A. PROJECT HISTORY

Chittenden County has led the State of Vermont over the past 30 years in total population and employment growth. Increased traffic and congestion has been one consequence of this growth. Engineering and planning studies addressing this traffic congestion led to the joint efforts of the four municipalities to secure Federal funding of a Demonstration Grant for the Chittenden County Circumferential Highway (CCCH) in the 1982 Surface Transportation Act. A technical memorandum on the project history is available from the CCCHD or Agency of Transportation.

The years of effort which led to the current status of the CCCH followed two approaches: one, engineering and planning studies done at the direction of local and state officials; and two, actions by public officials at all levels of government to advance the project.

Traffic studies conducted in 1957, 1962, and 1964 formed the basis for the first comprehensive study undertaken by the Vermont State Highway Department now the Vermont Agency of Transportation. This report was entitled "Greater Burlington Area Highway Plan" (1966) and one of its recommendations was for a limited access Essex Junction Beltline from Route 15 at Susie Wilson Road around the Village of Essex Junction to Route 2A at the Powerhouse Bridge. Relocation of Route 2A in Williston from the Powerhouse Bridge to a point north of Taft Corners was also recommended.

In 1965 the State Highway Department cooperated in developing the arterial route concepts as part of a Comprehensive Planning Study for the Town of Essex and the Village of Essex Junction prepared by Hans Klunder Associates, Inc.

In 1967 the State Highway Board and the Governor approved a Limited Access order for a proposed 21-mile highway which included the Burlington Beltline as well as a section from Route 127 in Colchester to Tafts Corner in Williston.

The project was placed on the ten-year highway construction plan adopted by the Legislature in 1968. However, in 1979 due to changing statewide priorities, funding was not made available for the project through the normal planning mechanism. When the 1967 Limited Access order was amended in 1979 to redefine the Burlington Beltline as the Northern and Southern Connector Highways, the Colchester-Essex-Williston section of the highway was omitted.

The Town of Essex and Village of Essex Junction made provision for a circumferential highway in their master plans beginning in 1967. Currently, Colchester and Williston include such a concept in their municipal master plans. For further explanation regarding the status of these plans see the section on Land Use in Chapter 3. In 1975, the
Chittenden County Regional Planning Commission adopted the regional plan with a major objective in the transportation element being completion of the Circumferential Highway. In 1977, the Commission again highly recommended this project in the report entitled Greater Burlington Federal Aid Urban Area Transportation Study.

In 1978, the Vermont Agency of Transportation commissioned a study entitled Needs of the Highway System for the Essex-Williston Study Area for the Next 20 Years. This study, by Edwards & Kelcey, Inc., identified seven intersections in the study area where inadequate levels of traffic service would develop by 1983. It recommended a circumferential highway designed to 60 mph standards with full access control.

Because State funding was not available to advance the Circumferential Highway in the immediate future, in 1980 the four municipalities, in cooperation with the Regional Planning Commission, sought other avenues for funding of this project. Senator Robert T. Stafford (R-VT) recommended that the group submit a request for a Demonstration Grant from the Federal Highway Administration. In 1981, a proposal entitled "The Circumferential Road - A Vermont Demonstration" was submitted to Senator Stafford with the full support of the Selectmen and Trustees of the four municipalities and the Commissioners of the Regional Planning Commission. The request was subsequently included in the 1982 Surface Transportation Act which was passed by Congress and signed into law by President Ronald Reagan on January 6, 1983.

This demonstration project was to determine the potential of saving time and costs by extending State certification coverage to a project of this size and diversity in areas that require improved access between rapidly growing suburban areas and established urban core areas.

In 1982, anticipating passage of the act, the four municipalities formed a Union Municipal District called the Chittenden County Circumferential Highway District (CCCHD) and in conjunction with the Vermont Agency of Transportation, undertook the task of planning, designing, and constructing the project. The concepts and policies for the design of the Highway are determined by a Steering Committee consisting of four members from the CCCHD and four from the Vermont Agency of Transportation with the Secretary of Transportation as the ninth member.

The engineering and planning firm of Wilbur Smith and Associates was retained to undertake planning and location studies. As a part of these studies, a computer model was developed to analyze 20-year travel demands as a function of projected socioeconomic factors. The studies established that projected travel demands required a four-lane facility. Additionally, they established that transportation system management techniques (i.e., expanded bus service, park-and-ride lots, van pooling, etc.) were not practicable given the particulars of the regional setting. The estimated construction cost for the recommended four-lane facility was in excess of $71 million in 1983 dollars, which exceeded the available funds allocated by Congress. Therefore, in November 1983, it was determined that a two-lane facility, with climbing lanes as necessary, on a four-lane right-of-way would be the design concept to be studied further.
The 1980 census reported that the urbanized portion of Chittenden County had exceeded a population of 50,000 persons. Therefore formation of a Metropolitan Planning Organization (MPO) was required to oversee transportation planning efforts for the entire urbanized area. An MPO was formed in 1983, and it adopted an Interim Transportation Plan which recommended that the Circumferential Road be constructed as an at-grade two-lane road.

In the fall of 1983, following the completion of the planning study the firm of Howard Needles Tammen & Bergendoff (HNTB) was retained to prepare the Environmental Impact Statement (EIS) for the proposed CCCH and to design the portion of it from Route 15 in Essex to I-89 in Williston.

The HNTB team concentrated its initial activities on encouraging public participation to the fullest extent possible and on identifying the location of sensitive social and environmental areas in the corridor. Eight separate alternative alignments were developed and construction and right of way estimates were determined. Coordination with public officials, area residents, and regulatory agencies was ongoing throughout this process.

In late June of 1984, a report entitled Evaluation and Recommendation of Alignments to be Carried into the Draft Environmental Impact Statement was published and distributed to all interested parties, including State and Federal Review Agencies. This report was reviewed by the Trustees of the CCCHD, the Selectmen and Trustees of the four municipalities and the citizens of the municipalities. The outcome of the review was the selection of three Build Alternatives to be considered in the Draft Environmental Impact Statement (DEIS) along with the No Action and the Rebuild Existing Alternatives. (See also Chapter 7.E-1 Screening)

The Draft Environmental Impact Statement was released in August 1985. The public was apprised of the information in the DEIS through many forms of communication including public meetings. The Circumferential Highway District Office was the public information center for the Project. Maps, prepared by the consultants, were displayed in the office and the Circumferential Highway Office issued press releases announcing the availability of the maps. These releases went to over 225 people on the interested parties list. Mailings were also sent to the citizens who were anticipated to be impacted by the toe-of-slope of the various alignments.

During the two year period from June 1984 to the end of June 1986, approximately 550 citizens visited the office to review the maps. There were additional calls from citizens to the office to have their questions answered. Citizens attended the meetings of the District Board of Trustees and were offered the opportunity to comment during these meetings. The citizens were instructed to make their comments known to their respective legislative body. The results of this public participation process aided the member municipalities, the District, and the Vermont Agency of Transportation in making decisions affecting the highway project.

A press briefing was held for the media immediately after the DEIS was available. Six public information meetings were held in the member municipalities in the period immediately following the release of the DEIS. These preceeded the official Public Hearing called to respond to the DEIS
and to meet the Vermont requirement for a Corridor Hearing. Approximately 170 people attended that Hearing. Prior to and after the hearings there were a series of meetings that the District and consulting staffs attended with the District’s legislative bodies. These provided the legislative bodies with the opportunity to receive information, to ask questions of the Project staff, and to hear from their own citizens.

The Selected Alternative for the Final Environmental Impact Statement was developed by a decision process that started with the legislative bodies of each community. After the public participation meetings these bodies made recommendations to the District Board of Trustees. From this information a position was carried by the Trustees to the Steering Committee for final policy votes. As a result of this process several small alignment location adjustments were made prior to the Final Environmental Impact Statement. Additionally, two intersections with the Circumferential Highway were added, and one intersection was upgraded from an at-grade to grade separated intersection. The responsiveness of the process to the needs of the citizens and the municipalities is reflected by the changes.

During the fall of 1985 and winter of 1986 a series of efforts were undertaken to inform the State Legislative delegation from Chittenden County about the Highway, and to support legislation regarding the Highway proposed to the Vermont Legislature. Briefings were held for local Legislators, the staff of the District and the Agency of Transportation were made available for the House and Senate Committees responsible for highway matters, and individual meetings were held with Legislators. As a result of this process a bill was passed by the 1986 Session of the Legislature titled: "An Act for the Construction of the Chittenden County Circumferential Highway as Part of the State Highway System". Included in this legislation were the changes making the Highway a state highway, the formalization of the Steering Committee process, and the recognition of the opportunity for the Circumferential Highway to be included by later session of the Legislature for funding under the Five Year Highway Transportation Program. Another piece of Legislation added the two interchanges of the Circumferential Highway with I-89 into the interstate system, and provided for the funding of these interchanges from interstate construction monies.

The results of the Environmental Impact Study process have been very beneficial to the Circumferential Highway. The citizens have received information as it became available; the municipal bodies have participated in the decisions that relate to the location and design of the Highway, and the Legislature has been informed and brought into the decision and funding process.

B. NEED FOR ACTION

The proposed action is construction of a new limited access Circumferential Highway in Chittenden County, between State Route 127 in the Town of Colchester and Interstate 89 in the Town of Williston. The Circumferential Highway will respond to the following issues:

- Road system hierarchy
- Capacity and level of service
- Transportation demand
Social demands and economic development
Existing and potential safety hazards

Road System Hierarchy

The road system hierarchy is an important consideration in the study of all highway networks. The definition of the system hierarchy and an understanding of how a highway system works as a whole provides insight as to the required parameters of the individual highway components.

The road system hierarchy is that hierarchy of streets and highways that occurs naturally in any highway transportation network. The paramount concern of system hierarchy is to have the properly sized roadway with the appropriate associated land use fronting the roadway. In general, highway systems are comprised of functional elements identified as local, collector, arterial and interstate. Local highways serve immediately adjacent land uses only and generally carry very low traffic volumes. Collector highways connect a series of local highways and also serve immediately adjacent land uses but carry increasingly significant volumes of traffic. Arterial highways connect a series of collector and local highways, and may serve immediately adjacent land uses. Traffic volumes on arterial highways are significant and the adjacent land uses are generally commercial, retail or industrial. Interstates serve regional needs.

Figure 2.B-1 illustrates the major highway facilities located in Chittenden County. Several planned highway improvements are depicted. Except for the intersection improvements shown at Blakely and Severance Roads and the Power House Bridge replacement, there are no improvements planned by the VAOT within the project area. A number of highway improvements are also planned by the local governments, e.g. the East-West Connector in the town of Essex. Two important observations can be made from Figure 2.B-1 as follows:

- Route 127 is the only major highway facility in Colchester traversing east/west, and this roadway has no interchange with I-89. In addition, the Malletts Bay Avenue-Blakely Road corridor is the only east/west highway link in the Town.

- All major east/west and north/south roadways east of Route 7, with the exception of I-89 and Route 2, must traverse the Five Corners intersection in Essex Junction.

Functional classifications of roadways in the project area are shown on Figure 2.B-2. In general, local highways, are not greatly impacted by highway improvements on a regional level. However, several local highways in Essex Junction presently receive heavy use by regional traffic bypassing congestion occurring at Five Corners. Examples include West Street, South Street, Grove Street, Pleasant Street, Mansfield Avenue, and South Summit Street which are carrying high levels of bypass traffic during the afternoon peak. See Figure 2.B-3.

Typical collector highways in the project area are Blakely Road, Malletts Bay Avenue, Severance Road, Kellogg Road, Industrial Avenue and Mountain View Road. Examples of arterial highways in the project area are Prim
Road, Route 127 from Prim Road north to Route 2/7, Susie Wilson Road, Route 2A, Route 15, Route 117 and Route 2 in Williston. Interstate 89 and I-189 are the interstate highways in the project area.

Capacity and Level of Service

Capacity is the maximum number of vehicles which can pass through an intersection or over a roadway in a given period of time. Capacity is usually defined in terms of vehicles (or passenger car equivalents) per hour.

The essence of traffic analysis is an examination of the relationship between the capacity of the roadway links and intersections and the projected volume of vehicles using the roadway during periods of maximum (or peak) demand.*

The closer the traffic volumes are to the capacity of the link or intersection, the slower the traffic flow, the more delays there will be and the lower the certainty in predicting driver behavior and reaction and therefore the increased potential for accidents. Travel time, freedom to maneuver, safety, comfort, convenience and fuel consumption are all affected. The degree to which all of these things are likely to be affected, positively or negatively, may be thought of as the "level of service" to the road user.

The six Levels of Service (LOS) that are commonly used for purposes of traffic analyses are shown in Table 2.B-1 and are briefly described below. A Level of Service "C" or better is usually considered acceptable to the user.

Level of Service A - free flow with low volumes and high speeds.

Level of Service B - stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions.

Level of Service C - stable flow, but speeds and maneuverability are more closely controlled by the higher volumes.

Level of Service D - approaching unstable flow, with tolerable operating speeds being maintained though considerably affected by changes in operating conditions.

* The peak hour demand referred to in this document is the highest hourly volume of traffic which occurs on each specific roadway on an average daily basis. Typically this peak volume occurs during a sixty minute period between the hours of 4:00 and 6:00 p.m. on a weekday and primarily includes commuters and shoppers.
Level of Service E - unstable flow with lower operating speeds than level D and with volumes at or near the capacity of the highway.

Level of Service F - forced flow operation at low speeds, where volumes are below capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream.

**TABLE 2.B-1**

**LEVELS OF SERVICE**

<table>
<thead>
<tr>
<th>LOS</th>
<th>DEFINITION</th>
<th>OPERATING SPEED (mph)*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Two Way Rural Highway</td>
</tr>
<tr>
<td>A</td>
<td>Free Flow</td>
<td>&gt; 60</td>
</tr>
<tr>
<td>B</td>
<td>Stable Flow</td>
<td>&gt; 50</td>
</tr>
<tr>
<td>C</td>
<td>Stable Flow</td>
<td>&gt; 40</td>
</tr>
<tr>
<td>D</td>
<td>Approaching Unstable Flow</td>
<td>&gt; 35</td>
</tr>
<tr>
<td>E</td>
<td>Unstable Flow</td>
<td>30</td>
</tr>
<tr>
<td>F</td>
<td>Forced Flow</td>
<td>&lt; 30</td>
</tr>
</tbody>
</table>

* Operating speed is the highest overall speed at which a driver can travel on a given roadway under favorable weather conditions and prevailing traffic conditions without at any time exceeding the safe speed as determined by the design speed.

Source: HRB 87, Highway Capacity Manual 1965

**Existing Congestion**

A highway link or intersection is generally considered to be congested when the level of service at that location drops below "C".

Congestion at intersections can often be remedied by traffic engineering measures such as adding signalization, adding approach lanes and/or revising signal phasing or timing. Congested highway links cannot usually be remedied by simple means and relief of congestion often involves reconstruction of significant lengths of roadways or construction of new roadways on new locations.
1984 Average Daily Traffic (ADT) volumes are illustrated in Figure 2.B-4.

Analysis of 1984 peak hour volumes which are shown in Figure 2.B-5 revealed several currently deficient intersections and roadway links. These are presented in Figure 2.B-6.

In summary, out of twenty-one analyzed intersections, seven presently operate at LOS D and six operate at LOS E or F. Deficient roadway links include Route 2A north of Susie Wilson Road and south of Five Corners, Route 15 north of Five Corners, portions of Route 2 in South Burlington, Burlington and Colchester, a portion of Route 7 in Burlington, the Lakeshore Drive - Malletts Bay Avenue - Blakely Road corridor, and Susie Wilson Road.

Transportation Demand and Future Congestion

The 1983 Chittenden County Circumferential Highway Planning Study by Wilbur Smith and Associates included an analysis of the trips taking place in Colchester, Essex, Essex Junction and Williston. The distribution of trips, shown in Figure 2.B-7, indicates a substantial traffic movement within the study corridor. The largest component of this movement consists of trips between western Colchester and Essex Junction.

A computer model of Chittenden County was developed by Wilbur Smith and Associates for the Planning Study. The model was used to transform socioeconomic data into vehicle trip data which were distributed to the highway network for analysis of the existing network and proposed additions. The model is described in the Planning Study report.

The model was utilized in a modified form to perform the EIS traffic analysis. The model was recalibrated to more closely replicate field counted traffic volumes at the Five Corners in Essex Junction and to include the latest plans for construction of new highway facilities. Several locations were further refined to address the comments made at the DEIS stage. The recalibration of the model in the Five Corners area required taking extensive field traffic counts in the vicinity of the intersection, and additional streets were added to the computer model to more fully describe the roadway network in Essex Junction. (See the 1986 Traffic Technical Report). Socio-economic data for the modified model were developed. The new data were input to the computer model and computer generated traffic volumes were compared with actual field counts. The recalibrated computer model was also utilized for the projection of future year travel for the EIS.

Projected Average Daily Traffic volumes on the existing roadway system for the year 2004 are shown on Figure 2.B-8.

Projected peak traffic flows for the 2004 design year on the existing system are shown in Figure 2.B-9. Analyses of these peak hourly volumes resulted in the identification of levels of service on existing roadways as illustrated in Figure 2.B-10. As is evident from this figure, the major highways in the study area will be deficient by the year 2004. Levels of service will generally be "D" or worse, for approximately 35 miles of road-
way, out of a total mileage of 65 excluding I-89. Of 21 intersections analyzed, 6 will operate at LOS D and 14 at LOS E or F. This indicates that the surrounding communities will experience a serious highway congestion problem by the year 2004 unless dramatic measures are undertaken to eliminate them.

**Social Demands and Economic Development**

Chittenden County has experienced significant population and economic growth in recent years and this growth is expected to continue. This has resulted in increased vehicle trips both within and through the region for work, shopping, and recreation as well as other purposes.

Through the study corridor the present travel demand between western Colchester, Essex, Essex Junction and northern Williston is served by a system of existing highways, comprising the following segments, between Route 127 in Colchester and I-89 in Williston.

- Prim Road, starting at Warner’s Corner
- Lake Shore Drive
- Malletts Bay Avenue
- Blakely Road
- Severance Road
- Kellogg Road
- Susie Wilson Road
- Route 2A to I-89

With the exception of Route 2A these facilities have historically functioned as local highways. Due to area growth and development trends and to seasonal activities along Lake Champlain over the last several years, they are now increasingly serving as arterials and collectors. The traffic demands are not compatible with existing frontage activities. As indicated in Figure 2.B-10 all these roadways will be deficient in the year 2004. The implications of this change in functional classification are apparent from the following analysis of the frontage developments along this system.

**Prim Road.** The estimated ADT on Prim Road for the year 2004 is 8,077. This roadway is primarily fronted by residential land use with some commercial development. Buildings have limited set-back distances from the roadway. Sidewalks appear warranted on both sides of the roadway travel lanes.

**Lake Shore Drive.** The estimated 2004 ADT on Lake Shore Drive is 15,430. This roadway is fronted by seasonal use buildings as well as year-round residences. There are commercial activities along both sides of the road (e.g. shopping mall and marinas). Lake Champlain’s Malletts Bay is in close
proximity to the roadway. A sidewalk is warranted along at least one side of this highway.

Malletts Bay Avenue, Blakely Road and Severance Road. Estimated 2004 ADT’s are 9,465, 10,184, and 9,779 for Malletts Bay Avenue, Blakely and Severance Roads respectively. The Town of Colchester’s municipal buildings and three schools are located along Malletts Bay Avenue and Blakely Road. Malletts Bay Avenue forms a difficult skewed intersection at Blakely Road. Proceeding easterly from Malletts Bay Avenue, the Blakely Road frontage is comprised of compact residential development to I-89. This section of Blakely Road west of I-89 warrants sidewalks on two sides. Blakely Road east of I-89 and Severance Road are sparsely settled. A sidewalk is warranted along at least one side of Malletts Bay Avenue and Blakely Road in the vicinity of schools and municipal buildings.

Kellogg Road. The estimated 2004 ADT on Kellogg Road is 11,390. This roadway has a mixture of residential frontage and commercial frontage. However, several local residential streets intersect this roadway. A sidewalk may be warranted along one side of this facility.

Susie Wilson Road. The 2004 estimated ADT on Susie Wilson Road is 8,259. The section of Susie Wilson Road from Kellogg Road to Route 2A is residential in nature. The horizontal and vertical alignment of this roadway is severely restricted and is incapable of accommodating large volumes of traffic.

Route 2A. Estimated 2004 ADT’s along Route 2A are 12,888, 13,628 and 21,354 from north to south respectively. This highway facility transitions from light residential and commercial frontage at Susie Wilson Road, to a major urban commercial center at Five Corners, to compact residential frontage south of Five Corners which then becomes sparsely developed approaching Industrial Avenue and Mountain View Road. Mountain View Road and Industrial Avenue form a critical intersection with Route 2A. Industrial Avenue functions as a major highway facility connecting Route 2A with Route 2 and, therefore, connecting Essex Junction with the Burlington Airport and major development strip along Route 2. The intersection of Route 2A with Route 2 further to the south is another critical location. Route 2A and Route 2 are major arterial roadways servicing local commercial, industrial, retail and regional traffic. The interchange of 2A with I-89 south of Route 2 is the cornerstone to servicing Williston, Essex and Essex Junction and the major population centers located in Burlington to the west and Montpelier to the east.

Existing or Potential Safety Hazards

Accidents were studied at those intersections and links which would be impacted by the construction of a circumferential highway. Figure 2.B-11 depicts location and the actual number of accidents which occurred from January 1979 to December 1983. This represents a total average of 148 accidents per year along these roadways. Of the accidents shown on Figure 2.B-11, thirty-five percent involved bodily injury incurred during the accident. From January 1979 to December 1983 one fatality occurred within the study area. As traffic volumes along these roadways increase the number of accidents will also increase.
Many of the roadways with identified accident occurrences on Figure 2.B-11 are local town roads which are presently functioning as collector or arterial highways. The horizontal and vertical alignment, pavement width, shoulder width and ditch treatment elements of these roadways do not currently correspond to present American Association of State Highway and Transportation Officials (AASHTO) Standards.

Conclusions

Projected population and economic growth and related traffic volumes in the project area coupled with existing congestion along certain links and at certain intersections, especially the Five Corners area, inadequate roadway geometrics, projected Levels of Service D or worse along many links by 2004, incompatibility between functional classification of existing roadways and adjacent land uses, and high occurrence of accidents indicate the need for major highway improvements in the study area.