Chapter 4
ALTERNATIVES EVALUATION

One goal of this Needs and Deficiencies Study is to compare a full range of transportation alternatives and evaluate their performance over a long range planning period. This evaluation is intended to consider the ability of these alternatives to accomplish defined transportation objectives, as well as their relative potential effects on the natural and social environment. Since transportation improvements usually have both positive and negative impacts, they must be weighed by decision makers and the public at-large to determine what combination of alternative strategies will provide the greatest benefit. A well-conceived transportation program for the study area could not only enhance the potential for regional economic development, but may also offer opportunities to improve the environment, and reinforce community linkages.

Because this Needs and Deficiencies Study considers a range of alternatives, the performance and impacts will vary over the evaluation period. This chapter presents a brief description of the level of improvement and the range of transportation improvements that is being considered in this evaluation. Subsequent chapters place these improvement alternatives in the context of the I-84 WOW corridor and evaluate their performance relative to the defined goals and objectives.

4.1 Level of Improvements

Level of Improvement (LOI) is intended to characterize the degree to which full construction or reconstruction is anticipated within the improvement alternative. Ranging from maintenance to "full build" alternatives, the LOI will dictate the type and degree of positive and negative impacts anticipated. The cost of even a "preservation of the mobility" approach can be quite substantial. Programs incorporating bridge or viaduct reconstruction often exceed $100 million. Costs of this magnitude must be carefully considered before alternatives to increase capacity are ruled out.

A first cut of defining Transportation Alternatives (TAs) involved generalizing improvements in to three broad categories. They are described and evaluated in the remainder of this chapter.

4.2 Screening Methodology

The Transportation Alternatives formulated for the initial evaluation within the I-84 WOW Needs and Deficiencies Study were intended to address transportation deficiencies identified early in the study process. They were not intended to represent the final solution or for that matter to limit future consideration of additional strategies. Each of the alternatives were screened based on the transportation benefit that they provided, their environmental and social impacts, and their preliminary cost. The alternatives that provided the greatest benefit with the least amount of impact and cost were selected and brought before the Advisory Committee and the public for concurrence.

Following the evaluation of these preliminary improvement strategies, elements from several of the TAs were selected for further environmental and engineering evaluation. The themes from which the alternatives were grouped included:

- TA 1- No Build (Existing And Committed)
- TA 2 - Transportation System Management, Transit Operations, & Transportation Demand Management Transit Operations
- TA 3 – Freeway and Interchange Reconstruction

4.3 TA 1- No Build (Existing And Committed)

The No Build package (TA 1) constitutes the base case condition for the evaluation of transportation improvements. No Build generally includes existing and committed projects, along with the normal maintenance and operation of the transportation system over the forecast period. The details of TA 1 were presented in Technical Report 1, the Existing and Future Conditions Report, which analyzed the future performance of this TA.

4.4 TA 2 - Transportation System Management, Transit Operations, & Transportation Demand Management Transit Operations

Figure 4.1 illustrates some of the strategies associated with TA 2, and Table 4.1 summarizes the improvement strategies that could be included in TA 2. Given the general nature of TSM, TDM, and Transit Operation Alternatives, these improvements are to be distributed throughout the corridor. TSM improvements would include traffic operations and safety improvements applicable in many areas of the corridor. TDM improvements will be focused on areas of internal travel demand such as Waterbury's downtown or shopping areas such as Main Street South in Southbury. Transit Operations improvements are suggested to make modifications within the context of the existing transit route system. Improvements such as the enhancement of express and local bus services are also included within this category.

Given the small-scale, localized nature of TA 2 improvements, a definitive list of improvement sites cannot be defined at this stage. Instead, typical locations and improvements have been identified for comparative evaluation. Final improvements may vary from those targeted in this analysis.

TSM, TDM and Transit Operations improvements are usually implemented within the right-of-way and are less capital intensive than other transportation improvement alternatives, but taken in aggregate, the cost associated with TA 2 would be significant. The success of the program especially the TDM segment depends in large measure on the voluntary cooperation of the public and private sector. The various potential alternatives are as follows:

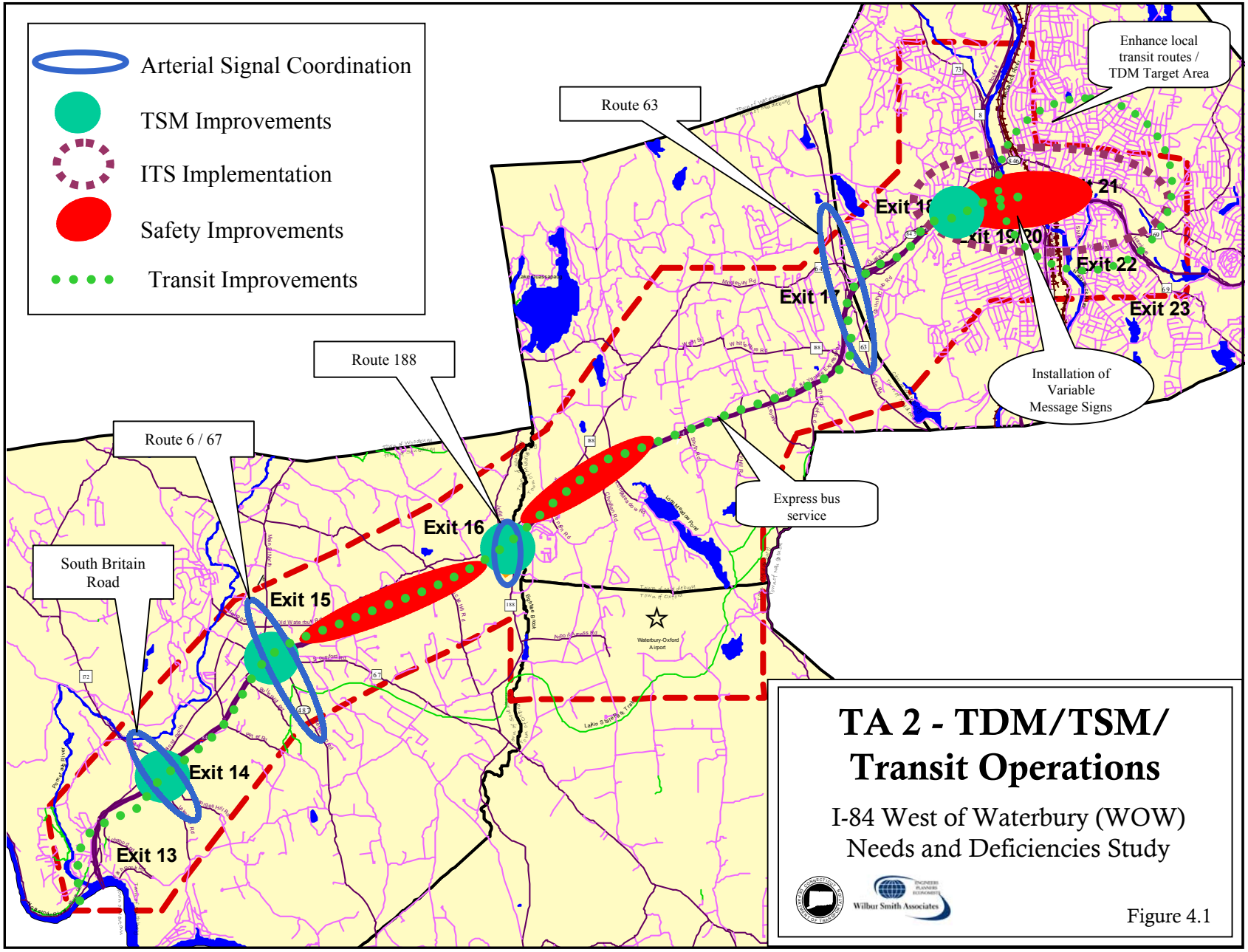

Arterial Signal Coordination
TSM Improvements
ITS Implementation
Safety Improvements
Transit Improvements
Route 63
Route 188
Route 6 / 67
South Britain Road
Enhance local transit routes / TDM Target Area
Installation of Variable Message Signs
Express bus service
Exit 13
Exit 14
Exit 15
Exit 16
Exit 17
Exit 18
Exit 19/20
Exit 21
Exit 22
Exit 23
TA 2 - TDM/TSM/ Transit Operations
I-84 West of Waterbury (WOW) Needs and Deficiencies Study
Wilbur Smith Associates
Figure 4.1

Table 4.1
TA 2: TSM, TDM, and TO

Transportation System Management (TSM)
Directional / Wayfinding Signage
Safety Enhancements
Intersection Improvements
Arterial Signal System Coordination
Intelligent Transportation Systems (ITS)
Sidewalks
Pedestrian Crossings & Separation
Bicycle Shared Lanes
Multi-purpose Paths
Transit Operations
Express Service Expansion
Additional Local Service
Transportation Demand Management (TDM)
Employer Ridesharing Subsidy
Employer Flex Hours
Peak Hour Pricing
Transit Discounts
Land Use Regulation - Mixed Use
Land Use - Transit Friendly
Land Use - Access Management
On-Street Parking Control
CBD Parking Control
Park and Ride Lots
Maintenance and Operations

Safety Enhancements

Safety improvements are an important part of the overall approach to transportation systems management. Five segments of I-84 had accident rates high enough to be listed on ConnDOT's 1995-1997 SLOSS (Suggested List of Surveillance Sites).

Some of the potential alternative solutions for these segments are as follows:

- Extension of truck climbing lanes, providing shoulders at truck climbing lanes (part of an existing ConnDOT project), and consideration of a truck rest area could reduce accidents between Interchanges 15 and 17.

- Improve the directional signage at Interchange 17 (Route 63) help reduce driver confusion in this area. Also, improving the intersection at Chase Parkway and Route 64 could reduce serious accidents at this area.

- Further study of the reconstruction of I-84 at the Route 8 interchange to remove the left hand exits and complex weaving patterns. Additionally, the installation of overhead variable message signs would alert traffic to peak hour congestion.

Intersection Operational Improvements

Several intersections in the I-84 WOW study area have been identified as having severe operational deficiencies. As part of the TSM strategy each of these intersections will need to be upgraded to meet acceptable standards for handling traffic. Some of the potential improvement solutions may include adding exclusive left turn lanes and signal phases, improving signal timing and coordination, adding lanes, grade separation, updating of signal and improving stripping and signing. Some of the intersections that could benefit from additional lanes or signal timing include South Britain Road and Main Street South, Main Street South and Main Street North, Old Waterbury Road and Route 188, and Route 188 and I-84 Westbound Ramps.

Arterial Signal Coordination

This technique could improve travel times on principal arterial streets. Through coordinated traffic signal timing, vehicles will maintain a uniform speed and encounter as few red traffic signals as possible. The result is that motorists will experience fewer delays. In addition to the congestion between intersections, the possibility of queuing along the I-84 ramps could also be reduced. Some of the locations identified for arterial signal coordination are South Britain Road, Route 6/67, Route 188, and Route 63.

Intelligent Transportation Systems (ITS)

Possible ITS solutions in the I-84 West of Waterbury corridor include Advanced Traveler Information Systems (ATIS) and Incident Management. Through ATIS, information can be provided to motorists by means of Variable Message Signs (VMS) and Highway Advisory Radio (HAR), as well as before they start their trip, either through a phone number, or a website, or both. Incident management is the rapid detection and response to any incident with the potential to reduce traffic flow. Motorists and Closed Circuit Television (CCTV) cameras detect incidents and an operator at a Traffic Operations Center (TOC) can determine what action is needed and dispatch appropriate personnel. The operator can then use the Advanced Traveler Information Systems to quickly notify motorists of the incident, so that they can choose alternate routes.

One of the major causes of traffic delays is non-recurring congestion, caused by construction, accidents, or other unusual incidents. Information will be provided to motorists by means of VMS and HAR. Information can also be made available to motorists before they start their trip, either through a phone number, or a website, or both.

Typically, an incident will occur on one route, while parallel routes will be unaffected. Unless they have accurate, up-to-date information, motorists will be unable to avoid these incidents, and will incur unnecessary delays.

Incident management is the rapid detection and response to any incident with the potential to reduce traffic flow. A common means of incident detection is cellular phone calls from motorists who observe an incident. According to the *ITS Strategic Plan*, this system works well. However, in order to confirm these reports, and help determine the appropriate response, an additional system is proposed. The surveillance of I-84 by a set of CCTV cameras would fulfill this function. These cameras would be connected to monitors at a TOC, where an operator can confirm that an incident has taken place, determine what is needed to clear the incident, and dispatch appropriate personnel and equipment to deal with it. The operator can then use the Advanced Traveler Information Systems to quickly notify motorists of the incident, so that they can choose alternate routes.

Another Incident Management facet recommended by the *ITS Strategic Plan* is the Connecticut Highway Assistance Motorist Patrols, or CHAMP. These are light trucks, staffed by Department of Transportation employees, equipped to handle minor traffic incidents without the dispatch of additional equipment. They can provide a motorist with gasoline, a jump-start, a battery, push a stalled auto out of the traffic stream, or assist in changing a tire. They can remove debris from the right-of-way, and set up signs for accident and detour routes. Additionally, they observe traffic conditions and report to the operators at the TOC. CHAMP patrols already exist on I-95 and on I-91, and the *ITS Strategic Plan* urges their expansion to I-84. Nationwide, Highway Service Patrols have proven to be extremely popular in many urban areas, and have proven invaluable in building public support for ITS projects.

Transportation Demand Management

In most portions of the I-84 WOW study area, the existing pattern of land use and the relative availability of parking (in comparison with larger metropolitan areas) favor the use of single-occupant vehicles (SOVs). Even workers within the regional core - Downtown Waterbury - utilize an SOV more commonly than any other mode. The 1990 census reports that 76 percent of Waterbury residents drove alone, while only 15 percent utilized carpools, or vanpools and three percent used public transportation. The remaining six percent either walked or bicycled to work, or worked at home. For outlying employment centers, the proportion of commuters driving alone is even greater, reaching 85 percent in Southbury, Middlebury and Oxford combined. Of these communities, nine percent carpool, less than one percent use public transit, and the remaining five percent walk, bike, or work at home.

Market rate parking costs in Downtown Waterbury range from approximately $40-60 monthly for parking garages. Most metered lots have a cost of twenty-five cents for each 20 minutes, usually with a limit of three hours. However, many of the Downtown employees, including most State of Connecticut employees, have free parking provided to them. Elsewhere within the study area, almost all employee parking is provided for free.

Based on past regional and nationwide experience, the adoption of a high-profile TDM initiative at an individual employer can result in an increase in use of High Occupancy modes of up to 20 percent. Because HOV travel still represents a minority of travel in most work sites (especially for suburban and non-CBD locations), the total impact on congestion or modal split would be proportionately lower. A voluntary employer-based program implies that participation will be substantially less than 100 percent. Current corporate participation rates (the number of firms

participating versus the total number of area businesses) are in the range of one percent of all employers and ten percent of all employees.

Park and Ride Lots

Park and Ride Lots are designed to encourage carpooling and reduce the number of vehicles on the road during peak hours. The eight park and ride lots found within the study area are listed in Table 2.3 in Chapter 2 of this report.

In a memorandum entitled *Commuter Parking Lot Facilities in the Central Naugatuck Valley Region, Occupancy Analysis and Recommendations* by the COGCNV dated December 27th, 2000, recommendations were given on the potential expansion of commuter lots. The COGCNV study confirmed that the Route 63 lot in Middlebury exceeds its capacity on average. Since ConnDOT considers commuter parking lots at or above 75 percent of their capacity to be sites for potential expansion, this was the only lot that met that criterion.

In addition, the study concluded that driver awareness of commuter parking lots along Interstate 84 is needed. The installation of "Park & Ride" signage along I-84 and Route 8 could encourage the use of such facilities.

Congestion Management Strategy Report

Federal regulations require every state and metropolitan planning organization to establish a congestion management system (CMS) as part of its overall transportation planning program. The CMS proposed for the State of Connecticut and the Central Naugatuck Valley includes a requirement to prepare a special strategy report for each area or corridor with significant congestion. The purpose of the report is to identify and evaluate appropriate congestion mitigation strategies.

The I-84 WOW Needs and Deficiencies Study will serve the function of a CMS strategy report. As such, the Needs and Deficiencies will: (1) identify and thoroughly assess congestion in the corridor, and (2) identify and fully evaluate all appropriate congestion mitigation strategies. The study will use appropriate performance measures to both assess congestion and evaluate the effectiveness of mitigation strategies. Performance measures will be selected from the list of measures specified in Connecticut's CMS guidelines.

Transit Operations

Improvements to transit operations could include a new express bus service on I-84 with loops into major centers of population within the study area. A conceptual service was evaluated as a transportation alternative to evaluate its feasibility.

To survey the need for additional transit service in the corridor, several of the activity centers connected by the conceptual transit route were contacted to determine the current transit use or need. Heritage Village provides their own transportation for residents. Mini-bus shuttles are available for rides to local activities and appointments. For longer excursions, Heritage Village rents motor coaches approximately monthly to attend events throughout New England. The

towns of Southbury, Middlebury and Oxford all provide handicapped and senior shuttle, which run on various days of the week for shopping and doctors appointments. The Southbury Training School also utilizes their own buses to accommodate scheduled trips. In addition to these services, the Waterbury Hospital provides a B-well shuttle for patients who need a ride to doctors appointments. Based on the conversations with these organizations, it appears that the transit needs of these populations are being adequately served by the existing on-call shuttle services.

In order to attract riders that are not transit-dependant, the conceptual transit route must have a competitive travel time with the existing transportation facilities in the study area. If a bus service ran on existing I-84 mixed with other traffic, the travel time would be the same as the other vehicles plus the delays due to stops for passenger drop-off and pick-up. Therefore, in order to be competitive with I-84, an exclusive lane or facility would have to be constructed.

Based on the low numbers of transit-dependant households and the low population density in the study corridor, the conceptual transit route would have low ridership unless congestion on I-84 significantly increased and an exclusive facility could be constructed. For these reasons, providing additional transit service beyond Waterbury did not prove feasible.

4.5 TA 3 – Freeway and Interchange Reconstruction

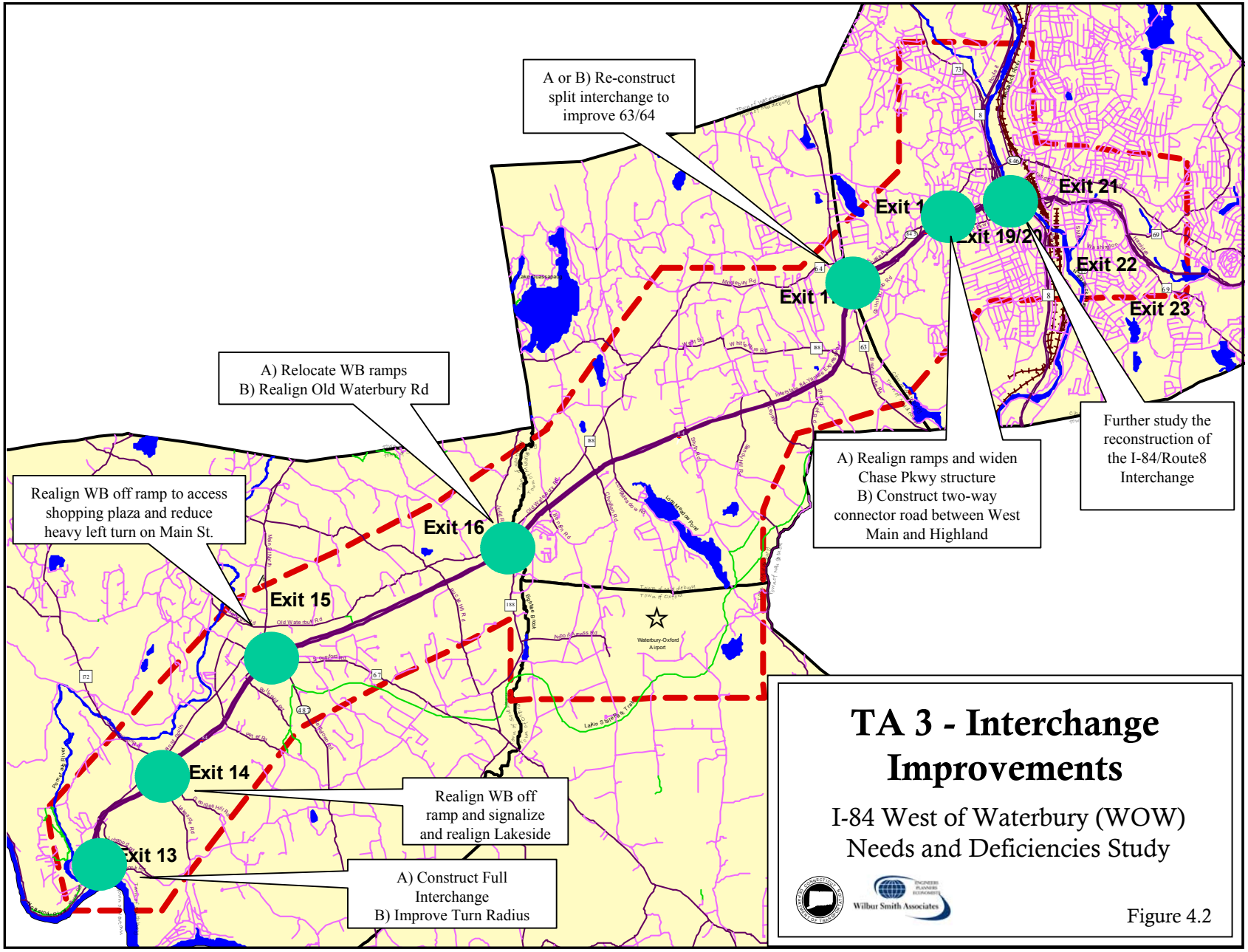
Reconstruction improvements include adding a general-purpose lane to the freeway in each direction as well as reconstruction of left entrance and exit ramps, completion of partial interchanges and consolidation of split interchanges. Illustrated on Figures 4.2, 4.3, and 4.4 are the strategies associated with TA 3.

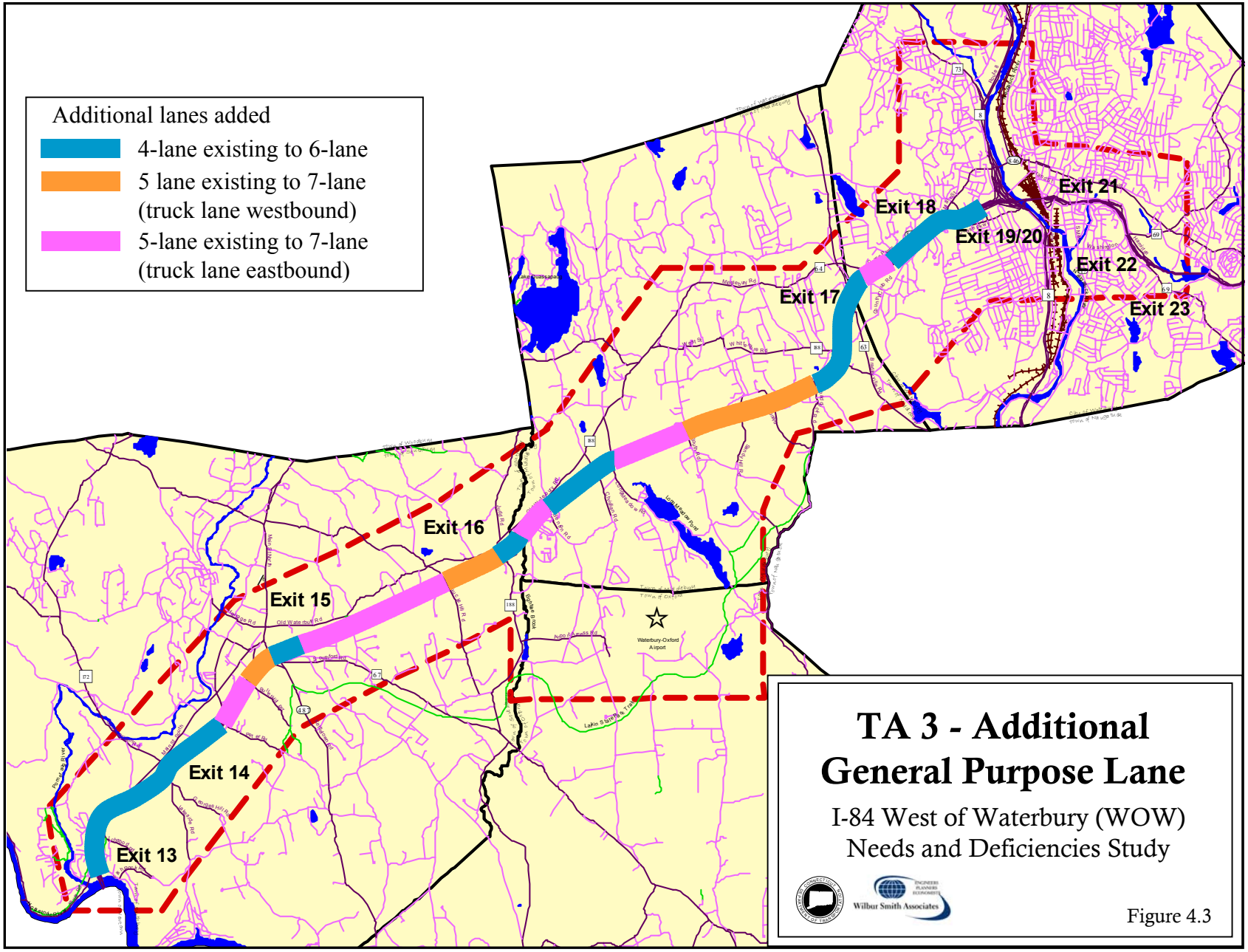
Additional General Purpose Lane Alternative

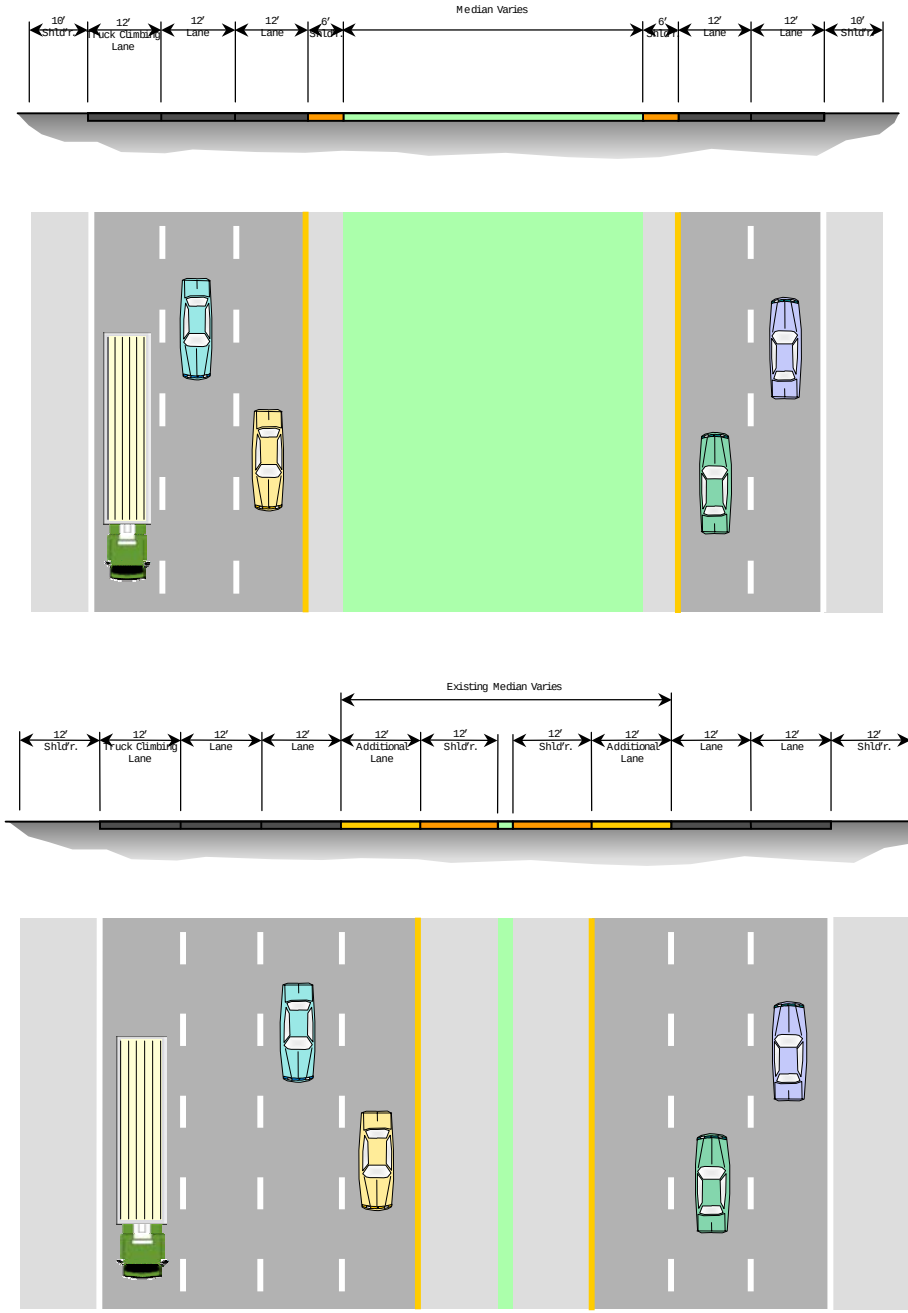
This improvement would consist of constructing an additional twelve-foot lane in each direction, and a twelve-foot inside shoulder. The additional lane would be continuous between the Housatonic River and Interchange 18. Segments where there is an existing climbing lane would consist of four lanes where the outer lane would remain a climbing lane. Every effort would be made to achieve and maintain a twelve-foot outside shoulder for safety reasons (ConnDOT is currently adding shoulders to climbing lanes between Interchanges 13 and 16). At some locations where the elevation differential between the eastbound and westbound alignment is great, retaining structures may need to be constructed. At the east end of the corridor near Interchange 18, right-of-way restrictions may require that inside and outside shoulders be reduced to minimize or eliminate impacts on adjoining property.

HOV Lanes

High Occupancy Vehicle (HOV) lanes were considered as a potential utilization of the additional lane alternative; however, they proved ineffective in reducing congestion on the interstate in the studies performed to the east and west of this corridor. Within the WOW corridor, development patterns are characterized by small pockets of commercial/industrial land uses that do not support the employment densities necessary for HOV facilities to be successful. In addition, connectivity to Downtown Waterbury would present considerable challenges due to the existing


A or B) Re-construct split interchange to improve 63/64
A) Relocate WB ramps
B) Realign Old Waterbury Rd
Realign WB off ramp to access shopping plaza and reduce heavy left turn on Main St.
A) Realign ramps and widen Chase Pkwy structure
B) Construct two-way connector road between West Main and Highland
Further study the reconstruction of the I-84/Route8 Interchange
Realign WB off ramp and signalize and realign Lakeside
A) Construct Full Interchange
B) Improve Turn Radius
Exit 21
Exit 19/20
Exit 22
Exit 23
Exit 16
Exit 15
Exit 14
Exit 13
Waterbury-Oxford Airport
TA 3 - Interchange Improvements
I-84 West of Waterbury (WOW)
Needs and Deficiencies Study
Wilbur Smith Associates
Figure 4.2


Additional lanes added
4-lane existing to 6-lane
5 lane existing to 7-lane
(truck lane westbound)
5-lane existing to 7-lane
(truck lane eastbound)
Exit 13
Exit 14
Exit 15
Exit 16
Exit 17
Exit 18
Exit 19/20
Exit 21
Exit 22
Exit 23
Waterbury-Oxford Airport
TA 3 - Additional General Purpose Lane
I-84 West of Waterbury (WOW)
Needs and Deficiencies Study
Wilbur Smith Associates
Figure 4.3



TA 3 - Additional General Purpose Lane

(Detailed View)

I-84 West of Waterbury (WOW)
Needs and Deficiencies Study

Wilbur Smith Associates

Figure 4.4

structural constraints in the area as well as the left hand entrance and exit ramp configurations that exist on I-84.

Interchange Improvement Alternatives

Based on workshops with ConnDOT and the study team, and meetings with the region, towns and city; a set of interchange improvements were developed to address the deficiencies identified at various locations along the corridor. The following paragraphs describe the proposed alternatives at each interchange. Conceptual illustrations of these alternatives are included in Technical Memorandum # 2.

Interchange 13 in Southbury is the westernmost interchange within the WOW study corridor. It forms a partial interchange just east of the Housatonic River, serving trips to and from the west. This interchange has two mainline lanes along I-84 in the eastbound and westbound directions. The on and off ramps to and from I-84 are single lane ramps. In the future year 2025 with increase in traffic volumes, the off-ramp to Fish Rock Road and I-84 eastbound junction operates at LOS F during the weekday evening peak hour condition. In the westbound direction, the on-ramp from Oakdale Road and I-84 junction operates at LOS F during the weekday morning peak hour condition.

The preliminary alternatives for this interchange were as follows:

- Complete the interchange so that traffic to and from all directions is served. In the westbound direction, the existing westbound entrance ramp would be replaced by new westbound entrance ramps in a buttonhook configuration terminating at a realigned Oakdale Manor Road. In the eastbound direction, the existing eastbound exit ramp would remain in the same location while a new eastbound entrance ramp would be constructed at the same point on Fish Rock Road. This alternative would likely require the overpass structure for River Road to be modified. The new ramp configuration would also allow for the inclusion of a commuter parking lot on either the eastbound or westbound side.

- Increase the turning radius of the westbound entrance ramp at Oakdale Manor Road. As it exists today, truck traffic heading east on Oakdale Manor Road attempting to enter the westbound ramp must encroach upon the westbound lanes to make a wide enough turn to access the ramp. Increasing to a standard 50-foot radius at this skewed approach will prevent this from occurring and improve safety. This alternative also has the potential for inclusion of a commuter parking facility.

Interchange 14 in Southbury has full directional access to and from Route 172. This interchange has two mainline lanes and single lane entrance and exit ramps along I-84 in the eastbound and westbound directions. In the future year 2025 with an increase in traffic volume, the eastbound entrance and exit ramp junctions with I-84 operate at LOS F during the weekday evening peak hour condition. The westbound entrance and exit ramp junctions with I-84 operate at LOS F during the weekday morning peak hour conditions. During the weekday evening peak hour, the South Britain Road and I-84 westbound exit ramp junction operates at LOS F. It has been determined that the lack of storage space between the westbound off ramp and Main Street South

along with the heavy right hand turn movement at this intersection creates a queuing problem at this ramp terminus.

The potential alternatives at this interchange were as follows:

- Improve operations by realigning the westbound exit ramp with the westbound entrance ramp. This alteration provides additional space between the ramp and Main Street South and forms a single signalized intersection where two un-signalized intersections previously existed. The relocation of the westbound exit ramp terminus raised the issue of sight distance from the northbound approach of Route 172. Preliminary calculations and site investigation determined that sight and stopping distance is adequate based on the ramp relocation.

- Realign Lakeside Road to form a perpendicular intersection with Georges Hill Road. This would reinforce Georges Hill as the major movement through this intersection and improve operations. The use of Lakeside by traffic towing boats should be considered if this alternative is to be advanced. Since Lakeside Road starts at the bottom of a hill, some vehicles towing heavy loads may have difficulty climbing the grade if they are forced to stop at the new intersection.

Interchange 15 is the primary access to the Town of Southbury. It provides full directional access to and from Route 6. Major commercial development in this area makes it the most heavily utilized interchange in Southbury. The configuration consists of two mainline lanes and single lane entrance and exit ramps along I-84 in the eastbound and westbound directions; however, in the westbound direction due to the presence of a climbing lane, there are three mainline lanes along I-84 just west of the on ramp from Route 6/Route 67 and the IBM Drive. Under the future year 2025 condition, the eastbound entrance and exit ramps from Route 67 operate at LOS F during the weekday evening peak hour, while the westbound entrance and exit ramps operate at LOS F during the weekday morning peak hour condition.

The preliminary alternatives for this interchange were as follows:

- Provide a bypass lane that diverges from the existing westbound frontage road just west of the intersection with Route 6 to alleviate the congestion at the Route 6 and Main Street South intersection. The bypass road would terminate at Bullet Hill Road just opposite the IBM westbound entrance ramp. This road could provide some relief to the Route 6 and Main Street South intersection by allowing traffic destined for Main Street South to use the bypass instead of the congested intersection.

- Carry the truck-climbing lane through the interchange area so that trucks and automobiles are not forced into a difficult weave near the eastbound exit ramp. This modification would likely involve the reconstruction of the I-84 bridge over Route 6.

Interchange 16 provides full directional access to and from Route 188 in Southbury. While these ramps are important to development in Southbury, they also serve development in Middlebury and Oxford. Interchange 16 also provides an important linkage to Oxford Airport. This interchange has two mainline lanes and single lane entrance and exit ramps along I-84 in the

eastbound and westbound directions. With increase in traffic volumes in the future year 2025, the eastbound entrance and exit ramps from Route 188 operate at LOS F during the weekday evening peak hour under future year condition, while the westbound entrance and exit ramps operate at LOS E and LOS F respectively during the weekday morning peak hour condition.

The preliminary alternatives for this interchange were as follows:

- Relocate the westbound exit and entrance ramps further east onto Route 188 in Middlebury. While the exact location and configuration of these ramps have not been precisely determined, relocation could help alleviate the congestion problem at the existing location and provide better access to development in Middlebury. Of course, such a modification could have negative impacts on property as well as to the Pomperaug High School.

- Increase the sub-standard radius ramp for the eastbound exit. A typical DOT radius under current standards would be 275 feet. Such an improvement would be aimed at safety, since the tighter radius requires a more rapid deceleration for vehicles exiting the highway. The eastbound entrance ramp would merge with the interstate at the same location as it does today.

- Realign Old Waterbury Road and Route 188 to intersect at approximately 180 feet to the north of the existing intersection. The realignment would provide the benefits of increasing the storage space between the existing westbound exit ramps while also improving sight distance at the intersection.

- Extend the acceleration lane from the westbound entrance ramp to provide additional merge distance for vehicles entering the interstate. Currently, vehicles are forced into a truck-climbing lane with little distance to merge safely.

New Interchange Between 16 and 17 - The Town of Oxford could potentially benefit from a more direct linkage to Oxford Airport and its surrounding development. Currently, access to this area is served by Interchange 16 along Route 188 and finally by an airport access road. If development in Middlebury and Oxford exceeds the State's forecast for zones in these towns, a new interchange alternative should be revisited.

The potential interchange would serve the airport in Oxford, the industrial area in the northern portion of Oxford, and the Middlebury industrial area. According to the "Plan of Development for Oxford, Connecticut" adopted in April 1991, Oxford has 1500 acres of industrially zoned property available for immediate development. If all of this property were to be developed in the next 25 years, the traffic could potentially exceed the capacity of Interchange 16.

Interchange 17 possesses some of the worst operational deficiencies in the WOW corridor. Due to the physical layout of the interchange, the eastbound entrance and exit ramps are accessed from Route 64 while the westbound entrance and exit ramps are accessed via Route 63. This split interchange configuration creates heavy congestion at the intersection of these two routes. Under the future year 2025 condition, the eastbound entrance and exit ramps from Route 63/Route 64 operate at LOS F during the weekday evening peak hour, while the westbound

entrance and exit ramps from Route 63 operate at LOS F during the weekday morning peak hour condition. In addition, the westbound off-ramp to Route 64 operates at LOS F during the weekday evening peak hour condition.

The preliminary alternatives at this interchange were as follows:

- Construct a full diamond-type ramp configuration with full directional access at Route 63. To handle the increase in traffic on Route 63, the road would be widened and realigned to approach the 63/64 intersection from the east rather that from the south. The existing Route 63 leg of the intersection (with the steep grade) would be terminated along with the existing Route 64 leg. The new intersection would consist of three legs, the east and west being the predominant movement, and would receive the additional green time from the terminated southern leg. The traffic using Route 64 east of the intersection would now be diverted to Route 63 by a newly constructed connector road between the two routes. Access to the existing Route 63 would still be possible and the residences along that road would be protected under this alternative.

- Provide full directional access to and from the interstate by constructing a connector road to Route 63 from the existing eastbound entrance and westbound exit ramps. Route 63 along with the Route 63/64 intersection would need major upgrades to handle the increase in traffic. Chase Parkway would also be realigned to merge with Route 64 without the intersection at the existing ramps. This alternative would not eliminate any of the legs at the Route 63/64 intersection.

Interchange 18 has two mainline lanes and single lane entrance and exit ramps along I-84 in the eastbound and westbound directions. However, in the westbound direction I-84 includes a truck-climbing lane at the Highland Avenue off ramp junction. Under the future year condition, all freeway ramp junctions operate at LOS E or worse during the weekday morning and evening peak hours.

The preliminary alternatives at this interchange were as follows:

- Improve the radius of curvature of the westbound exit ramp to Highland Avenue and West Main Street. The existing ramp is less than the 275-foot radius that is required under current standards.

- Consolidate the eastbound exit and entrance ramps to Chase Parkway and remove the Highland entrance ramp to I-84 eastbound. The new relocated entrance ramp would likely become two lanes to handle the additional traffic diverted from the Highland Avenue ramp.

- Widen the bridge carrying Chase Parkway over the interstate to accommodate additional left turn lanes at both ends. This would help alleviate the congestion at these intersections.

- Construct a two-way connector road between West Main Street and Highland Avenue and improve the I-84 exit ramp to a standard radius. The new westbound exit ramp would tee into the connector road at a new signalized intersection. This would allow for the passage of traffic between Highland and West Main Street.

Interchanges 19 – 21 - The conceptual alternatives for Interchanges 19 through 21 are included for the purpose of exploring the potential for a major bridge reconstruction. The benefits of these improvements have not been quantified in this analysis, but are discussed qualitatively to begin the thinking process on the future of this facility.

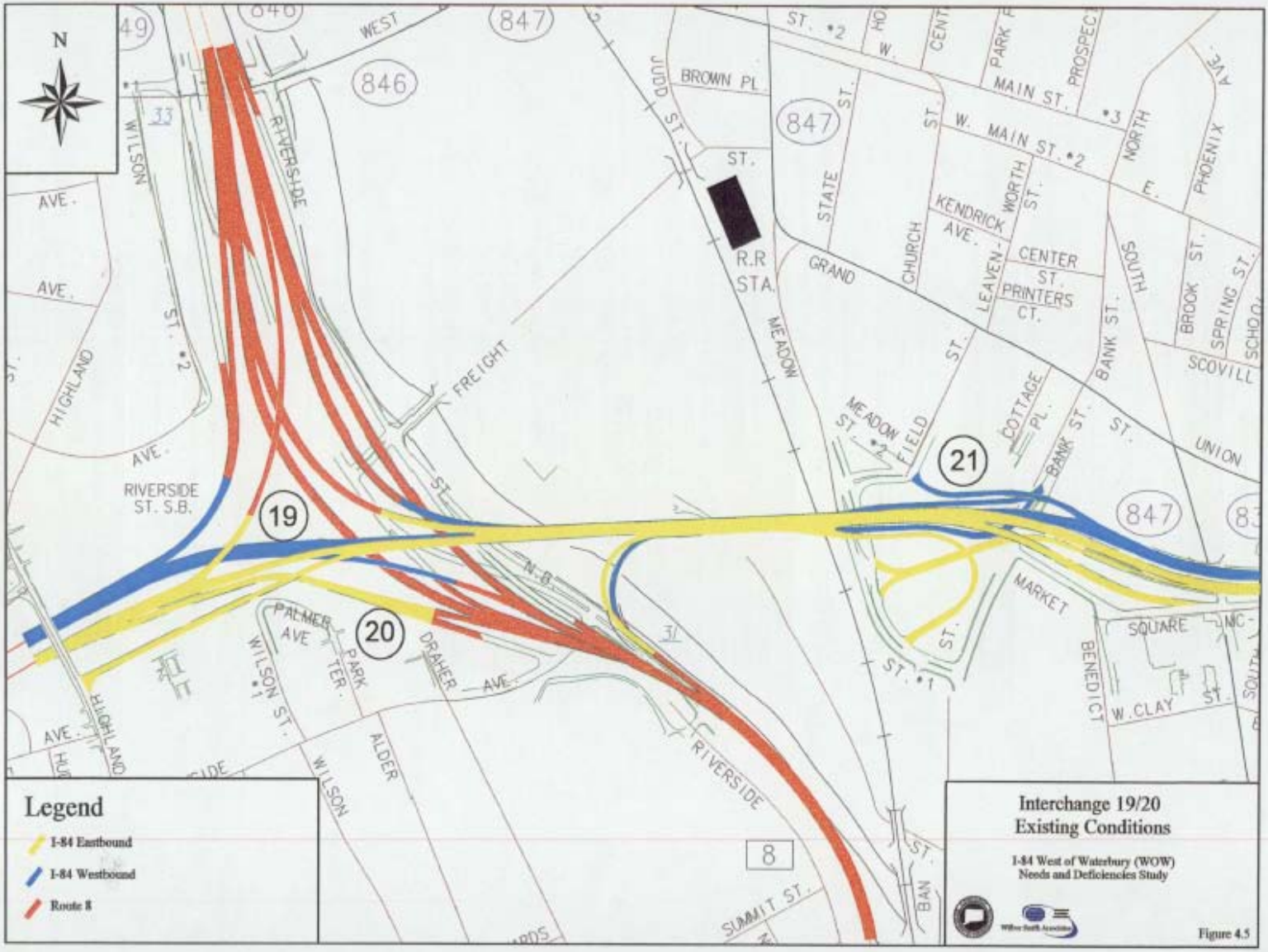
Interchanges 19, 20, and 21 constitute the series of ramps and interconnections that make up the 'Mixmaster' structure in Downtown Waterbury. The bridge structures for the eastbound and westbound viaducts are stacked vertically, rather than in a more conventional arrangement where the opposing roadways are parallel to each other. This section of I-84 experiences numerous operational, structural, and safety deficiencies. Some of these are as follows:

- Left hand exit from I-84 eastbound to Route 8 northbound;
- Left hand entrance to I-84 eastbound from Route 8 southbound;
- Left hand entrance to I-84 westbound from Route 8 northbound;
- Left hand entrance to I-84 westbound from Bank Street;
- Substandard weave section between I-84 eastbound entrance from Route 8 south to Meadow Street Exit ramp;
- Substandard weave section between I-84 westbound entrance from Route 8 north to Highland Street Exit ramp;
- High accident location I-84 at Route 8, Meadow Street Interchange (Interchange 21);
- Two lane stretch of I-84 eastbound between exit to Route 8 northbound and entrance from Route 8 southbound; and
- Poor structural rating on main span over Naugatuck River (will be upgraded by ConnDOT).

This structure was completed in the mid-1960's and no longer has the capacity to support the growth in traffic over the past forty years. While it is possible to maintain the structure so that it meets federal safety standards, it provides a major constraint to traffic flow on I-84 west of Hartford. While the rest of I-84 is upgraded to three lanes in each direction, Waterbury will continue to see gridlock conditions (especially eastbound) if some of these operational deficiencies are not addressed. To help visualize the complexity of the situation, Figure 4.5 has been color coded to identify the various components of this interchange.

Figure 4.6 is a conceptual layout of some of the possibilities that might address the deficiencies. This illustration is not intended to be a recommendation for future improvements. It merely explores the potential for some changes that can provide some benefit to the transportation system and the City of Waterbury as well. No traffic impacts, environmental impacts, or capital costs have been quantified. The highlights of this plan are as follows:

- A new I-84 westbound structure would be constructed that runs parallel to, and at the same elevation of, the existing eastbound structure to carry I-84 through traffic – a short segment of existing I-84 westbound upstream of the entrance ramp from Route 8 southbound would be eliminated;
- The existing I-84 westbound structure would remain functional to handle traffic destined for Route 8 or Downtown Waterbury;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Legend
I-84 Eastbound
I-84 Westbound
Route 8
Interchange 19/20
Existing Conditions
I-84 West of Waterbury (WOW)
Needs and Deficiencies Study
Figure 4.5
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21
847
846
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W. MAIN ST.
BROWN PL
JUDD ST.
R.R STA.
MEADOW
GRAND
CHURCH
STATE
KENDRICK AVE.
LEAVEN-WORTH ST.
CENTER ST.
PRINTERS CT.
BANK ST.
SOUTH
BROOK ST.
SPRING ST.
SCOVILL
UNION
COTTAGE PL.
MEADOW ST.
FIELD
FREIGHT
RIVERSIDE
RIVERSIDE ST. S.B.
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WILSON
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PARK TER.
DRAHER AVE.
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PHOENIX AVE.
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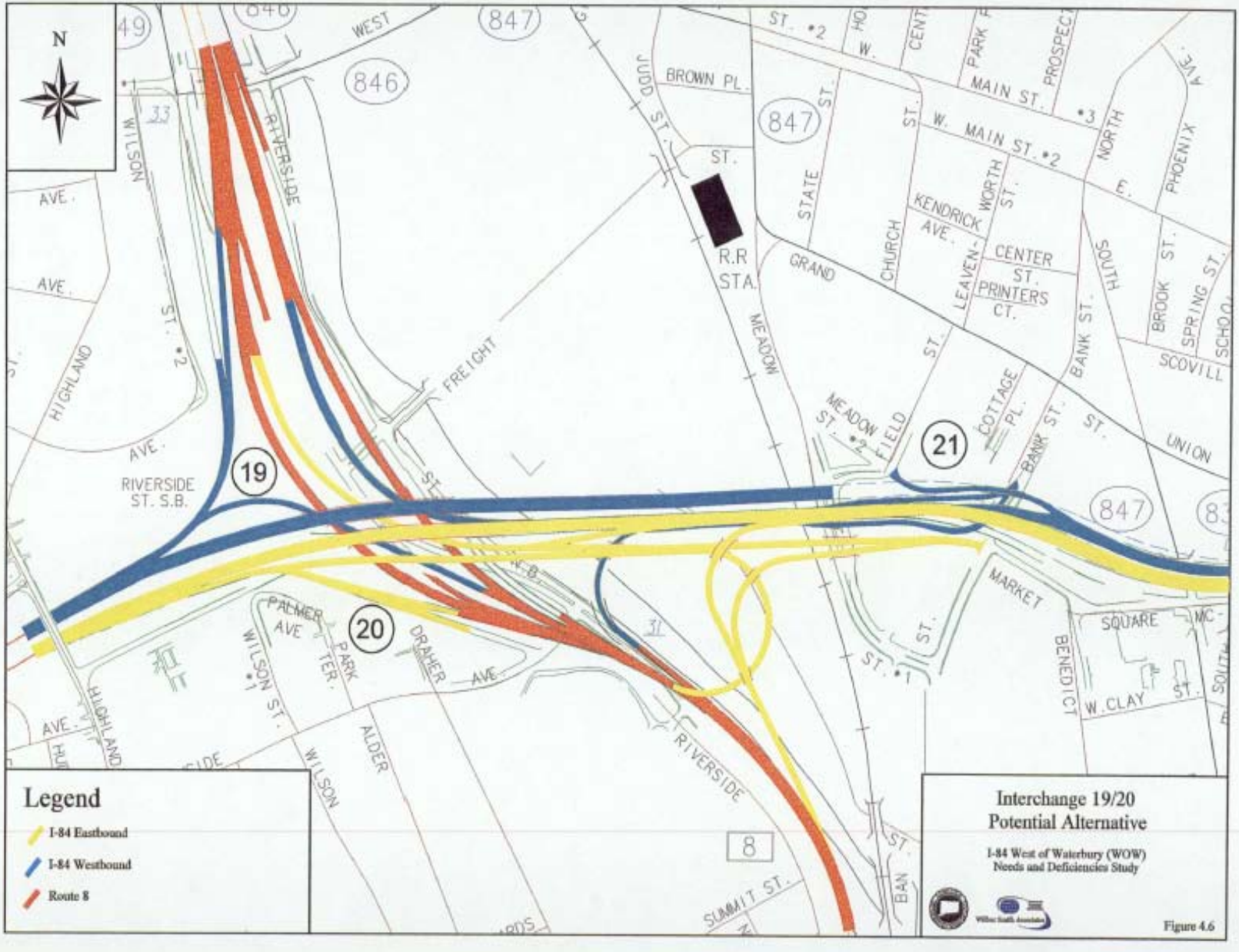
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MEADOW ST.
FIELD
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PALMER AVE
PARK TER.
WILSON ST.
DRAHER AVE.
ALDER
MARKET
SQUARE
BENEDICT
W. CLAY
SUMMIT ST.
8
Legend
I-84 Eastbound
I-84 Westbound
Route 8
Interchange 19/20
Potential Alternative
I-84 West of Waterbury (WOW)
Needs and Deficiencies Study
Figure 4.6

- A collector/distributor (CD) road would be constructed parallel to I-84 eastbound to handle traffic movement to Route 8 north and south and also to Downtown Waterbury – this road would eventually tie into the at-grade intersection at Bank Street and continue along Market Square to the entrance ramp at Interchange 22;
- Each of the left hand entrance and exit ramps would be replaced by right hand ramps; and
- I-84 eastbound would maintain three lanes throughout the interchange.

While no formal transportation improvement is to be evaluated in this study, the recommendation in this case would be to investigate the interchange area in greater detail in a future study.

4.6 Transportation Evaluation

Mainline Capacity Analysis

In order to assess the capacity along I-84 with the additional lane in each direction, a freeway analysis was performed during the weekday morning and evening peak hour conditions. The results of the analysis are shown in Tables 4.2 and 4.3. The following tables also indicate the number of lanes in each direction and the traffic volumes along I-84 for the weekday morning and evening peak hour conditions. East of Interchange 19, no additional lanes have been proposed, primarily due to the fact that the interchange with Route 8 is constrained to widening and three lanes currently exist east of the interchange. For this reason, the LOS does not improve for these segments for the Build scenario.

Table 4.2
Freeway Analysis Summary – Build Scenario (Eastbound Direction)

SECTION ALONG I-84	Number of Lanes		Traffic Volumes	Level of Service	
	No Build	Build		No-Build	Build
Between Int. 13 and Int. 14	2	3	2790(4730)	D(F)	C(E)
Between Int. 14 and Int. 15	2	3	2930(4390)	D(F)	C(D)
Between Int. 15 and Int. 16	2	3	2580(4180)	D(F)	C(D)
Between Int. 16 and Int. 17	2	3	2890(4300)	D(F)	C(D)
Between Int. 17 and Int. 17	2	3	2490(3670)	D(E)	C(D)
Between Int. 17 and Int. 18	2	3	3700(4940)	E(F)	D(E)
Between Int. 18 and Int. 19	2	3	4140(5350)	F(F)	D(E)
Between Int. 19 and Int. 20 *	2	2	3390(4460)	E(F)	E(F)
Between Int. 20 and Int. 21 *	4	4	7230(7990)	F(F)	F(F)
Between Int. 21 and Int. 22 *	3	3	6310(7720)	F(F)	F(F)
Between Int. 22 and Int. 23 *	3	3	5200(5940)	E(E)^	E(E)^

X(X) Represents LOS for AM peak hour. PM Peak LOS shown in parenthesis.
^ Analysis used a Peak Hour Factor (PHF) of 0.95 during the P.M. peak hour.
* No additional lanes have been proposed for these segments – need to analyze in separate study.

As indicated in the table, in the eastbound direction the additional lane along I-84 shows improvement in levels of service between Interchanges 13 and 19 from the no-build to build condition. The level of service does not change from the no-build condition east of Interchange 19 along I-84. It is important to note that wherever there is a climbing lane along I-84, the analysis was conducted for the worst-case scenario assuming that the climbing lane does not

exist along that section. The results of the capacity analysis are graphically represented in Figures 4.7 and 4.8.

In the eastbound direction, it was assumed for this analysis that the additional lane would be dropped at Interchange 19. Therefore, east of Interchange 19, the number of lanes along I-84 would be similar to existing conditions.

Table 4.3
Freeway Analysis Summary – Build Scenario (Westbound Direction)

SECTION ALONG I-84	Number of Lanes		Traffic Volumes	Level of Service	
	No Build	Build		No-Build	Build
Between Int. 13 and Int. 14	2	3	4420(3500)	F(E)	E(D)
Between Int. 14 and Int. 15	2	3	4170(3580)	F(F)	D(D)
Between Int. 15 and Int. 16	2	3	3850(3220)	E(E)	D(C)
Between Int. 16 and Int. 17	2	3	3940(3490)	F(E)	D(D)
Between Int. 17 and Int. 17	2	3	3340(3090)	E(E)	C(C)
Between Int. 17 and Int. 18	2	3	4210(4630)	F(F)	D(E)
Between Int. 18 and Int. 19 *	4	4	5530(6290)	E(E)	E(E)
Between Int. 19 and Int. 20 *	3	3	3300(4490)	D(E)	D(E)
Between Int. 20 and Int. 21 *	5	5	6150(8040)	D(E)	D(E)
Between Int. 21 and Int. 22 *	3	3	6310(7430)	F(F)	F(F)
Between Int. 22 and Int. 23 *	3	3	5160(6070)	E(E)^	E(E)^

X(X) Represents LOS for AM peak hour. PM Peak LOS shown in parenthesis.
^ Analysis used a Peak Hour Factor (PHF) of 0.95 during the P.M. peak hour.
* No additional lanes have been proposed for these segments – need to analyze in separate study.

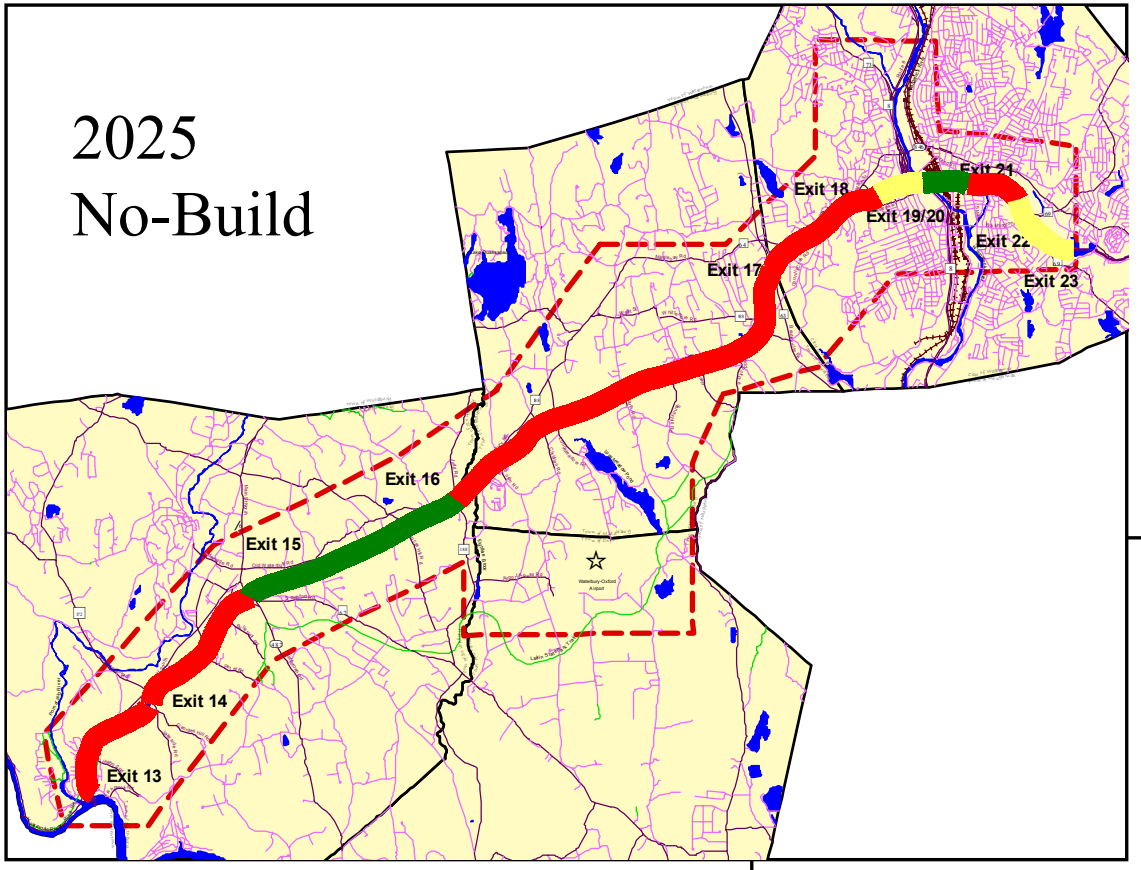
As indicated in the table, all sections of I-84 between Interchanges 13 and 19 will operate at LOS E or better with the additional lane in the westbound direction for the weekday morning and evening peak hour conditions.

Weaving Analysis

For the purpose of this analysis, it was assumed that the additional lane in the eastbound and westbound directions along I-84 would begin in the vicinity of Interchange 18. Because the improvements east of Interchange 18 would need to be studied in greater detail and recommendations at this area are not presented as part of this study, the critical weaving movements identified in the Existing and Future Conditions Report remain unaffected.

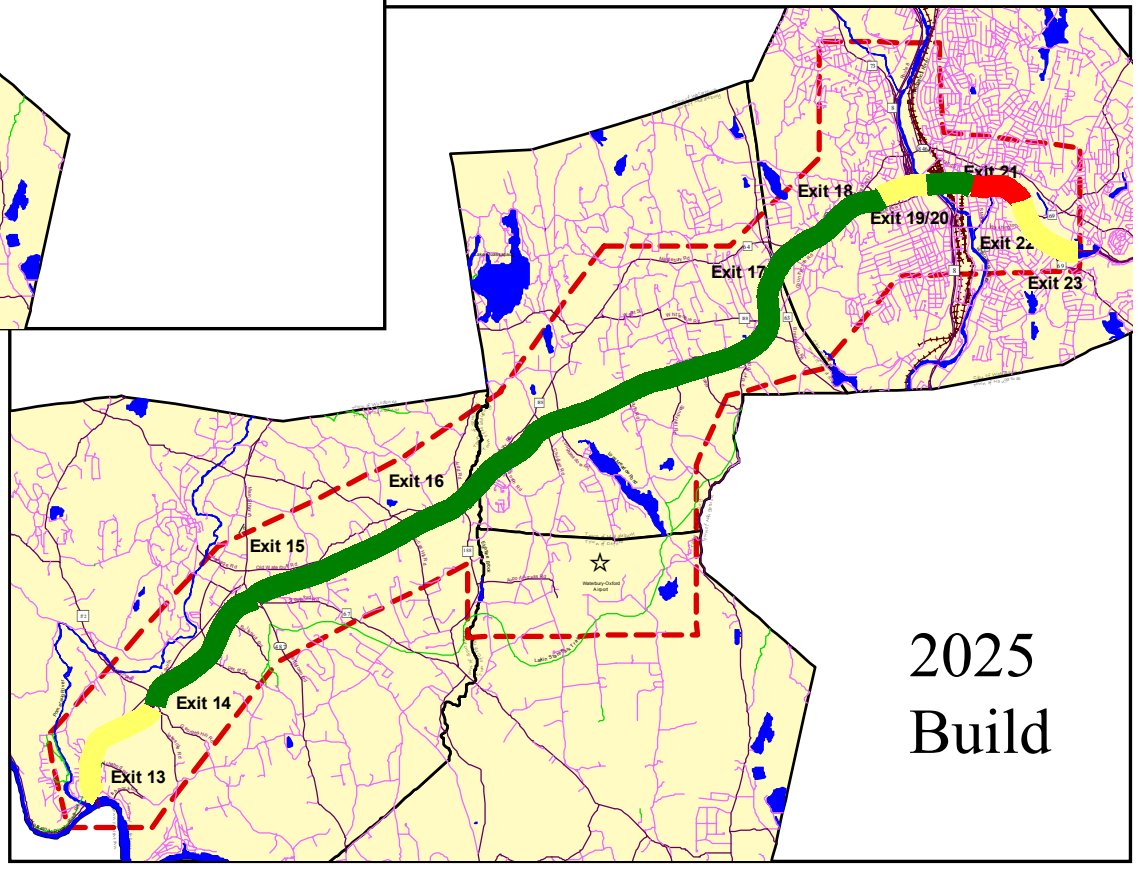
Freeway-Ramp Analysis

A freeway-ramp analysis was conducted for the weekday morning and evening peak hour conditions to observe the effect of an adding a general-purpose lane in each direction along I-84. Additionally, the TA3 scenario consists of providing interchange improvements at several locations along the corridor. The following table provides freeway and ramp volumes at each interchange that were used for analysis purposes. The results of the freeway-ramp analysis are provided in Table 4.4.



Level Of Service (LOS)

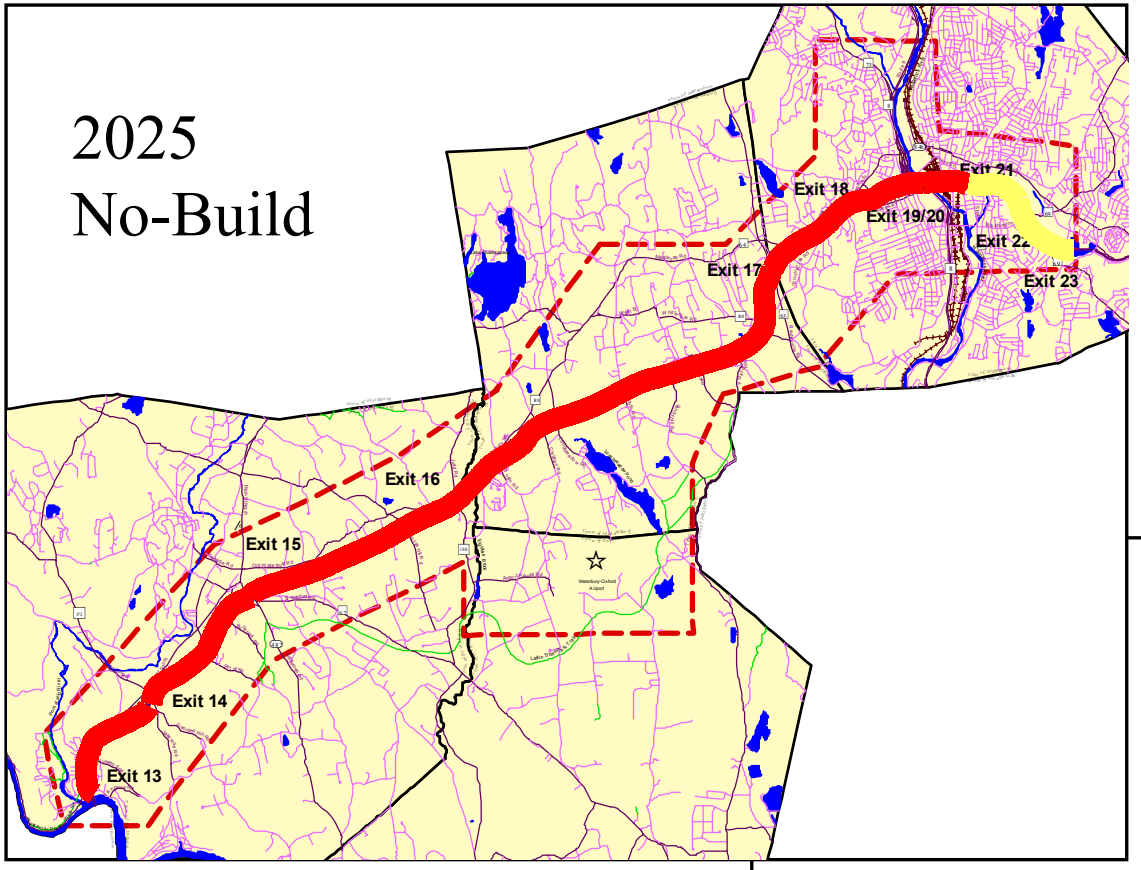
- A-C
- D
- E
- F



I-84 LOS Westbound AM Peak Period

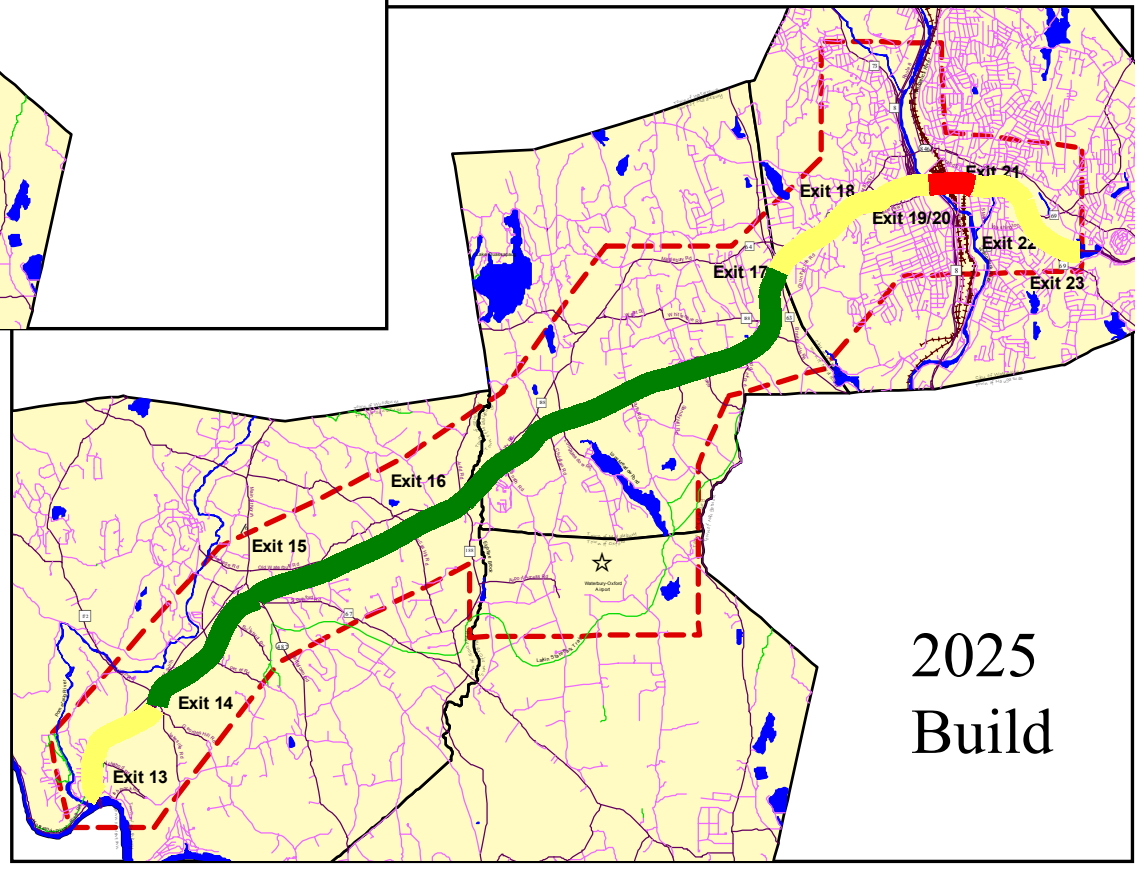
I-84 West of Waterbury (WOW)
Needs and Deficiencies Study

Figure 4.7



Level Of Service (LOS)

- A-C
- D
- E
- F



I-84 LOS Eastbound PM Peak Period

I-84 West of Waterbury (WOW)
Needs and Deficiencies Study

Figure 4.8

Table 4.4
Freeway Ramp Analysis Summary

INTERCHANGE on I-84	Eastbound Direction				Westbound Direction			
	Traffic Volumes		Level of Service		Traffic Volumes		Level of Service	
	Freeway	Ramp	No Build	Build	Freeway	Ramp	No Build	Build
Interchange 13								
Off Ramp to Fish Rock Road	2800(4820)	80(170)	C(F)	B(D)	-	-	-	-
On Ramp from Fish Rock Road	2720(4650)	70(80)	-	B(C)	-	-	-	-
Off Ramp to Oakdale Road	-	-	-	-	4420(3500)	50(70)	-	C(C)
On Ramp from Oakdale Road	-	-	-	-	4370(3430)	100(60)	F(D)	C(C)
Interchange 14								
Off Ramp to Lakeside Road	2790(4730)	210(660)	C(F)	B(D)	-	-	-	-
On Ramp from Georges Hill Road	2580(4070)	350(320)	D(F)	C(C)	-	-	-	-
Off Ramp to South Britain Road	-	-	-	-	4170(3580)	400(330)	F(F)	C(C)
On Ramp From South Britain Road	-	-	-	-	3770(3250)	650(230)	F(D)	C(C)
Interchange 15								
Off Ramp to Route 67	2930(4390)	850(980)	D(F)	C(D)	3850(3220)	890(580)	F(D)	C(C)
On Ramp from Route 67/I.B.M Drive	2080(3410)	500(770)	C(F)	B(D)	2960(2640)	1210(940)	F(D)	D(C)
Interchange 16								
Off Ramp to Route 188	2580(4180)	180(350)	C(F)	B(C)	3940(3490)	480(540)	F(D)	C(C)
On Ramp from Route 188	2400(3830)	490(470)	D(F)	C(C)	3460(2950)	390(270)	E(D)	C(C)
Interchange 17								
Off Ramp to Route 63	2890(4300)	400(630)	D(F)	B(C)	-	-	-	-
On Ramp from Route 64	2490(3670)	1210(1270)	D(F)	C(D)	-	-	-	-
Off Ramp to Route 64	-	-	-	-	4210(4630)	870(1540)	F(F)	C(D)
On Ramp from Route 63	-	-	-	-	3340(3090)	600(400)	F(D)	C(C)
Interchange 18								
Consolidated Ramp Alternative								
Off Ramp to Chase Parkway	3700(4940)	400(540)	E(F)	C(D)	-	-	-	-
On Ramp from Chase Parkway	3300(4400)	1440(1620)	F(F)	C(F)	-	-	-	-
Off Ramp to Main St./Highland Ave.	-	-	-	-	5530(6290)	1660(1930)	E(F)	E(F)
On Ramp from Chase Parkway	-	-	-	-	3870(4360)	340(270)	F(F)	C(C)
Connector Road Alternative								
Off Ramp to Chase Parkway	3700(4940)	400(540)	E(F)	C(D)	-	-	-	-
On Ramp from Chase Parkway	3300(4400)	840(950)	F(F)	D(E)	-	-	-	-
Off Ramp to Main St./Highland Ave.	-	-	-	-	5530(6290)	1660(1930)	E(F)	E(F)
On Ramp from Chase Parkway	-	-	-	-	3870(4360)	340(270)	F(F)	C(C)

Table 4.4 - continued
Freeway Ramp Analysis Summary

INTERCHANGE on I-84	Eastbound Direction				Westbound Direction			
	Traffic Volumes		Level of Service		Traffic Volumes		Level of Service	
	Freeway	Ramp	No Build	Build	Freeway	Ramp	No Build	Build
Interchange 19 *								
Off Ramp to Sunnyside Ave./Route 8 SB	4140(5350)	610(550)	C(D)	C(C)	-	-	-	-
Off Ramp to Route 8 NB	3530(4800)	740(1010)	D(F)	C(D)	-	-	-	-
On Ramp from Highland Ave.	2790(3790)	600(670)	D(F)	D(F)	-	-	-	-
On Ramp from Route 8 SB	-	-	-	-	3980(5100)	1550(1190)	E(F)	E(F)
Interchange 20 *								
Off Ramp to Route 8 SB	-	-	-	-	6150(8040)	1300(1550)	F(F)	F(F)
Off Ramp to Route 8 NB	-	-	-	-	4850(6690)	1550(2200)	D(F)	D(F)
On Ramp from Route 8 SB	3390(4460)	2260(2050)	F(F)	F(F)	-	-	-	-
On Ramp from Route 8 NB	5650(6510)	1580(1480)	F(F)	F(F)	3300(4490)	680(610)	F(F)	F(F)
Interchange 21 *								
Off Ramp to Meadow St.	7230(7990)	600(410)	F(F)	F(F)	6310(7430)	800(530)	F(F)	F(F)
Off Ramp to South Main St.	6630(7580)	800(760)	F(F)	F(F)	-	-	-	-
On Ramp from Meadow St.	5830(6820)	480(900)	F(F)	F(F)	-	-	-	-
On Ramp from Bank St. (Left)	-	-	-	-	5510(6900)	200(340)	E(F)	E(F)
On Ramp from Bank St. (Right)	-	-	-	-	5710(7240)	440(800)	F(F)	F(F)
Interchange 22 *								
Off Ramp to Frontage Road	6310(7720)	1110(1780)	F(F)	F(F)	-	-	-	-
Off Ramp to Union St.	-	-	-	-	5160(6070)	500(500)	D(F)	D(F)
On Ramp from Union St.	-	-	-	-	4660(5570)	1650(1860)	F(F)	F(F)
Interchange 23 *								
Off Ramp to Hamilton Ave.	-	-	-	-	5410(6390)	250(320)	F(F)	F(F)
On Ramp from Hamilton Ave.	5200(5940)	700(970)	E(F)	E(F)	-	-	-	-

* Note: Interchanges 19 through 23 do not improve from the No Build condition since the additional lane ends at Interchange 18.
( ) Denotes PM data.

As indicated in the table above, with the additional general-purpose lane along I-84 in both directions, all freeway-ramp junctions between Interchanges 13 and 17 operate at LOS D or better during the weekday morning and evening peak hour conditions.

At Interchange 18, the eastbound off ramp junctions operate at LOS D or better during the weekday morning and evening peak hour directions. Under the Consolidated Ramp Alternative, the Highland Avenue on-ramp is removed, and therefore the on-ramp from Chase Parkway has a higher volume as compared to the Connector Road Alternative. The new eastbound on-ramp from Chase Parkway under the first Alternative would operate at LOS C and LOS F respectively for the weekday morning and evening peak hour conditions; however, under the second Alternative, the eastbound on-ramp from Chase Parkway would operate at LOS D and LOS E respectively. It is important to note that under the first Alternative, the eastbound on-ramp from Chase Parkway is assumed to be a two-lane ramp to handle the increase in traffic.

In the westbound direction at Interchange 18, the off-ramp junction will operate at LOS E and LOS F during the weekday morning and evening peak hour conditions respectively. This is due to the fact that an additional lane would be provided along I-84 in the westbound direction west of Interchange 18. For this reason, the westbound on-ramp junction will improve to LOS C when compared to the No-Build condition (LOS F).

In the eastbound direction, it is assumed that the additional lane will be dropped after the interchange and therefore, east of Interchange 18 will have no improvement in levels of service beyond the No-Build condition. In the westbound direction, all freeway-ramp junctions east of Interchange 18 will not show improvements in levels of service since the additional lane begins west of this interchange.

Intersection Analysis

Level of service analysis at intersections affected by these improvements was conducted for the weekday morning and evening peak hour conditions. For this analysis it was assumed that I-84 would consist of an additional lane in the eastbound and westbound directions from Interchange 13 to 18. Table 4.5 presents the results of the intersection analysis by interchange alternative.

Table 4.5
Intersection Analysis – Build Scenario

INTERSECTION	No Build		Build	
	AM	PM	AM	PM
Interchange 13				
I-84 WB Ramps and Oakdale Road	-	-	**A**	**A**
I-84 EB Ramps and Fish Rock Road	**B**	**C**	**B**	**C**
Interchange 14				
South Main St. and South Britain Rd.	E	F	E	F
South Britain Road and I-84 WB Ramps	D	**F**	B	B
S. Britain Rd. and I-84 EB Ramps	**B**	**F**	B	C
Lakeside Rd. and Georges Hill Road	-	-	B	B
Interchange 15				
I-84 EB Ramps and Rt. 6/Rt. 67	B	C	C	C
I-84 WB Ramps and Rt. 6/Rt. 67	E	D	E	E
N. Main St. and Old Waterbury Rd./Heritage Road	F	E	F	E
Main Street and Southford Rd./Shopping Plaza	F	F	F	F
Rt. 487/Rt. 67 and Community House Road	C	D	C	D
Interchange 16				
With Relocated Westbound Ramps				
I-84 EB Ramps and Route 188	E	C	E	C
I-84 WB Ramps and Route 188	D	D	B	B
Old Waterbury Road and Route 188	F	F	F	F
With Realigned Old Waterbury Road				
I-84 EB Ramps and Route 188	E	C	E	C
I-84 WB Ramps and Route 188	D	D	D	D
Old Waterbury Road and Route 188	F	F	F	F

Table 4.5 – continued
Intersection Analysis – Build Scenario

INTERSECTION	No Build		Build	
	AM	PM	AM	PM
Interchange 17				
With Full Interchange at Rt. 63, Realignment of Rt. 63, and new Connector Road				
I-84 EB Off Ramp and Rt. 63	B	B	B	C
I-84 WB Off Ramp and Chase Parkway/Route 63	F	F	C	C
Route 63 and Route 64	F	F	B	C
Route 63 and Connector Road	-	-	C	D
With Connector Road to Route 63				
I-84 EB Off Ramp and Route 63	B	B	B	B
Connector Road and Route 63	F	F	C	C
Route 63 and Route 64	F	F	C	D
Interchange 18				
With Consolidated Eastbound Ramps				
I-84 EB Off Ramp and Chase Parkway	B	C	C	D
Chase Parkway and W. Main Street	**F**	**F**	C	C
Chase Parkway and Country Club Road	F	E	C	C
With Connector Road				
I-84 EB Off Ramp and Chase Parkway	B	C	B	C
W. Main St. and Connector Rd.	**F**	**F**	C	D
I-84 WB Off Ramp and Connector Road	-	-	A	A
Highland Ave. and Connector Road	F	F	C	C

Bold-faced letters indicate un-signalized intersection.

4.7 Environmental Evaluation

A preliminary environmental evaluation was made of the alternatives under consideration for the I-84 WOW study area. This evaluation looked at environmental constraints that would need to be studied further for the selected action(s) during the environmental process for project implementation under the National Environmental Policy Act (NEPA), and the Connecticut Environmental Policy Act (CEPA). The analysis also took into consideration the social and historical impacts that were potential to any of the alternatives. Each of the alternatives evaluated in the study have been given a rating of either 'no significant impact', 'minor impact', or 'major impact' for each of the constraints.

At this stage of planning, a simple qualitative evaluation of anticipated environmental constraints has been made, using secondary-source data such as GIS data, aerial mapping, and USGS topographic mapping. Under the NEPA and CEPA processes, it would be expected that a more rigorous investigation would be made into existing conditions and anticipated impacts using field review and more intensive data collection.

As part of any environmental evaluation, the study considers both a "No-Build" alternative as well as "Build" alternatives. The No-Build Alternative would assume that no action is taken in the study area other than maintenance of existing facilities and implementation of currently programmed actions. For the five interchanges that are evaluated below, the No-Build Alternative would be expected to have a negligible effect, if any, on most environmental

constraints, since no action would be taken. The one exception is air quality, where the No-Build alternative could potentially have adverse effects on air quality due to increased congestion and delay, compared to build alternatives, which would improve traffic operations.

Table 4.6 shows a comparative representation of the potential environmental impacts associated with each alternative. Potential impacts were ranked into broad qualitative categories: "Minor Impact," "Major Impact," and "No/Insignificant Impact."

4.8 Preliminary Construction Cost Estimates

Costs for each construction element of TAs 2 and 3 were estimated based on unit costs derived from similar planning project assessments. Capital cost items such as pavement, earthwork, structures, drainage, and other miscellaneous improvements were estimated for each alternative and subtotaled. Costs for contingencies and incidentals were added to this to get order of magnitude cost estimates for each type of improvement. Items such as right of way acquisitions and environmental mitigation efforts were not included in the costs due to the preliminary nature of these estimates.

The costs developed for the screening process were based on general assumptions regarding topographical constraints and feasible constructability. Due to these assumptions, conservative factors were used to derive the costs. Since these costs were "order of magnitude" estimates, they were used as a rough guideline for comparing the relative investments of each preliminary alternative improvement. More detailed cost estimates were developed for the alternatives that resulted from the screening process, and are included in Chapter 5 of this document.

4.9 Preliminary Screening

Each of the alternative improvements was evaluated based on their ability to address the initial Goals and Objectives of the study. Issues such as congestion mitigation, environmental impact, and preliminary cost were considered by ConnDOT, COGCNV, the AC, and corridor communities and over the course of the project preferences for several of the alternatives became apparent. In many cases, it was requested that the study team refine select alternatives in order to mitigate some of these issues and improve the solution. That process constitutes the next chapter in this report.

The following text contains a qualitative review of how each TA addressed the stated goals of the project.

Goal 1: Congestion Reduction

Congestion reduction includes eliminating operational or physical constraints on I-84 and arterials, reducing vehicle hours of travel during peak periods, and utilizing ITS strategies to more efficiently manage transportation services and demand. TA 1 is neutral or strongly negative in meeting the objectives associated with congestion reduction. TA 2 is neutral or generally supportive. TA 3 (Interchange Improvements) and TA 3 (Additional Lane) are generally supportive or strongly supportive.

Table 4.6

Ranking of Potential Environmental Impacts

Alternatives	Prime or Statewide Important Farmland Soil Impacts	Environmental Risk Sites	State Wetland Soils	Threatened and Endangered Species	Wells, Aquifers and Public Water Supplies	Floodplains	Surface Waters	Parks and Recreations (4(f))	Archeological	Historic Locations and Areas	Air Quality Impacts	Sensitive Noise Receptors	Right of Way Acquisitions
Alternative 13	-	-	-	-	×	-	-	-	✓	-	-	✓	-
Alternative 14	✓	-	-	✓	×	-	-	-	✓	-	-	-	-
Alternative 15	✓	-	-	✓	×	×	-	-	-	-	-	✓	-
Alternative 16A	×	-	✓	-	✓	✓	×	-	-	-	-	✓	✓
Alternative 16B	-	-	✓	-	-	-	-	-	-	-	-	-	-
Alternative 17A	✓	-	×	-	-	×	×	-	-	-	-	✓	×
Alternative 17B	✓	-	✓	-	-	×	✓	-	-	-	-	-	×
Alternative 18A	✓	-	×	-	-	-	-	-	-	-	-	-	✓
Alternative 18B	✓	-	×	-	-	-	-	-	-	-	-	-	✓
No Build	-	-	-	-	-	-	-	-	-	-	✓	-	-
Add-a-lane	-	-	-	-	✓	✓	✓	-	-	-	-	✓	-

Ranking of Potential Impacts

✓ = Minor Impacts × = Major Impacts - = No/Insignificant Impacts

Goals 2: Public Health and Safety

The goal of enhancing public health and safety within the corridor comes in many forms. The objectives defined to support this goal focus principally on the reduction in accidents and potential hazards, the reduction of truck-related accidents, the control of traffic speeds, the elimination or reduction of unsafe physical conditions, the reduction of mobile source air quality emissions, and the reduction in noise impacts on sensitive receptors. The safety of the traveling public in both motorized and non-motorized vehicles and the health and safety of adjoining property owners is of paramount importance.

TA 1 is expected to generally result in deterioration in all categories evaluated. Continued increase in demand and congestion will increase accidents, emissions and noise. TA 2 will have a generally positive impact on controlling speed and reducing emissions, a strongly positive impact on reducing accidents and neutral impact on truck accidents, physical upgrades and noise. TA 3 (Interchange Improvements) will generally benefit public health and safety in almost all categories. TA 3 (Interchange Improvements) (Additional Lane) is strongly supportive of most of the objectives, such as accident reduction, control of speeds, and physical roadway conditions, but is expected to be neutral in terms of emissions.

Goal 3: Economic Development

There are four objectives that have been defined to support the goal of continued regional and statewide economic growth and development. TA 1 is generally negative for economic development, while TA 2 is completely neutral. TA 3 (Interchange Improvements) and TA 3 (Additional Lane) are supportive, with TA 3 (Interchange Improvements) being generally supportive and TA 3 (Additional Lane) being strongly supportive.

Goal 4: Community Livability and Quality of Life

There are six objectives defined as a means to measure transportation influence on community livability and quality of life. While TA 1 is supportive of avoiding most environmental impacts, it is neutral or negative for all the other community livability objectives, such as air and noise impacts and improving traffic flow. TA 2 provides generally supportive short-term action without the likelihood of impact on environmental resources. TA 3 (Interchange Improvements) and TA 3 (Additional Lane), because they focus on improved freeway operations, capacity, and management, would have a generally beneficial or neutral impact. The exception is in the avoidance of impacts to environmental resources, in which both would have a negative impact.