.1		29.0	28.5			45.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		9.5	17.7		1.2		1.2	0.8			25.3	
Delay (s)		32.4	50.0		20.3		30.2	29.3			70.9	
Level of Service		C	D		C		C	C			E	
Approach Delay (s)		38.4			20.3			29.8			70.9	
Approach LOS		D			C			C			E	

Intersection Summary			
HCM Average Control Delay	32.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	23.3
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group

Arterial Level of Service: EB Colchester

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
S. Prospect	III	30	43.8	31.7	75.5	0.34	16.4	D
Mansfield	III	30	13.4	15.6	29.0	0.09	11.8	E
Fletcher Allen	III	30	15.1	21.5	36.6	0.11	10.5	E
East Ave.	III	30	27.2	35.2	62.4	0.21	12.3	E
Total	III		99.5	104.0	203.5	0.76	13.5	E

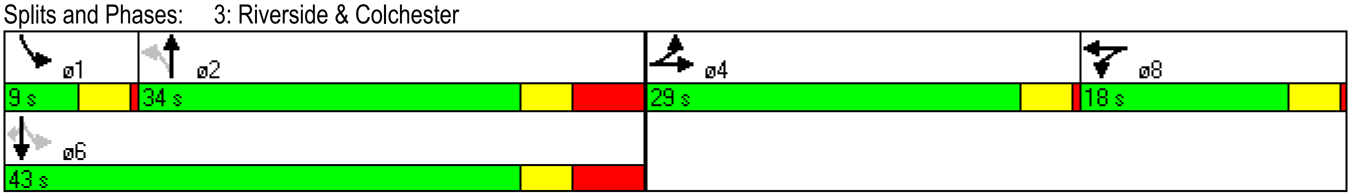
Arterial Level of Service: WB Colchester

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Trinity	III	30	21.0	23.8	44.8	0.16	12.6	E
Doctor's office	III	30	27.2	12.2	39.4	0.21	19.6	C
Mansfield	III	30	15.1	14.4	29.5	0.11	13.1	E
N. Prospect	III	30	13.4	26.6	40.0	0.09	8.5	F
Total	III		76.7	77.0	153.7	0.57	13.4	E

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	725	125	165	9	658	66	421	469
Turn Type	Split			Perm		pm+pt		Perm
Protected Phases	4	4	8		2	1	6	
Permitted Phases				2		6		6
Detector Phase	4	4	8	2	2	1	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	25.5	25.5	13.5	25.5	25.5
Total Split (s)	29.0	29.0	18.0	34.0	34.0	9.0	43.0	43.0
Total Split (%)	32.2%	32.2%	20.0%	37.8%	37.8%	10.0%	47.8%	47.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	5.0	5.0	0.5	5.0	5.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	8.5	8.5	4.0	8.5	8.5
Lead/Lag				Lag	Lag	Lead		
Lead-Lag Optimize?				Yes	Yes	Yes		
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	25.2	25.2	14.5		23.0	34.4	29.9	29.9
Actuated g/C Ratio	0.29	0.29	0.17		0.27	0.40	0.35	0.35
v/c Ratio	0.96	0.94	0.93		0.81	0.30	0.71	0.58
Control Delay	66.5	61.7	72.0		38.5	19.0	31.1	5.0
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	66.5	61.7	72.0		38.5	19.0	31.1	5.0
LOS	E	E	E		D	B	C	A
Approach Delay		64.1	72.0		38.5		17.4	
Approach LOS		E	E		D		B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 86.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 42.6	Intersection LOS: D
Intersection Capacity Utilization 104.6%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 3: Riverside & Colchester



Lane Group	EBL	EBT	WBT	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	457	454	288	700	69	442	492
v/c Ratio	0.96	0.94	0.93	0.81	0.30	0.71	0.58
Control Delay	66.5	61.7	72.0	38.5	19.0	31.1	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.5	61.7	72.0	38.5	19.0	31.1	5.0
Queue Length 50th (ft)	~278	269	152	191	23	202	0
Queue Length 95th (ft)	#500	#494	#304	265	49	316	62
Internal Link Dist (ft)		605	299	1016		69	
Turn Bay Length (ft)					25		
Base Capacity (vph)	475	483	309	964	231	726	911
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.94	0.93	0.73	0.30	0.61	0.54

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	725	125	18	12	165	97	9	658	0	66	421	469
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			8.5		4.0	8.5	8.5
Lane Util. Factor	0.95	0.95			1.00			0.95		1.00	1.00	1.00
Frt	1.00	0.99			0.95			1.00		1.00	1.00	0.85
Flt Protected	0.95	0.97			1.00			1.00		0.95	1.00	1.00
Satd. Flow (prot)	1625	1645			1711			3419		1711	1801	1531
Flt Permitted	0.95	0.97			1.00			0.95		0.21	1.00	1.00
Satd. Flow (perm)	1625	1645			1711			3233		385	1801	1531
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	761	131	19	13	173	102	9	691	0	69	442	492
RTOR Reduction (vph)	0	1	0	0	22	0	0	0	0	0	0	318
Lane Group Flow (vph)	457	453	0	0	266	0	0	700	0	69	442	174
Turn Type	Split			Split			Perm			pm+pt		Perm
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	25.2	25.2			14.5			22.9		30.7	30.7	30.7
Effective Green, g (s)	25.2	25.2			14.5			22.9		30.7	30.7	30.7
Actuated g/C Ratio	0.29	0.29			0.17			0.26		0.35	0.35	0.35
Clearance Time (s)	4.0	4.0			4.0			8.5		4.0	8.5	8.5
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	471	477			285			852		194	636	541
v/s Ratio Prot	c0.28	0.28			c0.16					0.02	c0.25	
v/s Ratio Perm								c0.22		0.11		0.11
v/c Ratio	0.97	0.95			0.93			0.82		0.36	0.69	0.32
Uniform Delay, d1	30.5	30.2			35.7			30.1		19.9	24.1	20.5
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	33.7	28.3			36.0			6.4		1.1	3.3	0.3
Delay (s)	64.2	58.6			71.7			36.5		21.0	27.4	20.8
Level of Service	E	E			E			D		C	C	C
Approach Delay (s)		61.4			71.7			36.5			23.7	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM Average Control Delay	43.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	86.9	Sum of lost time (s)	25.0
Intersection Capacity Utilization	104.6%	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)	21	43	1467	1	9	962
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)	22	45	1540	1	9	1010
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type			None			None
Median storage veh)						
Upstream signal (ft)			149			
pX, platoon unblocked	0.81	0.81			0.81	
vC, conflicting volume	2065	771			1541	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1851	262			1208	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	58	92			98	
cM capacity (veh/h)	52	600			467	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	67	1027	514	346	673
Volume Left	22	0	0	9	0
Volume Right	45	0	1	0	0
cSH	160	1700	1700	467	1700
Volume to Capacity	0.42	0.60	0.30	0.02	0.40
Queue Length 95th (ft)	47	0	0	2	0
Control Delay (s)	46.0	0.0	0.0	0.7	0.0
Lane LOS	E			A	
Approach Delay (s)	46.0	0.0		0.2	
Approach LOS	E				

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR	ø9
Lane Configurations									
Volume (vph)	725	125	165	9	658	66	421	469	
Turn Type	Split			Perm		pm+pt		Perm	
Protected Phases	4	4	8		2	1	6		9
Permitted Phases				2		6		6	
Detector Phase	4	4	8	2	2	1	6	6	
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	1.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0	22.0
Total Split (s)	28.0	28.0	20.0	24.0	24.0	8.0	32.0	32.0	22.0
Total Split (%)	27.5%	27.5%	19.6%	23.5%	23.5%	7.8%	31.4%	31.4%	22%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	2.0
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag				Lag	Lag	Lead			
Lead-Lag Optimize?				Yes	Yes	Yes			
Recall Mode	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	24.3	24.3	16.2		20.3	26.5	26.5	26.5	
Actuated g/C Ratio	0.29	0.29	0.20		0.25	0.32	0.32	0.32	
v/c Ratio	0.96	0.94	0.81		0.88	0.42	0.77	0.60	
Control Delay	64.0	59.6	50.8		46.0	30.7	37.0	6.0	
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	64.0	59.6	50.8		46.0	30.7	37.0	6.0	
LOS	E	E	D		D	C	D	A	
Approach Delay		61.8	50.8		46.0		21.3		
Approach LOS		E	D		D		C		

Intersection Summary	
Cycle Length: 102	
Actuated Cycle Length: 82.8	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 42.9	Intersection LOS: D
Intersection Capacity Utilization 97.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: Riverside & Colchester

Lane Group	EBL	EBT	WBT	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	457	454	288	700	69	442	492
v/c Ratio	0.96	0.94	0.81	0.88	0.42	0.77	0.60
Control Delay	64.0	59.6	50.8	46.0	30.7	37.0	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	59.6	50.8	46.0	30.7	37.0	6.0
Queue Length 50th (ft)	232	228	127	176	23	187	0
Queue Length 95th (ft)	#584	#581	#351	#390	69	#456	83
Internal Link Dist (ft)		1294	1244	1016		69	
Turn Bay Length (ft)					25		
Base Capacity (vph)	478	485	354	794	165	617	848
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.94	0.81	0.88	0.42	0.72	0.58

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	725	125	18	12	165	97	9	658	0	66	421	469
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			1.00			0.95		1.00	1.00	1.00
Frt	1.00	0.99			0.95			1.00		1.00	1.00	0.85
Flt Protected	0.95	0.97			1.00			1.00		0.95	1.00	1.00
Satd. Flow (prot)	1625	1645			1711			3419		1711	1801	1531
Flt Permitted	0.95	0.97			1.00			0.95		0.16	1.00	1.00
Satd. Flow (perm)	1625	1645			1711			3244		296	1801	1531
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
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	761	131	19	13	173	102	9	691	0	69	442	492
RTOR Reduction (vph)	0	1	0	0	19	0	0	0	0	0	0	334
Lane Group Flow (vph)	457	453	0	0	269	0	0	700	0	69	442	158
Turn Type	Split			Split			Perm			pm+pt		Perm
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	24.3	24.3			16.2			20.3		27.4	27.4	27.4
Effective Green, g (s)	24.3	24.3			16.2			20.3		27.4	27.4	27.4
Actuated g/C Ratio	0.29	0.29			0.19			0.24		0.32	0.32	0.32
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)	464	470			326			774		147	580	493
v/s Ratio Prot	c0.28	0.28			c0.16					0.02	c0.25	
v/s Ratio Perm								c0.22		0.13		0.10
v/c Ratio	0.98	0.96			0.83			0.90		0.47	0.76	0.32
Uniform Delay, d1	30.2	30.0			33.1			31.5		22.1	25.9	21.8
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	37.5	31.9			15.6			14.0		2.4	5.9	0.4
Delay (s)	67.8	61.9			48.7			45.4		24.5	31.8	22.2
Level of Service	E	E			D			D		C	C	C
Approach Delay (s)		64.8			48.7			45.4			26.6	
Approach LOS		E			D			D			C	

Intersection Summary			
HCM Average Control Delay	45.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	85.1	Sum of lost time (s)	21.2
Intersection Capacity Utilization	97.1%	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)	21	43	1467	1	9	962
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)	22	45	1540	1	9	1010
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type			None			None
Median storage veh)						
Upstream signal (ft)			149			
pX, platoon unblocked	0.81	0.81			0.81	
vC, conflicting volume	2065	771			1541	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1842	240			1194	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	58	93			98	
cM capacity (veh/h)	53	615			469	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	67	1027	514	346	673
Volume Left	22	0	0	9	0
Volume Right	45	0	1	0	0
cSH	161	1700	1700	469	1700
Volume to Capacity	0.42	0.60	0.30	0.02	0.40
Queue Length 95th (ft)	47	0	0	2	0
Control Delay (s)	45.5	0.0	0.0	0.7	0.0
Lane LOS	E			A	
Approach Delay (s)	45.5	0.0		0.2	
Approach LOS	E				

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		