3.0 EXISTING CONDITIONS

3.1 Existing Land Use Assessment

The land use assessment includes an overview of both the physical characteristics of the land along the corridor as well as a summary of the current local, regional, and statewide regulatory framework that are relevant to land along the corridor.

3.1.1 Existing Land Use along the Corridor

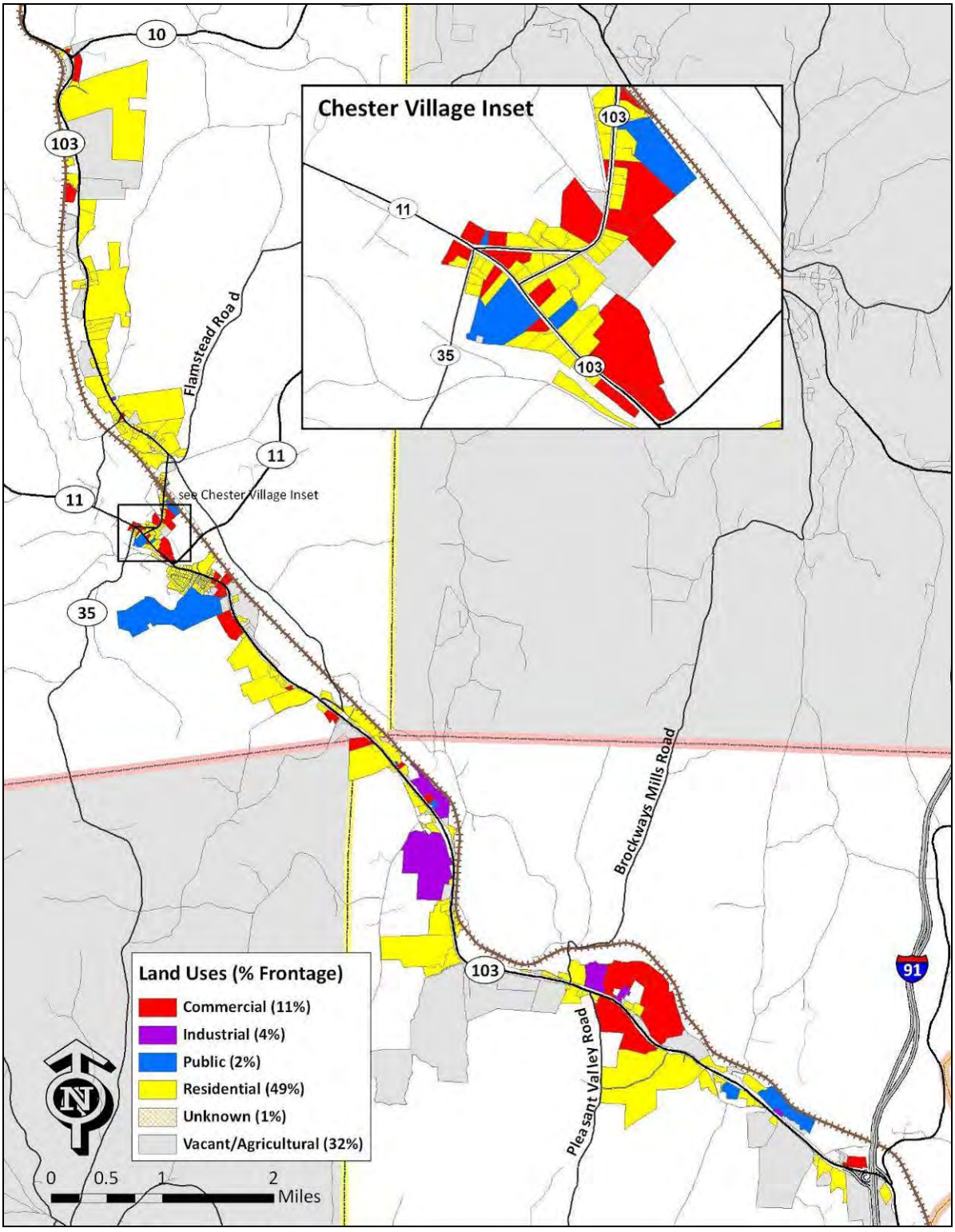
Heading north from I-91 Exit 6, the land uses are generally rural in nature and include a mix of commercial, light industrial and residential uses. Notable uses in this section include the Rockingham Meeting House, the Vermont Country Store, and the Rockingham Transport Park. This general land use pattern continues north to approximately the Green Mountain High School, where the character begins to shift to a denser, mixed-use setting approaching Chester Village. The village scale development continues north to the Chester Stone Village, where it transitions back to a rural setting, with primarily residential uses scattered along VT 103 north to the end of the corridor at VT Route 10 in Gassetts.

Figure 3 shows the existing land use for each parcel that fronts VT 103 in the study area.[1] Based on this assessment, majority of land (81%) along the corridor is either residential or vacant/agricultural. The full break-out of land use types is as follows:

- Residential: 49%
- Vacant/Agricultural: 32%
- Commercial/Retail: 11%
- Industrial: 4%
- Public Use: 2%
- Unknown: 1%

[1] Land use was determined using parcel boundaries, orthophotos, and existing E911 site location data from the Vermont Center for Geographic Information (VCGI). If there were multiple E911 sites of various land uses on one parcel, the land use was designated in the following priority order: Commercial, Industrial, Public, and Residential. Parcels that appeared to have a structure on them from the orthophoto but had no E911 data were identified as Unknown. If no structure was identified, the parcel was identified as vacant or agricultural land.

Figure 3: Existing Land Uses Adjacent to the Corridor



3.1.2 Identification of Environmental Features along the Corridor

Various environmental features can have significant impact on both the built environment and new development along the corridor. For instance, soils that are identified as "prime" or of "statewide" importance are not typically recommended for development because of their potential to be used for farmland. However, prime and statewide soils are not typically recommended for agricultural use when the slopes are greater than 25%. Although prime soils with relatively steep slopes are generally seen as developable land, extreme grade challenges also present a significant obstacle to development.

Other key features that may impact the potential build-out of an area include rivers, streams, and other water bodies, deer wintering areas, wetlands and their buffer zones, designated public lands, rare, threatened and endangered species, and wildlife roadway crossings.

The following environmental features are shown in Figure 4:

- Agricultural soils – prime and statewide
- Slopes 25% and greater

The map shows that much of the land adjacent to VT 103 is classified as valuable agricultural soil, given its location following the Williams River. Steep slopes in excess of 25% are scattered along the entire corridor.

Figure 5 shows the extent of identified and mapped wetlands from the Vermont Significant Wetlands Inventory and the FEMA Flood Zones along the corridor. The graphic shows a large number of wetlands and high risk flood zones along the corridor, given it's proximity to the Williams River. In the area north of Chester Village between the Stone Village and Gassets, VT 103 experiences occasional flooding often resulting from ice jams on the adjacent town bridges leading to flooding of the Williams River which occasionally tops VT 103.

The following environmental features are shown in Figure 6:

- Deer wintering areas
- Public lands
- Rare, Threatened, and Endangered Species

Figure 4: Environmental Features – Agricultural Soils and Steep Slopes

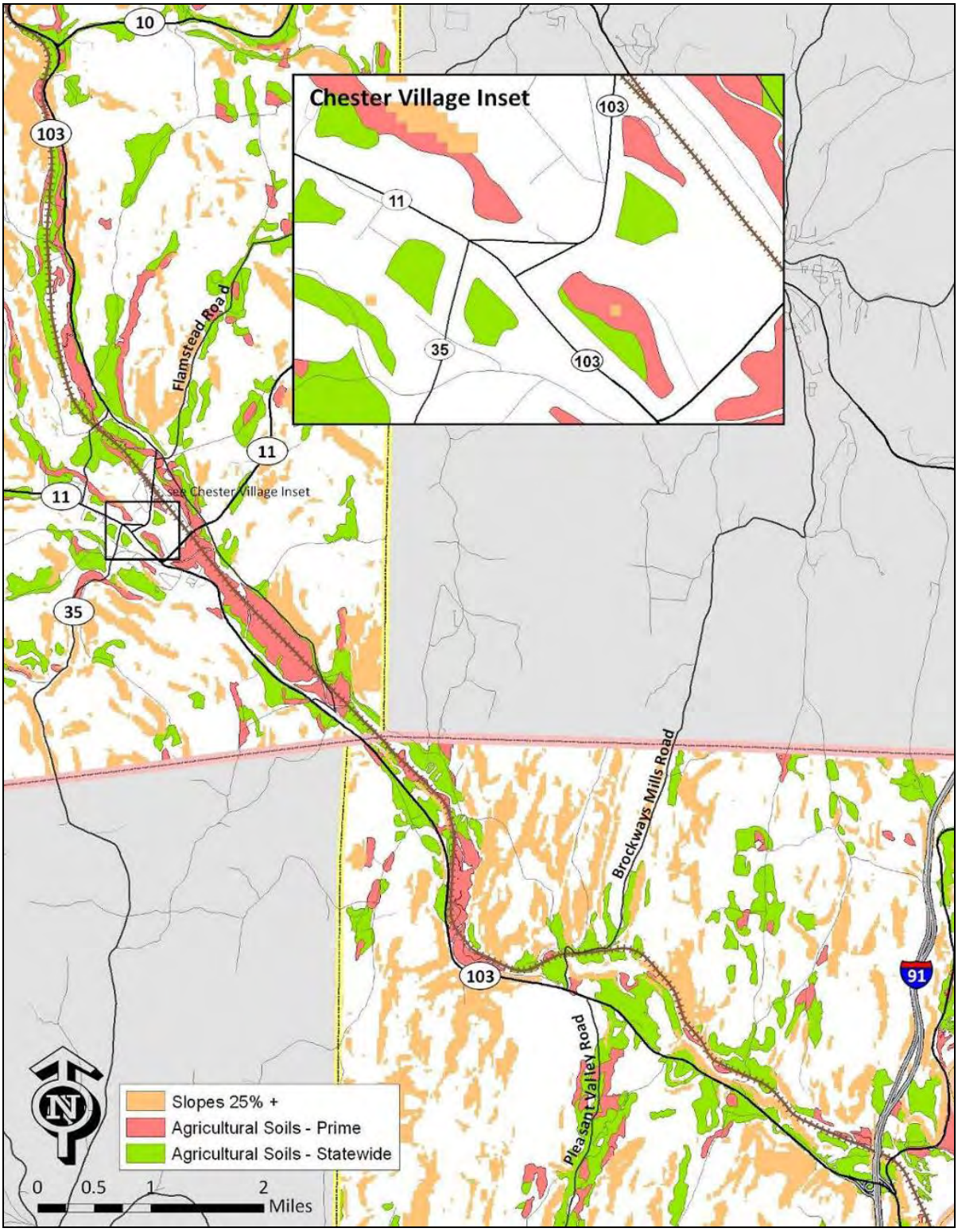


Figure 5: Environmental Features - Wetlands and Flood Zones

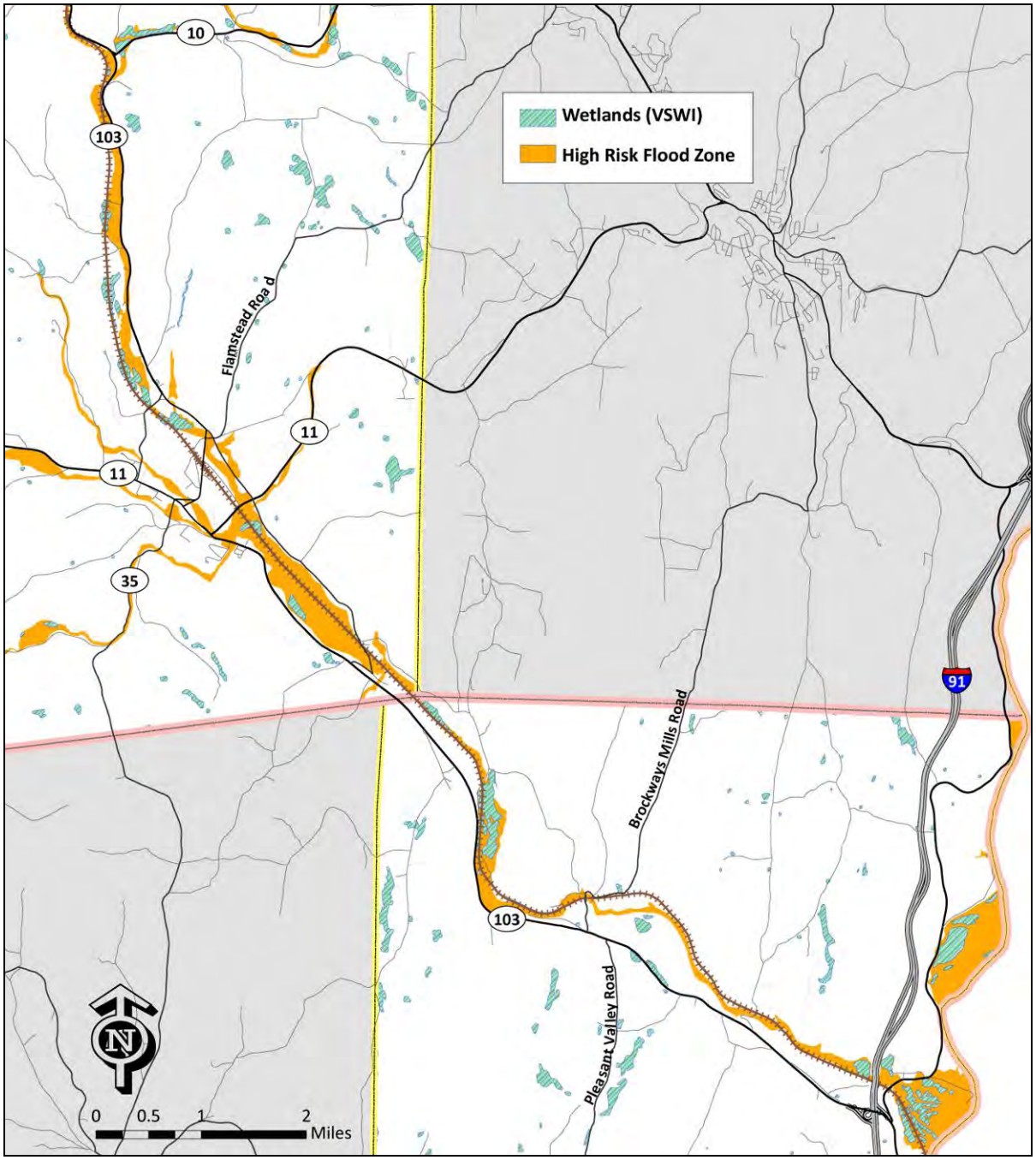


Figure 6: Environmental Features – Rare Species, Deer Wintering Areas, and Public Lands

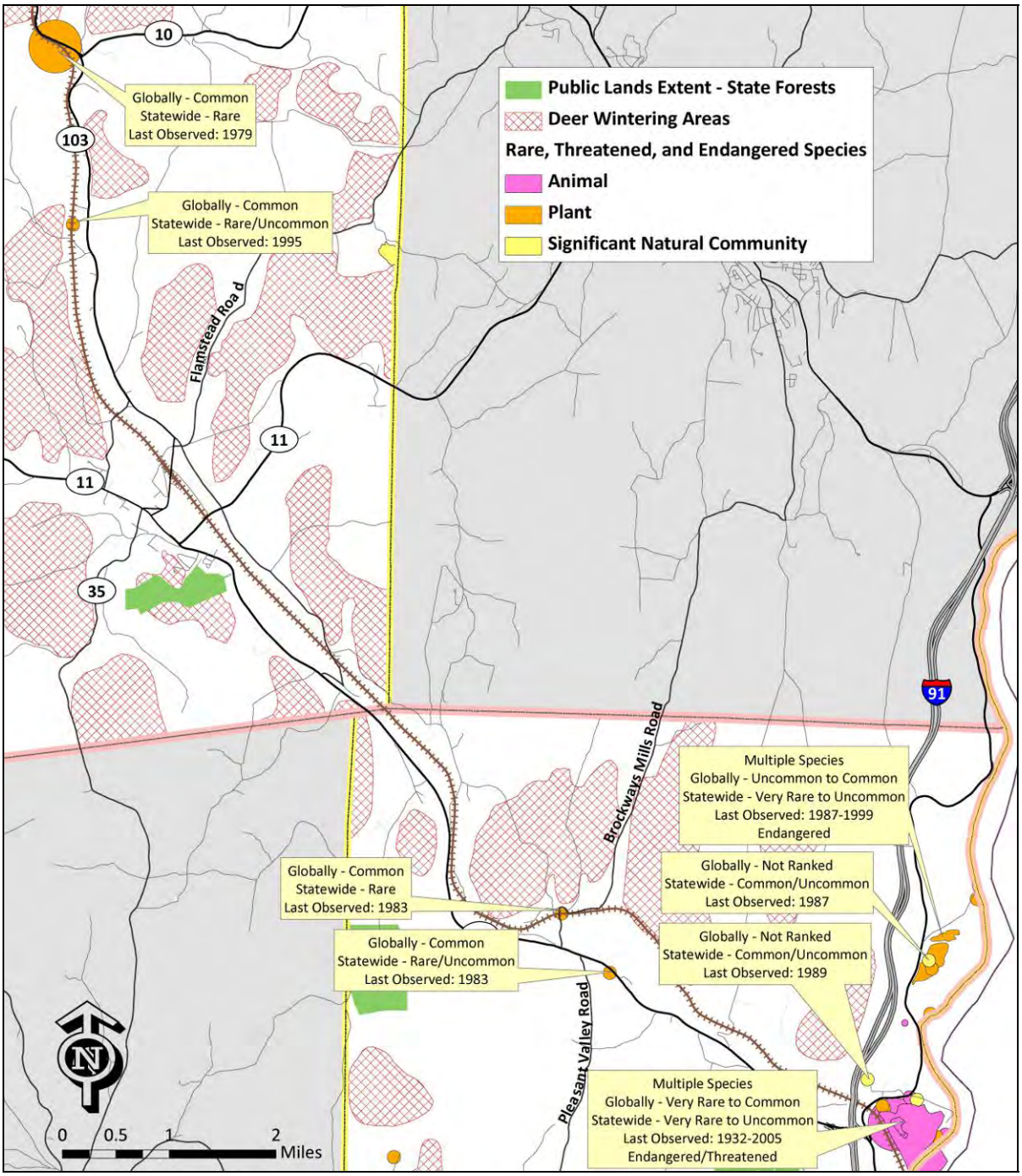
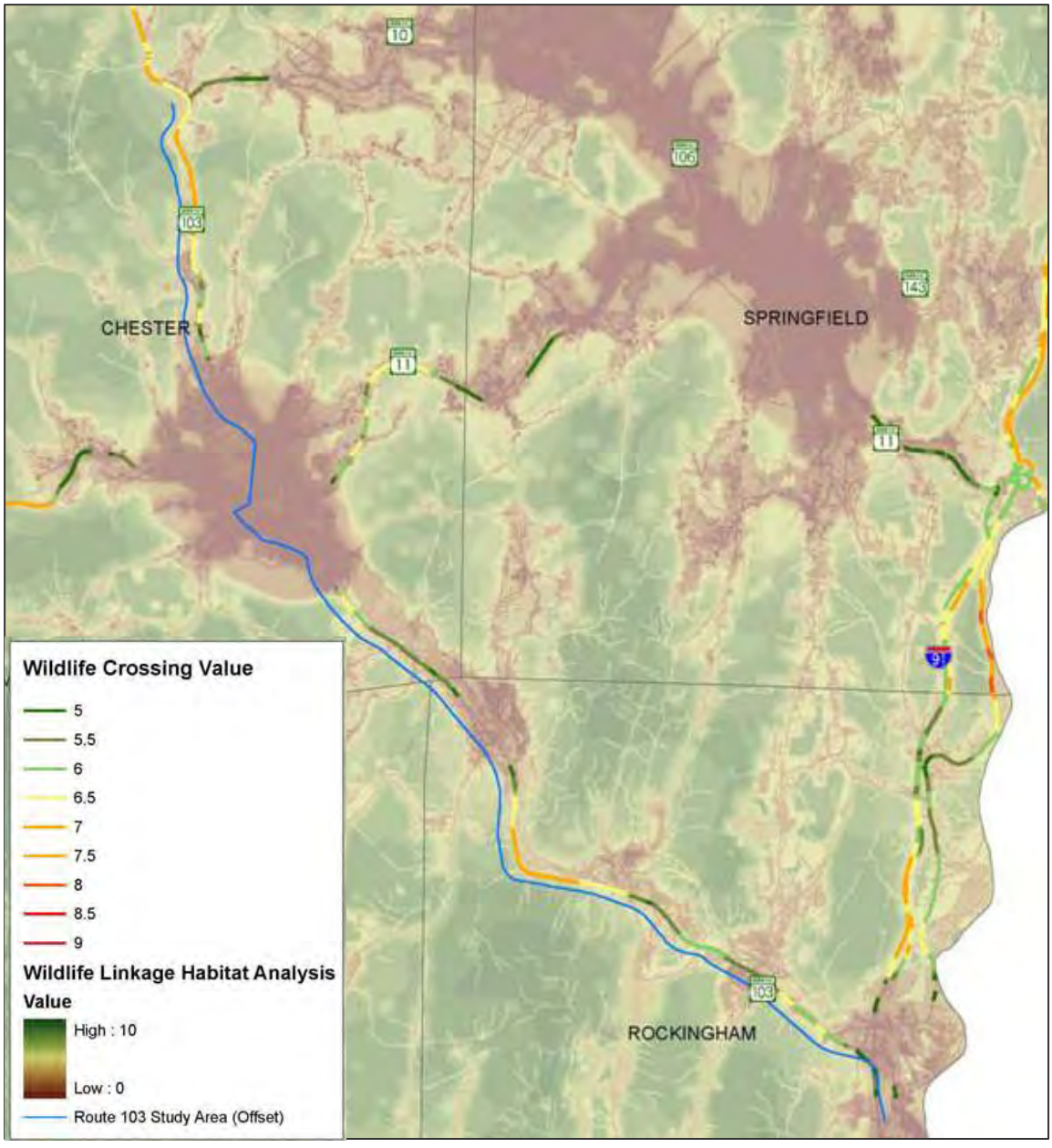


Figure 7 shows the Wildlife Crossing Values and Wildlife Habitat Suitability for each segment of the VT 103 corridor. The crossing value is rated on a scale from 0 to 10, (0 = low and 10 = high), and is based on the number of animals crossing the roadway at various points throughout the corridor.

The two most significant wildlife crossing opportunities in the study area are located at the "elbow" of VT 103 in the vicinity of Stearn Road (Wildlife Crossing Value of 7.0-7.5) and in the vicinity of the VT 10 intersection (Wildlife Crossing Value of 7.0-7.5). These areas are essential to the network of regional wildlife connectivity. Therefore, land use and transportation improvements in these areas should be particularly sensitive to the wildlife habitat and crossing needs.

Figure 7: Environmental Features – Wildlife Crossing



3.1.3 Existing Corridor Management Policies and Practices

This assessment of existing corridor management policies and practices includes the identification of management jurisdictions, and a review of relevant plans, policies and regulations, to gain some insight into the current state of corridor management. This analysis for the VT 103 corridor in the towns of Chester and Rockingham is based in part on an assessment methodology recently developed by the Center for Urban Transportation Research, which includes the use of checklists and matrices to evaluate the current status of inter-jurisdictional coordination, public policies and regulatory standards that apply within a particular corridor.

3.1.3.1 Inter-Jurisdictional Coordination

Figure 8: Current Practice Matrix: Administrative Jurisdiction

Jurisdictions	Yes	Partial	No	Notes
Planning	•			Shared: VTrans, WRC, SWRPC, Rockingham, Chester
Development Regulation	•			Shared: State (Act 250), RPCs (Act 250), Towns (municipal bylaws, ordinances, Act 250)
Access Approval	•			Shared: VTrans (VT 103, I-91 Exit 6), Rockingham (intersecting roads), Chester (Class I, intersecting roads)
Coordination Requirements/ Agreements/ Protocols		•		▪ No intergovernmental memoranda of agreement ▪ Internal application referrals at local level; no application referrals to state for review, comment ▪ New (2007) statutory requirement to refer applications to VTrans for variance requests on state roads ▪ Rockingham, Chester members of RPC planning and project development processes (RPC Boards, Transportation Advisory Committees) ▪ RPCs provide technical assistance (data analyses, studies, draft ordinances, development review) to member communities

It is very common for more than one governmental entity or agency to share responsibilities for corridor management – for the VT 103 corridor, which extends beyond municipal, regional and state boundaries, this is especially true. The following entities have jurisdiction over various, interrelated, aspects of land and transportation planning and development along the VT 103 corridor in Chester and Rockingham:

- **Vermont Agency of Transportation (VTrans)** – for agency transportation planning, state highway access permits, and highway infrastructure maintenance and improvements along the state highway corridor and at the I-91(Exit 6) interchange in Rockingham. VTrans, through interagency review, may participate in Act 250 proceedings, and also may have standing as an "interested person" to participate in local development review hearings.
- **District #2 Environmental Commission (DEC)** – for Act 250 development review, including consideration of a project's potential traffic and transportation infrastructure impacts and its conformance with municipal and regional plans.
- **Windham Regional Commission and Southern Windsor County Regional Planning Commission (RPCs)** – for regional comprehensive and transportation planning programs,

including the adoption of regional plans that include land use and transportation elements, and also regional transportation development plans, studies and improvement programs that are prepared with participation and oversight from the commissions' transportation advisory committees (TACs). Regional planning commissions also review and approve local plans, provide a variety of technical assistance to their member municipalities, and have standing in Act 250 proceedings.

- **Towns of Chester and Rockingham** – for comprehensive municipal planning, land use regulation, and town highway ordinances and access permits, including the adoption of municipal plans that include land use and transportation elements and implementing bylaws, regulations and programs. Local regulatory authority is shared between zoning administrators, a planning commission and zoning board (Rockingham) or a development review board (Chester), highway officials (highway department, public works director, town manager) and local select boards. Both towns are members of their regional planning commissions and have standing in Act 250 proceedings.

Each of these entities has different goals, objectives and responsibilities for corridor management. While the state retains immediate control along and within the highway right-of-way, it has little authority outside of Act 250 to plan for and regulate patterns and densities of development that may affect highway function, safety and efficiency.[1] This largely falls to the towns, under their municipal plans and land use regulations, and through local participation in Act 250 proceedings. The towns, however, have no authority to approve access to state highways, including VT 103 (except for Class 1 segments in Chester), or to independently require improvements within state rights-of-way.

Regional planning commissions serve largely in an advisory capacity to their member municipalities and the state, and as a technical resource to their members. They also, however, are responsible for regional land use and transportation planning, and have a separate role in Act 250 – particularly for projects considered to have a "substantial regional impact" as defined by the commissions. [2]

Efficient and effective corridor management among multiple jurisdictions requires a level of coordination that often is lacking, to the detriment of the highway and the communities and development it serves. Avenues exist for voluntary cooperation, including limited opportunities to participate in planning and project review at all levels, but currently there are few formal mechanisms in place that mandate inter-jurisdictional cooperation – particularly between VTrans and the towns, who shoulder most of the regulatory responsibilities for managing the corridor. Their respective authorities meet, and divide, along the highway right-of-way line. Current state statutes governing both require only that:

- As a condition of highway access approval by the state (or towns for local roads), compliance with all local ordinances and regulations relating to highways and land use is required (19 VSA. §1111).

1 Under Act 250,a project cannot be denied, rather only conditioned, with respect to its potential impacts on traffic congestion and highway safety under Criterion 5; however it can be denied based on its impacts to public investments, including transportation infrastructure under criterion 9(K) .

2 Both regional plans address substantial regional impact. The Windham plan includes a committee process to identify and assess substantial regional impacts that may include negative effects on regional infrastructure. The Southern Windsor plan, updated in July 2009, identifies specific criteria for determining substantial regional impact, which include projects, "Substantially affecting the safety of the traveling public on highways; Generating peak hour traffic equal or greater than 5% of the peak hour capacity of the transportation network serving the project site; Contributing to a reduction in the peak hour LOS from D to E or from E to F."

- In no case shall "reasonable" access to a property be denied, except as necessary to be consistent with state planning goals, and to be compatible with state agency, regional, or regionally approved municipal plans (19 VSA §1111).
- Applications to the state for a driveway or access permit must include a proposed highway access plan for the entire tract of land, and the agency can condition its approval accordingly, to include limits on accesses, the construction of frontage roads and lanes, traffic control improvements, etc.
- No deed for the subdivision of land abutting a state highway can be recorded by a town unless all subdivided lots meet state access requirements, including but not limited to the requirement to install a frontage road (19 VSA §1111).[1]
- The town must provide notices of public hearing to the agency for any requests for variances from setback requirements along state highways (24 V.S.A. §4464 as amended in 2007).[2]

3.1.3.2 Existing Plan Policies

Regional and municipal plans provide the statutory policy basis for managing growth and development along highway corridors. Current plan goals, policies and objectives that address development and transportation systems along the VT 103 corridor are summarized in Figure 9 below, and are highlighted as follows.

- All regional and municipal plans reviewed recognize the importance of VT 103 as a major east-west arterial serving local communities, the larger region and beyond. All plans note that VT 103 has been designated as part of the National Highway System (a concern of Chester residents) and the Vermont Truck Route Network[3]. It is also a designated Class 1 town highway through Chester Village.
- All plans identify functional conflicts resulting from the fact that VT 103 carries both through traffic from I-91 to ski areas and RT7, and local traffic, especially in villages and hamlets along the corridor.
- VT 103 has experienced steady increases in weekday truck traffic and seasonal ski area traffic, resulting in traffic congestion and safety hazards, especially in village areas. All plans reference recent traffic management planning for ski areas, coordinated through the regional planning commissions, and the need to better address both truck traffic and congestion along the corridor. [4]
- Needed transportation system improvements are identified in regional and local plans – including a bridge replacement (BR4) in Rockingham, sidewalk and intersection improvements in Chester (RT 103,/RT 11/Main Street), shoulder widening for recreational use between Chester Village and Gassetts, and a park-and-ride facility at Exit 6 in Rockingham.

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1 Many municipal clerks, who are responsible for recording deed and subdivision plats, are not aware of or have difficulty administering this requirement – as a result it is often ignored, as noted in a July 9, 2007 letter from the agency to municipal clerks.

2 A previous statutory requirement for municipalities to refer applications for development within 500 feet of an interchange ramp to the agency for review was repealed in 2004.

[3] The State Truck Network was eliminated under the FY 2010 Transportation Bill (H.438)

[4] See *Ski Corridor Traffic Management Study*, RSG, 2004, for reference.

Figure 9: Current Practice Matrix: Plan Policies, Recommendations

	VT 103 Corridor	Growth/Development	System Management
Windham Regional Commission Plans: **Regional Plan (2006)** **Regional Transportation Plan (2006)**	▪ Principal arterial, connects with I-91 ▪ NHS Highway ▪ VT State Truck Route ▪ In fair condition (100%) ▪ Steady traffic increases– both commercial and ski area traffic – traffic, speed particular concerns ▪ Functional conflicts – serves both through and local traffic ▪ Scheduled improvement: BR4 on VT 103 (ranked 6th) ▪ Awareness of connections between land use and transportation have increased – cyclical (feedback loop)	▪ Emerging development pattern –scattered growth on state highways, secondary roads ▪ Concentrate development in Regional Centers (2) and Villages (23) – none on corridor ▪ Direct residential development in rural areas to hamlets to prevent rural sprawl ▪ Minimize effects of strip development, encourage clustering <u>Land Use Designations</u>: ▪ Rural Lands ▪ Rural Residential ▪ Productive Rural Lands ▪ Resource Lands	▪ Develop innovative design programs, including access management programs to provide safe access and mobility ▪ Consider secondary growth that results from transportation infrastructure improvements and its effect on land use in all system decisions ▪ Use access management (in high intensity mixed use areas) to ensure proper function, safety and performance of roadways ▪ Encourage preservation of rights-of-way

Rockingham **Town Plan (2005)**	▪ Major arterial highway connecting to I-91 (Exit 6) ▪ Town subject to heavy through traffic ▪ Truck terminal complex on RT 103−access ▪ Work with state, WRC to reduce truck traffic (RT 103, villages) ▪ Review potential develop-ment, land uses near Exit 6 in view of potential traffic increases− especially truck, seasonal ski area traffic ▪ Evaluate transportation projects w/re to immediate, long-term impacts on growth and development ▪ Support Park & Ride at Exit 6	▪ Develop in an orderly fashion − to maintain viable village and urban centers, sustain character of rural areas ▪ Rockingham− hamlet ▪ Road capacity affects development potential; development impacts highway budgets. ▪ Encourage clustering for residential, commercial, industrial development – amend PUD regulations <u>Land Use Designations</u>: ▪ Commercial-Industrial ▪ Rural (low density) ▪ Historic Hamlet (Meeting House area) ▪ Resource (low density) ▪ Conservation (open)	▪ Adopt road policies (acceptance) ▪ Review all access points along RT 103 for compliance with town and state highway standards ▪ Limit access points, combine driveways when feasible to serve new lots; ▪ Adopt a policy to limit curb cuts (SB)

	VT 103 Corridor	Growth/Development	System Management
Southern Windsor RPC Plans: **Regional Plan (2003)** **Regional Transportation Plan (2005)**	▪ Preserve, maintain and Improve the function of RT 103 – important regional, state, national highway ▪ Major east-west arterial ▪ NHS Highway ▪ VT State Truck Network ▪ Regional "primary road" ▪ Class 1 – Chester (village) ▪ Traffic congestion issues (seasonal, ski area traffic) ▪ Truck traffic issues, especially along VT 103, in villages ▪ VHB Study (1999) – three areas w/ geometrical constraints ▪ VTrans – backlog of scheduled improvements Initiate planning process to: ▪ Inventory traffic volumes annually ▪ Identify geometric constraints ▪ Identify problem intersections ▪ Implement Ski Country Traffic Management Plan ▪ Continue RT 103 corridor planning process w/ towns, state, private interests to maintain integrity of corridor	▪ Strip development, seasonal traffic congestion problems ▪ Recent trend – rural residential development ▪ Chester expected to develop, especially north of village between RT 11 and RT 103 ▪ Support growth center designation, smart growth principles ▪ Concentrate development in Regional Centers (Springfield, Windsor), Town Centers (Chester Depot) ▪ Discourage rural sprawl, strip development Encourage economic growth along RT 103 corridor that does not degrade function <u>Land Use Designations</u>: ▪ Mixed Use (Village) ▪ Forest ▪ Agriculture/Open ▪ Rural ▪ Conservation	▪ Need better coordination between land use, development and transportation enhancements through corridor management ▪ Access management categories 3, 6 (village) ▪ AM preserves carrying capacity of highway ▪ Work with towns to inventory AM constraints ▪ Work with PCs to develop AM regulations ▪ Encourage town participation in issuance of access permits on state highways ▪ Work with large traffic generators to implement TDM options ▪ Traffic calming in villages

Chester Town Plan (2003 – readopted 2008)	▪ Major arterial, I-91 to RT 7 ▪ NHS Highway – designation concerns local residents ▪ VT Truck Network ▪ Class 1 through village ▪ Large increases in weekday truck traffic and seasonal ski area traffic– oversized loads, congestion, reduced safety ▪ Functional conflicts –local road for Chester residents ▪ Bad intersection –RT 103/ RT 11/Maple Street, tight turning radius ▪ Narrow shoulders from Gassetts to Chester Village – widening needed, enhance pedestrian cyclist safety ▪ Ski area traffic mitigation study (WSA) ▪ Sidewalk upgrades needed along VT 103 in village	▪ Excessive strip development on RT 103 discouraged ▪ Allow truck stops on RT 103 between Chester Village and Rockingham w/ shops, services, light industrial uses, freight transfer, tank farms, etc. (Highway Frontage Special Use) <u>Future Land Use Designations</u> ▪ Forest ▪ Agriculture ▪ Recreation ▪ Rural Residential ▪ Residential ▪ Village Residential ▪ Conservation Residential ▪ Mixed Use Village ▪ Highway Frontage Special Use ▪ Aquifer Protection Area ▪ Industrial ▪ Hazardous Materials ▪ Mineral Deposits	▪ Design. locate and maintain transportation systems consistent with planned land use ▪ New roads must meet town highway standards ▪ Widen, realign RT 103/ RT 11/ Maple St. intersection; acquire parcel on northeast corner ▪ Access management to balance access , mobility, avoid strip development ▪ Village parking plan ▪ Expand public and rail transportation to reduce traffic on RT 103 ▪ Work w/other towns along corridor to address truck, ski area traffic ▪ Costs of road improvements to be borne by developers

- All plans discourage strip development and scattered residential development, particularly in rural areas along the corridor, and promote concentrated, mixed use or higher density development within or adjacent to existing regional centers, villages and hamlets – especially within those areas currently served by water and wastewater infrastructure – to minimize sprawl and reduce traffic impacts.
- At the same time, there appear to be conflicts in some proposed land use designations along the corridor – especially between local and regional plans – in part because proposed land use districts tend to be more specifically defined at the municipal level, as the basis for zoning. For example, locally proposed commercial and industrial districts along the corridor in Rockingham (e.g., around Exit 6) and Chester (southeast of the village) do not necessarily correspond to more generally defined rural residential or rural resource districts on regional land use maps. Some of these districts (e.g., Chester's proposed "Highway Frontage Special Use District") are intended to accommodate potentially high traffic generators that could alter existing development patterns and affect system capacity.
- The Exit 6 interchange area is not specifically addressed in local or regional plans, except for a recommendation in the Rockingham Town Plan that potential development and land uses near this exit be reviewed for their impacts on corridor traffic. A "Commercial-Industrial" District is recommended for the northern portion of the

interchange area. There are no recommendations for preparing a more detailed interchange development or access management plan.

- All plans include observations that transportation and land use planning are necessarily interconnected – that highway access can promote development, and development can affect transportation system capacity. Maintaining and enhancing existing system capacity is consistently given priority over building new infrastructure.
- All plans identify the need for better access management along the corridor – especially within higher density, mixed use areas –to balance access and mobility needs and to maintain the route's functional capacity. Local plans recommend the adoption of access management policies and standards under local regulations, and also updated highway standards.
- The Windham Regional Plan cites the need for highway right-of-way preservation. The Southern Windsor Regional Plan also recommends traffic calming in villages, and working with larger traffic generators to implement traffic demand programs. The Chester Town Plan recommends expanded public and rail transportation to reduce traffic on VT 103.
- All regional and local plans support continued efforts, coordinated through the regional planning commissions, to jointly plan for and better manage development, truck and resort traffic congestion, and needed transportation system improvements along the VT 103 corridor.

3.1.3.3 Development Regulations

The regulation of development along the VT 103 corridor is largely the responsibility of the Towns of Chester and Rockingham under their adopted land use regulations and highway ordinances. As noted earlier, VTrans retains jurisdiction over access to the highway right-of-way along most of the corridor (outside of Chester Village), which extends to the subdivision of adjacent land. The agency, regional planning commissions, and towns also have party status in Act 250 proceedings for the review of larger developments along the corridor – including the review of their traffic and highway impacts.[1]

Chester and Rockingham have both adopted zoning bylaws that regulate the type, density and location of development along the VT 103 corridor, and separate subdivision regulations that control land subdivisions and supporting infrastructure – including the layout of new lots and roads. In addition to administrative officers (zoning administrators), Chester's regulations are administered by a single development review board; Rockingham's planning commission reviews site plan and subdivision applications, while the zoning board of adjustment reviews conditional use applications and variance requests. Neither community has adopted a unified (combined) set of development regulations, so the standards under each set of regulations may vary, especially as amended over time. Some regulations also predate and therefore do not incorporate more recent statutory requirements under the Vermont Planning and Development Act (24 VSA Chapter 117), as enacted in 2004.

1 For purposes of Act 250 jurisdiction, both Chester and Rockingham are classified as "10-acre towns" – Act 250 applies only to commercial or industrial development on more than 10 acres, or residential subdivisions of 10 or more lots. Given this scale of development, traffic studies are generally required for projects subject to Act 250 review.

A summary of local regulatory practices, existing and proposed, that are relevant to corridor management is presented in Figure 10. Key findings include the following:

- Application requirements under zoning bylaws are not specified in any detail – site plans are generally required for site plan and/or conditional use review. Subdivision regulations include more detailed application requirements – including location (vicinity) maps, subdivision plats that show lots, road rights-of-way, intersections, etc., and supporting documentation – including road, bridge and culvert design specifications.
- No bylaws require the submission of trip generation rates, traffic impact studies, infrastructure capacity analyses, or public transit information that could be use to evaluate the impacts of proposed development on highway infrastructure and transit routes.
- Currently there are no application referral requirements in the regulations that allow local and state highway officials to review applications prior to the issuance of development approvals – though at the local level this is now done through staff. Local access permits are commonly issued prior to development approvals in both communities, and in Rockingham are required for subdivision approval.
- None of the bylaws cite the need for state highway permits to access state highways, or refer to VTrans "Access Management Program Guidelines" (2005) that also regulate land subdivision and highway access along VT 103 and other state highways.

Figure 10: Current Practice Matrix: Development Regulations

Bylaw Provisions	Chester	Rockingham
Application Requirements:		
Location (adj. lots, rights-of-way, etc)	SR	SR
Site plan (access, parking, circulation)	ZB (CU	ZB (SP, PUD)
Subdivision plat (lots, rights-of-way, etc.)	SR	SR
Driveway, road, intersection specifications	SR	SR
Bridge, culvert design specifications	SR	SR
Trip generation rates		
Traffic impact/ infrastructure capacity analyses		
Transit information (routes, stops)		
Phasing schedule	SR	SR, ZB (PUD)
Referral/highway, public works − local highways		SR – file copy of application
Referral/VTrans − state highways		
Zoning Districts (area, frontage):		
Highway ribbon/strip districts	C –Commercial (40,000 SF)	C-I(2)−Comm-Industrial (1A)
Compact village/nodal districts	R20−Residential (20,000+ SF)	MHHD − Meeting House (2A)
Rural/low density districts	R80−Residential (80,000 SF)	RR-1− Residential (1A/2A)
Conservation/resource districts	M&M−Mining; APD2−Aquifer	RC − Rec/Conservation (2A)
Interchange districts		C-I(2)−Comm-Industrial (1A)
Access management overlay district		
Access Management Standards:		
Traffic generation, impacts	ZB (CU) − no specific standards	ZB (CU) − no specific standards
Statutory frontage, access requirements	ZB − min width 20’/50’	ZB − min width 20’/50’; PUDs
Lot frontage requirements	ZB− district (100’-200’)	ZB− district (none-200’)
Access spacing requirements		ZB− from street intersections
Limit number of accesses /lot, frontage		ZB (SP)−no standards
Elimination, consolidation requirements		ZB (SP)−no standards
Access from secondary roads		
Shared access/cross connections		
Driveway/access design standards		ZB− min 30’ width, except SF,TF
Curbing, other access control standards		
Reference state access standards		
Reference town, state highway permits		SR− waiver (< 5 lots) w/permit
Site Layout Standards:		
Minimum lot width (nonconforming lots)	ZB − 40’ (statutory)	
Maximize internal access, limit external access	ZB (CU, SP?)− no standards	ZB (SP, PUD) − no standards
Allow off-site, shared parking	ZB(CU) − no standards	ZB (SP, PUD) − no standards
Pedestrian sidewalks, paths, connections	ZB (PUD) – no standards	ZB (SP) − no standards
Mid-block pedestrian crossings		
Public transit facilities		

Bicycle facilities, path connections		
Subdivision (Multi-lot) Standards:		
Waiver provision (statutory)	SR– lack of connectivity	SR– lack of connectivity
Merger requirement (nonconforming lots)		ZB– statutory
Master plan for phased development		
PUD/clustering provisions	ZB (PUD)– up to 50% open	ZB (PUD) –no specific standards
Lot layout (e.g., avoid flag, irregular lots)	SR –limited standards	SR – limited standards
Access limits on public highways		
Access limits for re-subdivisions (use existing)		
Internal access/service road requirements	SR –2+ lots	SR–3+ lots
Road, intersection design standards	SR– ref town standards	SR – *and* ref town standards
Road intersection spacing requirements	SR –ref town standards	SR –*and* ref town standards
Road extension/connectivity requirements	SR	SR
Discourage/limit dead-ends, cul-de-sacs	SR – allowed	SR– allowed
Pedestrian sidewalk, path requirements	SR– no standards	SR– no standards
Infrastructure Improvements:		
Reference official map, capital program		SR – if adopted
Threshold (e.g., LOS) standards		
Installation, inspection requirements	SR, ZB (certification)	SR
Bonding requirement	SR	SR, ZB (CU, SP)
Right-of-way reservation requirements		SR
Dedication/acceptance standards	SR	SR

SR– Subdivision Regulations, ZB– Zoning Bylaw, SP– Site Plan Review, CU– Conditional Use Review, PUD – Planned Unit Development

- Zoning district designations in both communities allow for moderate densities of industrial, commercial, and residential development along the highway corridor. A range of uses is allowed in most districts. Minimum required lot sizes range from ½ acre (or 20,000 ft ^{2}) in higher density residential and commercial districts, up to ~4.5 acres (200,000 ft ^{2}) in Chester's Aquifer Protection District. Minimum lot size requirements vary by district, based in part on the availability of water and sewer infrastructure. Current district designations, which predate updated plans, do not always correspond to plan land use designations.
- Highway access also appears to play a role in some district designations – including more linear commercial zoning districts along the route and a commercial-industrial zoning in the vicinity of Exit 6. There are also district designations along the route that allow for concentrated (nodal) mixed use development in areas served by water and sewer. Zoning districts – including allowed uses and densities of development – should be reviewed with regard to potential traffic generation rates, and for potential impacts on available highway infrastructure capacity.
- Frontage requirements affect access spacing. Both zoning bylaws reviewed include basic statutory requirements for access to non-frontage lots, and for the merger of small nonconforming lots that subsequently come under single ownership. Chester's bylaw also specifies that pre-existing nonconforming lots must be at least 40 feet wide for development.

- Both bylaws also include minimum lot frontage requirements for most (but not all) zoning districts that apply district-wide and relate to minimum lot sizes (and the availability of water and sewer) rather than access spacing requirements. These range from 100' to 200' for new lots, in districts where road frontage is required.
- New roads trigger major subdivision review under both sets of subdivision regulations, however minor subdivisions (less than five lots) with frontage on public roads may be reviewed as minor subdivisions without any requirements for shared access. In Rockingham, the planning commission can waive all subdivision regulations if highway access (and health) permits have been obtained. There are separate access requirements for lots that do not have frontage on public highways.
- Zoning bylaw provisions regarding to access and site circulation (under site plan review) and impacts to traffic on highways in the vicinity of a project (under conditional use review) merely restate statutory "considerations." There are few specific access management requirements under local zoning bylaws – and no VT 103-specifc frontage or access requirements.
- Rockingham's bylaw includes minimum driveway standards that apply to all but single and two-family dwellings – a minimum cleared width of 30 feet, and a minimum separation distance of 100' from street intersections. The bylaw also includes specific frontage and access requirements for gas stations.
- On the other hand, the subdivision regulations for both Chester and Rockingham reference local highway ordinances for the design and construction of new roads and intersections. Rochester's subdivision regulations also include specific highway design standards in addition to referenced town highway ordinance requirements.
- Both subdivision regulations include road connectivity requirements for future extensions to adjoining parcels, but also allow for dead-end roads and cul-de-sacs. Neither regulation limits the number of subdivision accesses onto public highways, or access to re-subdivided parcels, as required under VTrans' access management guidelines.
- None of the regulations incorporate clear standards or thresholds (e.g., trip generation rates or levels of service) that trigger the need for highway infrastructure improvements to be paid for by the developer, in proportion to the impacts of development. Rockingham's subdivision regulations reference infrastructure depicted on the town's official map (if adopted) and improvements identified in the town's capital improvement program, to be included in subdivision design. The regulations also include right-of-way reservation requirements to accommodate planned improvements.
- Both sets of subdivision regulations include specific requirements for certifications, municipal inspections, and performance bonding to ensure that roads and other infrastructure are installed as required. Chester's zoning bylaw also allows performance bonding as a condition of approval under site plan or conditional use review.

Local bylaws and highway ordinances should be further reviewed to ensure that standards of review, as applied by the state, by local planning commissions and zoning or development review boards, and by town highway officials are consistent. A full range of access management tools should also be considered in preparing bylaw updates, to more effectively address land use and development impacts on transportation infrastructure capacity.

3.2 Existing Transportation Assessment

3.2.1 VT 103 Highway System Classification

VT 103 is an important northwest to southeast route through southern and central Vermont, connecting I-91 to US Route 7 in Clarendon. As such, the segment of VT 103 passing through the Towns of Rockingham and Chester plays a critical role in both the and regional transportation network for long distance vehicular and freight mobility as well as on the local level for business and residential access. Some of the important classifications for VT 103 are highlighted here and discussed below.

- Functional Classification: Rural Principal Arterial
- Roadway Jurisdiction: Vermont State Route under State jurisdiction for maintenance, except for the Class 1 section in Chester Village
- Access Management Classification:[1]
    - Category 3 north and south of Chester Village[2]
    - Category 6 in Chester Village[3]
- Designated part of the National Highway System

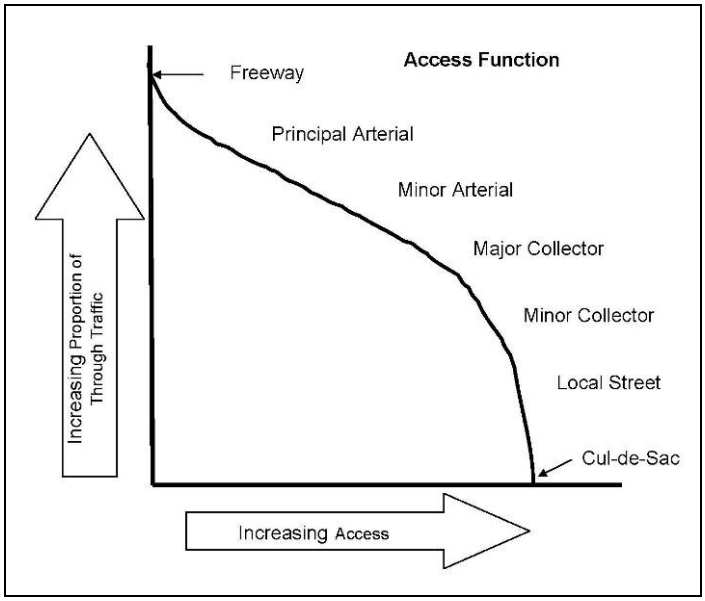
The Federal Highway Administration's roadway functional classification system, depicted in Figure 11, is organized as a hierarchy of facilities, based on the degree to which the roadway serves mobility and access to adjacent land uses. Freeways and interstate highways, at the top of the hierarchy, are devoted exclusively to vehicle mobility, with no direct access to adjacent land. Arterials and Collectors provide both mobility and access to adjacent land uses. The local road system is devoted exclusively to providing local access, with limited capacity and relatively slow speeds.

[1] Note that VTrans cannot deny "reasonable access," and that these classifications are recommended guidance.

[2] Access Management Category 3: Medium to high speed or medium to high volume roadways over medium and long distances that provide interregional, inter-city and intra-city travel needs.

[3] Access Management Category 6: Moderate to low speed roadways with moderate to high traffic volumes over medium and short travel distances providing inter-city, intra-city, and intro-community travel needs.

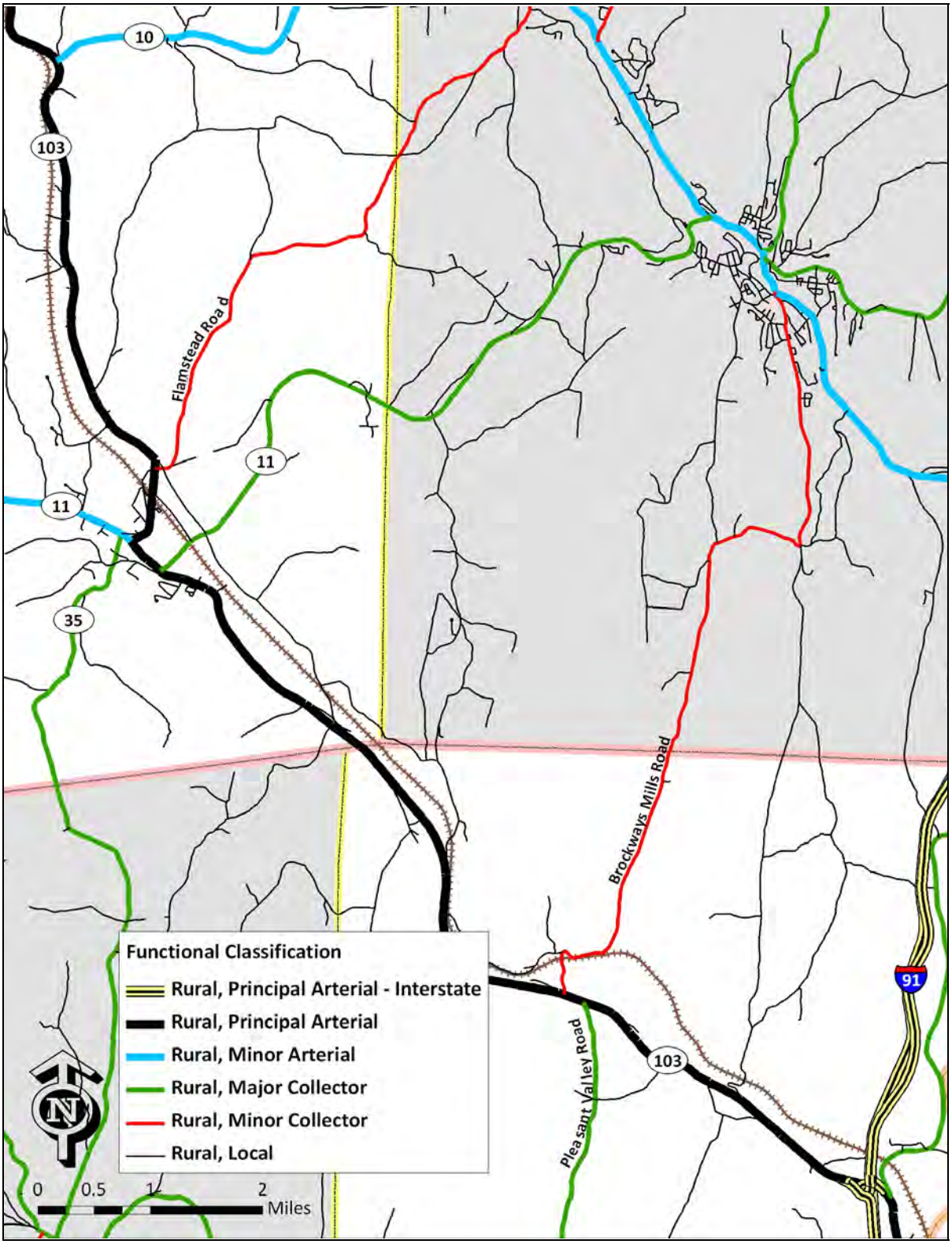
Figure 11: Conceptual Roadway Functional Hierarchy



The functional classification of all roads along and adjacent to the study corridor is shown in Figure 12. The VT 103 study corridor is designated as a rural principal arterial through the study area. The principal arterial designation places a higher priority on mobility than accessibility along the corridor. As a primary northwest-southeast route through southern and central Vermont, the VT 103 corridor serves a regional role to provide adequate mobility for through vehicles. However, the built up nature of Chester Village and the resulting cluster of commercial and retail uses in this section of the corridor indicate that a reasonable priority should be placed on access to abutting parcels.

The function of VT 103 as a rural principal arterial should be taken into consideration in state access permitting and local land use decision-making processes. Exceptions to this functionality should be made to provide access to properties along VT 103 within Chester Village and other areas of concentrated development as designated by town and regional plans. Such flexibility is essential in order to support local, regional and state planning goals.

Figure 12: Functional Classification



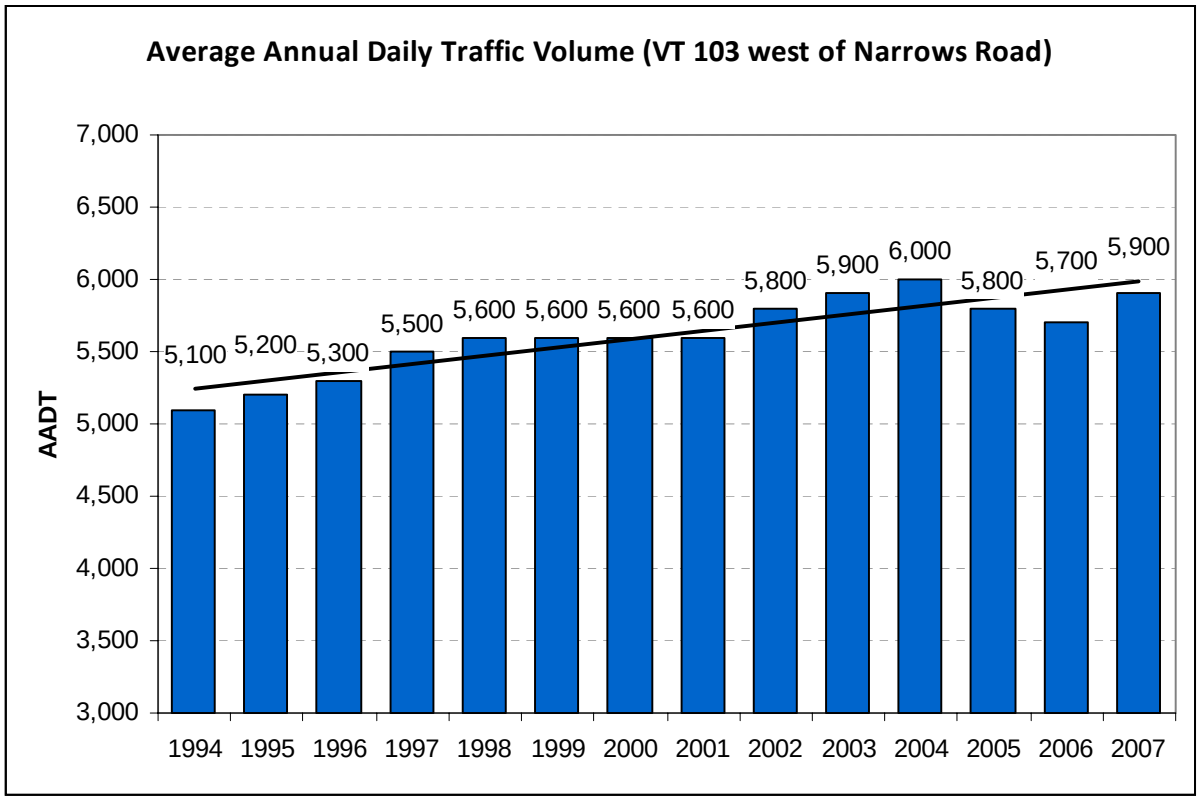
In addition to being classified as a rural principal arterial, VT 103 across the state is designated as part of the National Highway System (NHS). The 160,000-mile National Highway System (NHS) was established in 1995 by Congress, consisting of roadways judged to be important to the nation's economy, defense, and mobility. It consists of the Interstate system, the Strategic Highway Network (STRAHNET), nationally designated intermodal connectors, and principal arterials that serve both Interstate and interregional travel, and provide important intermodal connections. Vermont's NHS consists of 320 miles of Interstate Highways (which coincide with the STRAHNET system), 9.5 miles of intermodal connectors, and 374 miles of principal arterials.[1]

3.2.2 Traffic Volume Assessment

3.2.2.1 Historic Traffic Volume Trends

Since 1994, Average Annual Daily Traffic (AADT) on VT 103 just west of the intersection with Narrows Road has increased on average by 1.2% annually (Figure 13). This is greater than the statewide average for similar roadways which declined -0.2% per year between 2002 and 2007.[2]

Figure 13: Average Annual Daily Traffic Volume on VT 103 west of Narrow Road (1994-2007)[3]



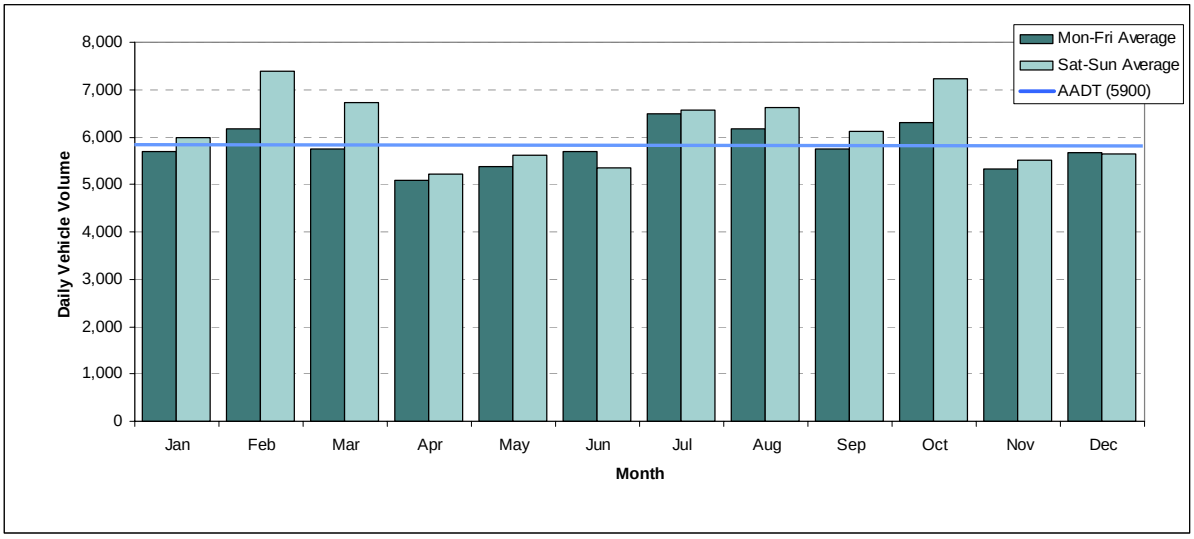
[1] Vermont Highway System Policy Plan, VTrans, 2004.

[2] VTrans, 2007 Continuous Traffic Counter Grouping Study and Regression Analysis Report ("The Red Book"), Short Term Growth Factors for Rural Primary and Secondary Continuous Traffic Counters.

[3] From VTrans CTC P6X249, located on VT 103, 0.35 miles West of Narrows Road.

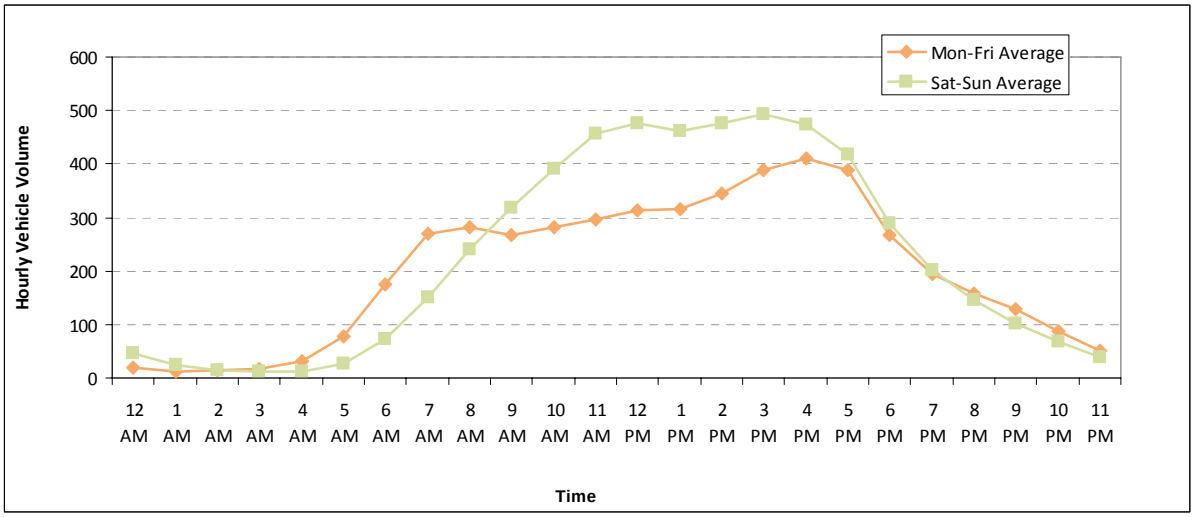
In the study area, traffic volumes tend to be highest in the late winter, summer months and during fall foliage season, which reflects the tourism-based nature of the corridor. With the exceptions of June and December, weekend daily traffic volume is appreciably greater than weekday daily traffic volume, which further demonstrates the tourism-driven character of traffic along the corridor (Figure 14).

Figure 14: 2007 Seasonal Traffic Volume Fluctuations on VT 103 west of Narrows Road Intersection



In 2007, weekday traffic volumes follow a typical workday cycle, with clear AM and PM peak hours. Saturday and Sunday traffic typically peaks during the midday hours (Figure 15).

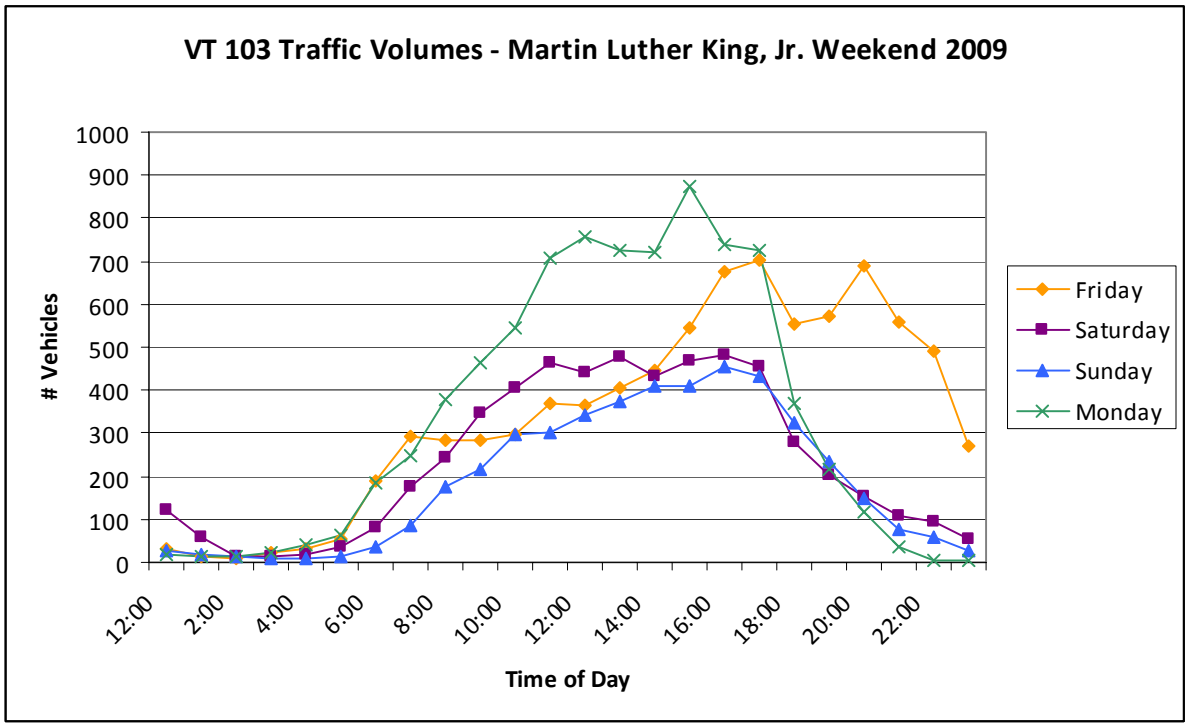
Figure 15: 2007 Daily Fluctuations



On Martin Luther King, Jr. Day Weekend 2009, an automatic traffic recorder was placed on VT 103 just south of Meeting House Road to monitor traffic volumes during a busy ski weekend. The traffic volume during that weekend shows a clear rush-hour peak on Friday afternoon and a second peak on Friday evening. This second peak is indicative of heavy traffic volumes on VT 103 headed towards local winter recreational areas. The highest volumes during this weekend

were recorded on Monday between 3:00 and 4:00 PM, most likely when the majority of ski-related traffic was headed home. These traffic patterns are shown graphically in Figure 16.

Figure 16: 2009 Martin Luther King, Jr. Holiday Weekend Traffic

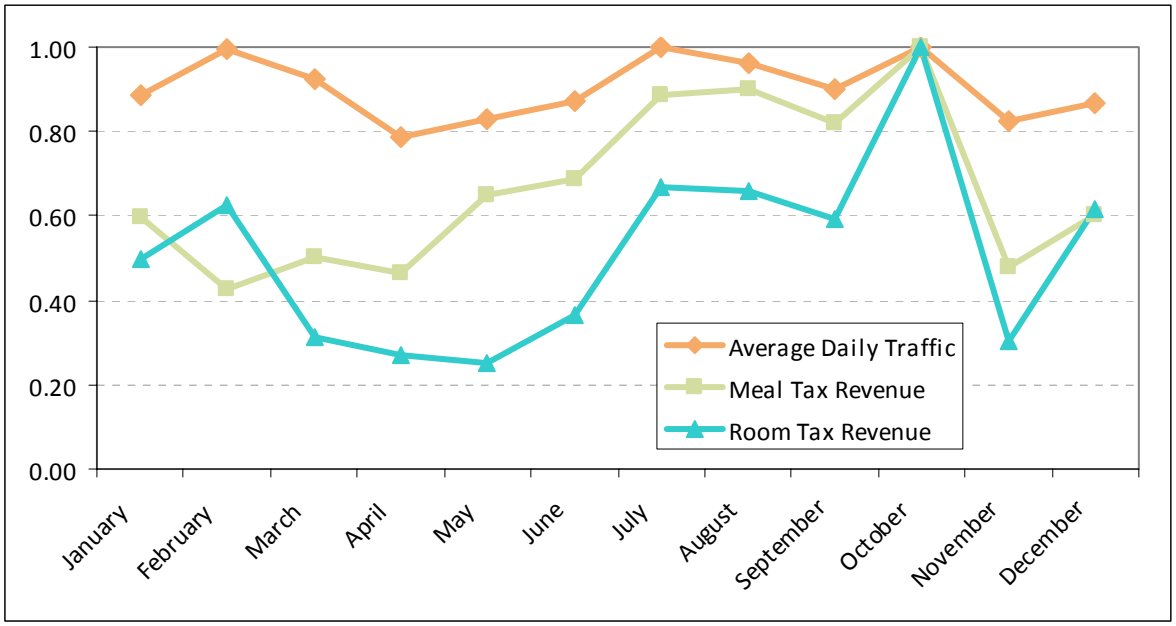


3.2.2.2 Traffic and Business Volume Fluctuations

Business activity in Chester closely mirrors the average daily traffic, which peaks in February, July and October and is driven primarily by tourism throughout the year (see Figure 17).[1] Comparable data for Rockingham was not available.

[1] Based on Room Tax Revenue and Meal Tax Revenue from the Vermont Department of Taxes, *Meals & Rooms Monthly Report*, 2007 Updated, Chester data (Rockingham Rooms revenue N/A).

Figure 17: 2007 Seasonal Traffic and Business Fluctuations in Chester



3.2.2.3 Average Volumes on Secondary Roads

Annual Average Daily Traffic Volumes were obtained from VTrans automated traffic counts for selected secondary roads off of VT 103 in the study area. These volumes are shown below in Table 1.

Table 1: Average Annual Daily Traffic Volumes on Secondary Roads along the Corridor

Secondary Road	AADT	Location	Source
VT 10	3,100	East of VT 103	VTrans, 2006
VT 11	4,600	West of VT 103	VTrans, 2006
VT 11	4,000	East of VT 103	VTrans, 2006
Pleasant Valley Rd	580	VT 103 to Corey Hill Road	VTrans, 2007

3.2.2.4 Intersection Volumes

Turning movement counts were obtained from VTrans at the following intersections with VT 103:

- VT 10 *(15 July 2008)*
- Depot Street *(18 February 2009)*
- VT 11/VT 35/Depot Street *(15 July 2008)*
- Maple Street/VT 11 *(7 August 2007)*
- VT 11 (Pleasant Street) *(28 July 2006)*
- Pleasant Valley Road *(1 June 2007)*
- I – 91 SB Ramp *(16 July 2008)*
- I – 91 NB Ramp *(16 July 2008)*

Intersection traffic volumes were adjusted to represent the Design Hour Volume (DHV) in 2009 using the following two adjustment factors:

- **Design hour adjustment factor**: The Design Hour Volume is the 30th highest hour volume of traffic for a year at a given location. In the study area, the DHV adjustment is based on VTrans Continuous Traffic Counter P6X249, located on VT 103 0.35 miles west of the Rockingham Hill Road intersection. The DHV adjustments by intersection are as follows:
    - VT 10 – 1.74
    - Depot Street – 2.23
    - VT 11/VT 35/Depot Street – 1.95
    - Maple Street/VT 11 – 1.95
    - VT 11 (Pleasant Street) – 1.30
    - Pleasant Valley Road – 1.66
    - I – 91 SB Ramp – 1.70
    - I – 91 NB Ramp – 1.70

    These adjustments are particularly high due to the significantly variable traffic on VT 103 due to the variable nature of traffic resulting from the high tourist-related traffic at various times throughout the year.
- **Annual adjustment factor**: The annual adjustment factor represents general background traffic growth and is based on estimated growth in the area. Based on the 20-year growth factor for VTrans Continuous Traffic Counter P6X249, the base year annual adjustment factors increases volumes as follows:
    - 2006 to 2009: 1.8%
    - 2007 to 2009: 1.2%
    - 2008 to 2009: 0.6%,
- The AM and PM peak hour volumes in Figure 18 and Figure 19, respectively, represent the balanced raw volumes with the application of the DHV and annual adjustment factors during the AM and PM peak hours.

Figure 18: 2009 AM Peak Hour Volumes

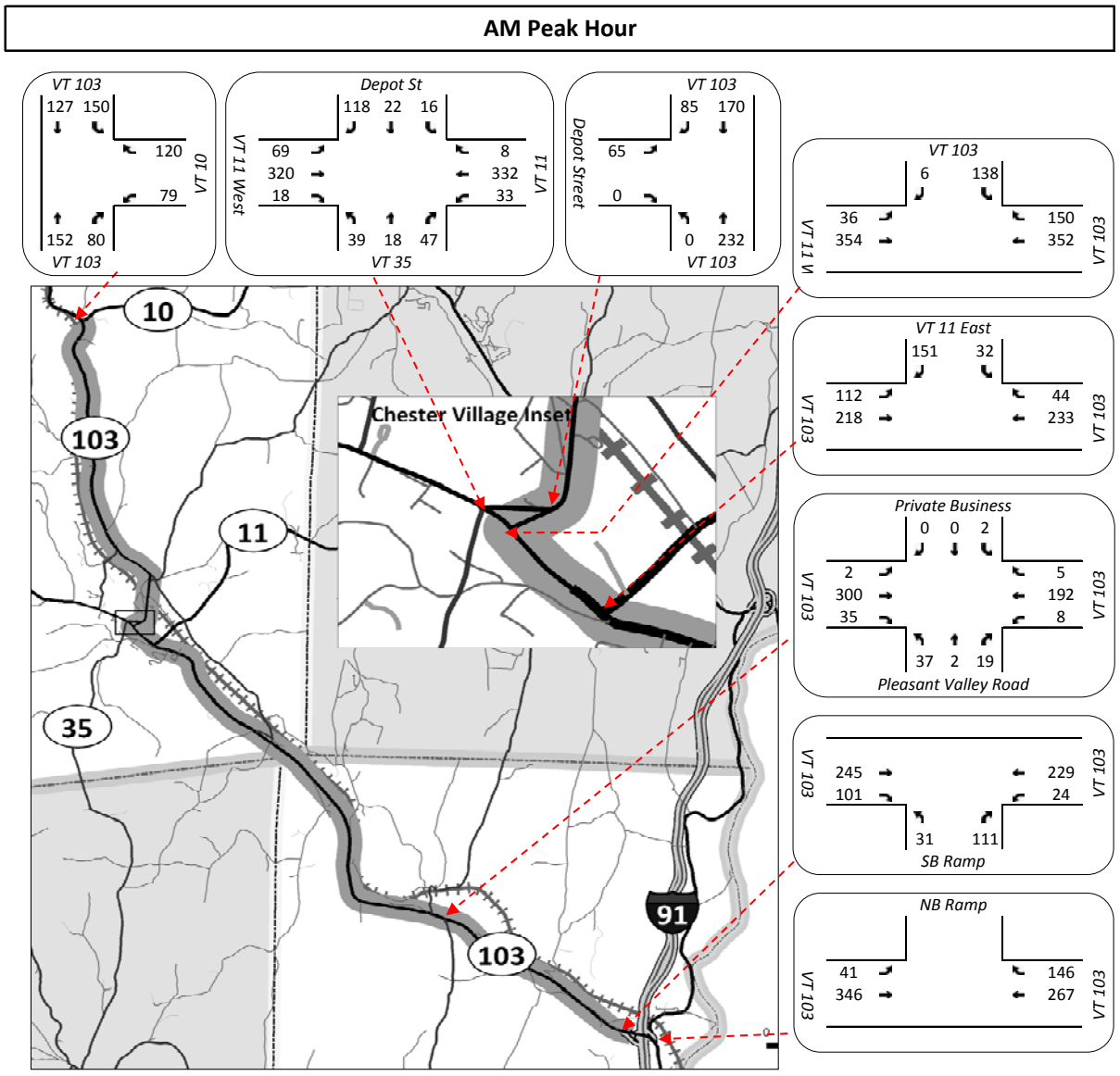
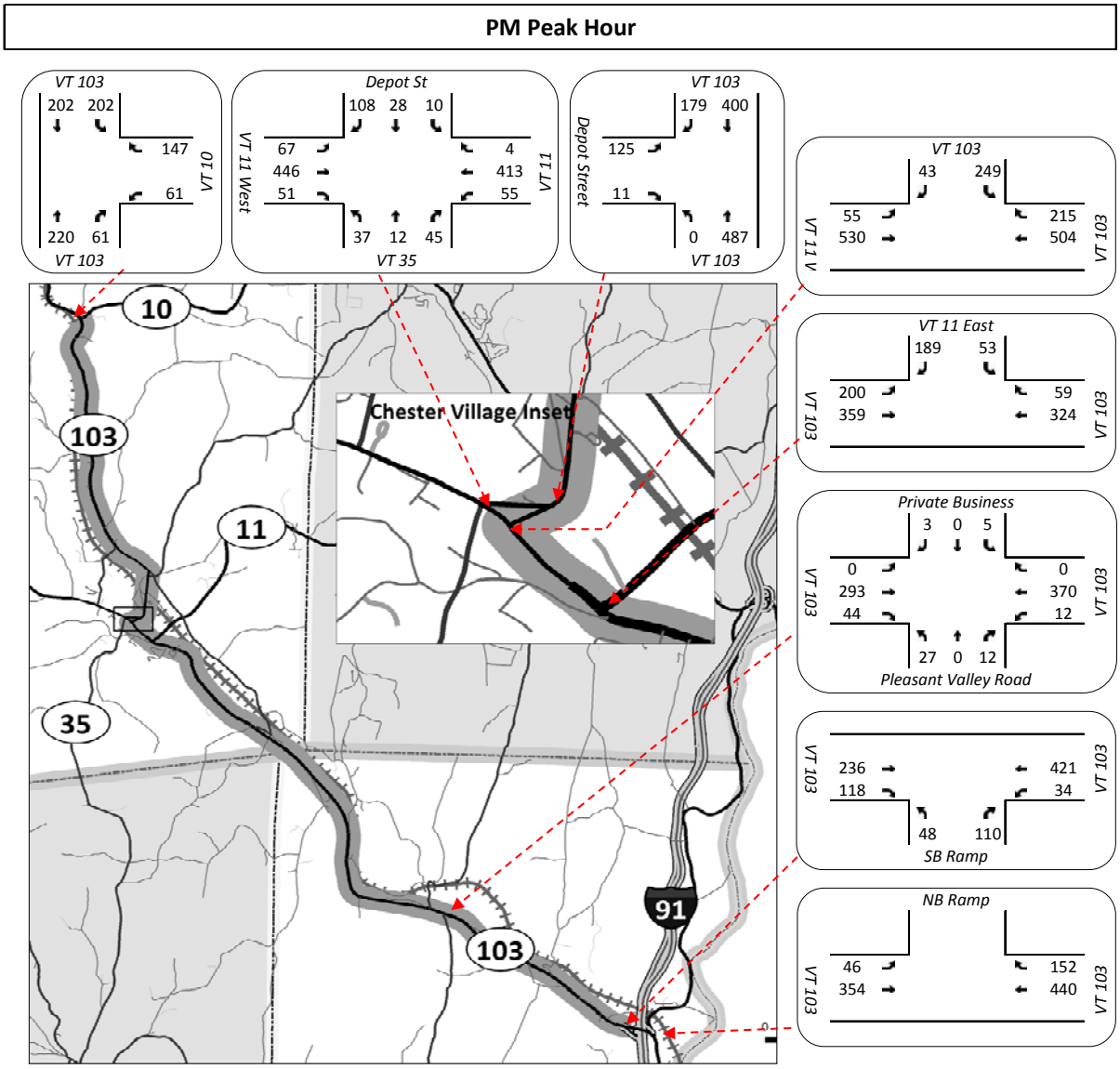


Figure 19: 2009 PM Peak Hour Volumes



3.2.2.5 Congestion Analysis

A Level of Service (LOS) analysis is the analytical tool used to estimate congestion at intersections. LOS is a qualitative measure rating the operating conditions as perceived by motorists driving in a traffic stream. The *Highway Capacity Manual*[1] (HCM) defines six grades of LOS at an intersection based on the control delay per vehicle.

Table 2 shows the various LOS grades, qualitative descriptions, and quantitative definitions for unsignalized and signalized intersections.

[1] Transportation Research Board, National Research Council, *Highway Capacity Manual: Special Report 209,* Washington DC, 2000.

Table 2: 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	> 50.1	> 80.1

VT 103 is classified as a rural principal arterial through the study area. 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.

Average delays and queues are calculated for all study intersections during the 2009 PM and Saturday peak hours.[1]

3.2.2.6 Level of Service (LOS) Results

Table 3 presents the average vehicle delay, corresponding Level of Service grade, and the volume to capacity ratio (v/c) at the study intersections under 2009 AM and PM design hour conditions. The following intersection approaches are estimated to operate currently below the VTrans standard during the design hour:

- The eastbound Depot Street approach at VT 103 (PM Only)
- The southbound VT 103 approach at VT 11 West (AM and PM)
- The northbound VT 35 approach at VT 11 West (AM and PM)

These movements are highlighted in yellow in the table below. Also note for the southbound approach at VT 103/VT 11 West, the V/C ratio has a value greater than one in the PM peak hour, which further indicates significant congestion for this approach.

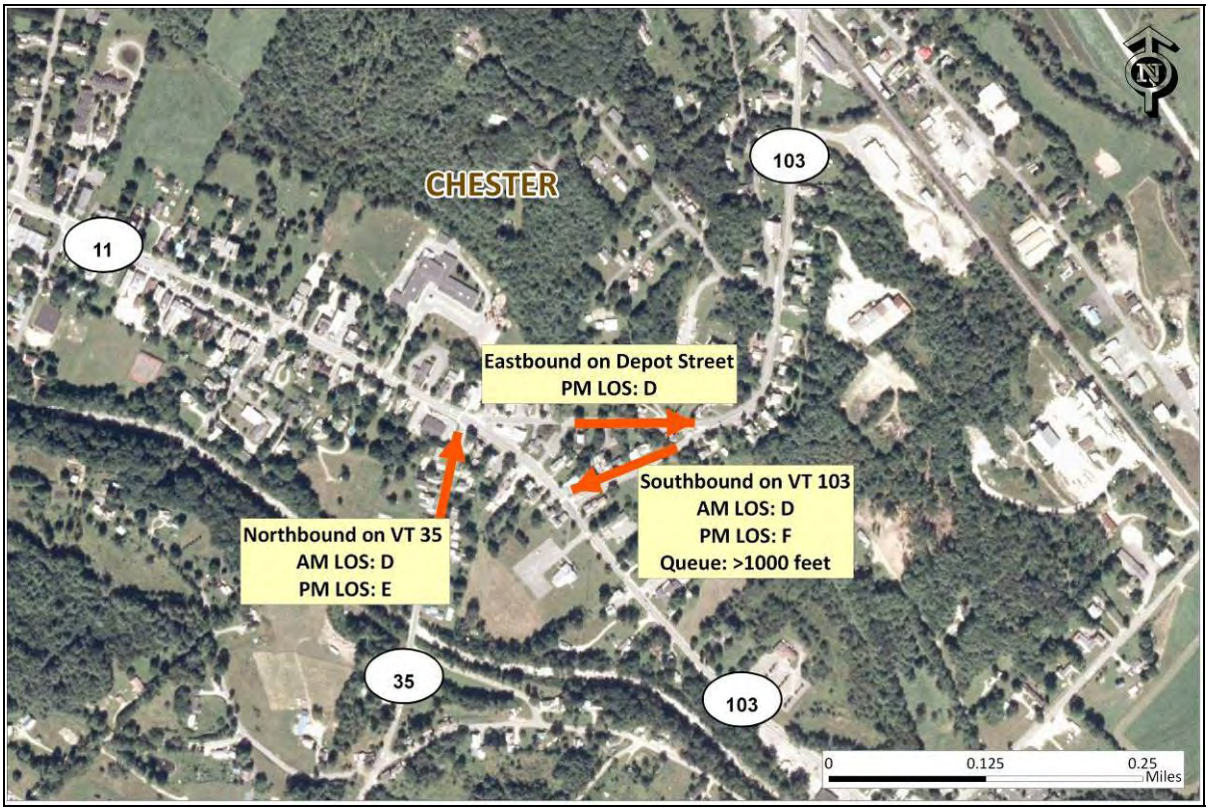
[1] Congestion and queue estimates were calculated using Synchro 7, which applies the 2000 Highway Capacity Manual methodology.

Table 3: AM and PM Peak Hour LOS Grade, Average Delay (seconds) and Queues (feet)

	AM Peak Hour 2009			PM Peak Hour 2009		
	LOS	Delay	v/c	LOS	Delay	v/c
VT 103/VT 10						
Westbound Approach, from VT 10	B	12	0.19	B	14	0.21
Northbound Approach, along VT 103 from Chester	A	<1	0.09	A	<1	0.13
Southbound Approach, along VT 103 from Ludlow	A	4	0.12	A	4	0.16
VT 103/Depot Street						
Eastbound Approach, along Depot Street	B	12	0.47	D	28	0.47
Northbound Approach, along VT 103 from Rockingham	A	<1	<0.01	A	<1	<0.01
Southbound Approach, along VT 103 from Ludlow	A	<1	0.34	A	<1	0.34
VT 11West/VT 35/Depot Street						
Eastbound Approach, along VT 11 from Reedville	A	2	0.06	A	2	0.06
Westbound Approach, along VT 11 from Rockingham	A	1	0.03	A	2	0.05
Northbound Approach, along VT 35	D	26	0.37	E	45	0.51
Southbound Approach, along Depot Street	B	16	0.33	C	22	0.40
VT 103/VT 11West						
Southbound Approach, along VT 103 from Ludlow	D	28	0.48	F	>100	1.62
Westbound Approach, along VT 103 from Rockingham	A	<1	0.30	A	<1	0.42
Eastbound Approach, along VT 11 West from Reedville	A	1	0.04	A	2	0.06
VT 103/VT 11East						
Southbound Approach, along VT 11 East	B	13	0.28	C	23	0.55
Westbound Approach, along VT 103 from Rockingham	A	<1	0.16	A	<1	0.23
Eastbound Approach, along VT 103 from Chester	A	3	0.09	A	4	0.17
VT 103/Pleasant Valley Road						
Eastbound Approach, along VT 103 from Chester	A	<1	0.20	A	<1	0.20
Westbound Approach, along VT 103 from Bellows Falls	A	<1	0.01	A	<1	0.01
Northbound Approach, along Pleasant Valley Road	B	13	0.10	B	14	0.09
VT 103/VT 10						
Eastbound Approach, along VT 103 from Chester	A	<1	0.20	A	<1	0.21
Westbound Approach, along VT 103 from Bellows Falls	A	<1	0.02	A	<1	0.03
Northbound Approach, along I-91 Ramps	B	11	0.15	B	13	0.15
VT 103/VT 10						
Eastbound Approach, along VT 103 from Chester	A	1	0.04	A	2	0.05
Westbound Approach, along VT 103 from Bellows Falls	A	<1	0.16	A	<1	0.26

The locations of the approaches operating below VTrans Los standards are shown in Figure 20.

Figure 20: LOS D, E, or F Approaches



3.2.2.7 Queuing Results

Queues were measured using SimTraffic *(version 7.0)*. Table 4 shows the average maximum queue length *(shown in number of vehicles)* at each approach for each of the study intersections. All approaches indicate that queues are relatively short, with the exception of the southbound approach at the VT 103/VT 11 West intersection, which also backs up through the VT 103/Depot Street intersection. Note that this analysis is for the design hour volume, which is typically during the winter weekend PM, and does not necessarily represent average weekday congestion.

Table 4: Queues (in vehicles) at the Study Intersections

	2009 Queue Length (veh) AM	PM
VT 103/VT 10		
Westbound Approach, from VT 10	2	2
Northbound Approach, along VT 103 from Chester	0	0
Southbound Approach, along VT 103 from Ludlow	1	2
VT 103/Depot Street		
Eastbound Approach, along Depot Street	1	6
Northbound Approach, along VT 103 from Rockingham	0	0
Southbound Approach, along VT 103 from Ludlow	0	30
VT 11West/VT 35/Depot Street		
Eastbound Approach, along VT 11 from Reedville	2	3
Westbound Approach, along VT 11 from Rockingham	1	2
Northbound Approach, along VT 35	2	3
Southbound Approach, along Depot Street	2	2
VT 103/VT 11West		
Southbound Approach, along VT 103 from Ludlow	4	27
Westbound Approach, along VT 103 from Rockingham	0	0
Eastbound Approach, along VT 11 West from Reedville	1	5
VT 103/VT 11East		
Southbound Approach, along VT 11 East	3	5
Westbound Approach, along VT 103 from Rockingham	2	0
Eastbound Approach, along VT 103 from Chester	0	5
VT 103/Pleasant Valley Road		
Eastbound Approach, along VT 103 from Chester	0	0
Westbound Approach, along VT 103 from Bellows Falls	2	0
Northbound Approach, along Pleasant Valley Road	0	1
VT 103/VT 10		
Eastbound Approach, along VT 103 from Chester	0	0
Westbound Approach, along VT 103 from Bellows Falls	1	1
Northbound Approach, along I-91 Ramps	1	1
VT 103/VT 10		
Eastbound Approach, along VT 103 from Chester	1	1
Westbound Approach, along VT 103 from Bellows Falls	0	0

3.2.3 Corridor Safety Assessment

3.2.3.1 Crash Data Analysis

Figure 21 shows the location of all reported vehicular crashes along the study corridor between 2003 and 2007. Reportable crashes generally involve a fatality, injury, and/or property damage in excess of $1,000.

In the period from 2003 to 2007, there were a total of 140 reported crashes along the VT 103 study corridor. These crashes included 56 injuries and no fatalities.

In order to be classified as a High Crash Location (HCL), an intersection or road section (minimum 0.3 mile section) must meet two conditions: 1) it must have at least 5 accidents over a 5-year period; and 2) the actual crash rate must exceed the critical crash rate.

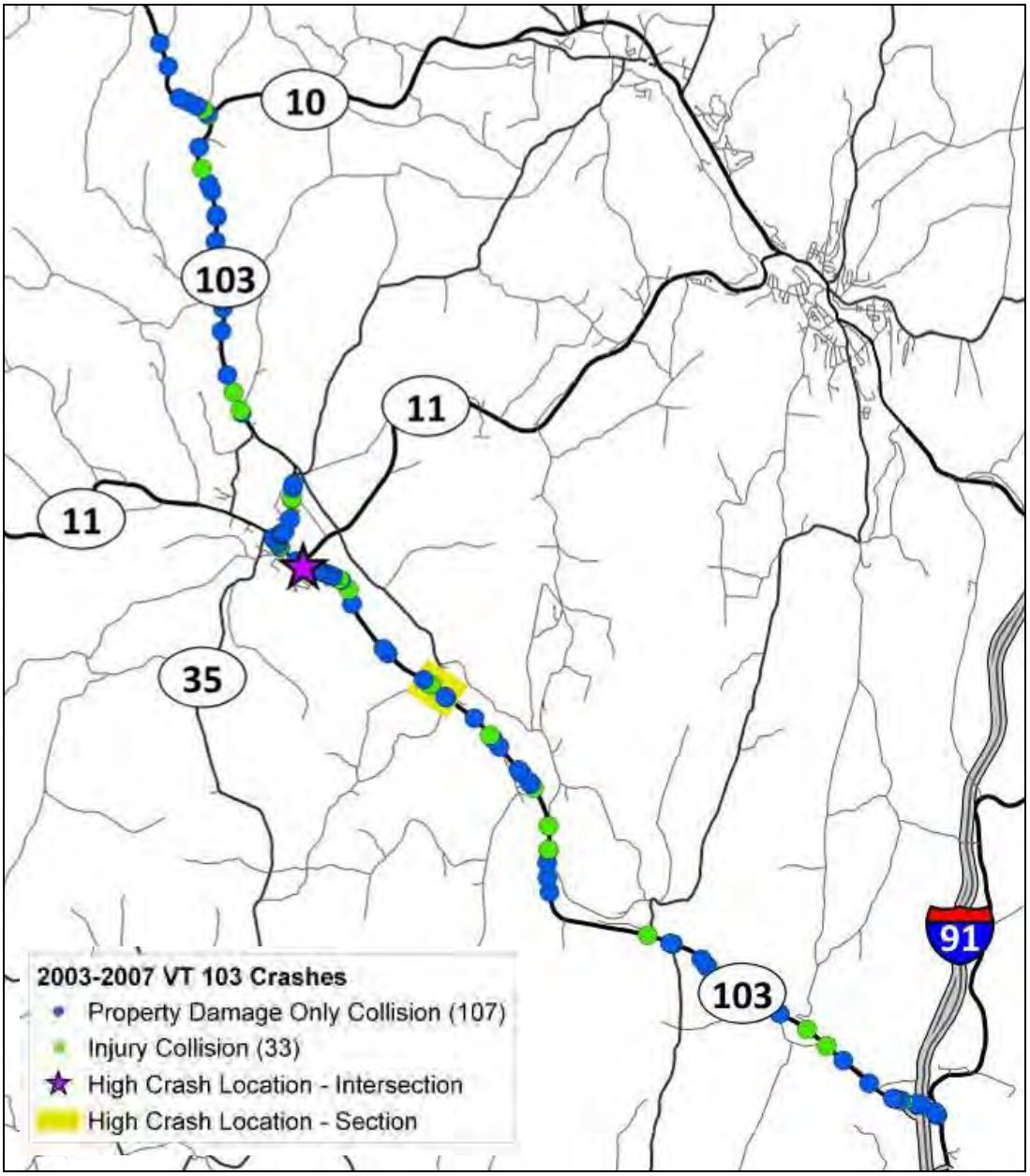
The most recent VTrans High Crash Location Report identifies 616 High Crash Location road segments and 131 High Crash Location intersections statewide. Within the study area, there are two identified High Crash Locations:

- The intersection of VT 103 and VT 11 East

- Mile Marker 0.347-0.647 on VT 103 in Chester

These High Crash Locations are identified in Figure 21.

Figure 21: Crashes and High Crash Sections



For both of the High Crash Locations, the time of day appears to be a significant contributing factor, as 80% of all crashes cluster between 12PM and 6PM at the intersection of VT 103/VT 11 East and 36% and 27% occur between 12PM and 3PM and 9PM and 12AM, respectively, at the section along VT 103.

Figure 22 and Figure 23 compare the percent of crashes by time of day in the study area (in purple) to the percent in Vermont (in red) and the percent in the two towns of Chester and

Rockingham (in yellow). Based on this comparison, it is evident that crashes in the study area are more prone to time-of-day related causes than in the rest of the towns and statewide.

Figure 22: Collisions by Time of Day at HCL Intersection (VT 103/VT 11/Pleasant Street)

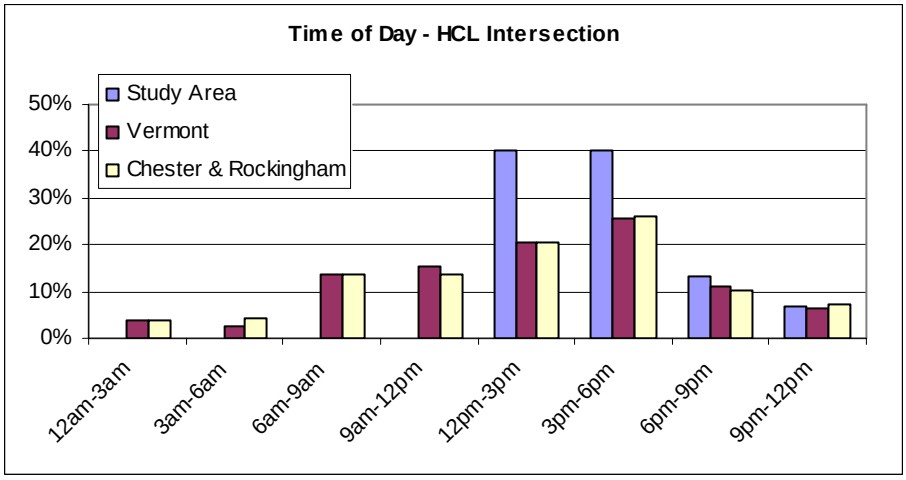
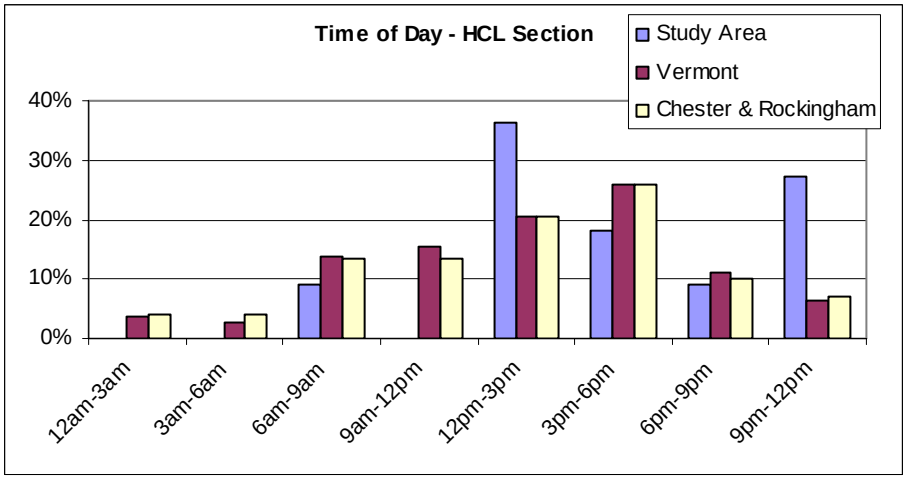


Figure 23: Collisions by Time of Day at HCL Section (VT 103, mile marker 0.347-0.647 in Chester)



At the VT 103/VT 11 East intersection, the most common types of crashes were rear ends (33%) and broadsides (27%). At the HCL section, the most common types of crashes were single vehicle crashes (45%) and rear ends (27%).

Some suggestions for causes of these high crash locations include poor sight distance, inadequate signage, and a large proportion of out-of-state (unfamiliar) drivers.

Other areas of the corridor that have been of interest include VT 103 in the vicinity of the I-91 interchange, the Vermont Country Store, the Chester Triangle,[1] and the intersection with VT 10. Details of these locations are shown in Figure 24 through Figure 27.

[1] The "Chester Triangle" refers to the triangle formed in downtown Chester by the following three intersections: VT 103/VT 11/Maple Street, VT 11/VT 35/Depot Street, VT 103/Maple Street/Depot Street

Figure 24: Crash Details at the I-91 Interchange

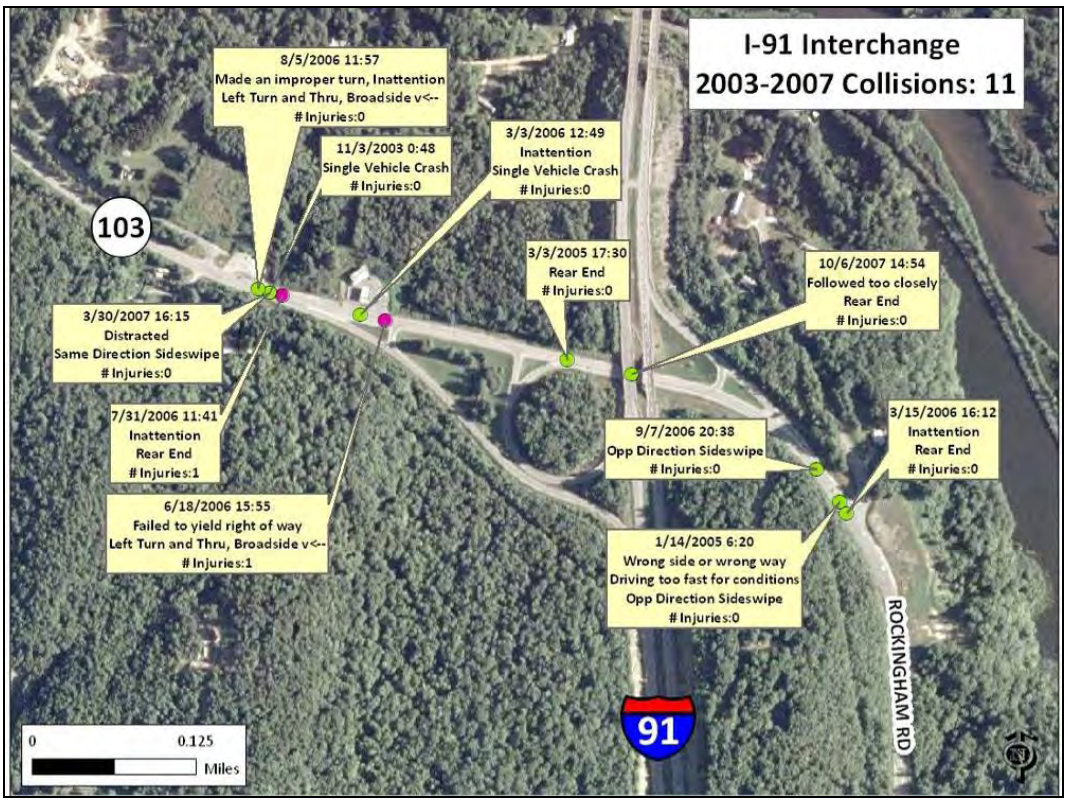


Figure 25: Crash Details at the Vermont Country Store

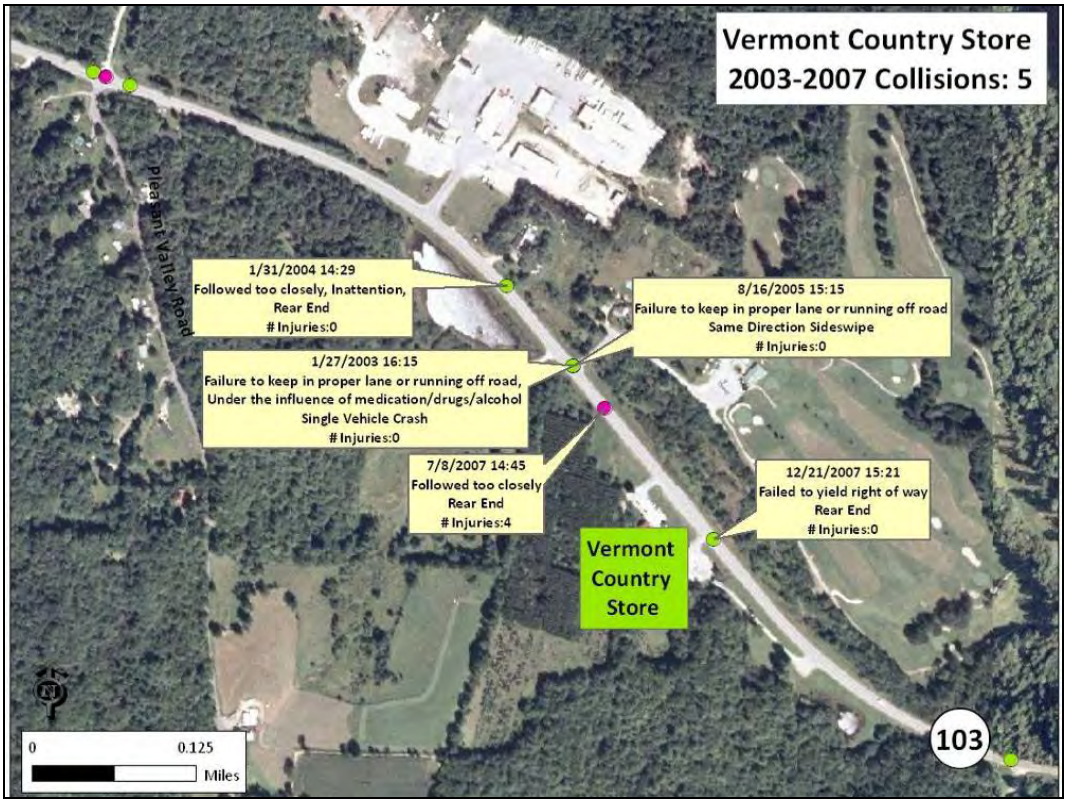


Figure 26: Crash Details at the Chester Triangle

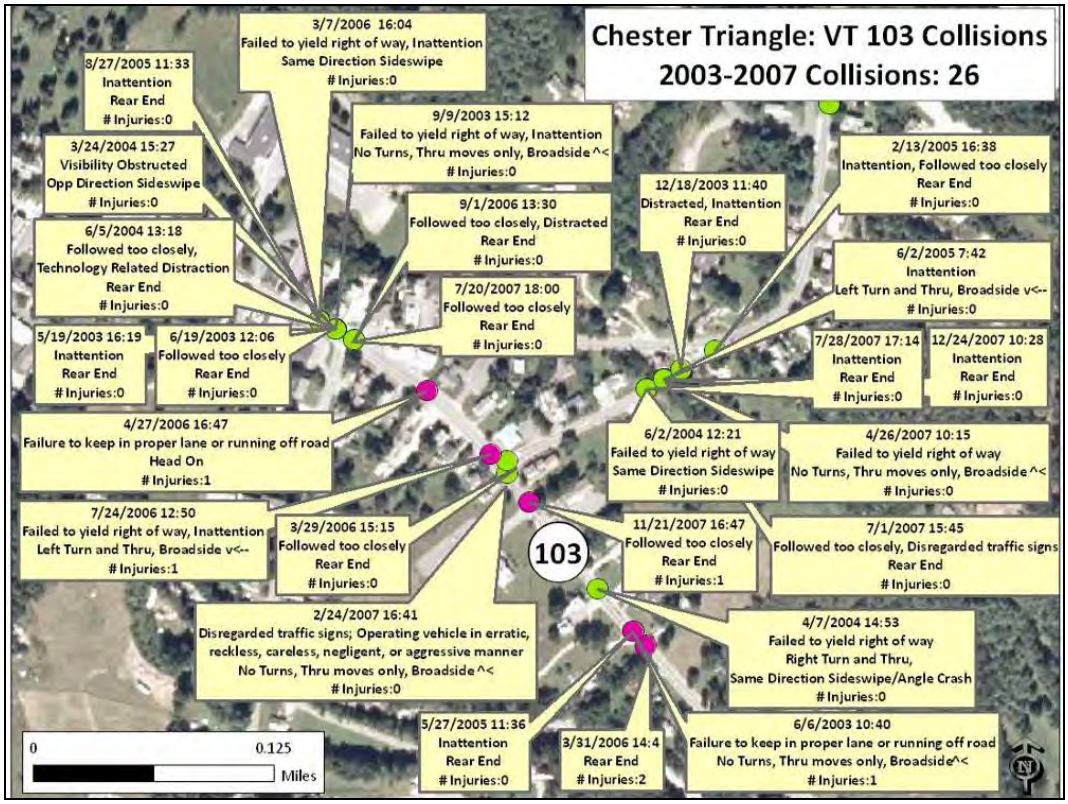
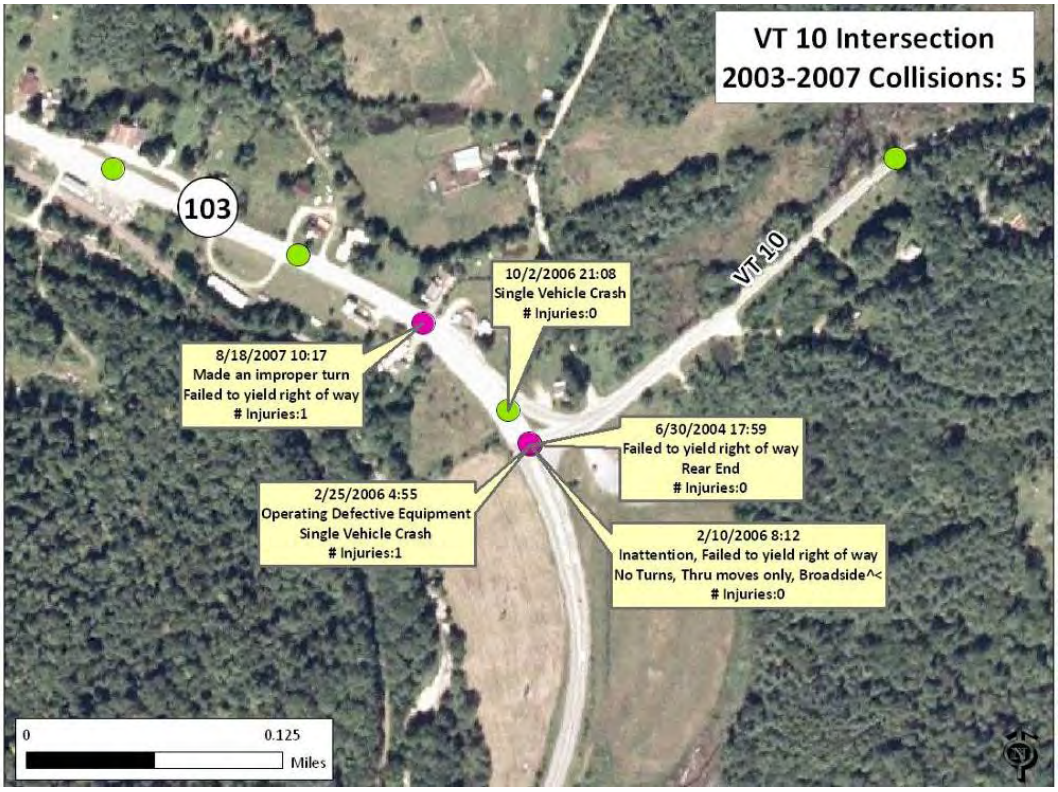


Figure 27: Crash Details at the intersection of VT 10



3.2.4 Corridor Infrastructure Assessment

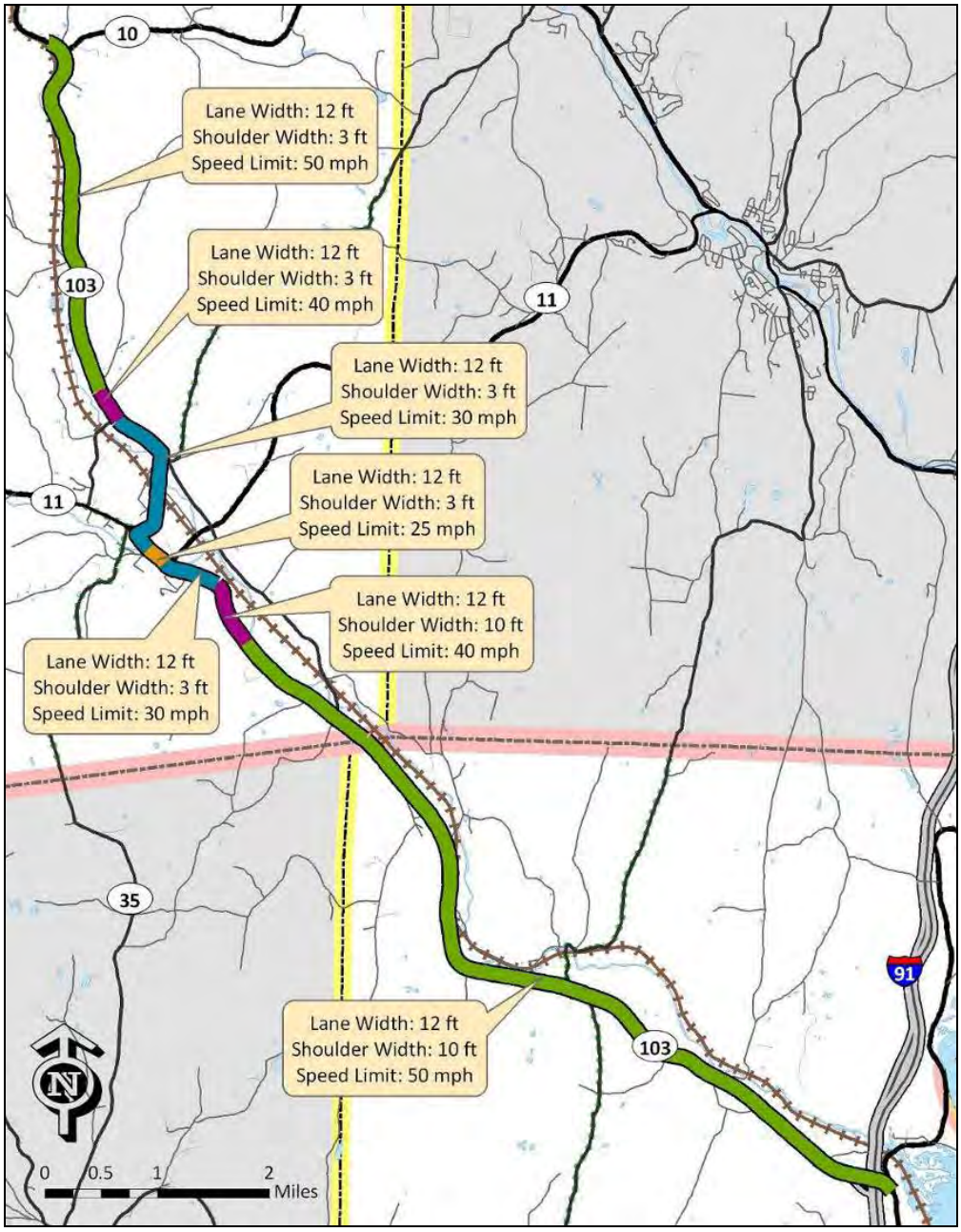
3.2.4.1 Roadway Geometric Assessment

Based on the Vermont State Design Guidelines, rural principal arterials with a Design Hour Volume greater than 400 vehicles should have lanes widths of at least 11 feet in the 35 and 40 mph zones and 12 feet in the 50 mph zone. In rural areas, the State Design Standards call for minimum shoulder widths of 8 feet at all speed zones.[1] It should be noted, however, that many locations along the corridor have natural constraints adjacent to the roadway that make the provision of 8 foot shoulders effectively cost-prohibitive. Within village sections of arterial roads, the State Design Standards allow for much greater flexibility in the provision of shoulders. The maximum grade for rural principal arterials should be 7% for the 35 mph zone, 6% in the 40 mph zone, and 5% in the 50 mph zones.

Typical cross-sections of VT 103 in the study area were defined using the 2006 VTrans Highway Sufficiency Rating reports and supplemented with field verification (Figure 28).

[1] These shoulder widths are considered necessary for adequate safety and service for this class of highway and may exceed the minimum paved widths needed solely to provide bicycle safety.

Figure 28: Typical Roadway Cross-Sections

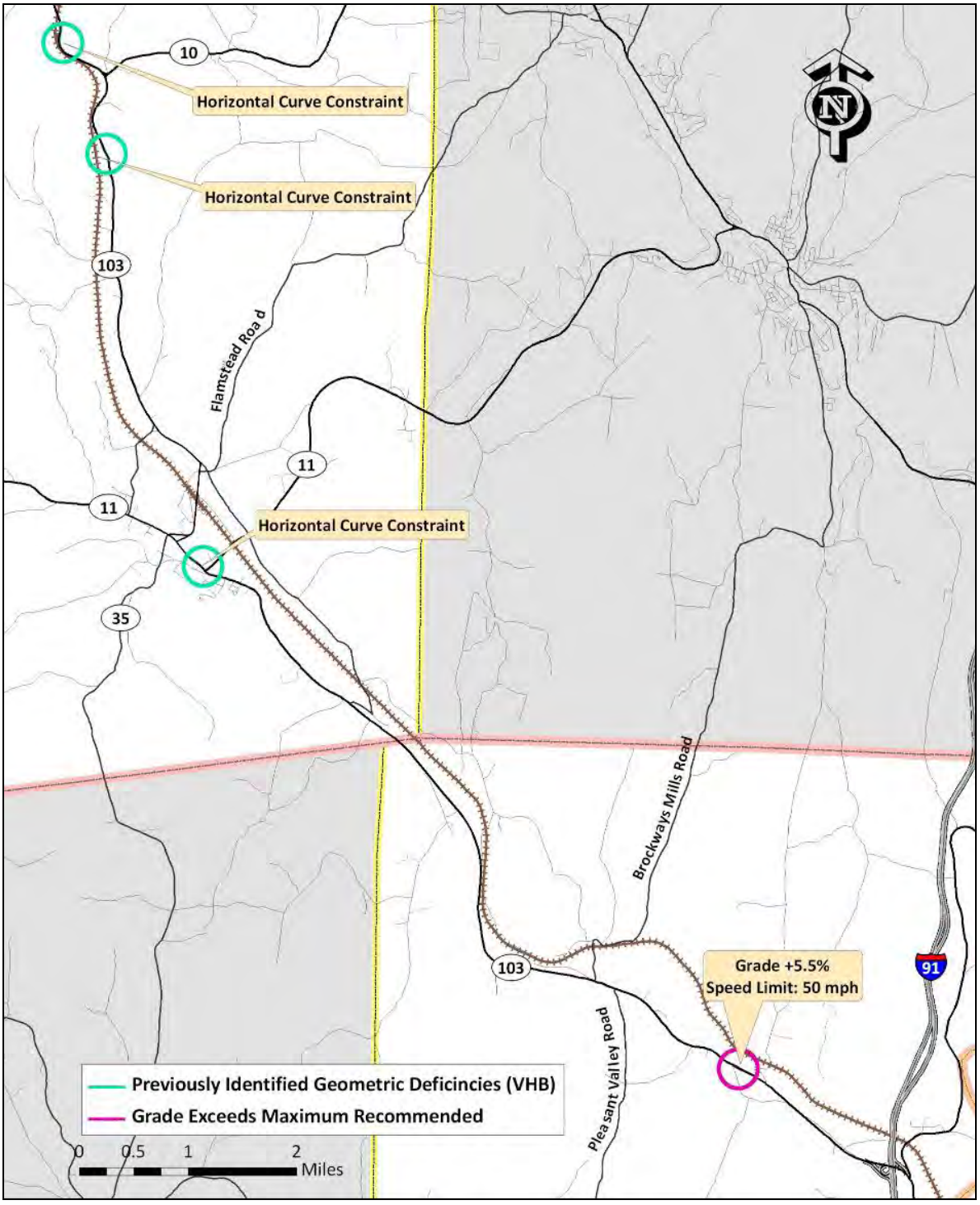


In the study area, lanes along VT 103 are all 12 feet in width. Shoulders are 10 feet in Rockingham and Chester south of Chester Village, but only 3 feet or less in the village and on VT 103 North towards Ludlow, which is below the design standard for new rural principal arterial roadways.

There is one location where the grade exceeds the maximum recommended limit, shown in Figure 29. Three other sections have been previously identified as geometrically deficient, and are also shown in this figure.[1]

[1] *Truck Network Improvements: Constraint Prioritization Study*, Vanasse Hangen Brustlin, Inc., 1999.

Figure 29: Roadway Grade in Excess of Maximum Recommendation



Note that the horizontal curve constraint identified at the intersection of VT 103/VT 11East is a result of the existing bridge (VTrans BR 9), which will be resolved with bridge reconstruction project which is scheduled for 2010-2011 (see 3.2.4.2).

3.2.4.2 Assessment of Bridges & Culverts

Based on the VTrans Bridge Inventory System, there are several bridges and culverts in the study area, some of which are deficient. [1] The first is known as the Benny Sunoco Bridge (VTrans BR 9), a steel stringer/multi-beam girder bridge that was built in 1935 and is located on VT 103 immediately east of the VT 103/VT 11 intersection. This bridge's abutments significantly restrict sight distance for vehicles turning from VT 103 onto VT 11. This bridge is scheduled for reconstruction in 2010-2011.

The second bridge (VTrans BR 8) is located just east of the Benny Sunoco Bridge on VT 103, is a concrete stringer/multi-beam girder bridge that was built in 1924, and is also scheduled for reconstruction in 2010-2011.

The third bridge in the study area is relatively new; constructed in 2004 and spanning 112 feet, it is a steel stringer/multi-beam girder bridge located at the intersection of VT 103 and the Green Mountain Turnpike, just north of the town of Chester.

There is one concrete culvert on VT 103 in Chester just north of the Rockingham town line. This culvert, which was built in 1962, is listed as being in good condition.

There are five steel culverts interspersed on VT 103 in Rockingham throughout the corridor. All are standard steel culverts that were built between 1958 and 1962. These five culverts reportedly range from critical to satisfactory condition. One of these culverts (VTrans BR 4) on VT 103 in Rockingham is a candidate project for reconstruction with no scheduled construction horizon (VTrans project NH 025-1(S)).

Based on information from the Town of Chester, an historic stone-laid culvert for Trebo Brook under VT 103 in the Stone Village is failing. The Town has a Structures program grant to design and reconstruct the structure. However, the Town is seeking other funds to pay for the remaining costs.

According to the Vermont Agency of Natural Resources, many of the town highway bridges over the Williams River along VT 103 north of the Chester Village are undersized, which may contribute to ice jams and related early spring flooding. Due to these limitations, and structural condition as most recently assessed by VTrans, bridges #28, 62 & 72 are eligible for replacement.

3.2.4.3 Pavement Assessment

Pavement condition is identified by multiple indices that assess various aspects of the road condition. Elements that go into this assessment are road roughness, structural crack value, average depth of ruts, and condition of the ride. The indices are based on a scale of 0 to 100, where 0 is very poor and 100 is good. These indices are then compiled to create an Overall Condition Index, which is used to identify pavement condition of the road section.[2]

The VTrans goal is for the pavement condition index based on vehicle miles traveled to be 70, with 25% or fewer of statewide lane miles to be classified in 'very poor' condition. VTrans has estimated that a nearly 100% increase in pavement management funding (from $56 million per year to $100 million per year) is needed to adhere to this goal. In 2002, only 14% of all state

[1] The VTrans Bridge Inventory System (BIS) stores data for all VTrans-owned bridges as well as some information that is supplemented by towns and RPCs.

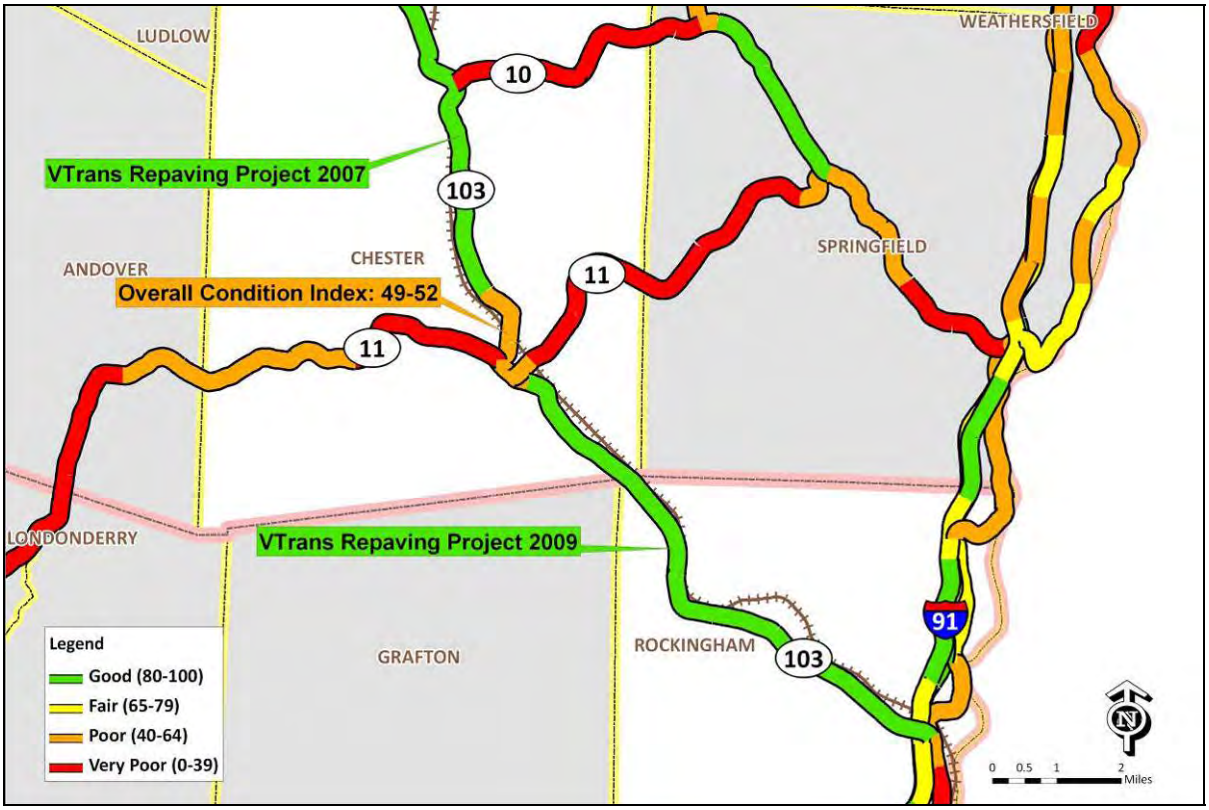
[2] Condition ratings were assessed by VTrans in 2006.

roads were identified to be in 'very poor' condition, with 66% identified as in 'very good' or 'fair' condition.[1]

Pavement conditions are assessed in the study area as shown on Figure 30. The section of VT 103 from I-91 through Chester Village was recently repaved by VTrans in 2009 (VTrans project NH 2628(1)).

Although VT 11 East was paved in 2008 as part of "Operation Smooth Ride," the subbase of the roadway remains deficient and thus is listed as being in "very poor" condition. Further, while VT 10 has had recent overlays at various points along the route, the overall roadway remains in very poor condition.

Figure 30: Pavement Condition on VT 103



3.2.5 Multi-Modal Transportation

3.2.5.1 Bicycle & Pedestrian Access

There are no designated bicycle lanes or paths along the corridor. However, the section of VT 103 south of Chester Village has 8-10 foot shoulders which sufficiently accommodate experienced bicyclists, but due to traffic volumes, speeds, and truck volumes, these shoulders may not be appropriate for beginning cyclists and children. The area through Chester Village and the section of VT 103 from Chester Village to VT 10 has 1-3 foot shoulders, which is below

[1] *Vermont Highway System Policy Plan*, VTrans, 2002.

VTrans recommended standard for bicyclists. Additionally, the relatively high level of truck traffic further inhibits bicycle travel along the corridor.

Sidewalks exist along the corridor in Chester Village, but do not exist elsewhere along the corridor. Interest in having a sidewalk connect the Village network to the Green Mountain High School in Chester has been expressed.

The Regional Bicycle and Walking Plan (RBWP) identified several bicycle/pedestrian deficiencies in the study area. They include:

- The section of VT 103 from Gassett's to Chester Village (mile marker 7.40 – 4.45) has little to no shoulder width and lacks continuity from sections to the north and south. The plan identifies that the shoulders would need to be widened by 1.5 – 3 feet on either side, and that environmental constraints – including the Williams River – may pose difficulties to this project.
- Bridge #8 is a constraint to bicycle travel due to insufficient bicycle lanes. This will be addressed with the scheduled VTrans bridge reconstruction project in 2010-2011.
- Pedestrian access in Chester Depot is inadequate. Needs include:
    - Pedestrian access to the excursion train station and surrounding residential, retail, and governmental areas,
    - Improving pedestrian safety throughout the network, and
    - Providing pedestrian crossing areas.

These elements are depicted in Figure 31 and Figure 33.

Figure 31: Existing Sidewalks in Chester Village

Although there are bicycle tour groups that share the road with vehicular traffic, this section of VT 103 does not experience a large number of daily bicyclists. The Windham Regional Commission's Bicycle Suitability Map (Figure 32) identifies this section of VT103 as having suitable shoulders for bicycle use, but high vehicular traffic volumes.

Figure 32: Bicycle Suitability Map in Rockingham (courtesy Windham Regional Commission, Bicycle Suitability Map, 2004)

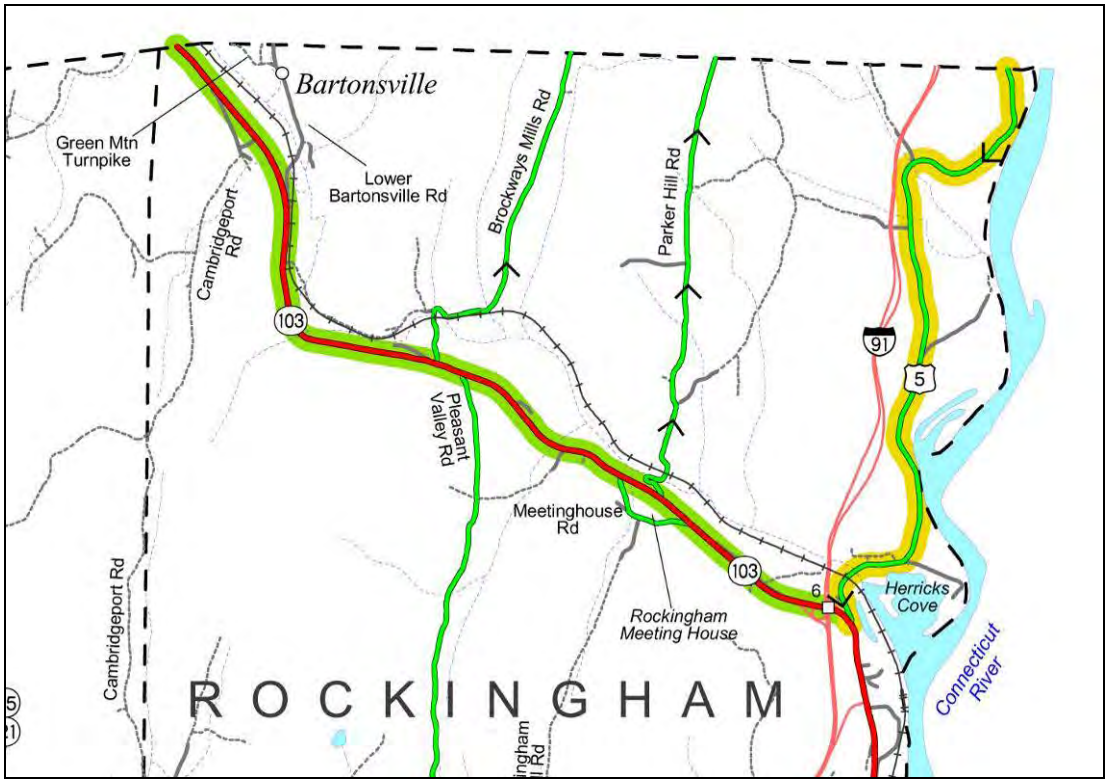
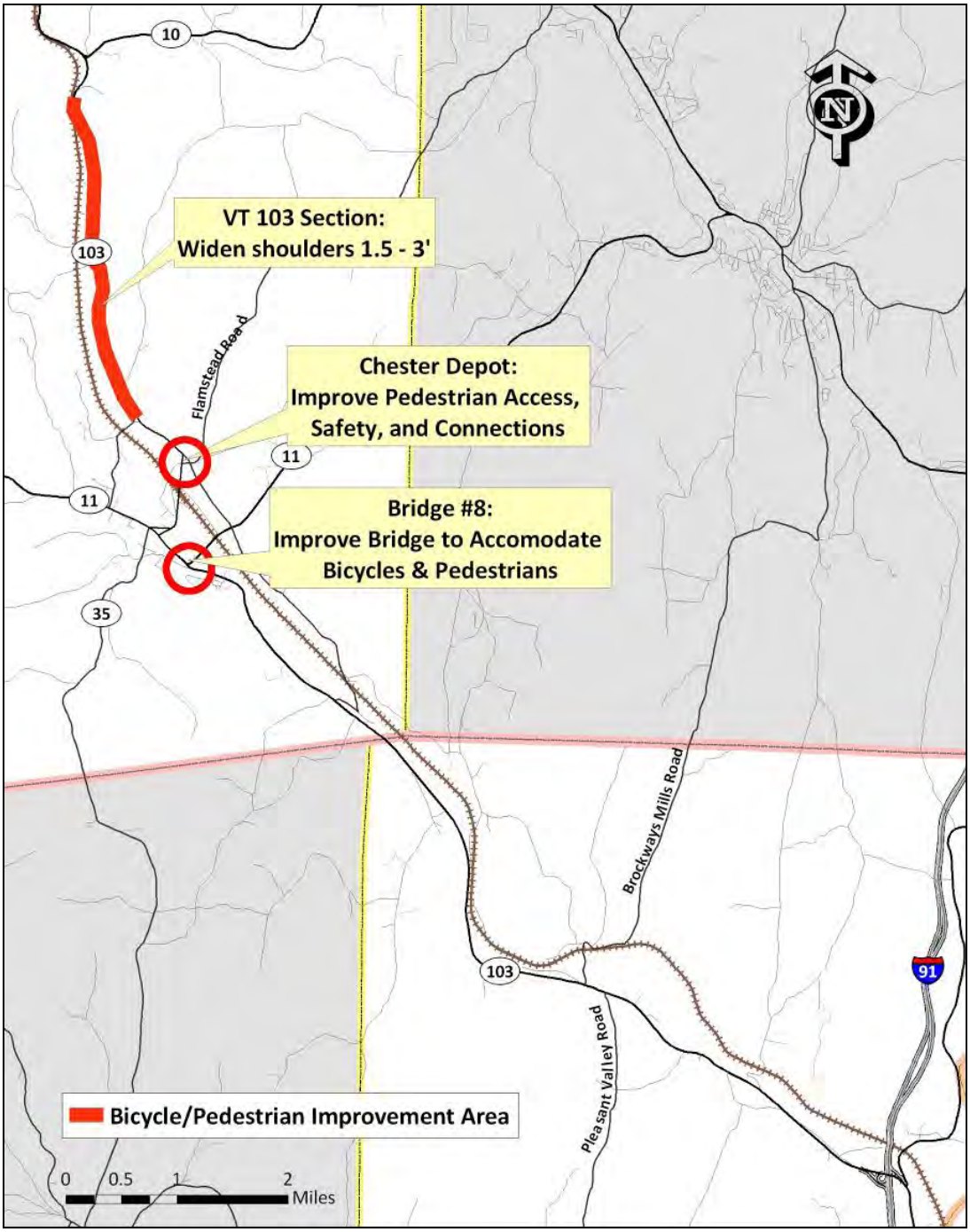


Figure 33 on the following page depicts the identified bicycle and pedestrian improvements along the corridor.

Figure 33: Identified Bicycle/Pedestrian Improvements Needed



3.2.5.2 Public Transit

Public transit along the corridor consists of one seasonal bus route as well as demand-response service and regular shopping trips for Chester seniors provided by Connecticut River Transit (CRT). The seasonal route travels from Bellows Falls to Okemo from November to April and makes two stops in Chester at the Chester Village Green and at the Chester Depot. This route

typically carries about 150 passengers per week, but jumps to 450 passengers per week during holiday weeks.

The CRT recently added a new bus route that connects Rutland to Bellows Falls via VT 10 to Springfield. Although this route does not service the Chester/Rockingham populations, the CRT recognizes that there there is need for service in Chester, as it is the most direct route from Rutland to Bellows Falls.

3.2.5.3 Rail and Freight

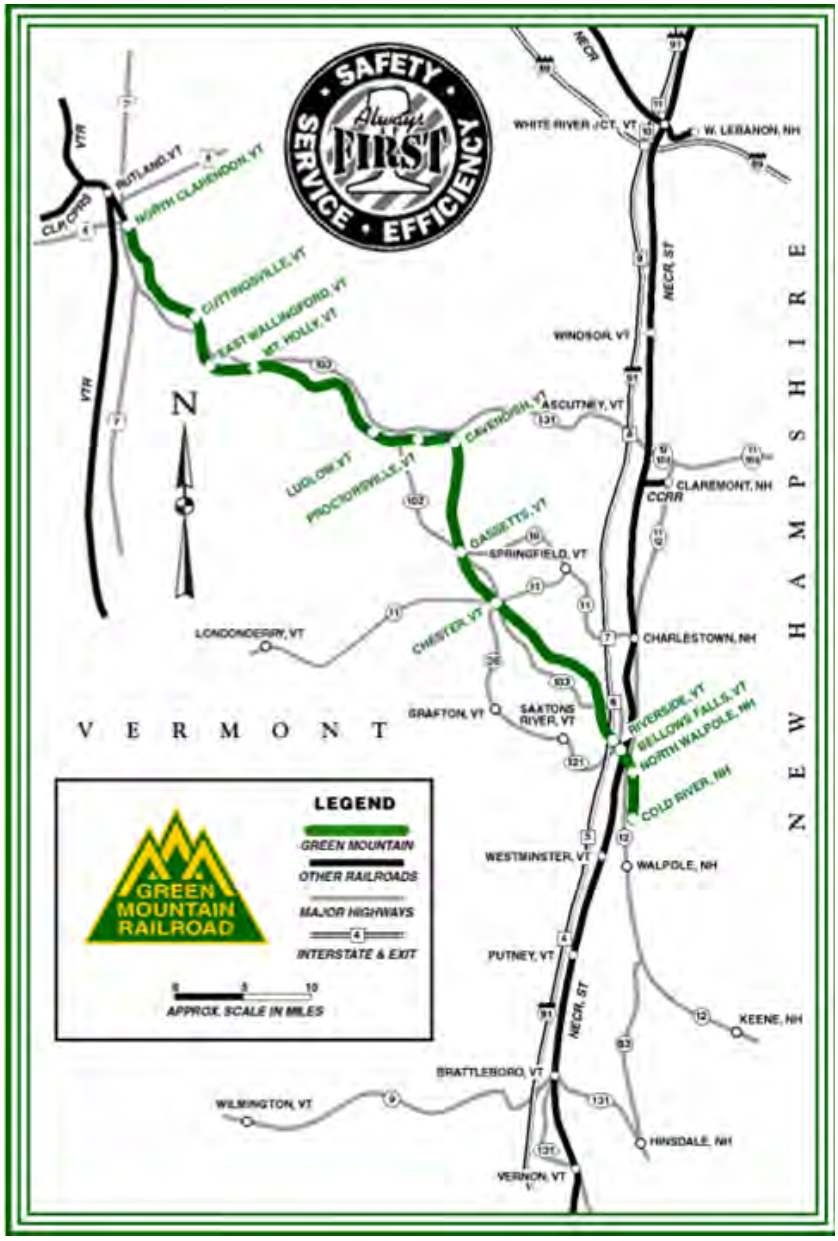
The Green Mountain Railroad (GMRC) is a part of the Vermont Rail System (VRS), which was established in 1997 to maximize rail resources in the state of Vermont. This line spans 50 miles of trackage, providing freight service between Bellows Falls and Rutland (Figure 34). It is state-owned and privately operated, with primary freight connections in Bellows Falls and Rutland. Two through freight trains run per day and the railroad operates on a six-day schedule. The Federal Railroad Administration (FRA) has identified the GMRC as a Class 2 railroad[1], which specifies a maximum allowable operating speed of 25 mph for freight trains and 30 mph for passenger trains.[2] It should be noted that due to the relatively low freight travel speeds, the train crossing of VT 103 in Chester Depot creates substantial vehicle delay and queues throughout the area.

The GMRC also runs special tourist excursion trains via the Green Mountain Flyer, which runs from Bellows Falls to Chester Depot for ten days of the year as well as for private events.

[1] A Class II railroad is a mid-sized freight-hauling railroad, in terms of its operating revenue. As of 2006, a railroad with revenues greater than $20.5 million but less than $277.7 million for at least three consecutive years is considered a Class II railroad. (source: Surface Transportation Board)

[2] *Vermont State Rail & Policy Plan*, VTrans, 2006.

Figure 34: Green Mountain Railroad System Map



The Highway System Policy Plan identifies between 500 and 1,000 trucks per day on the section of VT 103 in the study area. This, coupled with the high seasonal tourist volume throughout the corridor, suggests that the Green Mountain Railroad – which essentially runs parallel to VT 103 – could offer great benefit to the area by providing additional freight and passenger transportation uses.

With regard to planned rail projects in the study area, there is an underpass project on Parker Hill Road in Rockingham that will expand the existing one-lane structure to accommodate two lanes. This project is currently in the permitting and Right of Way stage. If the project stays on schedule, it will likely go out to bid in Fall 2009 with an anticipated construction start date in 2010.