# Route 13/Wallops Island
## Access Management Study

# Final Report



*prepared for*
Virginia Department of Transportation

*prepared by*
Vanasse Hangen Brustlin, Inc.

# Route 13/Wallops Island
## Access Management Study

*Prepared for*
**Virginia Department of Transportation**

*Prepared by*
**Vanasse Hangen Brustlin, Inc.**

**May 2002**

The study was completed for the Virginia Department of Transportation with the cooperation of many individuals and entities at the local, regional, state and federal levels. In particular, Vanasse Hangen Brustlin, Inc. wishes to acknowledge the dedication and guidance of the **Project Management Team** over the course of this study:

VDOT Transportation Planning Division: Harold Paxton

VDOT Accomac Residency: Will Cumming

Accomack-Northampton Planning District Commission: Jim McGowan

VDOT Traffic Engineering Division: Steve Edwards/Emmanuel Darko

VDOT Location & Design Division: Wilbert Lambert

VDOT Hampton Roads District – Transportation Planning: Eric Stringfield

Virginia Department of Rail & Public Transportation: Mark Rickards

Federal Highway Administration – Virginia Division: Jennifer DeBruhl

# Table of Contents

# Tables

# Figures

# Executive Summary

The Virginia Department of Transportation (VDOT) identified the need to evaluate transportation deficiencies on U.S. Route 13 and portions of Route 175 on Virginia's Eastern Shore. This report documents the findings of the U.S. Route 13/Wallops Island Access Management Study and presents the final recommendations and plan of action for the corridors.

## Study Goal

The goal of the study was to develop a plan that VDOT and the jurisdictions can implement to make U.S. Route 13 a safer and more efficient transportation facility for the traveling public over the next 20 years.

## Existing Corridor Conditions

The evaluation of existing conditions along the U.S. Route 13 corridor examined the characteristics of the roadway and its users, addressed the seasonal variation, and identified key issues affecting travel along the corridor as summarized below.

### Roadway

- U.S. Route 13 is a four-lane facility with no control of access.
- For most of its length, U.S. Route 13 has a median separating the northbound from the southbound directions of travel.
- There are several locations where the roadway is undivided with a center two-way left-turn lane. One location of particular concern is in Temperanceville where U.S. Route 13 is undivided with a three-foot flush median, curb/gutter, sidewalk, and numerous residences, driveways, and utility poles located on both sides of the road.
- The U.S. Route 13 corridor has a total of 21 traffic signals. With the exception of Exmore and Onley, signal spacing is not a concern. In these two towns, there is a concern about the addition of additional signals in the future.

## Roadway Users

- The U.S. Route 13 corridor experiences a high volume of through traffic in both directions, ranging from 1,600 to 1,800 vehicles per day.
- There is a high volume of tractor-trailers, particularly in the northern portion of the U.S. Route 13 study area with poultry trucks moving to/from the Tyson's and Perdue plants to the north.
- Farm vehicles may be present on U.S. Route 13 for short stretches along most of the corridor throughout a long growing season.
- The U.S. Route 13 corridor is used by Eastern Shore residents for many different trip purposes including local trips, shopping trips, and work trips.

## Safety

- Corridor crash rates are generally below the statewide average for similar primary routes, except in the towns of Exmore and Onley.
- Fatalities are a concern with a total of 24 fatalities recorded in the U.S. Route 13 corridor over the three-year analysis period (1997-1999). Of these fatalities, 40 percent occurred at night and 30 percent involved pedestrians.
- The proximity of obstructions to the roadway (i.e. utility poles, signs and structures) appears to be a contributing factor in 38 percent of these fatalities.
- Seventeen fatalities were recorded in the year 2000.
- The ability of the Virginia State Police to effectively enforce existing traffic safety laws along the U.S. Route 13 corridor, given current staffing levels, was raised as a local concern.

## Traffic Operations

- Based on existing traffic volumes, U.S. Route 13 operates at a good level of service. Unsignalized access onto U.S. Route 13 is difficult at many cross streets due to geometry deficiencies.
- The unsignalized intersection of Route 175 and Route 798 near the Wallops Island mainland complex during the summer months does not function at an adequate level of service and needs to be improved.

## Access

- A large number of access points (over 1,300) were identified throughout the U.S. Route 13 corridor. Many properties have multiple points of access.

## Median Crossovers

- The median width in many areas does not provide adequate protection for crossroad traffic.
- Crossover spacing needs to be reviewed and the provision of left-turn lanes should be considered at all of the crossovers.
- The crossover widths of many median crossovers (measured parallel to U.S. Route 13) are not wide enough to accommodate simultaneous left-turning traffic.

## Railroad

- The proximity of the Eastern Shore Railroad to U.S. Route 13, from Machipongo to Onley, impacts the safety of all crossroads connecting with U.S. Route 13 from the east.
- The upgrade of the rail line may impact these at-grade rail crossing as a result of the speeds increasing from 10 to 20 mph.

## Land Use

- U.S. Route 13 is the primary access corridor for the entire Virginia Eastern Shore. The majority of daily trips require most residents to travel on U.S. Route 13 for both local and regional trip purposes.
- Active land uses along the U.S. Route 13 corridor include seasonal agriculture, and commercial/residential development in the towns and unincorporated settlements. Major commercial centers are located in Nassawadox, Exmore and Onley.
- In Accomack County, there are many schools located directly on, or close to, the U.S. Route 13 corridor. Access for school buses is a key concern.
- The Wallops Island area is a major employment center, attracting workers from both Virginia and Maryland. U.S. Route 13 is a major travel route serving this commuter population.
- The recently implemented reduced toll structure on the CBBT may have an impact on land use and development in Cape Charles and the entire southern portion of Northampton County.

## Environment

Improvements in the U.S Route13 corridor could potentially impact sensitive environmental features particularly wetlands, prime farmland, and historic resources. Especially for improvements that involve roadway relocation or new

alignment, additional investigations will be necessary to determine the extent and significance of such impacts.

■

### Future Traffic Conditions

- Recent population projections show a relatively flat growth trend.
- Traffic volumes have continued to rise on U.S. Route 13. National transportation statistics support this rise in trip making activity.
- Given the potential for growth along the corridor, significant changes in land use development along U.S. Route 13 is likely to occur.
- By the year 2020, the U.S. Route 13 corridor will continue to operate at an overall good level of service.
- Side-street congestion is expected to occur at several unsignalized intersections, some of which may require signalization by 2020.
- Pockets of congestion are expected to occur at key signalized intersections, particularly at T's Corner, in Onley, and in Exmore.

## Access Management Principles and Application to U.S. Route 13

Access Management for this study has been defined as applying roadway and land use techniques to preserve the safety, function, and capacity of the U.S. Route 13 corridor. Successful access management requires that: 1) the roadway be improved by VDOT in accordance with the access management plan and 2) the localities implement land use controls in accordance with the access management plan.

■

### Roadway Techniques

Access management techniques considered for the roadway network included:

- Construction of turn lanes
- Driveway spacing and consolidation
- Adequate corner clearances and sight distances
- Crossover spacing and consolidation
- Median type, median widening and crossover width
- Signal spacing and timing
- Frontage roads/reverse frontage roads
- Inter-parcel connections

## Table ES-1
## Summary of Access Management Guidelines for the U.S. Route 13 Corridor

| Criteria | Recommended Guidelines | Special Notes |
|---|---|---|
| **Left-Turn Lanes** | Construct at all full-access median crossovers | May not fully apply to directional crossovers |
| **Two-Way Left-Turn Lanes** | Provide 12 feet minimum, 14 feet desirable | Replace with non-traversible median when AADT exceeds 25,000 to 30,000 vehicles per day |
| **Right-Turn Lanes** | Require at all commercial entrances and side streets | Results in minimum lot frontage requirement |
| **Shoulders** | Widen/construct 10 feet wide min. outside and 3 feet min. median shoulders | Where residential driveway densities >10/mile, 12 feet min. outside shoulder |
| **Driveway Spacing** | 400 feet minimum between commercial entrances | Results in minimum lot frontage requirement |
| **Corner Clearance** | U.S. Route 13<br>400 feet – upstream of cross street<br>250 feet – downstream of cross street | Vehicle storage needs may increase the 400-foot upstream requirement |
| | Cross Street<br>250 feet – upstream of U.S. Route 13<br>100 feet – downstream of U.S. Route 13 | Use of restrictive median may reduce the 250-foot upstream requirement to 100 feet |
| **Crossover Spacing** | 0.5 miles – full access 0.25 miles – directional access | Procedure needed for variances/modifications |
| **Median Width** | ➤ Provide 50 feet minimum at major generators and cross streets by:<br>➢ Roadway widening<br>➢ Flare widening | Convert medians to directional access only or close median opening if median widening not feasible |
| | ➤ Widen crossovers and lengthen left-turn lanes at locations with heavy vehicle considerations (buses, tractor trailers) | Convert medians to directional access only or close median opening if median widening not feasible |
| **Side-Street Connections** | Counties require new development to provide secondary access to side-streets where feasible<br>VDOT to construct new local road links | |
| **Signal Spacing** | Two miles in rural areas, 0.5 miles in developing areas, 0.25 miles in developed areas | |
| **Signal Timing** | Implement signal coordination in developed areas | |
| **Clear Zone** | Establish 30 foot recovery area beyond traveled way, where practical | In areas with curbing, min. clear zone can be reduced to 6 feet |

## Land Use Techniques

Included in the final Access Management Plan is a model Highway Corridor Overlay District (HCOD) ordinance. The HCOD is meant to apply to all developments abutting U.S. Route 13 and requiring site plan or subdivision review. The HCOD also applies to redevelopment projects. It addresses the number of access points, minimum corner clearances, minimum sight distances, outparcels, new subdivision connections, median crossovers, shared access and reverse frontage. All developments generating more than 1,000 average daily trips covered by the HCOD shall prepare and submit a traffic impact analysis which address the following:

- Turn lane and access improvements
- Internal site circulation
- Shared access/access to adjacent sites
- Impacts to intersections and median crossovers
- Potential need for signalization
- Relationship of the proposal to the U.S. Route 13 Access Management Plan

# Evaluation of Alternatives

Chapter 5 of this report presents the process used to develop and evaluate alternative improvement concepts. Access Management techniques were evaluated to address specific corridor deficiencies along with potential safety-related improvements. This study first sought to recommend the implementation of basic safety and access management solutions, where practical. In those areas where access management techniques were deemed insufficient or not practical, other solutions were evaluated including reconstruction of intersections or the construction of bypasses.

Since this is a planning level study, potential impacts are discussed in general terms and based on existing database information. Minor right-of-way takings and impacts to abutting land uses were not assessed. Furthermore, field investigations should be conducted prior to any construction activities to ensure compliance with all appropriate local, state and federal rules and regulations.

# Summary of Alternatives Evaluation

Table ES-2 summarizes the alternatives considered by this study.

## Table ES-2
## Summary of Alternatives Evaluation

| | Crossover Closure | Median Widening | Turn Lane Improve | Mainline Realign | 12-Foot Shoulder | Frontage Roads | Wetland Impact | Clear Zone | Bypass Length | Cost (Millions) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Route 175** | | | | | | | | | | |
| Alt 1–Existing | N/A | 6,900 ft. | 6 | N/A | 67,200 ft. | | 11.3 ac | | | $6.1 |
| Alt 2–New Alignment | N/A | N/A | 5 | N/A | None | | 22.1 ac | | 19,000 ft. | $14.5 |
| **US Route 13 Oak Hall & Temperanceville** | | | | | | | | | | |
| Oak Hall Alt 1 (Existing) | 6 | 7,650 ft. | 7 | 2,400 ft. | 8,600 ft. | | | | | $4.5 |
| Oak Hall Alt 2 (East Bypass) | 2 | | 2 | | | | 34.4 ac | | 11,800 ft. | $10.2 |
| Temperanceville Alt 1 (Existing) | 5 | 5,600 ft. | 3 | 4,300 ft. | 8,750 ft. | | | | | $5.6 |
| Temperanceville Alt 2 (West Bypass) | 1 | | 3 | | | | 1.6 ac | | 9,300 ft. | $10.4 |
| Temperanceville Alt 3 (East-South Bypass) | 2 | | 3 | | | | 2.7 ac | | 4,600 ft. | $6.6 |
| **Combined Alternatives** | | | | | | | | | | |
| Alt 4–West Bypass of Oak Hall & Temperanceville | 1 | | 4 | | | | 38.5 ac | | 22,000 ft. | $25.0 |
| Alt 5–Alt 4 with Interchange | 1 | | 4 | | | | 38.5 ac | | 22,000 ft. | $28.9 |
| **Intersection of US Route 13 and Route 175** | | | | | | | | | | |
| At-grade | 1 | | 1 | | | | | | | |
| High-capacity Intersection | 1 | | 1 | | | | | | | |
| Interchange | 1 | | 1 | | | | | | | |
| **Mappsville & Nelsonia** | | | | | | | | | | |
| Mappsville Alt 1 (Existing) | 5 | 8,400 ft. | 4 | 2,800 ft. | 12,400 ft. | | | | | $6.4 |
| Mappsville Alt 2 (West Bypass) | 0 | | 2 | | | | 12.0 ac | | 8,800 ft. | $8.4 |
| Nelsonia Alt 1 (Existing) | 4 | 6,400 ft. | 5 | 2,800 ft. | 6,000 ft. | | 0.2 ac | | | $4.9 |
| Nelsonia Alt 2 (East Bypass) | 2 | | 3 | | | | 14.1 ac | | 11,600 ft. | $8.2 |
| Mappsville & Nelsonia Alt 3 (Joint Bypass) | 1 | | 6 | | | | 26.1 ac | | 20,400 ft. | $16.6 |
| **Mary N. Smith** | 1 | 9,600 ft. | 4 | 9,600 ft. | | 2,000 ft. | | | | $7.0 |
| **Whispering Pines** | 2 | 900 ft. | 1 | 900 ft. | | | | 4,100 ft. | | $1.1 |
| **Onley** | 1 | | 5 | | | | | | | $2.0 |
| **Melfa/Keller/Painter** | | | | | | | | | | |
| Alt 1–Shift RR within Town | 4 | 22,000 ft. | 12 | | 11,400 ft. | | | | | $15.2 |
| Alt 2–Shift RR outside Town | 4 | 36,950 ft. | 12 | | 28,300 ft. | | 10.6 ac | | | $30.6 |
| **Exmore** | | | | | | | | | | |
| Alt 1–Connector Bayside Rd to Broadwater Rd | 1 | | 6 | | | | | | | $1.8 |
| Alt 2–Alt 1 plus Relocate Signal Shore Plaza Signal | 2 | | 7 | | | | | | | $2.8 |
| **Nassawadox** | | | | | | | | | | |
| Alt 1–Shift RR within Town | 2 | 6,250 ft. | 3 | | 6,250 ft. | | | | | $4.4 |
| Alt 2–Shift RR Outside Town | 2 | 6,250 ft. | 3 | | 6,250 ft. | | 1.5 ac | | | $7.0 |
| **Machipongo** | | | | | | | | | | |
| Alt 1–Route 627 Consolidate Median at Clam Shack | 3 | 3,400 ft. | 4 | 3,400 ft. | | | | 1,400 ft. | | $4.3 |
| Alt 2–Route 627 Consolidate Median at Young St | 3 | 3,400 ft. | 3 | 3,400 ft. | | | | 1,200 ft. | | $4.2 |
| Alt 3–New Local Connection to Route 618 | 4 | 3,400 ft. | 5 | 3,400 ft. | | | | 1,200 ft. | | $5.0 |
| Alt 4–Variant of Alt 3 (Young St Open) | 4 | 3,400 ft. | 5 | 3,400 ft. | | | | 1,200 ft. | | $4.9 |
| Alt 5–Route 627 Consolidate Median near Chevon | 3 | 3,400 ft. | 3 | 3,400 ft. | | | | 1,400 ft. | | $4.5 |
| **Martin Siding** | | | | | | | | | | |
| Alt 1–Frontage & Reverse Frontage Roads | 2 | | 3 | | | 1,000 ft. | | | | $2.0 |
| Alt 2–Realign US Route 13 & Construct Frontage Rds | 2 | 1,200 ft. | 3 | 1,200 ft. | | 1,100 ft. | | | | $1.1 |
| **Route 184 Intersection** | | | | | | | | | | |
| Alt 1–Interchange & Grade Separation of RR | 5 | | 5 | 4,500 ft. | | | | | | $17.2 |
| Alt 2–Intersection Improve & Grade Separation of RR | 2 | | 4 | 3,000 ft. | | | | | | $11.1 |
| **Cape Center** | 5 | 3,100 ft. | 2 | 3,100 ft. | | | | | | $3.0 |
| **Kiptopeke Road** | 2 | 2,400 ft. | 2 | 2,400 ft. | | | | | | $3.1 |

## Study Recommendations

The recommended actions to improve the efficiency and safety of the U.S. Route 13 corridor are presented in Chapter 6. First, this plan recommends that VDOT implement the Access Management Guidelines set forth in Chapter 4. Second, this plan recommends that each locality along the corridor adopt the Highway Corridor Overlay District also discussed in Chapter 4. Finally, a series of roadway and safety improvements are recommended based on the alternatives analysis and public input process described in Chapter 5. The improvements are summarized as follows:

■

### Corridor-wide Actions

#### Policy Actions

- ➤ Adoption of U.S. Route 13 Access Management Guidelines by VDOT
- ➤ Adoption of Highway Corridor Overlay District Ordinance by Localities
- ➤ Adoption of Recommended Concept Plan to guide future access decisions

#### Physical Improvements

- ➤ 10-foot outside shoulders on U.S. Route 13 as a minimum
- ➤ Rumble strips – outside and inside shoulders
- ➤ Raised pavement markers – center line only at 80-foot spacing
- ➤ Milepost markers – every mile
- ➤ Relocation or Removal of Hazards in Clear Zone
- ➤ Drainage Grate Reconstruction in Median – 202 total structures
- ➤ Move/consolidate crossovers – 70 locations
- ➤ Turn lane improvements at major intersections

■

### Location and Study Recommendations

#### Maryland State Line to Route 175

- ➤ Clear vegetation in clear zone north of Route 710, near Welcome Center
- ➤ Provide 12-foot shoulder on southbound U.S. Route 13 through New Church
- ➤ Localized median widening – U.S. Route 13 at Route 710 in New Church
- ➤ Realign Route 704 (east) intersection with U.S. Route 13
- ➤ Localized median widening – U.S. Route 13 at Route 704

### Route 175 to Route 692 (Oak Hall and Temperanceville)

- Construct improved intersection on U.S. Route 13 at Route 175
- Construct four-lane, divided bypass between Route 175 and Route 692
- Realign Route 702 intersection with U.S. Route 13
- Clear vegetation in clear zone north of Route 692

### Route 692 to Route 729 (Mappsville)

- Provide 12-foot shoulders on northbound U.S. Route 13 between Route 692 and Route 691
- Localized median widening – U.S. Route 13 at Route 691
- Construct median through Mappsville
- Provide 12-foot shoulders on northbound and southbound U.S. Route 13 through Mappsville
- Realign Route 689 intersection with U.S. Route 13

### Route 729 to Route 681 (Nelsonia)

- Provide 12-foot shoulders on northbound and southbound U.S. Route 13 through Nelsonia
- Construct medial through Nelsonia
- Realign Route 681 intersection with U.S. Route 13

### Route 681 to Route 679

- Localized median widening – U.S. Route 13 at Route 680
- Localized median widening – U.S. Route 13 at Route 738
- Construct reverse frontage road – northbound at Route 738

### Route 679 to Route Business 13/ Route 663 (Mary N. Smith Area)

- Realign Route 679 intersection with U.S. Route 13
- Construct median in North Accomac area, between Route 661 and Route 663
- Improve roadway alignment and widen median from Route 661 to Route 663
- Construct one-way frontage roadson southbound U.S. Route 13 at two locations

### Business 13/Route 663 to Route 639 (Accomac and Onley)

- Clear vegetation in clear zone between Route 662 and Business 13
- Realign Business Route 13 and Route 659 at Whispering Pines
- Construct reverse frontage road – northbound at Route 648

- Construct access road between Route 179 and Chesapeake Square Shopping Center
- Construct two-way frontage road – northbound at Route 1616
- Localized median widening – U.S. Route 13 at Route 680 (Nandua HS)
- Provide 12-foot shoulders on southbound U.S. Route 13 north of Route 639

### Route 639 to Route 607 (Melfa, Keller, Painter)

- Relocate railroad right-of-way in Melfa, Keller and Painter to the east to allow for roadway widening
- Construct 16-foot-wide median through Melfa, Keller and Painter
- Localized median widening – U.S. Route 13 north and south of Melfa
- Construct directional median access at community college
- Realign Route 734 (east) to intersect with industrial park access
- Localized median widening – U.S. Route 13 north and south of Keller
- Localized median widening – U.S. Route 13 at Central Middle School

### Route 607 to Route 618 (Exmore)

- Localized median widening – U.S. Route 13 at Bundick's Kuzzen's
- Provide 12-foot shoulder on southbound U.S. Route 13 north of Route 181
- Construct access road to serve Food City plaza and Trawler restaurant
- Construct local road connection between Route 618 and Route 652
- Future relocation of existing traffic signal

### Route 618 to Route 617 (Nassawadox)

- Provide 12-foot shoulder on southbound U.S. Route 13 through Nassawadox
- Relocate railroad right-of-way in Nassawadox to the east to allow for roadway widening
- Localized median widening – U.S. Route 13 through Nassawadox

### Route 617 to Route 628 (Treherneville and Machipongo

- Construct one-way frontage road on southbound U.S. Route 13 in Weirwood
- Clear vegetation in clear zone between Route 617 and Route 620
- Construct one-way frontage road on southbound U.S. Route 13 in Treherneville
- Construct access road between Route 622 and Route 625
- Provide 12-foot shoulder on southbound U.S. Route 13 south of Route 622
- Localized median widening – U.S. Route 13 at Route 627
- Realignment of Young Street (Route 627)

### Route 628 to 630 (Martin Siding)

- Construct one-way frontage road on southbound U.S. Route 13 in Martins Siding
- Construct one-way frontage road on northbound U.S. Route 13 in Martins Siding
- Localized median widening – U.S. Route 13 at Route 1701
- Clear vegetation in clear zone between Route 1703 and Route 630
- Localized median widening – U.S. Route 13 at Route 630

### Route 630 to Route 642 (Cape Charles)

- Construct interchange on U.S. Route 13 at Route 184
- Construct access road between Route 642 at Food Lion Shopping Center

### Route 642 to Route 624 (Cape Center)

- Localized median widening – U.S. Route 13 at Route 684 (Kiptopeke ES)
- Construct one-way frontage road on northbound U.S. Route 13 between Route 643 and Route 644
- Construct one-way frontage road on southbound U.S. Route 13 between Route 643 and Route 644
- Localized median widening – U.S. Route 13 at Cape Center
- Construct reverse frontage road – northbound at Cape Center

### Route 624 to Route 600 (Kiptopeke)

- Clear vegetation in clear zone between Route 624 and Route 646
- Provide 12-foot shoulder on southbound U.S. Route 13 north of Route 646
- Localized median widening – U.S. Route 13 at Route 645
- Close Route 704 access onto U.S. Route 13
- Construct access road improvements on Route 645

### Route 175 from U.S. Route 13 to Mosquito Creek

- Provide left-turn lanes as needed between U.S. Route 13 at Route 798
- Provide 12-foot shoulder on eastbound and westbound Route 175

The study recommendations are projected to cost a total of **$139.3 million** (current dollars), with approximately 60 percent of the improvements occurring in Accomack County and the remaining 40 percent occurring in Northampton County.

## Action Plan

Along with the recommendations previously summarized, an "Action Plan" for implementation of a short-term improvement program was developed. Short-term improvements have been identified that address existing safety concerns and/or begin to implement the access management guidelines.

### Table ES-3
### Summary of Short-term Recommendations

| Recommended Action | Milepost Location | Cost by County | |
|---|---|---|---|
| | | Accomack | Northampton |
| **Corridor-wide Actions** | | | |
| Adoption of Access Management Guidelines | NA | NA | NA |
| Adoption of Highway Corridor Overlay District Ordinances by localities | NA | NA | NA |
| Adoption of Recommended Concept Plan | NA | NA | NA |
| Install rumble strips in outside shoulders | NA | $74,000 | $64,000 |
| Install raised pavement markers in center dashed line only at 80 feet spacing | NA | $242,000 | $208,000 |
| Install milepost markers – every mile | NA | $8,000 | $7,000 |
| Drainage grate reconstruction in median at 120 Accomack and 82 Northampton locations | NA | $562,000 | $226,000 |
| Headwalls – 50-Accomack and 10-Northampton | NA | $70,000 | $14,000 |
| Turn-Lane Improvements | NA | $500,000 | $500,000 |
| **Site-specific Actions – Accomack County** | | | |
| Clear vegetation within clear zone | | | |
| — North of Route 710 near the Welcome Center | 138-136 | $26,500 | |
| — North of Route 692 | 129 | $6,500 | |
| — Between Route 662 and Business 13/Route 659 | 117-115 | $31,500 | |
| Intersection improvement – Route 175 at Route 679 | | $300,000 | |
| Intersection improvement – Route 175 at Route 798 | | $300,000 | |
| Localized median widening – U.S Route 13 at Route 738 | | $750,000 | |
| Construct of reverse frontage road – Route 738 | | $250,000 | |
| **Site-specific Actions – Northampton County** | | | |
| Clear vegetation within clear zone | | | |
| — Between Route 617 and Route 620 | 94-92 | | $10,500 |
| — Between Route 703 and Route 630 | 88-87 | | $18,800 |
| — Between Route 624 and Route 646 | 75-73 | | $18,000 |
| Construct one-way frontage road – south of Route 628 | 89-88 | | $575,000 |
| Localized median widening – U.S. Route 13 at Route 684 | 78 | | $2,250,000 |
| **Total Short-term Improvements Cost** | | **$3,120,500** | **$3,891,300** |

# 1 Introduction

The Virginia Department of Transportation (VDOT) identified the need to evaluate transportation deficiencies on U.S. Route 13 and portions of Route 175 on Virginia's Eastern Shore. Based on the study that is described in this report, an Access Management Plan was developed to address these deficiencies. This report documents the findings of the study and presents the following: summary of existing conditions; future conditions analyses; development and analysis of various alternatives considered; and the final recommendations and plan of action for the corridors.

## 1.1 Study Area

The study area extended along the U.S. Route 13 corridor from the Virginia – Maryland state line to Route 600 just north of the Chesapeake Bay Bridge-Tunnel toll facility, a distance of approximately 69 miles. In addition, Route 175 serving the NASA facility at Wallops Island was also a part of the study. Figure 1-1 depicts the study area as defined for development of this plan.

Regionally, U.S. Route 13 is the principal north-south corridor linking the Eastern Shore of Virginia with the mainland of Virginia to the south and to the northeast through the State of Maryland. In Virginia, the U.S. Route 13 corridor traverses both Northampton and Accomack Counties in their entirety.

For many on Virginia's Eastern Shore, U.S. Route 13 is considered the "main street" and economic lifeline. Not only does it serve the incorporated communities of Accomac, Onley, Melfa, Keller, Painter, Exmore, Nassawadox, Eastville, and Cheriton but also the unincorporated communities of New Church, Oak Hall, Temperanceville, Mappsville, Nelsonia, Weirwood, Birdsnest, and Treherneville.

Within the study area, U.S. Route 13 is currently an uncontrolled access, four-lane highway that has a variable width median separating northbound and southbound traffic throughout most of the corridor.

## 1.2 Study Team and Coordination

The "Project Team" involved in this study consisted of staff from the Virginia Department of Transportation (VDOT) and the Vanasse Hangen Brustlin, Inc. (VHB) consultant team. Other members of the consultant team included Travesky and Associates, Fitzgerald and Halliday, Transfomation Systems and 3Di, Inc. Key project staff included:

- Mr. Harold Paxton – VDOT Project Manager, Transportation Planning Division
- Mr. Will Cumming – VDOT Accomac Resident Engineer
- Mr. Richard Lockwood – VHB Project Manager
- Mr. Stephen Aldrich – VHB Transportation/Traffic Task Manager
- Ms. Karin Ertl – VHB Public Involvement Task Manager
- Mr. Mitchell Johnson – VHB Engineering Task Manager
- Mr. Chris DeWitt – VHB Land Use Task Manager
- Ms. Marie Travesky – Travesky and Associates, Public Involvement
- Ms. Denise Nugent – Travesky and Associates, Facilitator

Part of the initial stages of this project involved the establishment of a VDOT Project Management Team. This Management Team was comprised of representatives from VDOT's Transportation Planning, Traffic Engineering, and Location and Design Divisions, the Hampton Roads District and Accomac Residency, along with the Department of Rail & Public Transportation, Virginia Division of the Federal Highway Administration, and the Accomack-Northampton Planning District Commission. The purpose of the Project Management Team was to guide the consultant team through the duration of the study, review all technical documents, and provide direct input on alternatives. The Project Management Team met at critical decision points, meeting on average once a month.


Chesapeake Bay
Atlantic Ocean
Belle Haven
Exmore
Nassawadox
Weirwood
Birdsnest
Treherneville
Machipongo
NORTHAMPTON
Eastville
Cheriton
Cape Charles
Cape Center
Kiptopeke State Park
Chesapeake Bay Bridge Tunnel
MP 100
MP 95
MP 90
MP 85
MP 80
MP 75
MP 70
MP 65
178
182
600
183
BUS 13
618
13
609
617
625
628
630
634
636
639
680
184
643
624
646
Legend
MP Milepost
Route 13/Wallops Island
Access Management Study
Figure 1-1
Sheet 1 of 2
Northampton County
Study Area
1 0 1 2 Miles

MARYLAND

VIRGINIA

New Church

MP 135

Oak Hall

Saxis

Atlantic

Hallwood

Temperanceville

MP 130

Mappsville

Chesapeake Bay

MP 125

Bloxom

Nelsonia

Wallops Island

Parksley

ACCOMACK

MP 120

Atlantic Ocean

MP 115

Onancock

Accomac

Onley

MP 110

Melfa

Keller

Wachapreague

MP 105

Painter

Belle Haven

MP 100

Exmore

709 693 175 702 695 679 689 187 316 176 677 657 126 179 718 626 620 180 600 614 182 652 183

13 BUS 13

**Legend**

MP Milepost

Route 13/Wallops Island Access Management Study

Figure 1-1
Sheet 2 of 2
Accomack County
Study Area

1 0 1 2 Miles

## 1.3 Study Process

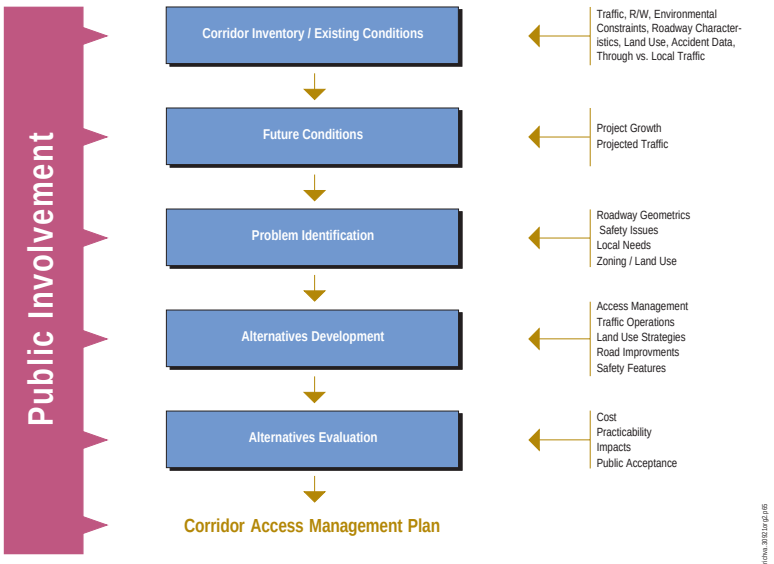
■

### 1.3.1 Technical Tasks

Similar to most engineering and planning studies, a structure or "process" for the study was established at the outset. The study process consisted of a series of technical tasks that built upon one another in a logical sequence. Interjected into the technical tasks was a comprehensive public involvement program that allowed for meaningful public input throughout the process and the incorporation of input into the technical analyses. The various technical tasks within the study process are identified below and depicted in Figure 1-2, which provides a general overview of the project sequence and deliverables. These technical tasks were generally as follows:

- Task 1 – Corridor Inventory and Analysis of Existing Conditions
- Task 2 – Analysis of Future Conditions
- Task 3 – Problem Identification/Transportation Deficiencies
- Task 4 – Development of Alternatives
- Task 5 – Analysis of Alternatives
- Task 6 – Development of Corridor Access Management Plan/Recommendations
- Task 7 – Final Report

**Figure 1-2**
**Study Process**



These tasks were completed through a combination of: 1) utilization of existing information/databases from a variety of sources, 2) collection of additional information as needed, and 3) input received through the public involvement program described below.

■

### 1.3.2 Public Involvement

In addition to the technical tasks noted above, a major component of this project was public involvement. Key components of the Public Involvement Program were:

- Initial Scoping Meetings
- Coordination with Elected Officials
- Citizen Advisory Committee Meetings
- Technical Advisory Committee Meetings
- Community Meetings
- Public Information Meetings/Workshops
- Miscellaneous Outreach Meetings
- Briefings to Local Boards/Commissions

Public involvement began at the very beginning of the study process through a series of initial scoping meetings and continued throughout the entire study. The purpose of the scoping meetings was to identify transportation-related issues in the corridor and to solicit input on potential representatives for a Citizens Advisory Committee.

Based on this scoping process, a Citizens Advisory Committee (CAC) was formed for the purpose of serving as a sounding board for the study team - to insure that the study process was grounded and addressed the issues and concerns of the "people" of the Eastern Shore. Six CAC meetings were held over the course of the study.

In addition, a total of four public information meetings were held, two in each county. The purpose of these meetings was to obtain public comments at the initiation of alternatives identification and at the draft recommendation stages.

During the development of alternatives, a series of five "Town" meetings were held to obtain input regarding alternative options within the following communities: 1) Nelsonia/Mappsville, 2) Temperanceville/Oak Hall, 3) communities along Route 175, 4) Melfa/Keller/Painter, and 5) Machipongo/Nassawadox.

Coordination with elected officials was considered essential to insure that the leadership of the Eastern Shore was kept informed and had a means to provide input during the study process. The study team met individually with officials throughout the study.

## 1.4 Study Goals and Objectives

In order to keep the study focused, specific goals and objectives were developed at the outset based on field reviews of the corridor, information received during the initial scoping process, and input from the first Citizen Advisory Committee meeting. The overall study goal and related transportation objectives are described briefly below.

### 1.4.1 Study Goal

The goal of the study was "to develop a plan that VDOT and the jurisdictions can implement to make U.S. Route 13 a safer and more efficient transportation facility for the traveling public over the next 20 years."

### 1.4.2 Objectives

The following nine objectives were identified as the most important in terms of achieving the study goal.

1. Improve Intersections
   - ➢ Add, lengthen, and/or improve deceleration lanes
2. Improve Entranceways/Exits To and From Existing and Future Businesses Along U.S. Route 13
   - ➢ Consolidate curb cuts
   - ➢ Enhance local zoning
   - ➢ Move, eliminate and/or consolidate crossover locations
3. Improve Roadway Geometrics
   - ➢ Provide additional travel lanes
   - ➢ Widen shoulders
   - ➢ Improve median width/crossover locations
4. Provide Additional Safety Features
   - ➢ Add signage
   - ➢ Increase distance of fixed objects from roadway (i.e., utility poles)
   - ➢ Add rumble strips to shoulder pavement
5. Better Accommodate Farm Vehicles/Equipment and School Buses

6. Better Accommodate Local with Through Vehicles

   - ➢ Control truck traffic volumes and speed
   - ➢ Regulate speed of other through vehicles
   - ➢ Construct frontage roads (where appropriate)
   - ➢ Construct bypasses (where appropriate)

7. Better Accommodate Bicycles and Pedestrians on and across U.S. Route 13

8. Increase Capacity

   - ➢ Increase capacity to accommodate growth
   - ➢ Evaluate impact of toll change

9. Enforcement of Traffic Laws

# 2

# Existing Conditions

A thorough understanding of the U.S. Route 13 corridor on Virginia's Eastern Shore required that the early stages of this study include both field observations and detailed physical and operational data collection. This chapter describes the examination of the roadway facility, the surrounding environment, and its users. Facility inventories determined roadway and intersection geometry, adjacent land uses, locations of driveways and median crossovers, posted speed limits, and width of travel lanes and shoulders. User analyses determined seasonal travel patterns and variations, origin and destination patterns within the study area, the types of vehicles using the roadway corridor, and the operational function of the roadway facility (the ability of the roadway corridor to accommodate the existing users' demands). Surrounding environment inventories included land use patterns, historical growth trends, and environmental resources.

## 2.1 Traffic Characteristics

A detailed data collection program was conducted that involved field observations, roadway inventories, daily machine counts, peak period intersection turning movement counts, and origin/destination license plate surveys. In addition, the study team utilized extensive historical traffic data obtained primarily from records of VDOT and the Chesapeake Bay Bridge and Tunnel District (CBBTD). The following sections present the significant findings from these work efforts.

### 2.1.1 Daily Volumes/Vehicle Mix

Daily traffic volumes were reviewed and tabulated to understand traffic demands at various locations along the corridor. An analysis of seasonal, daily and hourly variations was also completed in order to understand and characterize daily volumes at different times. The volume data came from several sources:

- Automatic Traffic Recorder (ATR) counts collected by VHB
- Revenue data from the Chesapeake Bay Bridge-Tunnel (CBBT)
- ATR counts collected by VDOT

Figure 2-1 summarizes daily traffic volumes and heavy vehicle percentages as recorded along the U.S. Route 13 corridor during the spring (May) and summer (July) of 2000. During May, daily traffic volumes were lowest at the southern end of the corridor - approximately 8,200 vehicles per day (vpd) at the Chesapeake Bay Bridge-Tunnel (CBBT). Proceeding north, volumes gradually increased with a peak in the vicinity of Onley of 18,000 vpd. From Onley to the Maryland State Line, traffic volumes ranged from 15,000 to 17,000 vpd. During July, overall daily volumes on U.S. Route 13 were higher than during the month of May with a low of 12,000 vph at the Chesapeake Bay Bridge – Tunnel and 21,500 vpd at the northern end of the corridor.

U.S. Route 13 experiences significant heavy vehicle use throughout the corridor. (Heavy vehicles are defined as vehicles having six tires or more). Heavy vehicles generally comprised 12 to 21 percent of May daily traffic volumes and from 10 to 18 percent of July daily traffic volumes. The largest percent of heavy truck traffic was recorded at the southern end of the corridor for both months.

## Seasonal Variation

To understand seasonal variation in daily traffic, monthly volumes from 1998, 1999, and 2000 were examined and averaged. Table 2-1 presents a summary of seasonal variation at the VDOT permanent count station located approximately ¼ mile north of Route 180 in the vicinity of Keller. Table 2-2 presents a summary of the seasonal variation of traffic at the Chesapeake Bay Bridge-Tunnel (CBBT).

The following observations can be made by examining Tables 2-1 and 2-2:

- Traffic volumes are highest in July (almost 21,000 vpd north of Route 180 and over 11,500 vpd at the CBBT).
- The second and third highest traffic volume months are August and June, respectively.
- The lowest daily traffic volumes occur in January (12,800 vpd north of Route 180 and 4,800 vpd at the CBBT).
- In both locations, April traffic volumes best represented the average annual daily volume.
- Traffic (AADT) seasonal variations are much greater at the Chesapeake Bay Bridge-Tunnel.

See Sheet 2

Chesapeake Bay

Atlantic Ocean

Belle Haven

Exmore

Nassawadox

Weirwood

Birdsnest

Treherneville

Machipongo

NORTHAMPTON

Eastville

Cheriton

Cape Charles

Cape Center

Kiptopeke State Park

Chesapeake Bay Bridge Tunnel

| | |
|---|---|
| 15,500 | 14% |
| 18,500 | 12% |

| | |
|---|---|
| 15,000 | 12% |
| 17,500 | 10% |

| | |
|---|---|
| 12,200 | 15% |
| 13,500 | 13% |

| | |
|---|---|
| 8,500 | 17% |
| 11,800 | 15% |

| | |
|---|---|
| 8,500 | 19% |
| 12,500 | 17% |

| | |
|---|---|
| 8,200 | 21% |
| 12,000 | 18% |

**Legend**

| | | |
|---|---|---|
| Spring | ADT | HV % |
| Summer | ADT | HV % |

Route 13/Wallops Island Access Management Study

Figure 2-1
Sheet 1 of 2
Northampton County
2000 Average Daily Traffic (ADT) Volumes and Percent Heavy Vehicles (HV)

1 0 1 2 Miles

MARYLAND

VIRGINIA

Chesapeake Bay

Atlantic Ocean

ACCOMACK

| | |
|---|---|
| 17,000 | 9% |
| 21,500 | 10% |

| | |
|---|---|
| 15,000 | 14% |
| 18,000 | 12% |

| | |
|---|---|
| 16,000 | 12% |
| 19,000 | 10% |

| | |
|---|---|
| 15,500 | 14% |
| 19,000 | 12% |

| | |
|---|---|
| 15,500 | 15% |
| 19,000 | 13% |

| | |
|---|---|
| 16,000 | 14% |
| 18,000 | 12% |

| | |
|---|---|
| 18,000 | 14% |
| 19,000 | 12% |

| | |
|---|---|
| 16,900 | 12% |
| 18,500 | 10% |

| | |
|---|---|
| 15,500 | 14% |
| 18,500 | 12% |

See Sheet 1

New Church
Oak Hall
Saxis
Atlantic
Temperanceville
Hallwood
Mappsville
Wallops Island
Bloxom
Nelsonia
Parksley
Onancock
Accomac
Onley
Melfa
Keller
Wachapreague
Painter
Belle Haven
Exmore

**Legend**

| | | |
|---|---|---|
| Spring | ADT | HV % |
| Summer | ADT | HV % |

Route 13/Wallops Island Access Management Study

Figure 2-1
Sheet 2 of 2
Accomack County
2000 Average Daily Traffic (ADT) Volumes and Percent Heavy Vehicles (HV)

1 0 1 2 Miles

**Table 2-1**
**Seasonal Variation of U.S. Route 13 Daily Traffic Volumes**
**1/4 Mile North of Route 180, near Keller**

| Month | 1998 (vpd) | 1999 (vpd) | 2000 (vpd) | Average (vpd) | Seasonal Adjustment Factor* |
|---|---|---|---|---|---|
| January | ---- | 13,149 | 12,458 | 12,804 | 1.299 |
| February | ---- | 14,064 | 14,512 | 14,288 | 1.164 |
| March | ---- | 14,622 | 15,209 | 14,916 | 1.115 |
| April | 16,841 | 17,360 | 16,017 | 16,739 | 0.993 |
| May | 16,782 | 17,201 | 17,208 | 17,064 | 0.975 |
| June | 17,909 | 18,149 | 18,918 | 18,325 | 0.907 |
| July | 20,623 | 21,309 | ---- | 20,966 | 0.793 |
| August | ---- | 19,790 | ---- | 19,790 | 0.840 |
| September | 17,542 | 16,491 | ---- | 17,017 | 0.977 |
| October | 16,261 | ---- | | 16,261 | 1.023 |
| November | 15,912 | 16,388 | ---- | 16,150 | 1.030 |
| December | 15,060 | 15,401 | ---- | 15,231 | 1.092 |

* Seasonal adjustment factor represents the typical deviation of the month's average daily traffic volumes from the average annual daily traffic volume.

**Table 2-2**
**Seasonal Variation of U.S. Route 13 Daily Traffic Volumes**
**Chesapeake Bay Bridge-Tunnel**

| Month | 1995 (vpd) | 1996 (vpd) | 1997 (vpd) | 1998 (vpd) | 1999 (vpd) | Average (vpd) | Seasonal Adjustment Factor* |
|---|---|---|---|---|---|---|---|
| January | 4,744 | 4,197 | 4,831 | 5,091 | 5,162 | 4,805 | 1.606 |
| February | 4,941 | 4,602 | 5,135 | 5,150 | 5,587 | 5,083 | 1.518 |
| March | 5,690 | 5,785 | 6,322 | 5,840 | 6,021 | 5,932 | 1.301 |
| April | 7,789 | 7,348 | 7,016 | 7,743 | 8,103 | 7,600 | 1.016 |
| May | 7,924 | 7,933 | 8,176 | 8,320 | 8,514 | 8,173 | 0.944 |
| June | 8,861 | 8,966 | 8,911 | 9,068 | 9,388 | 9,039 | 0.854 |
| July | 11,626 | 10,679 | 11,193 | 11,769 | 12,371 | 11,527 | 0.670 |
| August | 10,540 | 11,623 | 12,096 | 11,284 | 11,431 | 11,395 | 0.677 |
| September | 8,580 | 7,697 | 7,821 | 8,606 | 7,641 | 8,069 | 0.956 |
| October | 7,101 | 6,889 | 7,163 | 7,552 | 7,757 | 7,292 | 1.058 |
| November | 6,907 | 6,673 | 6,961 | 7,481 | 7,875 | 7,179 | 1.075 |
| December | 6,148 | 6,652 | 6,399 | 6,430 | 6,962 | 6,518 | 1.184 |
| **Total** | **90,850** | **89,044** | **92,025** | **94,335** | **96,813** | **92,613** | |

* Seasonal adjustment factor represents the typical deviation of the month's average daily traffic volumes from the average annual daily traffic volume.

## Daily Variation

The study team further examined traffic volumes by day of the week to better understand the weekly traffic demands along the corridor. Figure 2-2 summarizes daily variation at the VDOT permanent count station, again approximately one-quarter mile north of Route 180 in the vicinity of Keller. Figure 2-3 summarizes daily variation at the CBBT.

The following observations can be made:

- Summer daily volumes are consistently higher than spring volumes.
- Weekday volumes (excluding Friday) are relatively consistent, ranging from roughly 16,000 vpd to 18,000 vpd near Route 180.
- U. S. Route 13 traffic in the central part of the corridor peaks on Friday at 22,000 vpd, with the second highest travel day being Saturday (20,000 vpd).
- Summer traffic volumes at the CBBT are highest on Saturday (almost 18,000 vpd) and Sunday (almost 16,000 vpd), indicating a strong recreational/weekend demand.

**Figure 2-2**
**Existing Daily Variation of U.S. Route 13 Traffic Volumes**
**One-quarter Mile North of Route 180**

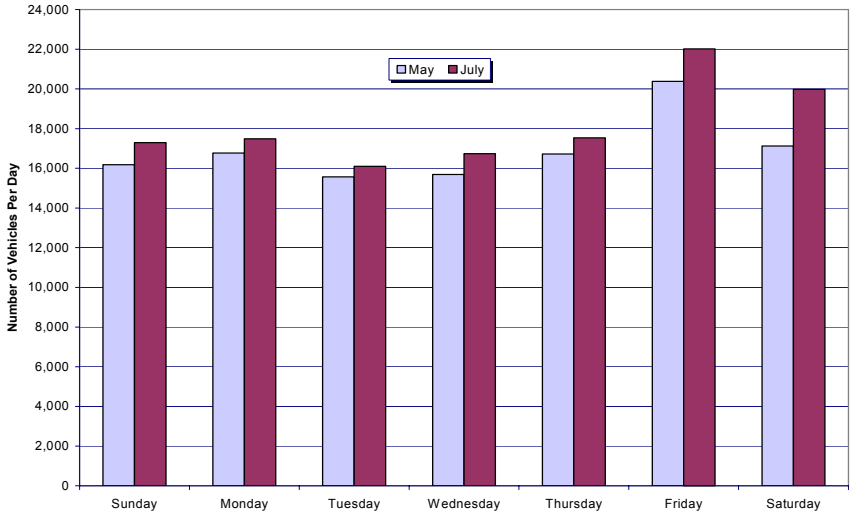
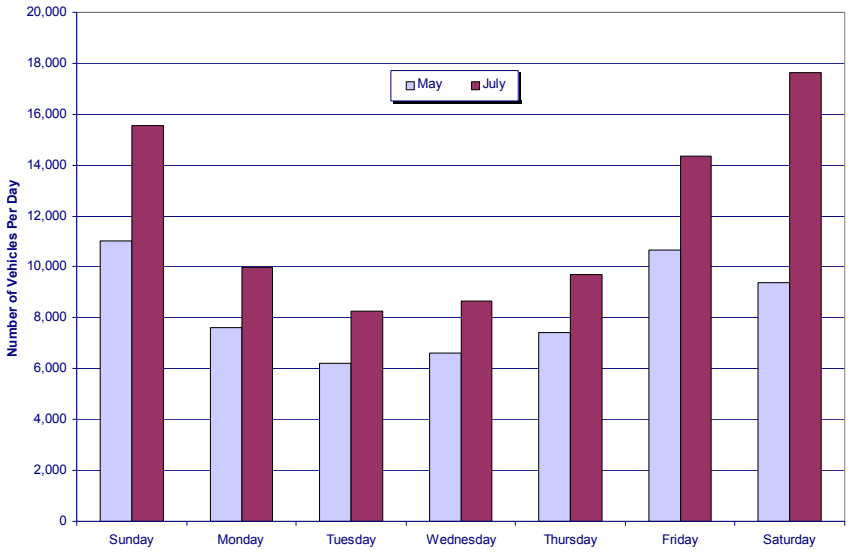


**Figure 2-3**
**Existing Daily Variation of U.S. Route 13 Traffic Volumes**
**Chesapeake Bay Bridge-Tunnel**




## Hourly Variation

Analysis of weekday and weekend (Saturday) hourly traffic volumes allowed the study team to understand how traffic demand varies over the course of the day. Hourly fluctuations in daily volumes help identify the degree to which commuting traffic and recreational traffic utilize the highway. Such fluctuations also highlight periods of peak usage of U.S. Route 13. Traffic volumes on a weekday and a Saturday in July 2000 were examined at the permanent count station north of Route 180 (Figure 2-4) and at the Chesapeake Bay Bridge-Tunnel (Figure 2-5).

At the U.S. Route 13 location near Keller, the following observations can be made with respect to hourly traffic volume variation:

- Weekday traffic volumes represent a relatively "typical" peaking pattern with both a morning and evening peak period.

- The weekday evening peak hour volume is noticeably higher than the morning peak hour volume with almost 1,300 vehicles per hour (vph) as compared to 1,000 vph.

- Weekday traffic volumes drop rapidly after 6:00 PM.

- Weekend daily traffic patterns are significantly different from weekday patterns, with a steady increase in traffic demand from 5:00 AM to midday and a more gradual, but steady, decline in traffic demand throughout the afternoon and into the evening.

**Figure 2-4**
**Hourly Variation of U.S. Route 13 Weekday & Saturday Traffic Volumes**
**1/4 Mile North of Route 180 near Keller (July 2000)**

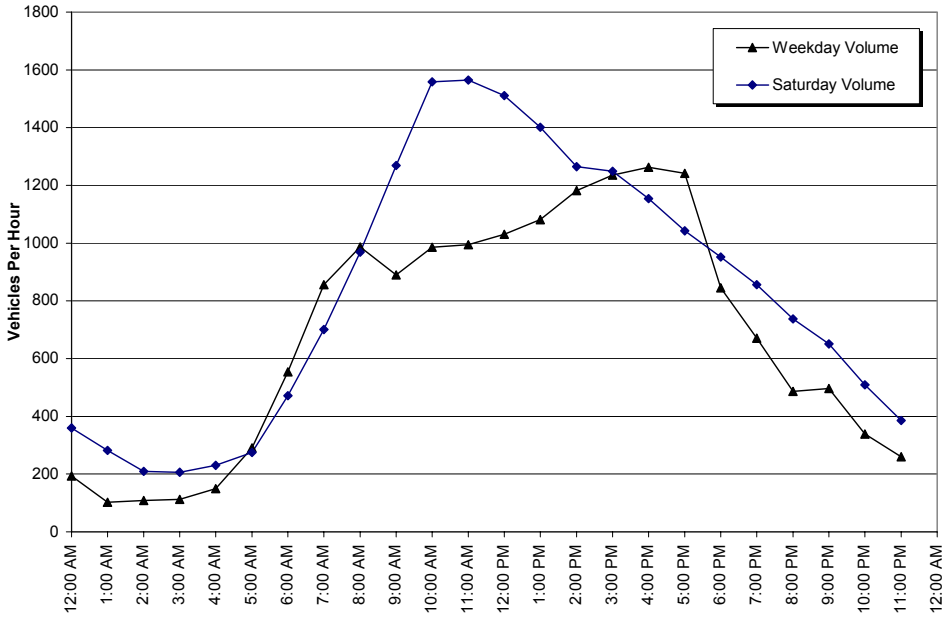
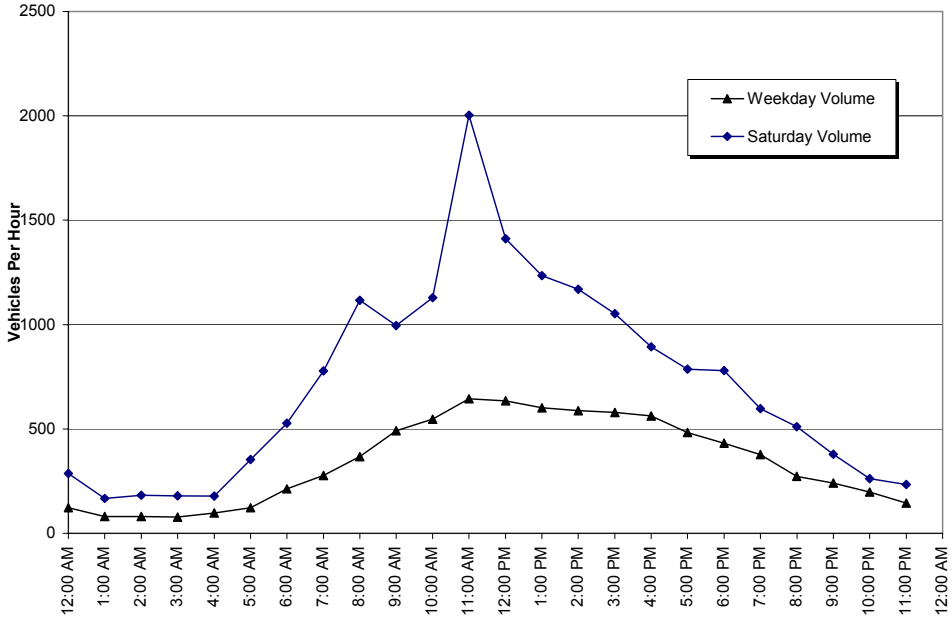



**Figure 2-5**
**Hourly Variation of U.S. Route 13 Weekday & Saturday Traffic Volumes**
**Chesapeake Bay Bridge-Tunnel (July 2000)**



At the Chesapeake Bay Bridge-Tunnel, weekday and weekend traffic patterns are more similar to each other and reflect recreational demands. The following observations were made:

- Weekday traffic patterns do not reflect the traditional peak period commuter patterns that were observed further north along U.S. Route 13.
- Weekday patterns show a steady increase in volume from 5:00 AM to 11:00 AM followed by a more gradual decline in volume throughout the afternoon and into the evening.
- Weekend patterns also reflect this midday peaking characteristic, with a much higher volume and the midday peak (11:00 AM) is much sharper and more defined than the weekday midday peak.

■

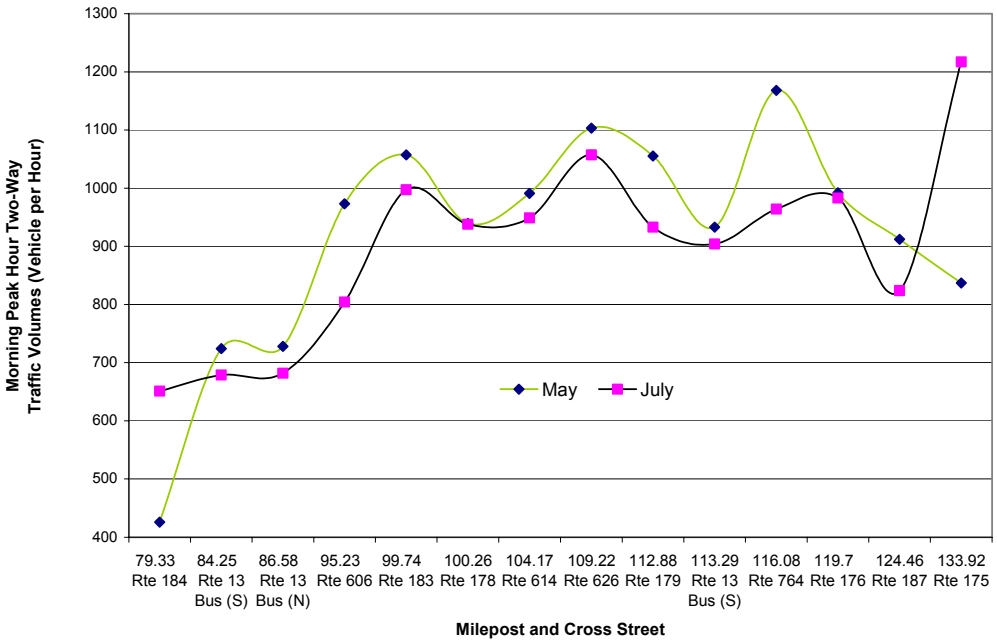
### 2.1.2 Peak Hour Volumes

In order to understand the operational characteristics of the roadway and key intersections along the corridor, an extensive peak hour traffic volume data collection effort was undertaken. Weekday peak hour turning movement counts were conducted at 16 locations in May, 2000 and 27 locations in July, 2000. Figures 2-6 and 2-7 summarize two-way traffic volumes on U.S. Route 13 during the morning and afternoon peak hours as recorded in both May and July.

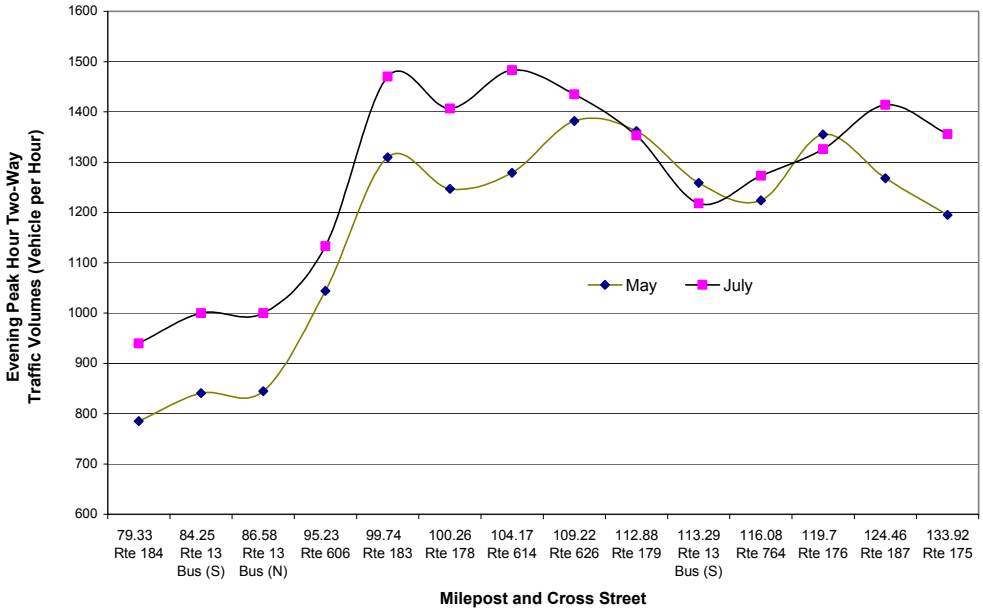
The figures show that during each of the peak hours, traffic volumes are lowest at the southern end of the corridor, and increase heading north to Route 183 at Exmore. Between Exmore and Route 175, intersection volumes are relatively constant, and from Route 175 decrease slightly heading north to the Maryland State Line.

Afternoon peak hour volumes are generally 30-50 percent higher than morning peak hour, and summer volumes are higher than spring. Also, during the summer afternoon peak hour, considerable intersection traffic demands occur at the three shopping plaza intersections: Chesapeake Square, 4 Corner Plaza and Shore Plaza.

## Figure 2-6
## Existing Morning Peak Hour Corridor Two-Way Traffic Volumes




## Figure 2-7
## Existing Evening Peak Hour Corridor Two-Way Traffic Volumes



### 2.1.3 Corridor Origin-Destination Patterns

In order to better understand the travel patterns of existing users of U.S. Route 13, a video license plate survey was conducted on Tuesday, July 18, 2000 between 7:00 AM and 7:00 PM. Video cameras were used to record individual license plate numbers of vehicles at the following three locations:

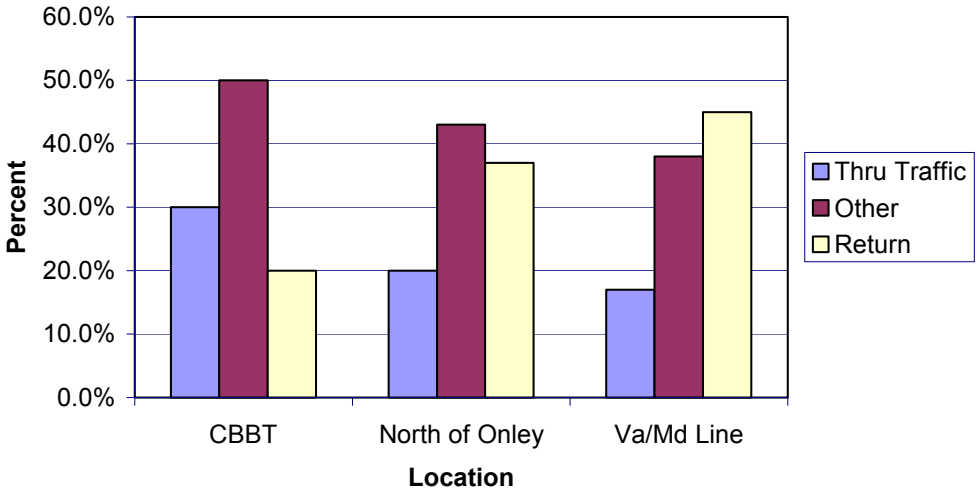
- U.S. Route 13 just north of the CBBT toll plaza
- U.S. Route 13 between Route 648 and Route 650 (north of Onley)
- U.S. Route 13 between Route 175 and the Maryland State Line

Video images of the rear license plates of vehicles passing in both directions and in all four travel lanes were recorded on U.S. Route 13. A typical camera setup is shown in Figure 2-8.

**Figure 2-8**
**Typical Camera Setup for U.S. Route 13 License Plate O/D Survey**

A total of 27,393 license plate records were collected, representing approximately 86 percent of the total volume (31,788 vehicles) passing the survey stations during the 12-hour period. A graphic showing some of the results of the survey are shown in Figure 2-9. In this graphic, three trip types are shown: through traffic, return traffic and other traffic. Through traffic was defined as traffic that both entered and exited the study area at the two end points (CBBT and Maryland State Line). Return traffic was defined as vehicles that crossed the survey station in both directions during the survey period. Other traffic was defined as traffic that crossed a survey station in only one direction and was not through traffic. Key findings are discussed below.

**Figure 2-9**
**U.S. Route 13 Origin/Destination Survey Summary**




## Through Traffic

Through traffic was defined as traffic going from the Chesapeake Bay Bridge-Tunnel through Northampton and Accomack Counties into Maryland (or the reverse). Overall, summer weekday through traffic on U.S. Route 13 was 3,600 vehicles per day. This comprises 17 percent of vehicles measured at the Maryland State Line, 20 percent of traffic measured at the mid-point station and 30 percent of vehicles measured just north of the CBBT toll plaza.

## Return Trips

A significant number of return trips occurred during the morning and evening commuting times and these patterns were evident at both the southern and northern ends of the study area. On the northern end, approximately 45 percent of vehicles measured at the Maryland State line were recorded crossing the state line twice in one day (either trips from Virginia to Maryland or the reverse). On the southern end, the commuting patterns were evenly split with 10 percent traveling southbound in the morning (across the CBBT) and returning to the Eastern Shore in the evening and 10 percent in the reverse commuting pattern. The data also clearly shows very low matches between either of the two end points of the study area and the mid-shore location (roughly between Onley and Accomac). This means there is low commuting activity from either end of the corridor to the mid-shore area.

### Other Trips

As previously stated, other trips are defined as traffic crossing a survey station in one direction that were not through trips. A major portion of other trips can also be defined as external to internal trips. Twenty-five percent of all southbound vehicles entering the survey area from the north at the Maryland State Line were found passing the mid-point station (north of Onley). In the northbound direction, 45 percent of all vehicles entering the survey area from the CBBT were found passing the mid-point station. In both cases, vehicles did not exit the corridor at either end during the 12-hour period. This population could be comprised of different trip activities, including travelers stopping at a hotel or arriving at an Eastern Shore destination. It could also include commuting trips on the northern end from Maryland that used U.S. Route 13 in the morning and returned using a secondary road in the Wallops Island area back into Maryland.

■

## 2.1.4 Corridor Travel Speeds

To determine the prevailing vehicle speeds through various segments of U.S. Route 13, 24-hour spot speed data was collected using automatic traffic counters in July 2000. From the raw speed data collected, both average and 85th percentile travel speeds were derived. Table 2-3 shows both the average and 85th percentile speeds for U.S. Route 13 Business in Cheriton. It should be noted that speed data was collected at only one location in each roadway segment and the actual speed within that segment may vary.

Posted speed limits on U.S. Route 13 vary from 45 mph to 55 mph. Average travel speeds measured on U.S. Route 13 range from 34 mph in the northbound direction between Route 695 and Route 175 to 66 mph in the northbound direction between the northern ends of Business 13 in Eastville and Cheriton. In general, average and 85th percentile speeds are lower in the northbound direction than in the southbound direction, and are highest on the southern sections of U.S. Route 13. The lowest observed speeds were on the section of U.S. Route 13 between Route 179 and Route 609 in Onley.

## Table 2-3
## U.S. Route 13 Travel Speed Summary (July 2000)

| Roadway Segments | | Direction | Posted Speed Limit (mph) | Average Speed (mph) | 85th Percentile Speed (mph) |
|---|---|---|---|---|---|
| Maryland State Line | Route 175 | Northbound | 55 | 56 | 62 |
| | | Southbound | 55 | 58 | 63 |
| Route 175 | Route 692 | Northbound | 45 | 34 | 51 |
| | (Temperanceville) | Southbound | 45 | 48 | 56 |
| Route 692 | Route 187 (Nelsonia) | Northbound | 55 | 44 | 58 |
| (Temperanceville) | | Southbound | 55 | 46 | 62 |
| Route 187 (Nelsonia) | Route 176 | Northbound | 55 | 55 | 68 |
| | | Southbound | 55 | 62 | 68 |
| Route 176 | North end of U.S. Route 13 | Northbound | 55 | 58 | 64 |
| | Business (Accomac) | Southbound | 55 | 58 | 63 |
| North end of U.S. Route 13 | Route 764 (Accomac) | Northbound | 55 | 57 | 63 |
| Business (Accomac) | | Southbound | 55 | 58 | 64 |
| Route 764 (Accomac) | Route 179 (Onley) | Northbound | 55 | 40 | 64 |
| | | Southbound | 55 | 59 | 64 |
| Route 179 (Onley) | Route 609 (Onley) | Northbound | 45 | 38 | 49 |
| | | Southbound | 55 | 36 | 46 |
| Route 609 (Onley) | Route 180/Route 696 | Northbound | 50 | 49 | 57 |
| | (Keller) | Southbound | 50 | 53 | 60 |
| Route 180/Route 696 | Route 182/Route 614 | Northbound | 55 | N/A | N/A |
| (Keller) | (Painter) | Southbound | 55 | 41 | 60 |
| Route 182/Route 614 | Route 178 (Exmore) | Northbound | 55 | 58 | 65 |
| (Painter) | | Southbound | 55 | 58 | 64 |
| Route 178 (Exmore) | Route 698/U.S. Route 13 | Northbound | 45 | 48 | 56 |
| | Business (Exmore) | Southbound | 45 | 49 | 57 |
| Route 698/U.S. Route 13 | Route 606 (Nassawadox) | Northbound | 55 | 59 | 63 |
| Business (Exmore) | | Southbound | 55 | 56 | 63 |
| Route 606 (Nassawadox) | Route 628 | Northbound | 55 | 57 | 62 |
| | | Southbound | 55 | 59 | 65 |
| Route 628 | North end of U.S. Route 13 | Northbound | 55 | 59 | 65 |
| | Business (Eastville) | Southbound | 55 | 57 | 67 |
| North end of U.S. Route 13 | N End of U.S. Route 13 | Northbound | 55 | 66 | 69 |
| Business (Eastville) | Business (Cheriton) | Southbound | 55 | 63 | 68 |
| North end of U.S. Route 13 | Route 184 /U.S. Route 13 | Northbound | 55 | 56 | 63 |
| Business (Cheriton) | Business (Cheriton) | Southbound | 55 | 56 | 63 |

Source: Vanasse Hangen Brustlin, Inc.

## 2.2 Roadway and Access Inventory

An inventory of roadway and access characteristics was compiled for the U.S. Route 13 corridor and entered into a geographic information system (GIS) for purposes of data management and analysis. Existing data was geo-referenced to allow graphical presentation and analysis of existing geometric features along the corridor. Field observations were used to update current VDOT physical inventories, and these changes were integrated into the GIS environment using orthogonal aerial photography. This allowed for the use of Arcview and ArcInfo GIS software to add, revise or otherwise modify existing data records.

A summary of key roadway features is shown in Figure 2-10 for Northampton County and in Figure 2-11 for Accomack County. Each graphic displays the following information for U.S. Route 13:

- Right-of-Way
- Posted speed limit (by direction of travel)
- Median type and width
- Right shoulder width (by direction of travel)
- Driveway density (by direction of travel)
- Crossroads
- Communities
- Milepost location

More detailed discussion of these features is provided below.

■

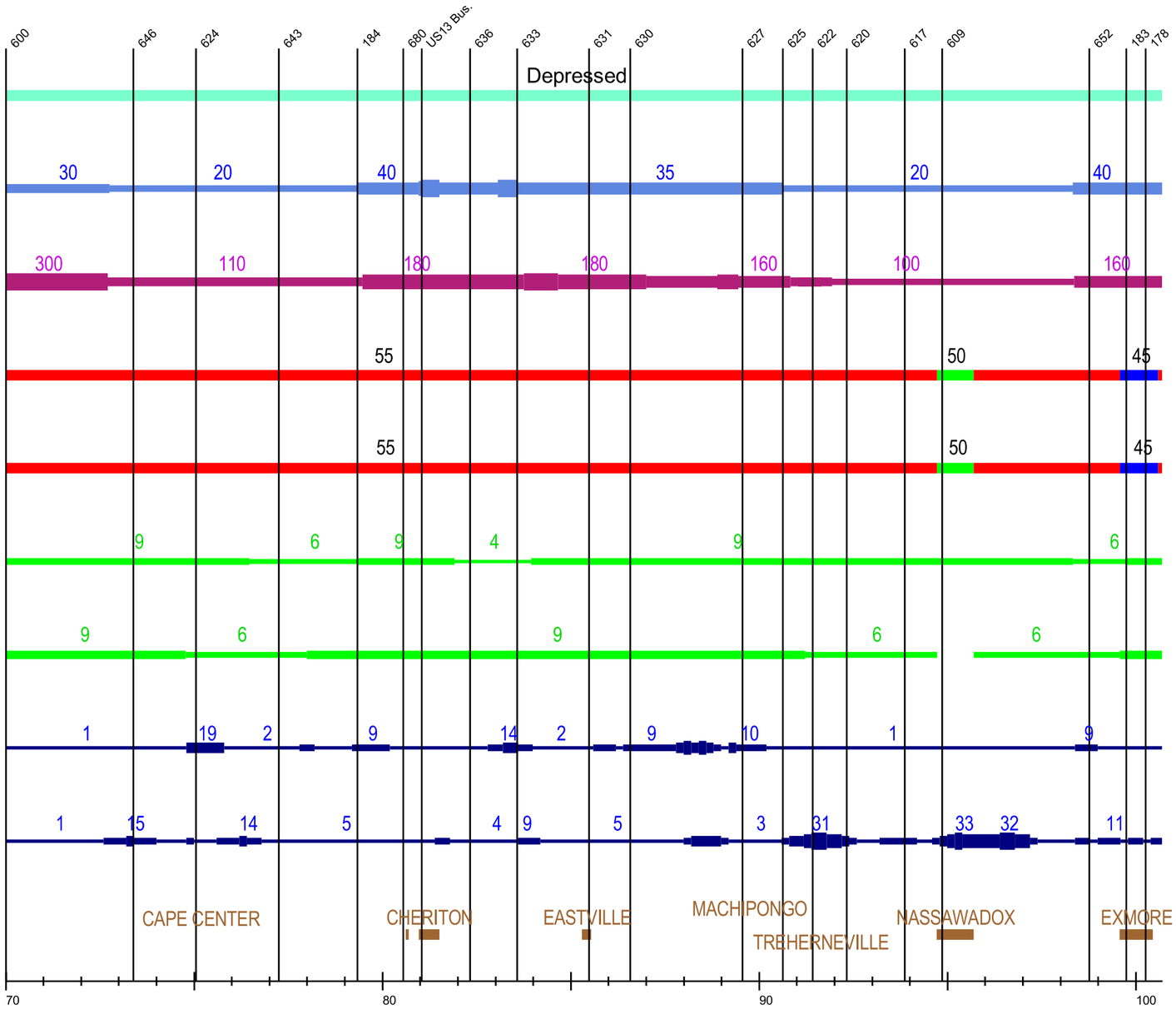
### 2.2.1 Roadway Infrastructure

Critical to an evaluation of the current needs of the U.S. Route 13 corridor was an understanding of the roadway geometric characteristics on the facility. Detailed field surveys were conducted by updating the existing VDOT Statewide Highway Planning System (SHPS) database. To provide more precise detail, separate tables were completed for the northbound and southbound sides of the highway. A summary of key features is provided below.

For most of its length, U.S. Route 13 is a 4-lane divided highway with a depressed median and a 55 mph speed limit. Conditions vary, however, particularly in the many settlements and incorporated communities that exist along the highway. Overall, the speed limit changes 23 times along the corridor and the median width changes 22 times.

Conditions are most consistent in the southern portion of the corridor where the speed limit remains at 55 mph for an uninterrupted stretch of approximately 25 miles. Shoulder widths are relatively consistent in this section, with a wide right shoulder of predominantly 9 feet (but ranging as low as 4 feet), and a left shoulder width between 0 feet and 2 feet. The median in the southern section generally ranges from 18 feet to 30 feet, with two small sections approaching 120 feet.


Chesapeake Bay
Atlantic Ocean
Belle Haven
Exmore
MP 100
MP 95
Nassawadox
Weirwood
Birdsnest
Treherneville
MP 90
Machipongo
NORTHAMPTON
Eastville
MP 85
Cheriton
MP 80
Cape Charles
Cape Center
MP 75
Kiptopeke State Park
MP 70
Chesapeake Bay Bridge Tunnel
MP 65
Legend
MP Milepost
U.S. Route 13
Route 13/Wallops Island Access Management Study
Northampton County Location Map for Figure 2-10
2 0 2 4 Miles




**Selected Crossroads**

**Median Type**

**Median Width (Feet)**

**Estimated Minimum ROW Width (Feet)**

**Posted Speed Limit NB (MPH)**

**Posted Speed Limit SB (MPH)**

**Right Shoulder Width NB (Feet)**

**Right Shoulder Width SB (Feet)**

**Driveway Density NB Per Mile**

**Driveway Density SB Per Mile**

**Communities**

**Milepost**

Route 13/Wallops Island
Access Management Study

Figure 2-10
Existing Roadway Features
Northampton County

At the Town of Nassawadox, roughly 25 miles north of Route 600, the speed limit drops to 50 mph, and curb and gutter delineates the southbound side of the road. From Nassawadox to the Town of Accomac, roughly 19 miles to the north, the speed limit changes every 2 to 4 miles, dropping from 55 mph to either 50 mph or 45 mph. Shoulders in this segment vary widely, with the right shoulder ranging from 0 to 10 feet, and the left from 0 to 2 feet. Depressed medians in this section range from 15 to 40 feet, and several five-lane cross sections appear, providing turning lanes where U.S. Route 13 runs through incorporated communities.

Between Accomac and the unincorporated settlement of Nelsonia, the speed limit returns to 55 mph for approximately 11 miles. Here, the right shoulder decreases from 10 feet near Accomac to 2 feet near Nelsonia, and the left shoulder varies from 0 to 2 feet. The median ranges from 20 to 30 feet, with one small section of a 12-foot flush median.

From Nelsonia to the Maryland State Line, the speed limit changes roughly every 2 miles, alternating between 55 and 45 mph as U.S. Route 13 passes through several unincorporated settlements. Shoulder and median conditions vary considerably as the roadway cross section changes several times from four-lane divided to four lanes with a flush median. One segment through Temperanceville contains a 3-foot flush median. This is the narrowest section of median in the entire corridor. Sidewalks also exist in several of the settlements.

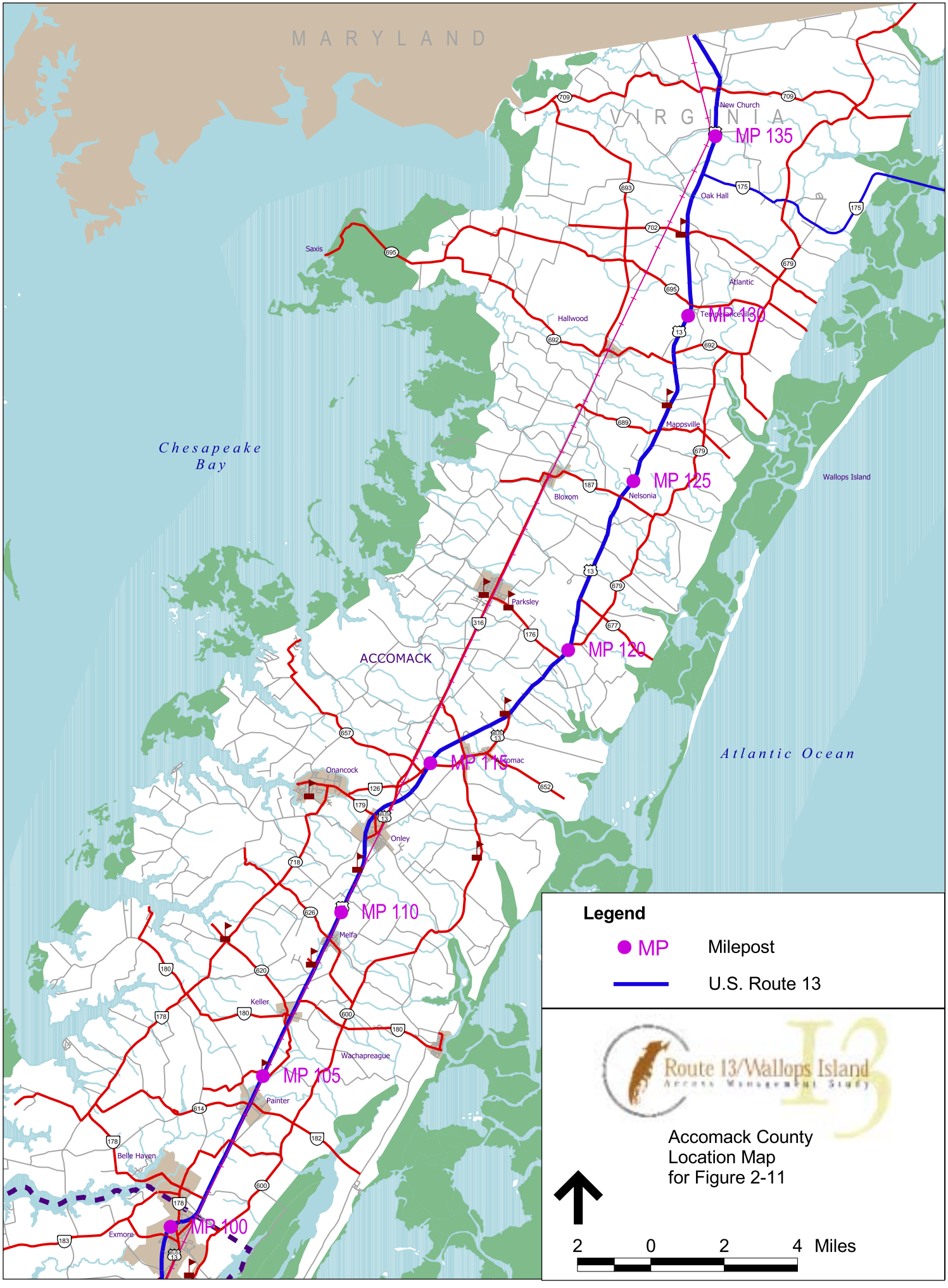
The updated SHPS database, linked into the GIS, allowed for more detailed spatial analysis of existing geometric features along the corridor. This also facilitated the analysis of potential roadway improvements. Separate databases were created for the northbound and southbound lanes so this analysis could accommodate differing conditions (such as shoulder width) on each side of the highway.

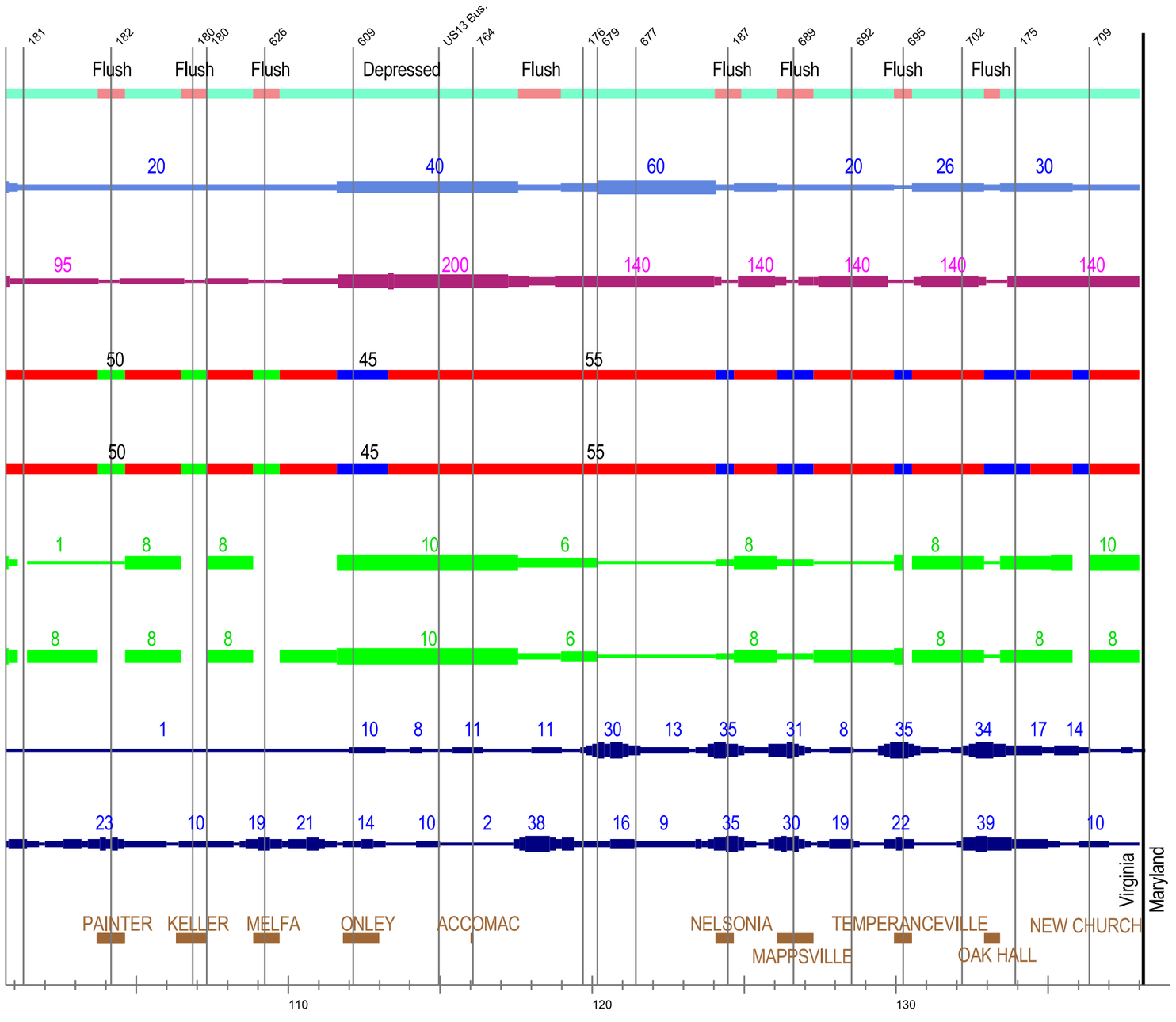
■

### 2.2.2 Right-of-Way

Along the U.S. Route 13 corridor, the existing roadway right-of-way (ROW) varies from its narrowest at 60 feet wide (a 2.5 mile stretch from MP 106.5 to MP 109) through downtown Keller to its widest at 300 feet at the southern end of the corridor. The ROW through Keller is further constrained as the Eastern Shore Railroad ROW is located immediately adjacent to U.S. Route 13 on the east side.

Almost 30 percent of the 69-mile long corridor has a minimum ROW of 100 feet or less. Thirty-eight percent of the corridor has between 101 and 140 feet of right-of-way, with the remaining 32 percent having between 141 and 300 feet.


MARYLAND
VIRGINIA
Chesapeake Bay
Atlantic Ocean
Wallops Island
New Church
Oak Hall
Atlantic
Temperanceville
Hallwood
Saxis
Mappsville
Nelsonia
Bloxom
Parksley
ACCOMACK
Onancock
Onley
Melfa
Keller
Wachapreague
Painter
Belle Haven
Exmore
MP 135
MP 130
MP 125
MP 120
MP 115
MP 110
MP 105
MP 100
Legend
MP Milepost
U.S. Route 13
Route 13/Wallops Island
Access Management Study
Accomack County
Location Map
for Figure 2-11
2 0 2 4 Miles




**Selected Crossroads**

**Median Type**

**Median Width (Feet)**

**Estimated Minimum ROW Width (Feet)**

**Posted Speed Limit NB**

**Posted Speed Limit Sl**

**Right Shoulder Width NB (Feet)**

**Right Shoulder Width SB (Feet)**

**Driveway Density NB Per Mile**

**Driveway Density SB Per Mile**

**Communities**

**Milepost**

Route 13/Wallops Island
Access Management Study

Figure 2-11
Existing Roadway Features
Accomack County

■

### 2.2.3 Traffic Signals

There are a total of 21 traffic signals in operation on U.S. Route 13 in the study corridor. These signals operate in a non-coordinated, actuated manner. With the possible exception of Exmore and Onley, most signals are located at isolated locations (usually the major cross street for a town or unincorporated settlement). See Figure 2-17 for the locations of these traffic signals.

■

### 2.2.4 Access

Existing driveways and median crossovers were identified along the corridor and entered into the GIS. Key features of each driveway and crossover were classified. This information is summarized in Table 2-4 for driveways and in Table 2-5 for median crossovers.

**Table 2-4**
**Existing Roadway Access – Driveways**

| | | | By County | | |
|---|---|---|---|---|---|
| **Driveways** | **Classification** | **Direction** | **Northampton (32 miles)** | **Accomack (37 miles)** | **Total** |
| | Non-Residential | Northbound | 69 | 161 | 230 |
| | | Southbound | 114 | 195 | 309 |
| | Residential | Northbound | 85 | 223 | 308 |
| | | Southbound | 153 | 290 | 443 |
| | Unclassified | Northbound | 1 | 2 | 3 |
| | | Southbound | 9 | 10 | 19 |
| **Overall** | | Northbound | 155 | 386 | 541 |
| | | Southbound | 276 | 495 | 771 |
| | | **Total** | **431** | **881** | **1312** |

Source: Vanasse Hangen Brustlin, Inc.

## Table 2-5
## Existing Roadway Access – Median Crossovers

| Median Crossovers | | By County: Northampton (32 miles) | By County: Accomack (37 miles) | Total |
|---|---|---|---|---|
| **Overall** | **Total Crossovers** | **121** | **150** | **271** |
| Median Width (feet) at Crossover | 40 + | 54 | 17 | 71 |
| | 30 –39 | 6 | 67 | 73 |
| | 20 – 29 | 58 | 58 | 116 |
| | 10 – 19 | 3 | 5 | 8 |
| | less than 10 | 0 | 3 | 3 |
| Crossover Width (feet) | 60 + | 49 | 40 | 89 |
| | 50 – 59 | 47 | 35 | 82 |
| | 40 – 49 | 21 | 41 | 62 |
| | 30 – 39 | 4 | 30 | 34 |
| | less than 30 | 0 | 4 | 4 |
| Left-Turn Lanes | Northbound Only | 22 | 26 | 48 |
| | Southbound Only | 16 | 14 | 30 |
| | Both Directions | 37 | 53 | 90 |
| | No Left-Turn Lanes | 46 | 57 | 103 |

Source: Vanasse Hangen Brustlin, Inc.

### Driveways

- A total of 1,312 driveways were identified along the U.S. Route 13 corridor.
- 67 percent are located in Accomack County and 33 percent are located in Northampton County.
- 59 percent of all driveways are located on the west side of U.S. Route 13 (served by the southbound travel lanes).
- 58 percent of all driveways are low volume residential driveways serving mostly single-family dwellings.
- Areas with high driveway density (greater than 20 driveways per mile) are located in Treherneville, Nassawodax, the Mary N. Smith area (between Accomac and Pastoria), Nelsonia, Mappsville, Temeperanceville, and Oak Hall.

### Median Crossovers

- A total of 271 median crossovers are located along the U.S Route 13 corridor.
- A majority of these crossovers (74 percent) have median widths (distance between the northbound and southbound travel lanes) of less than 40 feet.

- In Accomack County, there are 66 crossovers out of 150 total (44 percent) with a width less than 30 feet. Furthermore, 8 of these are less than 20 feet wide.

- In Northampton County, there are 61 crossovers out of 121 total (50 percent) with a width less than 30 feet. Only three of these are less than 20 feet wide.

The median width at crossover locations is a key safety concern, especially where they are utilized by larger vehicles (such as school buses or tractor trailers) on a regular basis. The narrower the median, the less room there is to safely accommodate longer vehicles.

### Crossover Width

In addition to median width, crossover width can also affect the ability of vehicles to perform left turns and U-turns. Crossovers are openings in the median, and their width is measured parallel to the roadway, whereas median width is measured perpendicular to the roadway. Per AASHTO standards, this distance is dependent on the design vehicle, the median end treatment, and the width of the median. For passenger vehicles, with a 40-foot wide median, the minimum design crossover width is approximately 40 feet, although this does not apply to certain turn radii or to U-turns, in which cases the crossover width should be greater. Furthermore, for tractor-trailers, this distance can be as wide as 60 feet (even higher for medians shorter than 40 feet wide). Since median widths at the majority of crossovers in the corridor are less than 40 feet, crossover width is a key safety and operational factor. As can be seen in Table 2-5, 233 of the crossovers (86 percent) are greater than 40 feet wide. In Accomack County, however, 34 crossovers (23 percent) are less than 40 feet wide.

### Turn Lanes

The provision of adequate turning lanes at median crossovers can be a very effective improvement to reduce speed differentials on U.S Route 13, as well as crash potential. In general, Northampton County has more median crossovers with left-turn lanes in both directions.

- Of the 271 median crossovers within the study area, 48 have northbound left-turn lanes, 30 have southbound left-turn lanes and 90 have both northbound and southbound left-turn lanes.

- A total of 103 crossovers (38 percent) have no left-turn lanes.

■

## 2.2.5 Pedestrian and Bicycle Infrastructure

At the time of this study, the Accomack-Northampton Planning District Commission (PDC) was in the process of developing a bicycle plan for Virginia's Eastern Shore. A formal committee was established by the PDC to oversee development of the bicycle plan, and several public workshops were held to solicit input. Although the PDC plan will cover the entire region, improvements on U.S. Route 13 resulting from this corridor study could potentially support development of the bicycle plan. Bicycle

interests on the Shore include the Eastern Shore Bicycle Club and the Citizens for a Better Eastern Shore.

Currently, U.S. Route 13 is not a formally designated bicycle route and has no signed/striped bicycle accommodation. As on other unlimited access roadways in Virginia, bicyclists are not restricted from using U.S. Route 13 and, in fact, do use the roadway and shoulders. Throughout the corridor, bicyclists and pedestrians use the roadway (including shoulder) for a variety of purposes including travel to and from work. According to personal communications from residents on the shore, seasonal agricultural workers rely heavily on U.S. Route 13 to bike or walk to/from work. Bicyclists are routinely observed incorrectly riding against the flow of vehicular traffic, posing a potential safety hazard. Recognizing the demand for bicycle travel, there is a need to accommodate these users in the safest manner possible. Furthermore, crossing the highway on a bike or on foot is an issue, particularly at areas where significant development exists. In addition to physical improvements, safety education of cyclists, pedestrians, and motorists is an important consideration, as is the need for adequate signage.

Bicyclists are generally categorized into three types:

- "A" = Advanced or experienced riders; typically comfortable riding on the roadway with motor vehicle traffic.
- "B" = Basic or less confident adult riders; prefer riding on designated facilities such as bike lanes, wide shoulder lanes, neighborhood streets, and shared use paths.
- "C" = Children

Given the high speed and percentage of heavy trucks, most sections of U.S. Route 13 are currently not recommended for the class "B" or "C" rider. The presence of wide (8- to 10-foot) right shoulders along some sections of the highway represents one opportunity for safely accommodating bicyclists, particularly for the advanced or "A" class rider.

Providing additional pavement where shoulders are narrower could expand these areas for non-motorized transportation in this high-speed corridor. Nevertheless, given the travel speeds and function of the corridor, safety issues will remain, especially for certain groups (less-than-advanced cyclists, for instance). If analysis suggests that this is a viable solution, keeping the shoulders passable and free from debris will be important. On sections of U.S. Route 13, this option might prove infeasible, given constraints such as existing development, available right-of-way, or fixed objects.

■

### 2.2.6 Public Transit

Public transit on the Eastern Shore is provided by STAR Transit (STAR stands for Shore Transit and Rideshare). The service is organized under the Accomack-Northampton Transportation District Commission (ANTDC), authorized by the Virginia General Assembly. The ANTDC provides administrative oversight to all aspects of commercial transportation on the Eastern Shore of Virginia, including

STAR Transit, the Eastern Shore Railroad, the Port of Cape Charles, and the Accomack County Airport. ANTDC Commissioners include a Virginia Department of Rail and Public Transportation (VDRPT) representative, as well as appointees of the Boards of Supervisors of each County from among their own members.

STAR Transit began service in 1996, and offers five fixed routes operating Monday through Friday, from 6 AM to 6 PM. The routes, which access sites along U.S. Route 13 as well as within Chincoteague, Onancock, Parksley, and Cape Charles, run three times a day, round trip. For a six-month trial period beginning in 1999, STAR operated a route across the Chesapeake Bay Bridge-Tunnel. The route was cancelled in May 2000. STAR utilizes passenger vans, the largest of which carries 16 people; all of the vans are handicap accessible. In FY 99, ridership totaled 37,013 passengers, with a peak of 3,809 in November. Funding is provided by the Federal Transit Administration, VDRPT, and local revenues including fares, which are a flat $1.

Several small private bus/van services also exist, and primarily serve specific programs and locations such as senior centers.

■

### 2.2.7 Rail

The Eastern Shore Railroad (ESRR) operates freight service out of Cape Charles. For much of its length, the rail parallels U.S. Route 13 at a close distance from the highway. From Cape Charles, the line runs east until it crosses U.S. Route 13, then runs north approximately 0.4 miles east of the highway. At Machipongo, the rail line comes in close proximity to the highway, and the two facilities run adjacent to each other before separating at Exmore where the rail runs through town. North of Exmore, the two run close together again until Onley. Here, the highway crosses the rail line via an overpass, and from Onley north to Oak Hall, the rail runs roughly 2 miles to the west of the highway. Near Oak Hall, the two facilities again come into close proximity.

The service operates over the former Penn Central line from Pocomoke City, Maryland, to Norfolk, and consists of 70 miles of mainline and a 26-mile car-float operation from Cape Charles to Little Creek. The ESRR interchanges with Norfolk Southern Corporation at Pocomoke City and Norfolk. The rail also interchanges with CSX Railroad and the Norfolk-Portsmouth Belt Line in Norfolk. The ESRR bypasses the congested northeast corridor and its restricted clearances. It reduces travel time to the northeast by three to four days as compared to the routing through the Hagerstown Gateway.

The railroad moves 6,500 annual carloads, consisting of stone and coal, as well as feed products for the Perdue poultry processing plant. Having recently moved from a Class I to a Class II facility, the rail operates trains up to 20 mph (Class II permits speeds up to 25 mph).

## 2.2.8 Land Use and Zoning

In the context of this analysis, land use becomes an important consideration to the extent that it impacts access management and highway corridor preservation. Certain land use trends, such as strip commercial development, could adversely impact the highway. Conversely, land use practices that encourage nodal development, thereby facilitating appropriate access planning, could support the goals of this effort. In conjunction with recommended roadway improvements, efficient land use patterns can help maintain highway function. This section seeks to identify the opportunities and constraints of existing development, and assess the access management implications of current land use plans and development review processes.

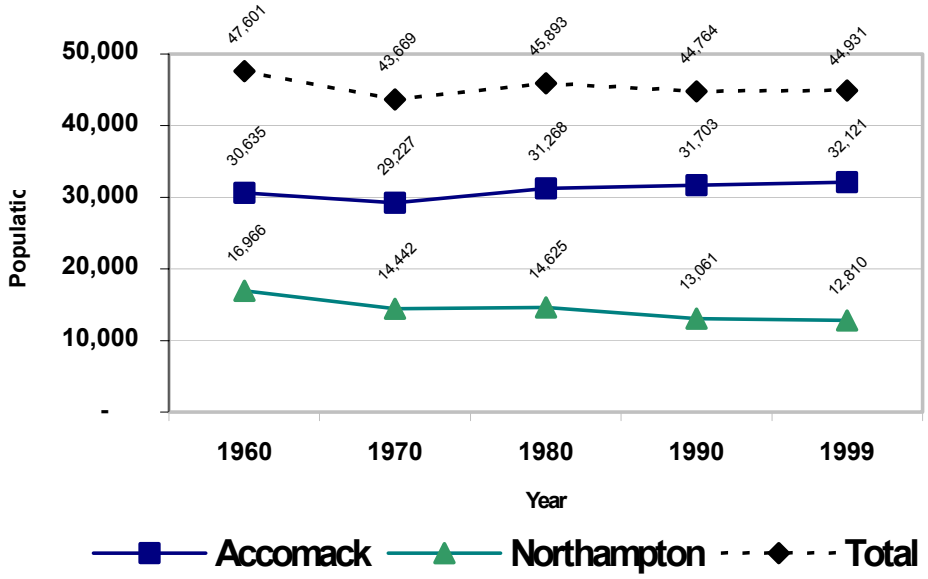
It is worth noting that both Northampton and Accomack Counties are currently revising their zoning ordinances in ways that could affect access management. Accomack is considering changes to its zoning map that would encourage infill commercial development, while discouraging further strip development in rural areas. Accomack is also considering amendments to the zoning text that would improve the county's commercial entrance requirements. Both of these measures have been recommended by the Planning Commission to the Board of Supervisors. The county plans to revisit its residential zoning districts in an attempt to discourage direct driveway access to U.S. Route 13. Amendments recently approved in Northampton County would also cluster new development in existing towns and villages, and discourage further "stripping" of the highway where isolated businesses currently exist.

Each of the incorporated towns also has its own comprehensive plan and zoning ordinance. In Northampton, town ordinances are administered by the County, while in Accomack they are administered by the towns. Furthermore, the Accomack-Northampton PDC regularly assists the towns in updating their plans and ordinances. These dynamics indicate that land use-based access management practices will require coordination among the counties, towns, and the PDC.

### Study Area Demographics

As shown in Figure 2-12, the region's rate of population growth has remained relatively stable over the past several decades. Records indicate a slight reduction in population between 1960 and 1999 from 47,600 to 44,930. In general, the population in Accomack County shows a slight growth trend while Northampton County is declining. For example during that period, Accomack County has increased in population from 30,635 to 32,120, while Northampton County has decreased from 16,965 to 12,810. The ongoing Baycreek resort/retirement development in the Cape Charles area might reverse the downward trend in Northampton.

**Figure 2-12**
**Historical Population Growth Trends on the Eastern Shore**




Source: Accomack County population - The Accomack County Comprehensive Plan August 4, 1997 and the Weldon Cooper Center for Public Service, 2000. Northampton County population - the Weldon Cooper Center for Public Service, 2000.

The Eastern Shore of Virginia Comprehensive Economic Development Strategy (CEDS) states that recent trends show a relatively stable level of employment over the past ten years. The CEDS describes food processing, aerospace, tourism, agriculture/ horticulture, seafood/aquaculture, and studio businesses as existing industry clusters, and cites sustainable technology and boat building as emerging clusters. This reflects the presence of large poultry operations in Accomac and Temperanceville, the NASA Wallops Flight Facility, the Cape Charles Sustainable Technology Park, and the Airport Industrial Park at Melfa. Future development at all of these facilities could impact traffic volumes in the corridor.

Another factor that could affect the timing and pattern of demographic change on the Eastern Shore is the reduction in the toll for crossing the CBBT. The current two-way rate of $20 for passenger cars changed effective March 1, 2002 to $14 if the return trip is made within 24 hours of the initial trip. A June, 2000 study conducted by VDOT indicates that toll reduction has the potential to bring the Eastern Shore into the growth zone of Hampton Roads more quickly than might otherwise happen. The study finds that the current toll is not a significant deterrent to growth, and that spillover from Hampton Roads can be expected at some point in the future. However, the study suggests that toll reduction could speed this phenomenon, placing within the area of growth pressure, areas of Northampton County that otherwise might not experience such pressure until after 2018.

## Existing Land Use

Land uses in the U.S. Route 13 corridor are primarily rural and agricultural (especially in the southern half of the study area) with long stretches of farm fields and forests separating towns, settlements, and commercial areas. Each county's comprehensive plan indicates that development comprises roughly 2 percent of the total area within each jurisdiction; much of that, however, is clustered along the highway. To relate existing land use to access management, the study team field verified the location and nature of driveway access throughout the corridor.

In the rural areas of the corridor, there are few land use impediments to effective access management. However, individual driveway access to homes and farms means that slower moving vehicles must enter and exit the high-speed free-flowing lanes without adequate deceleration and acceleration lanes. These areas offer an opportunity to recommend specific improvements at identified problem sites, and to implement driveway spacing, reverse frontage, and other access management techniques to prevent degradation of the highway caused by future development. A potential threat exists in the form of isolated rezonings and special use authorizations. Although the land use plans for both counties generally seek to maintain the rural nature of these segments, individual actions could create situations at odds with the overall goal. In Accomack County, for instance, commercial uses are allowed by special use permit in the rural areas. Frequent approval of such uses has the potential to result in strip development throughout the corridor, a possibility that could severely limit the highway's function as an arterial for carrying traffic at relatively high speeds for long distances.
Incorporated communities and unincorporated settlements throughout the corridor exhibit mixed land use patterns that include residential, commercial, and industrial. A common feature to all forms of development in these areas is direct driveway access lacking adequate auxiliary lanes. Development intensity has resulted in speed limit reductions and, in some cases, traffic lights. In two major segments of the highway (from Nassawadox to Accomac, and from Nelsonia to the Maryland State Line) the speed limit changes every two to four miles. The primary access management constraint in these areas is existing development, which may make improvements difficult because of intensity or proximity to the highway. However, potential opportunities exist for access management techniques such as consolidating entrances and improving corner clearance.

Large commercial areas exist at Exmore and Onley consisting of strip development in the form of retail shopping, fast food, hotels, and banks. Development in each of these areas has necessitated installation of multiple traffic signals. In addition to the constraints posed by the difficulty and expense of retrofitting existing development, the possibility of expansion of the strip pattern, and resulting additional traffic signals represents a potential threat to highway function.

■

## 2.2.9 Environmental

Comprising the southern portion of the Delmarva Peninsula, Virginia's Eastern Shore is located within the Coastal Plain physiographic province of Virginia. It is predominantly

rural in character with miles of unspoiled coastline. Less than 15 miles wide in most areas, Virginia's Eastern Shore is relatively narrow and flat. Elevation ranges from sea level to 50 feet above sea level, with slopes rarely exceeding two percent. The eastern or "sea side" of the shore, facing the Atlantic Ocean, is protected by a complex system of pristine barrier islands and hundreds of acres of continuous salt marsh and beds of submerged aquatic vegetation. Along the western or "Bay side," many tidal creeks cut through the landscape and flow into the Chesapeake Bay. Surrounded by water on three sides, the Eastern Shore has an extensive coastline dominated by wetlands and beach habitat. U.S. Route 13 is generally located along a slight ridge near the center of the peninsula. Sensitive environmental features potentially within the existing U.S. Route 13 study area include wetlands, prime farmland, threatened and endangered species, historic resources, and groundwater recharge areas. Information on these resources was obtained from existing sources as noted below. No field investigations were conducted to verify the information contained herein.

## Wetlands

Wetlands are regulated by a variety of local, state, and federal laws and statutes. As a result, they can pose a regulatory constraint to project development. At this early stage, information on wetlands was obtained from the U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) database in order to get a rough assessment of jurisdictional wetlands on the shore. In addition, mapped hydric soils information was obtained from the Natural Resource Conservation Service (NRCS) as another indicator of potential wetland areas. As indicated by the NWI mapping shown in Figure 2-13, wetlands are a predominant feature in the area, particularly in the northern half. Large expanses of tidal marsh are located on both sides of the peninsula, with smaller areas of non-tidal wetlands scattered throughout the remainder of the area. Hydric soils data also verified this assessment. Proposed improvements to U.S. Route 13, especially any relocations or new alignments (i.e., bypasses) will require additional wetland investigations to more accurately define wetland limits and to ensure that impacts to wetlands are avoided and minimized to the maximum extent possible.

## Prime Farmland

If federally funded, transportation projects must comply with Farmland Protection Policy Act requirements which seek to minimize the extent to which farmland is converted to non-agricultural uses. Digital information on prime farmland was obtained from the Accomack-Northampton Planning District Commission. As shown in Figure 2-14, most of the Eastern Shore is comprised of soils considered to be prime agricultural soils. Specific soil types in this category include the Bojac series (fine sandy loam, loamy sand, sandy loam), Dragston fine sandy loam, Munden sandy loam, and Nimmo sandy loam. Proposed improvements to U.S. Route 13 that may be federally funded and impact farmland will require coordination with the local NRCS personnel to evaluate potential impacts to prime farmland.

## Threatened and Endangered Species

Plant, animal or insect species classified as "threatened" and/or "endangered" are protected at the state and federal level by various state and federal laws. In December 2000, digital information with regard to protected species on Virginia's Eastern Shore was obtained from the Virginia Department of Conservation and Recreation's Natural Heritage Program. Maintained by DCR, the Biological and Conservation Data System contains general locations of documented occurrences of rare, threatened or endangered plant and animal species. Due to the sensitivity of the resource itself, the geographic information provided by the database is intentionally not exact. While a number of threatened and endangered species are located on the shore, only three have been documented within a roughly two-mile radius of U.S. Route 13 – the northeastern beach tiger beetle (federally threatened) at the southern end of the corridor; the Delmarva Peninsula fox squirrel (federally endangered) east of Nassawadox; and the bald eagle (federally threatened/state endangered), with a number of nests located within the study area (see Figure 2-15). Depending on the improvements recommended for U.S. Route 13 and the location of those improvements, additional investigations may be necessary to determine potential impacts to these species.

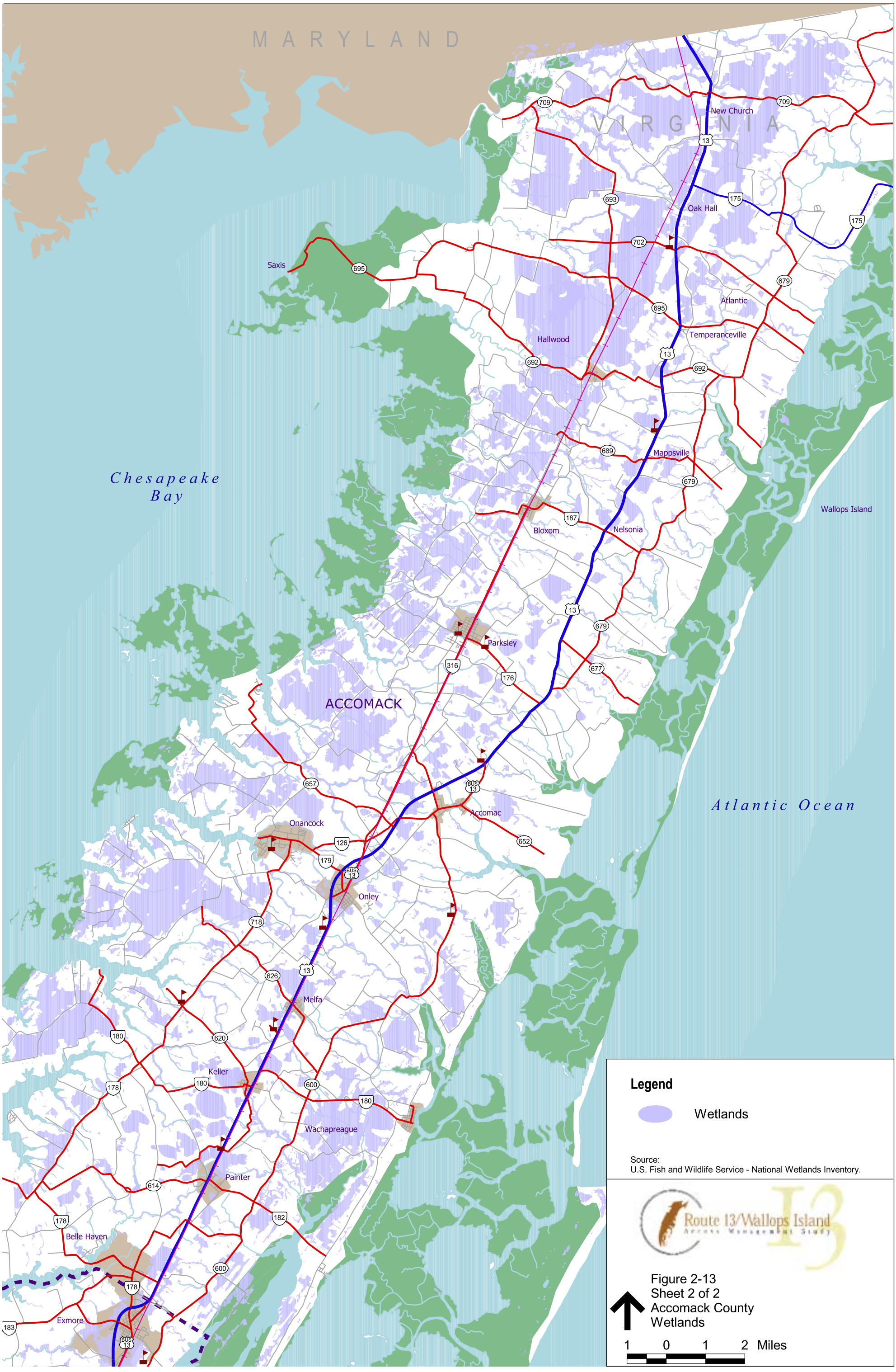
## Historic Resources

Significant cultural resources are protected by several laws including Section 106 of the National Historic Preservation Act and Section 4(f) of the Department of Transportation Act. Significant cultural resources are defined as those that are listed or eligible for listing on the National Register of Historic Places. A cursory file review was conducted at the Virginia Department of Historic Resources to identify potentially significant architectural properties and/or historic districts previously recorded in close proximity to U.S. Route 13. At this time, archaeological sites were not evaluated due to the fact that impacts to archaeological sites are readily mitigated and rarely pose a fatal flaw to project development. Based on this file review, it appears that numerous historic properties are located along U.S. Route 13. Some of the individual historic structures that have previously been evaluated were found not eligible for listing on the National Register. Others were not evaluated for eligibility but could potentially meet National Register criteria including the Lower Northampton Baptist Church and the First Baptist Church at Capeville, both just north of Cape Center.

Several historic districts are located along or near U.S. Route 13 that are listed or were found eligible for listing on the National Register:

- Eastville and Eastville Station Historic District – a large district comprised of 150 to 200 buildings centered at the intersection of U.S. Route 13 and Route 631 in Northampton County.
- Machipongo Historic District – comprised of 15 buildings along Route 627, immediately east of U.S. Route 13.
- Accomac Historic District – large district (+130 acres) in the town of Accomac, a portion of which is just east of U.S. Route 13.


Chesapeake Bay
Atlantic Ocean
NORTHAMPTON
Painter
Belle Haven
Exmore
Nassawadox
Weirwood
Birdsnest
Townsend
Machipongo
Eastville
Cheriton
Cape Charles
Cape Center
Kiptopeke State Park
614
178
182
600
183
BUS 13
618
13
609
617
622
625
628
630
634
636
639
680
184
643
624
646
Legend
Wetlands
Source:
U.S. Fish and Wildlife Service - National Wetlands Inventory.
Route 13/Wallops Island
Access Management Study
Figure 2-13
Sheet 1 of 2
Northampton County
Wetlands
1 0 1 2 Miles


MARYLAND
VIRGINIA
New Church
Oak Hall
Saxis
Atlantic
Temperanceville
Hallwood
Mappsville
Chesapeake Bay
Bloxom
Nelsonia
Wallops Island
Parksley
ACCOMACK
Accomac
Atlantic Ocean
Onancock
Onley
Melfa
Keller
Wachapreague
Painter
Belle Haven
Exmore
709
13
175
693
702
695
679
689
187
316
176
677
657
BUS 13
126
652
179
718
626
620
180
600
178
614
182
183
Legend
Wetlands
Source:
U.S. Fish and Wildlife Service - National Wetlands Inventory.
Route 13/Wallops Island
Access Management Study
Figure 2-13
Sheet 2 of 2
Accomack County
Wetlands
1 0 1 2 Miles


Chesapeake Bay
Atlantic Ocean
NORTHAMPTON
Painter
Belle Haven
Exmore
Nassawadox
Weirwood
Birdsnest
Treherneville
Machipongo
Eastville
Cheriton
Cape Charles
Cape Center
Kiptopeke State Park
614
178
182
600
183
BUS 13
618
13
609
617
622
625
628
630
634
636
680
639
184
643
624
646
Legend
Prime Agricultural Lands
Source:
Accomack - Northampton Planning District Commision.
Route 13/Wallops Island
Access Management Study
Figure 2-14
Sheet 1 of 2
Northampton County
Prime Farmland
1 0 1 2 Miles


**Legend**

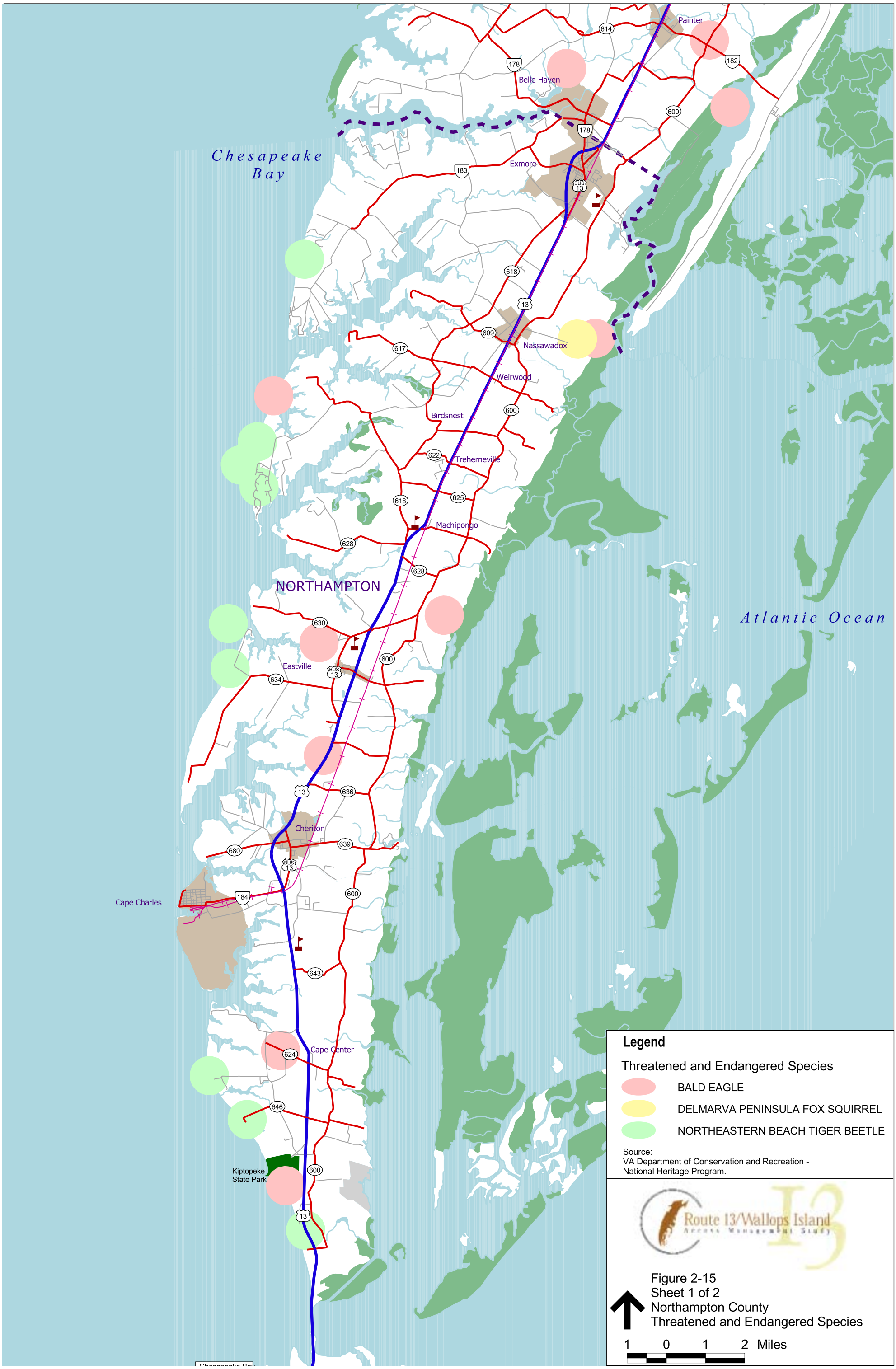
Prime Agricultural Lands

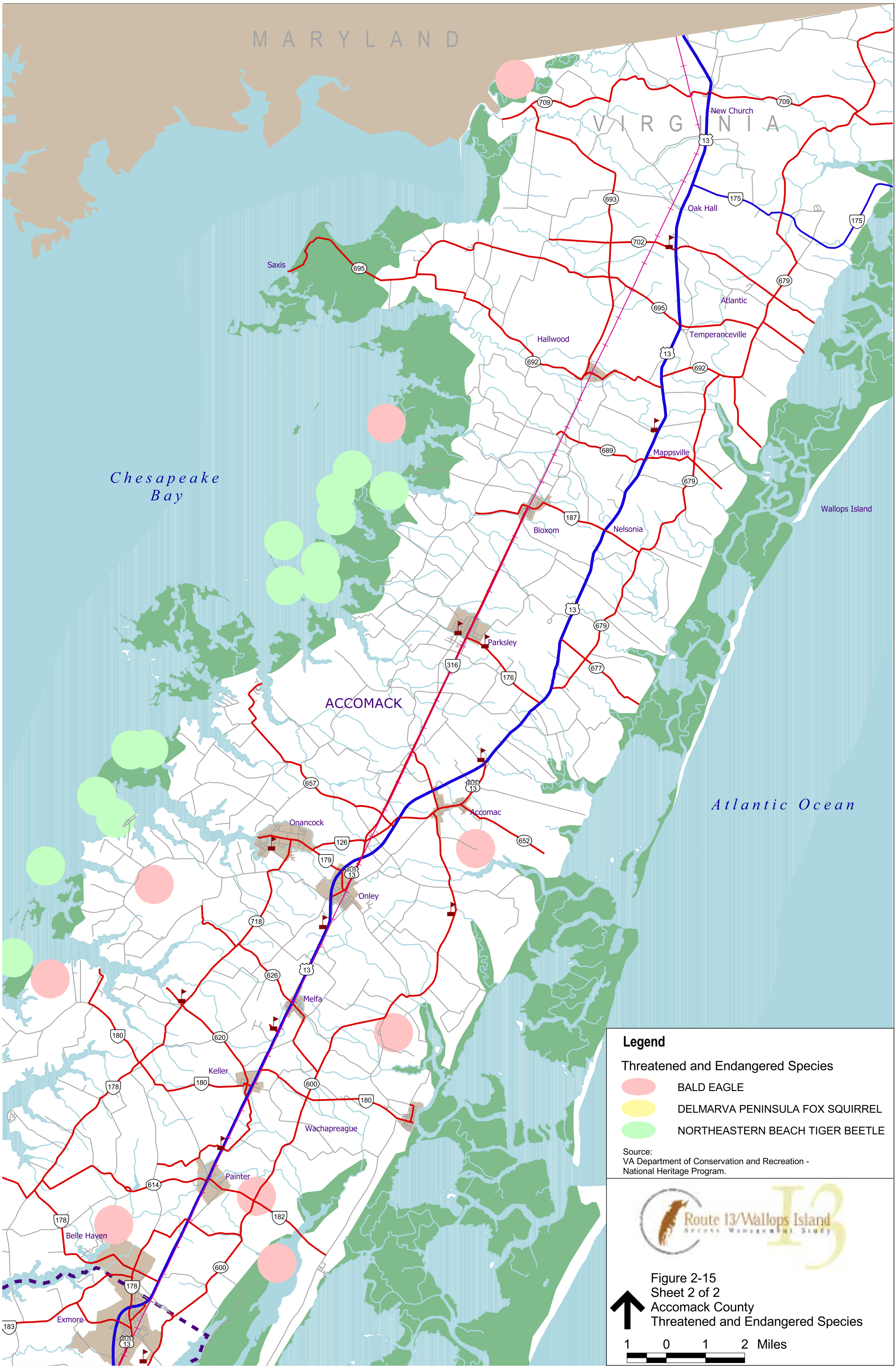
Source:
Accomack - Northampton Planning District Commision.

Route 13/Wallops Island Access Management Study

Figure 2-14
Sheet 2 of 2
Accomack County
Prime Farmland

1 0 1 2 Miles


Chesapeake Bay
Atlantic Ocean
NORTHAMPTON
Painter
Belle Haven
Exmore
Nassawadox
Weirwood
Birdsnest
Townsend
Machipongo
Eastville
Cheriton
Cape Charles
Cape Center
Kiptopeke State Park
614
178
182
600
183
BUS 13
618
13
609
617
622
625
628
630
634
636
639
680
184
643
624
646
Legend
Threatened and Endangered Species
BALD EAGLE
DELMARVA PENINSULA FOX SQUIRREL
NORTHEASTERN BEACH TIGER BEETLE
Source:
VA Department of Conservation and Recreation - National Heritage Program.
Route 13/Wallops Island
Access Management Study
Figure 2-15
Sheet 1 of 2
Northampton County
Threatened and Endangered Species
1 0 1 2 Miles


MARYLAND
VIRGINIA
New Church
Oak Hall
Saxis
Atlantic
Temperanceville
Hallwood
Mappsville
Chesapeake Bay
Bloxom
Nelsonia
Wallops Island
Parksley
ACCOMACK
Accomac
Atlantic Ocean
Onancock
Onley
Melfa
Keller
Wachapreague
Painter
Belle Haven
Exmore
709
693
175
702
695
679
689
187
13
316
176
677
657
BUS 13
126
179
718
626
620
180
178
600
614
182
652
183
692
Legend
Threatened and Endangered Species
BALD EAGLE
DELMARVA PENINSULA FOX SQUIRREL
NORTHEASTERN BEACH TIGER BEETLE
Source:
VA Department of Conservation and Recreation -
National Heritage Program.
Route 13/Wallops Island
Access Management Study
Figure 2-15
Sheet 2 of 2
Accomack County
Threatened and Endangered Species
1 0 1 2 Miles

During the course of project development for the final recommendations, more detailed cultural resource investigations will be necessary to determine potential impacts and identification of avoidance, minimization or mitigation efforts.

### Surface and Ground Water

Numerous creeks and rivers traverse the peninsula. In general terms, areas east of U.S. Route 13 generally drain east towards the Atlantic Ocean, and areas west of U.S. Route 13 generally drain westward into the Chesapeake Bay. A large portion of freshwater in these streams is supplied from groundwater sources. Groundwater is an important resource on the shore; it is used as the primary source of drinking water and it is also used for irrigation, commercial, and industrial purposes. In 1976, the Virginia Department of Environmental Quality designated the region as a "Groundwater Management Area." Rainwater infiltration is the only source of freshwater recharge to the aquifer system. According to earlier groundwater studies, the primary source of recharge is located along a 5,000 foot "spine" that runs north/south near the center of the peninsula for its entire length. As shown in Figure 2-16, this recharge spine generally follows the U.S. Route 13 corridor. Proposed transportation plans along the U.S. Route 13 corridor will need to assess potential effects on groundwater through possible reduction of recharge areas.

## 2.3 Existing Traffic Operations

A detailed analysis was completed to determine existing traffic operation conditions in the study area. The analysis used the procedures documented in the *2000 Highway Capacity Manual*[1] to provide a technical assessment of the operational qualities of unsignalized intersections and roadway segments. Synchro 4 was used to analyze the signalized intersections. The input information for the analysis included the existing traffic volumes, traffic signal and control data, as well as corridor geometric design conditions.

The relationship between the supply (roadway capacity) and demand (traffic volume) on a roadway is a primary indicator of how well a transportation facility accommodates vehicular traffic. The traffic operation analysis procedures used in this study assigned a level-of-service (LOS) rating for each specific intersection or segment of roadway analyzed. LOS is a qualitative measurement of the operating conditions of a roadway facility or intersection, taking into account a number of variables such as speed, vehicle maneuverability, driver comfort, and safety. Similar to a report card, level-of-service designations are letter-based, ranging from A to F; LOS A represents the best operating condition and LOS F corresponds to conditions with demands approaching or at the available capacity.

In a rural area, LOS C is used as the acceptable threshold for design purposes. Level-of-service C is typically used, because it ensures a more acceptable quality of service to facility users. Typically, Level-of- service C conditions are equal to an average

1 Highway Capacity Manual; Transportation Research Board, National Research Council; Washington D.C. 2000.

delay at a side-street stop sign of 10 to 20 seconds and from 20 to 35 seconds at a traffic signal.

■

### 2.3.1 Peak Hour Intersection Operations

Signalized and unsignalized intersections were evaluated along the study corridor in 2000. A summary of conditions at these intersections is provided below. It is important to realize that LOS is a broadly applicable measurement, designed to assess traffic operations in a variety of environments.

#### Signalized Intersections

Twenty signalized intersections were evaluated along the U.S. Route 13 corridor within the study area. During both the morning and afternoon peak periods for spring and summer 2000 traffic volume conditions, all the intersections were operating at LOS A or B with relatively short average delays and low volume to capacity (v/c) ratios. No obvious traffic capacity deficiencies were identified at the signalized intersections as a result of this analysis.

#### Unsignalized Intersections

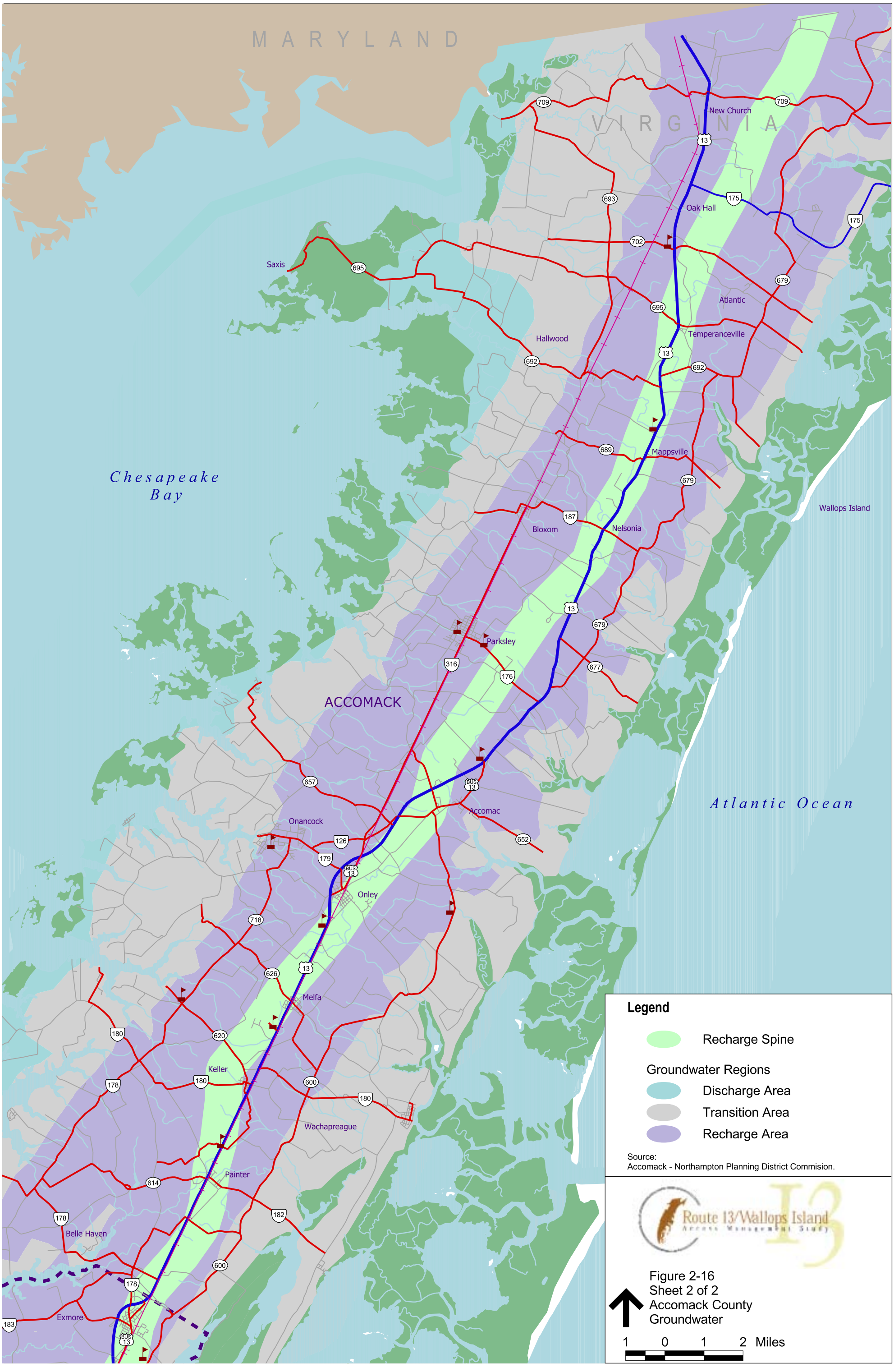
Eight unsignalized intersections within the U.S. Route 13 study area were also analyzed to determine their adequacy in handling peak hour traffic. These intersections were chosen because level of service was evaluated for each of the side-street movements as well as the left-turn movements from the street approaches. The results of the capacity analysis indicate that with the exception of the Route 175/ Route 798 intersection, all of the unsignalized intersections studied are operating within acceptable levels.

At the intersection of Route 175 and Route 798, the northbound and southbound Route 798 approaches are operating at LOS E and F, respectively, during the summer afternoon peak hour. The analysis results indicate average delays of approximately 42 seconds for the northbound approach and 86 seconds for the southbound approach during that peak hour. The low LOS for the Route 798 approaches are primarily the result of insufficient gaps in the Route 175 traffic stream. The lack of gaps in the oncoming traffic stream prevents traffic from turning left from Route 798 onto Route 175, thereby creating long delays.

#### Roadway Segments

A total of eleven roadway segments were assessed along the U.S. Route 13 corridor. The LOS analysis was performed for each of the peak periods during May and July traffic conditions. For all of the roadway segments studied, LOS A operating conditions were determined to occur during each of the analysis conditions.


Chesapeake Bay
Atlantic Ocean
NORTHAMPTON
Painter
Belle Haven
Exmore
Nassawadox
Weirwood
Birdsnest
Treherneville
Machipongo
Eastville
Cheriton
Cape Charles
Cape Center
Kiptopeke State Park
614
178
182
600
183
BUS 13
618
13
609
617
622
625
628
630
634
636
639
680
184
643
624
646
Legend
Recharge Spine
Groundwater Regions
Discharge Area
Transition Area
Recharge Area
Source:
Accomack - Northampton Planning District Commision.
Route 13/Wallops Island
Access Management Study
Figure 2-16
Sheet 1 of 2
Northampton County
Groundwater
1 0 1 2 Miles


MARYLAND
VIRGINIA
Chesapeake Bay
Atlantic Ocean
ACCOMACK
New Church
Oak Hall
Saxis
Hallwood
Atlantic
Temperanceville
Mappsville
Bloxom
Nelsonia
Wallops Island
Parksley
Accomac
Onancock
Onley
Melfa
Keller
Wachapreague
Painter
Belle Haven
Exmore
709
693
702
695
679
692
689
187
316
176
677
657
126
179
718
626
620
600
614
182
178
183
652
175
13
BUS 13
Legend
Recharge Spine
Groundwater Regions
Discharge Area
Transition Area
Recharge Area
Source:
Accomack - Northampton Planning District Commision.
Route 13/Wallops Island
Access Management Study
Figure 2-16
Sheet 2 of 2
Accomack County
Groundwater
1 0 1 2 Miles

## 2.4 Safety Conditions

Safety is of paramount concern when assessing a corridor such as U.S. Route 13. A safety analysis was conducted for the U.S. Route 13 corridor within the study area to identify safety deficiencies or safety issues. The issues and deficiencies uncovered during this analysis became top priority issues considered during the identification and evaluation of corridor improvement alternatives discussed in Chapter 5.

■

### 2.4.1 Methodology

The safety analysis was based on an examination of vehicular crash rates on the roadway and a comparison to statewide averages for similar types of facilities. Traffic crash data for U.S. Route 13 were supplied by the Virginia Department of Transportation for the period January 1997 through December 1999, which represents the most recent three-year period available. This data included all reported crashes listed by location. For each location the crash description included number of vehicles involved, lighting conditions, crash type, type of traffic control, primary cause of crash, weather conditions, roadway conditions, and types of vehicles involved. Crash rates were calculated for each intersection analyzed in the capacity analysis and for the segments between intersections. The crash rates were then compared to statewide averages for similar types of facilities, if available, to determine where safety deficiencies exist.

■

### 2.4.2 Vehicular Crash History

A summary of the crash rates by intersection and segment is presented in Table 2-6. The intersection crash rates ranged from 15 crashes per 100 million entering vehicles (100 MEV) at the intersection of U.S. Route 13 and Routes 180/696 to 136 crashes per 100 MEV at the intersection of U.S. Route 13 and Route 652. The statewide crash statistics do not summarize intersection crash rates and therefore no comparisons can be made between the intersections along U.S. Route 13 and those across the state. However, there are five intersections on U.S. Route 13 that are experiencing crash rates considerably higher than the others in the corridors:

- Route 695 @ Temperanceville (102 crashes per 100 MEV)
- Route 178 @ Exmore (86 crashes per 100 MEV)
- Route 652 @ Shore Plaza (136 crashes per 100 MEV)
- Route 606 @ Nassawadox (104 crashes per 100 MEV)
- Route 184 @ Cape Charles (87 crashes per 100 MEV).

For roadway segments, a review of Table 2-6 reveals the 0.98-mile segment between Route 183 and Route 652 experienced the highest crash rate of 171 crashes per 100 million vehicle-miles (MVM). This is well above the 1999 statewide average crash rate for similar type facilities of 120 crashes per 100 MVM. There is one other segment experiencing crash rates above this statewide average: U.S. Route 13 from Chesapeake Square to Route 179.

The five high-crash intersection locations and the two roadway segments experiencing crash rates above the statewide average were further analyzed to determine if any of the locations was experiencing an identifiable crash pattern. This data is presented in Tables 2-7 and 2-8.

As shown in Table 2-7, angle-type crashes are the leading type of crash for each of the high crash intersections. At each of these intersections, angle-type crashes account for 50 percent or more of the total number of crashes. This is followed closely by rear-end type crashes, which account for between 25 to 38 percent of the crashes.

The crash statistics also indicate that the severity of the crashes was split approximately fifty-fifty between personal injury and property damage only. There was one fatal crash at the intersection with Route 184. The major factor for the crashes evaluated was listed as inattention or error in over 68 percent of the crashes. Weather and speed were not listed as factors for the crashes evaluated. Each of the high crash locations also had crashes that involved trucks. The percentage of crashes involving trucks ranged from 11 to 25 percent. Road conditions or road geometry are not shown as contributors to the intersection crashes reviewed

A review of Table 2-8 indicates that angle-type and rear-end type crashes are the prevalent crash types on each of the high crash segments. On the section of U.S. Route 13 between Chesapeake Square and Route 179, five of the seven crashes were rear-end type crashes, and on the segment between Route 183 and Route 652, 33 percent were rear-end type crashes and 39 percent were angle-type crashes. The leading cause of crashes on each of these segments of U.S. Route 13 was driver inattention or error. A contributing factor to these crashes may be the amount of roadside development along each of these sections of roadway. The number of driveways and the associated turning maneuvers may contribute to driver confusion.

## Table 2-6

## U.S. Route 13 Crash Summary

| Intersection | Crashes by Year 1997 | 1998 | 1999 | Total | Daily Exposure | Crash Rate* |
|---|---|---|---|---|---|---|
| Route 175 | 6 | 5 | 5 | 16 | 22,490 | 65 |
| Route 695 | 5 | 6 | 8 | 19 | 16,930 | 102 |
| Route 187 | 5 | 4 | 4 | 13 | 19,400 | 61 |
| Route 176 | 1 | 2 | 4 | 7 | 17,320 | 37 |
| Route 764 | 1 | 4 | 3 | 8 | 16,495 | 44 |
| Chesapeake Square | 0 | 3 | 0 | 3 | 15,750 | 17 |
| Route 179 | 7 | 2 | 1 | 10 | 22,210 | 41 |
| U.S. Route 13 Bus.- Onley | 2 | 9 | 3 | 14 | 22,830 | 56 |
| Route 626 | 5 | 1 | 0 | 6 | 18,890 | 29 |
| Route 180/696 | 1 | 1 | 1 | 3 | 18,200 | 15 |
| Route 182/614 | 5 | 2 | 3 | 10 | 18,830 | 48 |
| Route 178 | 5 | 6 | 5 | 16 | 17,080 | 86 |
| Route 183 | 5 | 1 | 1 | 7 | 12,070 | 53 |
| Route 652 | 4 | 5 | 6 | 15 | 10,050 | 136 |
| Route 606 | 4 | 5 | 5 | 14 | 12,300 | 104 |
| Route 631 | 1 | 5 | 2 | 8 | 11,330 | 64 |
| Route 680 | 2 | 2 | 3 | 7 | 9,740 | 66 |
| Route 184 | 7 | 3 | 2 | 12 | 12,580 | 87 |

| Segment | 1997 | 1998 | 1999 | Total | AADT** | Crash Rate*** | Length (miles) |
|---|---|---|---|---|---|---|---|
| North of Route 175 | 20 | 16 | 16 | 52 | 19,000 | 61 | 4.09 |
| Route 175 - Route 695 | 11 | 18 | 24 | 53 | 16,000 | 82 | 3.69 |
| Route 695 - Route 187 | 20 | 36 | 30 | 86 | 16,000 | 85 | 5.77 |
| Route 187 - Route 176 | 15 | 21 | 15 | 51 | 15,500 | 63 | 4.76 |
| Route 176 - Route 764 | 33 | 16 | 17 | 66 | 15,000 | 111 | 3.62 |
| Route 764 – Chesapeake Sq. | 11 | 9 | 12 | 32 | 15,000 | 67 | 2.91 |
| Ches. Sq. - Route 179 **** | 4 | 1 | 2 | 7 | 15,000 | 147 | 0.29 |
| Route 179 - U.S. Route 13 Bus | 8 | 3 | 6 | 17 | 19,000 | 110 | 0.74 |
| U.S. Route 13 Bus – Route 626 | 9 | 10 | 20 | 39 | 19,000 | 64 | 2.92 |
| Route 626 - Route 180/696 | 7 | 13 | 6 | 26 | 17,000 | 59 | 2.37 |
| Route 180/696 - Route 614 | 8 | 10 | 10 | 28 | 15,000 | 64 | 2.68 |
| Route 614 - Route 178 | 13 | 13 | 11 | 37 | 9,700 | 89 | 3.91 |
| Route 178 - Route 183 | 1 | 1 | 1 | 3 | 9,800 | 54 | 0.52 |
| Route 183 - Route 652 **** | 2 | 10 | 6 | 18 | 9,800 | 171 | 0.98 |
| Route 652 - Route 606 | 11 | 11 | 21 | 43 | 9,700 | 115 | 3.53 |
| Route 606 - Route 631 | 27 | 31 | 38 | 96 | 10,000 | 90 | 9.75 |
| Route 631 - Route 680 | 7 | 14 | 17 | 38 | 9,600 | 73 | 4.93 |
| Route 680 - Route 184 | 6 | 5 | 2 | 13 | 9,600 | 101 | 1.22 |
| South of Route 184 | 15 | 26 | 38 | 79 | 9,600 | 80 | 9.34 |

* Crash rate for intersections is expressed in crashes per 100 million entering vehicles (MEV).
** AADT Annual Average Daily Traffic
*** Crash rate for roadway segments is expressed in crashes per 100 million vehicle miles.
**** Above State Average
Source: VDOT HTRIS data files

## Table 2-7
## U.S. Route 13 High Crash Intersection Summary

| | U.S. Route 13 at | | | | |
|---|---|---|---|---|---|
| | Route 695 | Route 178 | Route 652 | Route 606 | Route 184 |
| **Year** | | | | | |
| 1997 | 5 | 5 | 4 | 4 | 7 |
| 1998 | 6 | 6 | 5 | 5 | 3 |
| 1999 | 8 | 5 | 6 | 5 | 2 |
| Total | 19 | 16 | 15 | 14 | 12 |
| **Crash Type** | | | | | |
| Rear-end | 5 | 6 | 5 | 4 | 3 |
| Angle | 11 | 8 | 8 | 7 | 7 |
| Head-on | 0 | 0 | 0 | 0 | 0 |
| Sideswipe (same direction) | 0 | 2 | 1 | 1 | 0 |
| Sideswipe (opposite direction) | 0 | 0 | 0 | 0 | 1 |
| Fixed object in road | 0 | 0 | 0 | 0 | 0 |
| Train | 0 | 0 | 0 | 0 | 0 |
| Non-collision | 1 | 0 | 1 | 0 | 0 |
| Fixed object off road | 2 | 0 | 0 | 0 | 1 |
| Deer | 0 | 0 | 0 | 0 | 0 |
| Other animal | 0 | 0 | 0 | 1 | 0 |
| Pedestrian | 0 | 0 | 0 | 1 | 0 |
| Backed into | 0 | 0 | 0 | 0 | 0 |
| Miscellaneous | 0 | 0 | 0 | 0 | 0 |
| Total | 19 | 16 | 15 | 14 | 12 |
| **Severity** | | | | | |
| Fatal | 0 | 0 | 0 | 0 | 1 |
| Injury | 7 | 7 | 9 | 7 | 6 |
| Property damage only | 12 | 9 | 6 | 7 | 5 |
| Total | 19 | 16 | 15 | 14 | 12 |
| **Major Factor** | | | | | |
| Miscellaneous | 2 | 1 | 1 | 1 | 0 |
| Handicap | 0 | 0 | 1 | 0 | 1 |
| Under influence | 3 | 1 | 2 | 0 | 1 |
| Speeding | 0 | 0 | 0 | 0 | 0 |
| Inattention or error | 13 | 13 | 11 | 12 | 10 |
| Vehicle defective | 0 | 1 | 0 | 0 | 0 |
| Weather or visibility condition | 0 | 0 | 0 | 1 | 0 |
| Road defective | 0 | 0 | 0 | 0 | 0 |
| Road slick | 1 | 0 | 0 | 0 | 0 |
| Not stated | 0 | 0 | 0 | 0 | 0 |
| Total | 19 | 16 | 15 | 14 | 12 |
| **Vehicle Type** | | | | | |
| Bus | 0 | 0 | 0 | 0 | 0 |
| Truck | 2 | 4 | 2 | 3 | 2 |
| Recreational vehicle | 0 | 0 | 0 | 0 | 0 |
| Emergency vehicle | 0 | 0 | 0 | 0 | 0 |
| Other heavy vehicle | 0 | 0 | 0 | 0 | 0 |
| No heavy vehicle involved | 17 | 12 | 13 | 11 | 10 |
| Total | 19 | 16 | 15 | 14 | 12 |

Sources: VDOT HTRIS data files

## Table 2-8
## U.S. Route 13 Roadway Segment Crash Summary

| From: | Chesapeake Square | Route 183 |
|---|---|---|
| To: | Route 179 | Route 652 |
| Segment Length: | 0.29 mile | 0.98 mile |
| **Year** | | |
| 1997 | 4 | 2 |
| 1998 | 1 | 10 |
| 1999 | 2 | 6 |
| Total | 7 | 18 |
| **Crash Type** | | |
| Rear-end | 5 | 6 |
| Angle | 1 | 7 |
| Head-on | 0 | 0 |
| Sideswipe (same direction) | 1 | 1 |
| Sideswipe (opposite direction) | 0 | 1 |
| Fixed object in road | 0 | 0 |
| Train | 0 | 0 |
| Non-collision | 0 | 0 |
| Fixed object off road | 0 | 2 |
| Deer | 0 | 0 |
| Other animal | 0 | 0 |
| Pedestrian | 0 | 1 |
| Backed into | 0 | 0 |
| Miscellaneous | 0 | 0 |
| Total | 7 | 18 |
| **Severity** | | |
| Fatal | 0 | 0 |
| Injury | 4 | 12 |
| Property damage only | 3 | 6 |
| Total | 7 | 18 |
| **Major Factor** | | |
| Miscellaneous | 0 | 0 |
| Handicap | 0 | 0 |
| Under influence | 0 | 1 |
| Speeding | 0 | 0 |
| Inattention or error | 6 | 15 |
| Vehicle defective | 0 | 0 |
| Weather or visibility condition | 0 | 0 |
| Road defective | 0 | 0 |
| Road slick | 0 | 2 |
| Not stated | 1 | 0 |
| Total | 7 | 18 |
| **Vehicle Type** | | |
| Bus | 0 | 0 |
| Truck | 0 | 0 |
| Recreational vehicle | 0 | 0 |
| Emergency vehicle | 0 | 0 |
| Other heavy vehicle | 0 | 0 |
| No heavy vehicle involved | 7 | 18 |
| Total | 7 | 18 |

Sources: VDOT HTRIS data files

■

### 2.4.3 Fatalities

A total of 37 fatalities were recorded in 1,087 crashes on the state accident database over a three-year period from 1997 to 1999 on the U.S. Route 13 corridor. The location of 24 of these fatalities (22 crashes) could be located based on the detail contained in the accident reports. Table 2-9 summarizes this information.

**Table 2-9**
**U.S. Route 13 Fatality Summary**

| Milepost | Location Description | Number Killed | Year of Fatality |
|---|---|---|---|
| 79.33 | Route 13 at Route 184/US 13 Business | 1 | 1997 |
| 83.57 | Route 13 at Route 633 | 1 | 1999 |
| 87.58 | Route 13 between Route 674 and Route 1703 | 1 | 1997 |
| 89.66 | Route 13 at Route 627 | 1 | 1997 |
| 91.42 | Route 13 at Route 622 | 1 | 1998 |
| 94.76 | Route 13 between Routes 617 and 609 | 2 | 1999 |
| 99.75 | Route 13 at Route 183 | 1 | 1997 |
| 101.35 | Route 13 between Routes 181 and 603 | 1 | 1997 |
| 102.04 | Route 13 between Routes 603 and 607 | 1 | 1998 |
| 103.13 | Route 13 between Routes 607 and 614 | 1 | 1997 |
| 109.01 | Route 13 between Routes 1113 and 1115 | 1 | 1997 |
| 112.72 | Route 13 at Bank Street | 1 | 1998 |
| 117.82 | Route 13 between 13 business and Route 744 | 1 | 1999 |
| 117.91 | Route 13 between 13 business and Route 744 | 1 | 1999 |
| 122.78 | Route 13 between Routes 676 and 680 | 2 | 1999 |
| 123.08 | Route 13 at Route 680 | 1 | 1998 |
| 124.16 | Route 13 between Routes 681 and 187 | 1 | 1998 |
| 126.1 | Route 13 at Route 769 | 1 | 1999 |
| 126.45 | Route 13 between Routes 769 and 689 | 1 | 1998 |
| 129.57 | Route 13 at Route 757 | 1 | 1997 |
| 132.17 | Route 13 at Route 702 | 1 | 1999 |
| 137.65 | Route 13 between New Church and the MD State Line | 1 | 1998 |
| Total | | 24 | |

Source: VDOT HTRIS data files

### 2.4.4 Enforcement of Traffic Laws

Early in this study, the Citizens Advisory Committee (CAC) identified enforcement of traffic laws as a key goal to enhancing the safety of the corridor. One factor contributing to this goal is the staffing level of Virginia State Police assigned to the Eastern Shore. At the time of this study, 15 troopers patrolled the region. The Virginia State Police officer who participated as a member of the CAC pointed out that the demographics of the Eastern Shore justified 27 troopers.

## 2.5 Other Issues

Sections 2.1 through 2.4 have described many of the key roadway and traffic characteristics along the U.S. Route 13 corridor and the issues associated with those characteristics that affect development of the access management plan. In addition, there are other corridor issues that also need to be considered such as the impact of the Eastern Shore rail line, the location of schools, employment centers and recreational areas, and other tourist attractions - all of these play a factor in the operations of the U.S. Route 13 corridor and need to be considered in the development of a corridor access management plan. Figure 2-17 displays many of these issues graphically.

## 2.6 Summary of Existing Corridor Conditions

The evaluation of existing conditions along the U.S. Route 13 corridor presented in this chapter has examined the characteristics of the roadway and its users, addressed the seasonal variation experienced on U.S. Route 13, and has identified key issues affecting travel along the corridor. The findings are summarized below:

### Roadway

- U.S. Route 13 is a four-lane facility throughout the Eastern Shore with no control of access, and for most of its length has a median separating the northbound from the southbound directions of travel. There are several locations where the roadway is undivided with a center two-way left-turn lane. One location of particular concern is located in Temperanceville where U.S. Route 13 is undivided with a three-foot flush median, curb and gutter, sidewalk, and numerous residences, driveways, and utility poles located on both sides of the road.

- The US Route 13 corridor has a total of 21 traffic signals in operation. With the exception of Exmore and Onley, signal spacing is not a concern. In these two towns, there is a concern about the addition of additional signals in the future and the effect on the overall safety and travel through the corridor. Consideration should be given to the development of coordinated signal systems in these areas to minimize delay to through traffic.

### Roadway Users

- The U.S. Route 13 corridor experiences a high volume of through traffic in both directions (ranging by direction from 1,600 to 1,800 vehicles per day). There is a higher volume of tractor-trailers, particularly in the northern portion of the U.S. Route 13 study area with poultry trucks moving to/from the Tyson's and Perdue plants to the north.

- Farm vehicles may be present on U.S. Route 13 for short stretches along most of the corridor throughout a long growing season (multiple crops and harvesting periods). Given the size of some farm equipment, U.S. Route 13 is the only road wide enough to accommodate these vehicles. Also, there are many fields accessible only from U.S. Route 13.

- The U.S. Route 13 corridor is used by Eastern Shore residents for many different trip purposes, including local trips, shopping trips, and work trips.

### Safety

- Corridor crash rates are generally below the statewide average for similar primary routes except in the towns of Exmore and Onley.

- Fatalities are a concern in this corridor, however, with a total of 37 fatalities recorded over the three-year analysis period (1997-1999). Of the 24 fatalities located on the corridor, 40 percent of these fatalities occurred at night and 30 percent involved pedestrians. The proximity of side street obstructions to the roadway travel lanes, such as utility poles, roadway banks, signs and structures, appears to be a contributing factor in 38 percent of these fatalities. In addition, while not specifically assessed in this study, the count for 2000 reached 17 fatalities.

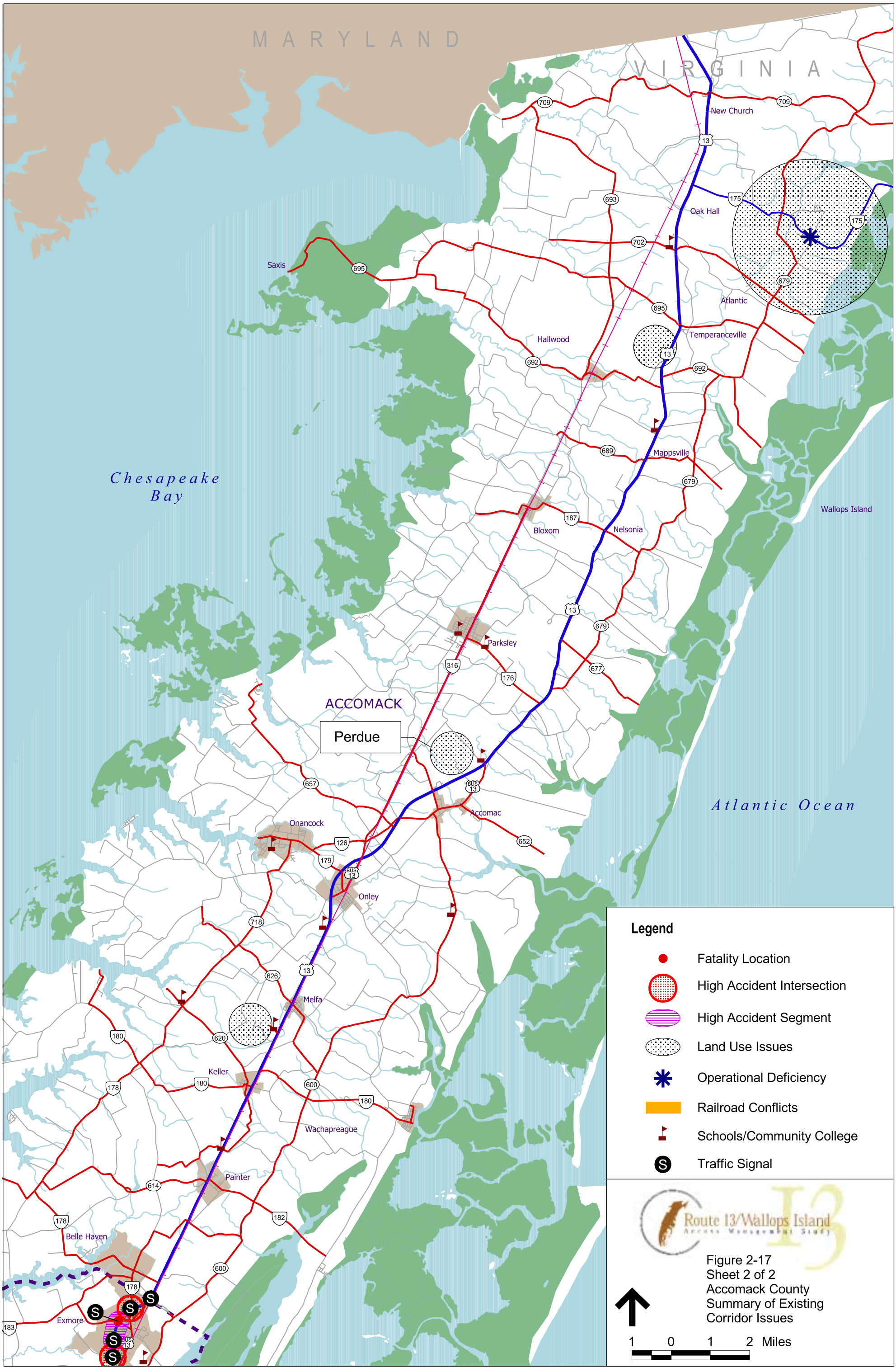
- The ability of the Virginia State Police to effectively enforce existing traffic safety laws along the U.S. Route 13 corridor, given current staffing levels, has been raised as a local concern.

### Traffic Operations

- Based on existing traffic volumes, U.S. Route 13 operates at a good level of service throughout the study area. Unsignalized access onto U.S. Route 13 is difficult at many cross streets within the study area; however, the primary reason for this difficulty is based on geometry, not through volume.

- The unsignalized intersection of Route 175 and Route 798 near the Wallops Island mainland complex during the summer months does not function at an adequate level of service and needs to be improved.


Chesapeake Bay
Atlantic Ocean
Belle Haven
Exmore
Nassawadox
Weirwood
Birdsnest
Machipongo
NORTHAMPTON
Eastville
Cheriton
Cape Charles
Cape Center
Kiptopeke State Park
Chesapeake Bay Bridge Tunnel
178
182
600
183
618
13
609
617
625
628
630
634
636
639
680
184
643
624
646
622
US 13
BUS 13
Legend
Fatality Location
High Accident Intersection
High Accident Segment
Land Use Issues
Operational Deficiency
Railroad Conflicts
Schools/Community College
Traffic Signal
Route 13/Wallops Island
Access Management Study
Figure 2-17
Sheet 1 of 2
Northampton County
Summary of Existing
Corridor Issues
1 0 1 2 Miles


MARYLAND
VIRGINIA
New Church
Oak Hall
Saxis
Atlantic
Temperanceville
Hallwood
Mappsville
Chesapeake Bay
Bloxom
Nelsonia
Wallops Island
Parksley
ACCOMACK
Perdue
Accomac
Atlantic Ocean
Onancock
Onley
Melfa
Keller
Wachapreague
Painter
Belle Haven
Exmore
709
693
702
695
679
689
187
175
176
316
677
657
126
179
718
626
620
180
178
600
614
182
183
652
13
BUS 13
Legend
Fatality Location
High Accident Intersection
High Accident Segment
Land Use Issues
Operational Deficiency
Railroad Conflicts
Schools/Community College
Traffic Signal
Route 13/Wallops Island
Access Management Study
Figure 2-17
Sheet 2 of 2
Accomack County
Summary of Existing
Corridor Issues
1 0 1 2 Miles

### Access

- A large number of access points (over 1,300) were identified throughout the U.S. Route 13 corridor. Many properties with multiple points of access were identified. There is a need to review access in more detail to either reduce or improve the driveway spacing.

### Median Crossovers

- The median width in many areas does not provide adequate protection for crossroad traffic. Consideration is needed to evaluate either widening of the median or alternate treatments.

- Crossover spacing needs to be reviewed and the provision of left-turn lanes should be considered at all of the crossovers.

- The crossover widths of many median crossovers (measured parallel to U.S. Route 13) are not wide enough to accommodate simultaneous left-turning traffic.

### Railroad

- The proximity of the Eastern Shore Railroad to U.S. Route 13, from Machipongo to Onley, impacts the safety of all crossroads connecting with U.S. Route 13 from the east. Vehicles trying to access the U.S. Route 13 corridor often back into the current at-grade rail crossings at many of the major cross streets along this section of the corridor.

- The planned upgrade of this rail line may impact these at-grade rail crossing as a result of the speeds increasing from 10 to 20 mph.

### Land Use

- U.S. Route 13 is the primary access corridor for the entire Virginia Eastern Shore. The overwhelming majority of daily trips require most residents to travel on U.S. Route 13 for both local and regional trip purposes.

- Active land uses along the U.S. Route 13 corridor include seasonal agriculture through much of the study area and commercial and roadside residential development in the towns and unincorporated settlements. Major commercial centers are located in Nassawadox and Exmore in Northampton County and in Onley in Accomack County.

- In Accomack County, there are many schools located directly on, or close to, the U.S. Route 13 corridor. Access for school buses is a key concern at these locations.

- The Wallops Island area is a major employment center, attracting workers from both Virginia and Maryland. U.S. Route 13, between the Maryland state line and Route 175, is a major travel route serving this commuter population.

- Significant residential and recreational development activity is occurring in the Cape Charles area (Northampton County), located to the west of U.S. Route 13 off Route 184. The potential impact of a reduced toll structure on the CBBT, now under consideration, may have significant impacts on land use and development in Cape Charles and the entire southern portion of Northampton County.

### Environment

- Improvements in the U.S. Route 13 corridor could potentially impact sensitive environmental features including wetlands, prime farmland, threatened and endangered species, historic resources and groundwater recharge areas. Particularly for improvements that involve roadway relocation or new alignment, additional investigations may be necessary to determine the extent and significance of such impacts.

# 3

# Future Traffic Conditions

This chapter presents information on the anticipated future conditions along U.S. Route 13. Included in the discussion are the economic outlook for the Eastern Shore of Virginia, the historical traffic growth, the expected growth rate, forecasts by others, and estimated future traffic operations for the study area. It is important to note that these projected data and analyses are absent any strategies to reduce or manage future traffic demands along the corridor. These types of actions and their effectiveness in accommodating overall corridor travel demand will be discussed in Chapter 5.

## 3.1 Forecast Year

The first task of a future conditions analysis involves the selection of a planning horizon year, or forecast year. It is common practice to design transportation infrastructure for traffic demands anticipated at some time in the future. This level of planning helps prevent a facility from operating at capacity shortly after construction is completed. AASHTO[2] eferences designing to accommodate highway traffic projections of a 20-year period. Federal Planning Regulations[3] which guide the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) require a minimum horizon of 20 years for statewide planning. ITE[4] also acknowledges the usefulness of forecasting traffic to accommodate 20-year demands.

The selection of a 20-year planning horizon will allow for projections that give an appropriate indication of the long-term needs along the corridor. Therefore, the year 2020 was established as the horizon year for this study that was initiated in the year 2000.

## 3.2 Review of Recent Studies

A review of recent transportation studies can be extremely useful in the development of future traffic growth forecasts. For the U.S. Route 13 Corridor, there are several studies that have been completed within the past five years. These include:

- *U.S.Route 13 Corridor Plan – Eastern Shore of Virginia*, Accomack-Northampton Planning District Commission (A-NPDC), July 1999.

2 A Policy on the Geometric Design of Highways and Streets, American Association of State Highway Transportation Officials (AASHTO), 1990.
3 Code of Federal Regulations, 23 CFR 450.214(b)(2), revised as of April 1, 1995.
4 Traffic Engineering Handbook, 4th Edition, Institute of Transportation Engineers, 1992.

- *Chesapeake Bay Bridge Tunnel Traffic Evaluation Study*, Chesapeake Bay Bridge and Tunnel District, April 11, 2000.

- Potential Land Use Impacts of a Commuter Toll Reduction on the Chesapeake Bay Bridge-Tunnel, Virginia Department of Transportation, June 2000.

- Chesapeake Bay Bridge-Tunnel Toll Impact Study completed in October 2001 by the A-NPDC provides further evaluation of the impacts of a toll reduction on development in lower Northampton County.

A brief summary of the future growth estimates assumed in each study is provided below.

■

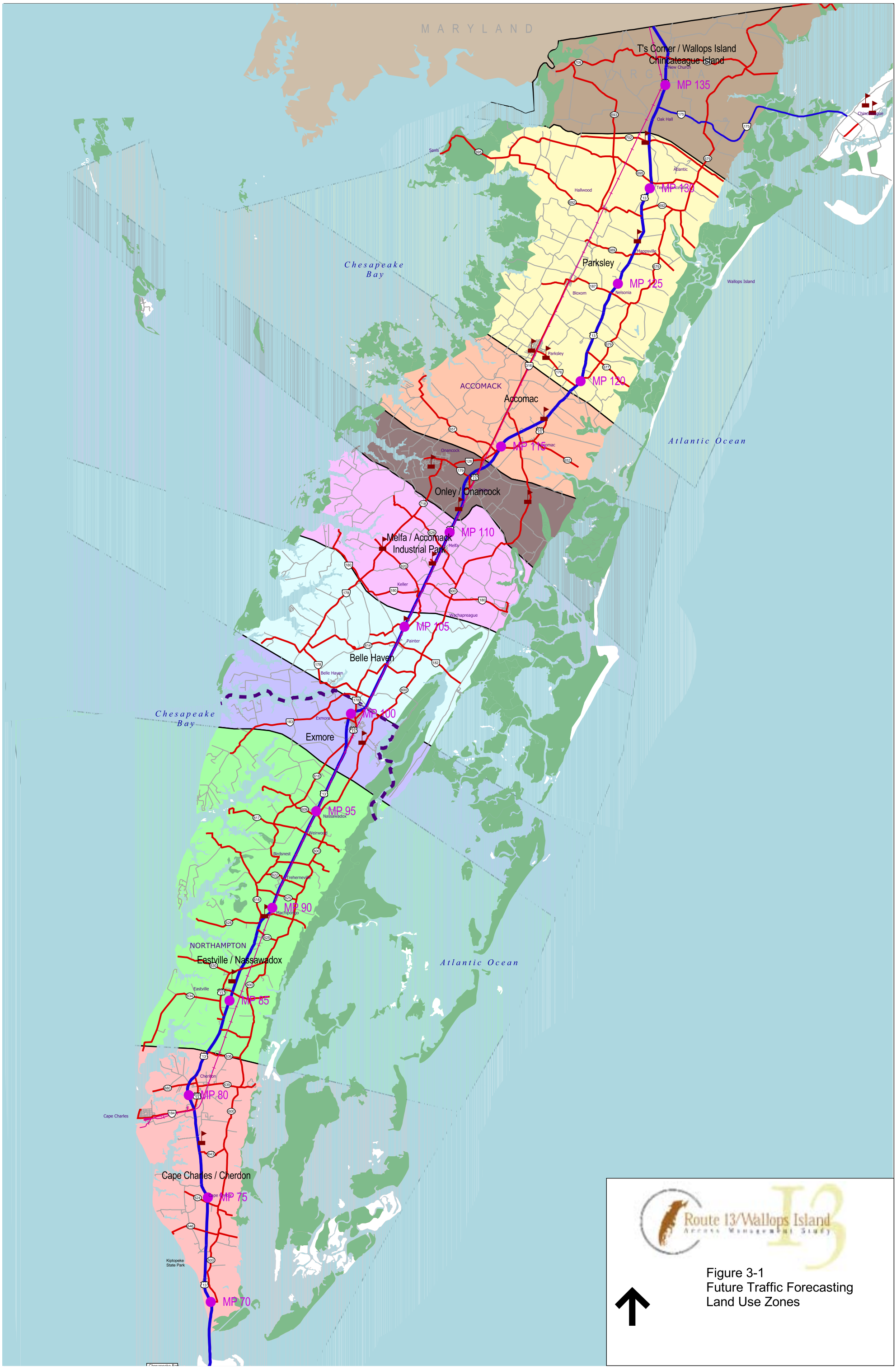
### 3.2.1 A-NPDC Study of the U.S. Route 13 Corridor

This study estimated future traffic growth in two steps. First, through traffic was identified based on interview surveys conducted at the Chesapeake Bay Bridge-Tunnel toll plaza. Through traffic is defined as the traffic observed at MD-VA border and CBBT. Through traffic growth of 2.7 percent was then forecasted based on the historical average annual growth rate experienced on the Bridge-Tunnel.

Next, the potential growth in local traffic was evaluated through the development of several future land development scenarios. These scenarios assumed a range of average annual population growth from 0.5 percent up to 1.5 percent. The specific areas along the Eastern Shore where residential, commercial and industrial growth is likely to occur were projected. An average population growth rate for the entire Eastern Shore of Virginia of one percent was selected as the maximum likely to happen. This scenario was called the "Highest Anticipated Growth Scenario."

#### Future Population Growth

Under the Highest Anticipated Growth Scenario, population growth would average roughly one percent per year, similar to the state average. The Eastern Shore's population would grow to 57,000 by 2020, roughly 27 percent higher than the 1995 base population of approximately 45,000. To refine the pattern of growth, the Eastern Shore was divided into nine zones, as shown in Figure 3-1. Existing population and employment were identified for each zone, and then assumptions were made about which zones would experience the most growth.


MARYLAND
VIRGINIA
T's Corner / Wallops Island
Chincateague Island
MP 135
MP 130
MP 125
MP 120
MP 115
MP 110
MP 105
MP 100
MP 95
MP 90
MP 85
MP 80
MP 75
MP 70
Parksley
ACCOMACK
Accomac
Onley / Onancock
Melfa / Accomack
Industrial Park
Belle Haven
Exmore
NORTHAMPTON
Eastville / Nassawadox
Cape Charles / Cherdon
Chesapeake Bay
Atlantic Ocean
Wallops Island
Oak Hall
Saxis
Hallwood
Atlantic
Mappsville
Bloxom
Nelsonia
Parksley
Onancock
Accomac
Melfa
Keller
Wachapreague
Painter
Belle Haven
Exmore
Nassawadox
Weirwood
Birdsnest
Trehernevile
Machipongo
Eastville
Cherrion
Cape Charles
Kiptopeke
State Park
Route 13/Wallops Island
Access Management Study
Figure 3-1
Future Traffic Forecasting
Land Use Zones

As shown in Table 3-1, the highest rates of residential growth occur at the southern and northern ends of the Eastern Shore, which would increase by average annual rates of 2.7 percent and 2.2 percent, respectively. Much of the growth in the Cape Charles area would consist of retirement population at the Bay Creek development. The remainder of the Shore would experience average annual residential growth rates at or below one percent. This growth pattern is consistent with that suggested by local and regional planners during the initial scoping interviews conducted as part of this study. The concentration of residential growth at each end of the study area emphasizes the need to analyze commuting patterns to Hampton Roads, Maryland, and to the center of the study area, where significant employment growth is projected (see below).

This growth scenario, though not a scientific projection of population, is substantiated by recent data. The 2000 census indicates that the population on the Eastern Shore for 2000 was approximately 13,100 for Northampton County and 38,300 for Accomack County. The County of Accomack estimates that their population number should be closer to 34,100. Accepting Accomack's numbers, the population on the Eastern Shore for 2000 is 47,200. This correlates to a growth rate of 1.0 percent per year from 1995 to 2000, which is consistent with the Highest Anticipated Growth Senario average annual growth percentage per year.

**Table 3-1**
**Population Growth Scenario – Highest Anticipated**

| Land Use Zone | 1995 Population* | 2020 Forecast* | Average Annual Growth ( %/yr. ) |
|---|---|---|---|
| 1 – Cape Charles/Cheriton | 3,855 | 7,500 | 2.7 |
| 2 – Eastville/Nassawadox | 4,535 | 5,100 | 0.5 |
| 3 – Exmore | 4,535 | 5,100 | 0.5 |
| 4 – Belle Haven | 4,535 | 5,400 | 0.7 |
| 5 – Melfa/Accomack Airport Ind. Park | 4,535 | 5,400 | 0.7 |
| 6 – Onley/Onancock | 6,349 | 7,600 | 0.7 |
| 7 – Accomac | 3,175 | 3,600 | 0.5 |
| 8 – Parksley | 9,070 | 10,100 | 0.4 |
| 9 – T's Corner/Wallops Island/ Chincoteague Island | 4,535 | 7,900 | 2.2 |
| Total | 45,124 | 57,700 | 1.0 |

* 1995 and 2020 population estimates provided by the Accomack-Northampton Planning District Commission.

## Future Commercial Growth

As shown in Table 3-2, average annual growth in retail and commercial development is anticipated to be concentrated in the areas of Exmore (three percent per year), Onley (two percent per year), and T's Corner (three percent per year). Expanding commercial development in previously developed areas is consistent with local long-range plans, and could help preserve undeveloped sections of the corridor. However, it also highlights the need for effective access management in those areas to prevent degradation of mobility along U.S. Route 13. Also, measures to address existing problems will take on heightened importance.

### Table 3-2
### Commercial-Retail Growth Scenario – Highest Anticipated

| Land Use Zone | 1995 Square Footage* | 2020 Forecast Square Footage* | Average Annual Growth ( %/yr. ) |
|---|---|---|---|
| 1 – Cape Charles/Cheriton | 225,000 | 270,000 | 0.7 |
| 2 – Eastville/Nassawadox | 150,000 | 180,000 | 0.7 |
| 3 – Exmore | 375,000 | 790,000 | 3.0 |
| 4 – Belle Haven | 225,000 | 330,000 | 1.5 |
| 5 – Melfa/Accomack Airport Industrial Park | 150,000 | 220,000 | 1.5 |
| 6 – Onley/Onancock | 750,000 | 1,230,500 | 2.0 |
| 7 – Accomac | 225,000 | 250,000 | 0.4 |
| 8 – Parksley | 450,000 | 540,000 | 0.7 |
| 9 – T's Corner/Wallops Island/ Chincoteague Island | 450,000 | 940,000 | 3.0 |
| Total | 3,000,000 | 4,750,500 | 1.9 |

* 1995 and 2020 commercial growth estimates provided by the Accomack-Northampton Planning District Commission.

The Highest Anticipated Growth Scenario assumes that commercial-retail growth would be at the rate of 1.9 percent annually compared to 1.0- percent average annual population rate.

## Future Industrial Growth

Industrial growth, shown in Table 3-3, is anticipated to occur at a slower rate (0.6 percent average annual rate) along the Eastern Shore than commercial-retail growth, so that overall commercial-industrial growth (1.4 percent) would slightly exceed residential growth (1.0 percent). Industrial development is anticipated to be focused on the Accomack Airport Industrial Park (five percent average annual rate) in Melfa.

### Table 3-3
### Industrial Growth Scenario – Highest Anticipated

| Land Use Zone | 1995 Square Footage* | 2020 Forecast Square Footage* | Average Annual Growth ( %/yr. ) |
|---|---|---|---|
| 1 – Cape Charles/Cheriton | 250,000 | 360,000 | 1.5 |
| 2 – Eastville/Nassawadox | 150,000 | 170,000 | 0.5 |
| 3 – Exmore | 150,000 | 170,000 | 0.5 |
| 4 – Belle Haven | 50,000 | 60,000 | 0.7 |
| 5 – Melfa/Accomack Airport Ind. Park | 250,000 | 850,000 | 5.0 |
| 6 – Onley/Onancock | 150,000 | 170,000 | 0.5 |
| 7 – Accomac | 150,000 | 150,000 | 0.0 |
| 8 – Parksley | 2,600,000 | 2,600,000 | 0.0 |
| 9 – T's Corner/Wallops Island/ Chincoteague Island | 1,200,000 | 1,250,000 | 0.2 |
| Total | 4,950,000 | 5,780,000 | 0.6 |

* 1995 and 2020 industrial growth estimates provided by the Accomack-Northampton Planning District Commission.

## Summary of Demographic Projections

The higher rate of commercial-retail development is premised in part on the potential for highway tourist-oriented business such as hotels and gas stations, as a function of a strong mid-Atlantic economy. The growth is also a factor of the potential demand for an upscale retail outlet center. According to the A-NPDC report, this pattern would mimic the period from 1985 to 1995, when commercial growth exceeded residential growth. The bulk of the new development is anticipated to occur later in the planning horizon, after full absorption of the '85-'95 growth. These assumptions and growth scenarios have implications for through and local traffic growth.

It bears emphasizing that the Highest Anticipated Growth Scenario assumes no change in the toll structure at the CBBT. As stated in the Existing Conditions section of this report, decreasing or removing the toll would not significantly affect the overall long term (greater than 50 years) growth potential of the Eastern Shore. Reducing or eliminating the toll structure in the near term could effectively bring

southern Northampton County into the Hampton Roads commuter shed sooner. The recent decrease in toll structure is expected to increase the growth in the general vicinity of Cape Charles by the year 2020, but not enough to change the alternatives and recommendations presented in Chapters 5 and 6.

It is recognized that all of the above forecast of growth represents a general estimate of where local growth is likely to occur, not a specific development plan.

■

### 3.2.2 Chesapeake Bay Bridge Tunnel Traffic Evaluation Study

This report evaluated the toll revenue impact associated with the implementation of various toll discount rate scenarios. A total of four fiscal years were evaluated, and for this study, an average annual growth in traffic of 1.7 percent was selected.

■

### 3.2.3 Virginia Department of Transportation Bridge-Tunnel Study

This report did not develop future traffic forecasts, however the report did examine the growth scenarios as developed by the A-NPDC. The primary focus of this study was to determine whether a change in toll structure on the Bridge-Tunnel could draw lower Northampton County into the Hampton Roads commuting market. The study concluded that a reduction of the current $10 toll to $5 could influence people to live on the Eastern Shore and commute to the Hampton Roads region by 2020. This analysis examined projected travel times from major employment centers in Hampton Roads to fringe areas, such as Isle of Wight County, and conducted a comparison of the total costs of commuting.

■

### 3.2.4 Chesapeake Bay Bridge-Tunnel Toll Impact Study

The toll impact study report was completed in October 2001 after the completion of the travel forecasting effort of this project. As a result, the traffic forecasts presented in this Chapter do not include traffic projections with the proposed commuter fare in place. This fare structure, effective March 1, 2002 lowered the round trip passenger vehicle fare from $20.00 to $14.00 for vehicles using the facility in both directions within a 24-hour period. The toll impact study estimated 2025 daily traffic volumes on U.S. Route 13 on the Eastern Shore both with and without the commuter toll reduction. A 13 percent increase in daily traffic was projected for southern Northampton County (CBBT to Cape Charles/Cheriton), as a result of the commuter toll reduction. Between Cheriton and Nassawadox, an 18 percent increase was projected, an eight percent increase through Nassawadox, and a four percent increase through Exmore. The commuter toll reduction is projected to have minimal effects on daily traffic flow (one percent growth or less) in Accomack County.

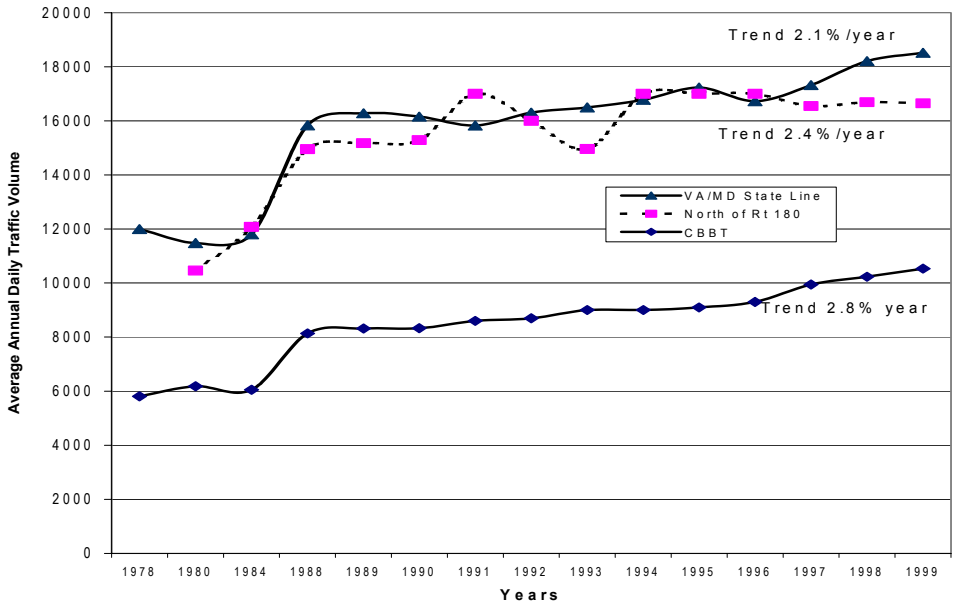
The development of study alternatives and recommendations, presented in Chapters 5 and 6, anticipated the potential for increased growth in southern Northampton County due to a change in the toll structure. The improvements developed in those Chapters are consistent with and sufficient to accommodate the increased traffic projections and still maintain acceptable traffic operations on U.S. Route 13. A review of the toll impact study does not change any of the findings and recommendations presented later in this report in Chapters 5 and 6.

## 3.3 Historical Traffic Growth

A review of historical traffic growth trends was conducted for the U.S. Route 13 corridor. Figure 3-2 presents historical average daily traffic information obtained at three locations along U.S. Route 13 at the Chesapeake Bay Bridge-Tunnel, at a VDOT permanent count station in Keller (MP 106.85) north of Route 180 and at the Virginia/Maryland State Line (provided by the Maryland State Highway Administration). These historical data would support a growth rate in the 2.1 to 2.8 percent ranges. It is important to note that growth trends along U.S. Route 13 vary from south to north with the southern end experiencing the highest growth rate and the northern end with the lowest growth rate.

Traffic volumes on the U.S. Route 13 corridor experienced significant increases between 1984 and 1988, coinciding with one of the most prosperous growth periods within the past 20 years. Between 1996 and today, a significant upturn in traffic growth has occurred on the U.S. Route 13 corridor.

**Figure 3-2**
**Historical Traffic Growth Trends on U.S. Route 13**



## 3.4 Travel Demand Forecasting

Travel demand and patterns are a function of the location and extent of human activities. More specifically, travel demands are affected by the location and density of housing, employment, shopping opportunities, schools, services, recreational opportunities, etc. Travel demands are also affected by economic factors such as income, car ownership, number of jobs per household, etc. Growth in travel demand is generally correlated to changes in population, employment, land uses, and economic factors.

Traffic forecasts for transportation planning are done by a variety of means. Traffic volumes are commonly forecasted simply using historical traffic statistics—generally referred to as "current trends extended." They are also forecasted using statistical analysis based on projections of changes in demographics or economic conditions, either as part of a travel demand model or by regression analyses.

After reviewing recent studies, historical traffic growth, population growth and regional projections, a method to forecast 2020 traffic volumes was selected.

### 3.4.1 Projected Growth Rate Methodology

The historical traffic information shows that traffic growth has not occurred uniformly throughout the corridor. In fact, growth rarely does occur uniformly along a roadway corridor of this length. The reason for this is because the composition of the users traveling on U.S. Route 13 is also not uniform. The users of U.S. Route 13 can generally be divided into two categories: 1) non-local traffic that is traveling on U.S. Route 13 from an external origin to an external destination (Delaware to Virginia Beach, for example), and 2) local traffic, which includes all vehicles that have an origin, a destination, or both within the Eastern Shore of Virginia.

Based on the origin-destination survey conducted in July 2000 as part of the study, through traffic was estimated at 5,000 vehicles per day. (A lower estimate of 3,600 vehicles per day was developed for Spring conditions.)

Local traffic, meanwhile, is composed of short trips that are entirely local in nature, commuting traffic (to and from Maryland or using the Bridge-Tunnel), and seasonal trips that have a local origin or destination. Local traffic is, therefore, all traffic that is not considered a though trip. This volume was determined by subtracting the through traffic volume from traffic counts taken at various sections of the corridor.

The next step was to develop a methodology to forecast future growth. Through traffic was grown at the prevailing growth rate measured at the Chesapeake Bay Bridge-Tunnel (2.8 percent per year). To project local traffic, the A-NPDC demographic "Highest Anticipated Growth" scenario was used to forecast the relative change in local traffic by sub-regions. The nine sub-regions developed in the A-NPDC study were used for consistency with prior plenary efforts. The result was a

different average annual growth rate in each sub-region based on the relative changes in traffic intensity.

The residential-to-work trip table, as presented in the A-NPDC study, was used to forecast the relative growth in traffic volumes along U.S. Route 13. The trip table was multiplied by a factor of two to reflect a two-way trip (from home to work and then work to home). These two-way trips were then assigned to the roadway network. This total future local traffic was then compared to the existing local traffic (excluding through traffic), and an average annual compounded growth rate was determined for each sub-region. Forecasted growth in local traffic was then added to forecasted growth in through traffic in order to determine an average change in corridor demands.

The resultant corridor growth shows a pattern consistent with recent historical traffic trends. That is, overall average annual traffic growth varies from a high of around three percent at the Bridge-Tunnel to a low near two percent at the Virginia/Maryland State Line.

## 3.5 Future Traffic Projected Volumes

The results of the preceding forecast analysis are shown in Tables 3-4 and 3-5 for spring and summer conditions, respectively. More detailed information on the steps used to develop the local growth estimates are provided in the Appendix. Daily traffic volumes projected for the 2020 analysis year are graphically depicted in Figure 3-3. In summary, the U.S. Route 13 corridor is projected to experience 2020 daily traffic volumes ranging from 14,000 to 26,000 vehicles per day in the spring and from 21,000 to 33,000 vehicles per day in the summer. Along the Route 175 corridor, daily traffic volumes will range from 10,000 to 14,000 vehicles per day during the spring and summer months.

## 3.6 Future Traffic Operations

Using the forecasted growth in U.S. Route 13 traffic, a detailed analysis was conducted to determine year 2020 future traffic operating conditions in the study area. The analysis used the procedures documented in the *1997 Highway Capacity Manual* to provide a technical assessment of the operational qualities of intersections and roadway segments. The input information for the analysis included the existing traffic volumes, traffic signal and control data, as well as corridor geometric design conditions.

For the year 2020, in addition to the existing traffic signals, the signalization of the intersection of Route 175 and Route 798 is also assumed.

■

### 3.6.1 Peak Hour Intersection Operations

Signalized and unsignalized intersections were evaluated along the study corridor for 2020 morning and evening peak hour traffic conditions. A summary of conditions at these intersections is provided below. It is important to realize that Level of Service (LOS) is a broadly applicable measurement, designed to assess traffic operations in a variety of environments.

**Table 3-4**
**Year 2020 Spring Weekday Daily Traffic Volume Projections**

**U.S. Route 13 Corridor**

| Stations From | To | 2000 Existing Total Volume | 2000 Existing Through Traffic | 2000 Existing Local Traffic | 2020 Thru Traffic Growth Rate* | 2020 Thru Traffic 2020 Through Volume | 2020 Local Traffic Land Use Zone** | 2020 Local Traffic Growth Rate*** | 2020 Local Traffic 2020 Local Volume | Total 2020 Volumes Unrounded 2020 Volume | Total 2020 Volumes Rounded 2020 Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Virginia/Maryland Border | Route 175 – T's Corner | 17,000 | 3,600 | 13,400 | 2.8% | 6,250 | 9 | 1.9% | 19,602 | 25,852 | 26,000 |
| Route 175 – T's Corner | Route 695 – Temperanceville | 15,000 | 3,600 | 11,400 | 2.8% | 6,250 | 9 | 0.7% | 13,148 | 19,398 | 19,000 |
| Route 695 – Temperanceville | Route 187 – Nelsonia | 16,000 | 3,600 | 12,400 | 2.8% | 6,250 | 8 | 0.7% | 14,301 | 20,551 | 21,000 |
| Route 187 – Nelsonia | Route 176 – Parksley | 15,500 | 3,600 | 11,900 | 2.8% | 6,250 | 8 | 0.7% | 13,725 | 19,975 | 20,000 |
| Route 176 – Parksley | N US 13 Bus – Accomac | 15,500 | 3,600 | 11,900 | 2.8% | 6,250 | 8 | 0.7% | 13,725 | 19,975 | 20,000 |
| N US 13 Bus – Accomac | N US 13 Bus – Onley | 16,000 | 3,600 | 12,400 | 2.8% | 6,250 | 7 | 0.8% | 14,615 | 20,865 | 21,000 |
| N US 13 Bus – Onley | Route 639 – Melfa | 18,000 | 3,600 | 14,400 | 2.8% | 6,250 | 6 | 1.0% | 17,424 | 23,674 | 24,000 |
| Route 639- Melfa | Route 180 – Keller | 16,900 | 3,600 | 13,300 | 2.8% | 6,250 | 5 | 1.3% | 17,228 | 23,478 | 23,000 |
| Route 180 – Keller | Route 181 – Belle Haven | 15,500 | 3,600 | 11,900 | 2.8% | 6,250 | 4 | 1.6% | 16,318 | 22,568 | 23,000 |
| Route 181 – Belle Haven | Route 609 – Nassawadox | 15,500 | 3,600 | 11,900 | 2.8% | 6,250 | 3 | 1.7% | 16,771 | 23,021 | 23,000 |
| Route 609 – Nassawadox | Route 628 – Machipongo | 12,700 | 3,600 | 9,100 | 2.8% | 6,250 | 2 | 2.2% | 14,071 | 20,321 | 20,000 |
| Route 628 – Machipongo | N US 13 Business – Eastville | 12,200 | 3,600 | 8,600 | 2.8% | 6,250 | 2 | 2.2% | 13,298 | 19,548 | 20,000 |
| N US 13 Business – Eastville | Route 636 | 8,500 | 3,600 | 4,900 | 2.8% | 6,250 | 2 | 2.2% | 7,577 | 13,827 | 14,000 |
| Route 636 | N US 13 Business - Cheriton | 8,500 | 3,600 | 4,900 | 2.8% | 6,250 | 1 | 2.7% | 8,310 | 14,560 | 15,000 |
| N US 13 Business – Cheriton | Route 184 – Cape Charles | 8,500 | 3,600 | 4,900 | 2.8% | 6,250 | 1 | 2.7% | 8,310 | 14,560 | 15,000 |
| Route 184 – Cape Charles | Route 704 – Kiptopeke | 8,500 | 3,600 | 4,900 | 2.8% | 6,250 | 1 | 2.7% | 8,310 | 14,560 | 15,000 |
| Route 704 – Kiptopeke | CBBT | 8,200 | 3,600 | 4,600 | 2.8% | 6,250 | 1 | 2.7% | 7,801 | 14,051 | 14,000 |

* Average annual growth rate based on 20-year trend at the CBBT.
** Land Use Zones used by the Accomack-Northampton Planning District Commission to Conduct Land Use Projections.
*** Average annual growth rate based on total projected change in local traffic.

**Route 175 Corridor**

| Stations From | To | 2000 Existing Total Volume | 2000 Existing Through Traffic | 2000 Existing Local Traffic | 2020 Thru Traffic Growth Rate* | 2020 Thru Traffic 2020 Through Volume | 2020 Local Traffic Land Use Zone** | 2020 Local Traffic Growth Rate*** | 2020 Local Traffic 2020 Local Vol. | Total 2020 Volumes Unrounded 2020 Vol | Total 2020 Volumes Rounded 2020 Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|
| U.S. Route 13 – T's Corner | Route 679 – Wattsville | 7,560 | 0 | 7,560 | 2.8% | 0 | 9 | 1.9% | 11,059 | 11,059 | 11,000 |
| Route 679 – Wattsville | Route 798 – Wallops Island | 7,240 | 0 | 7,240 | 2.8% | 0 | 9 | 1.9% | 10,591 | 10,591 | 11,000 |
| Route 798 – Wallops Island | Chincoteague Island | 4,760 | 0 | 4,760 | 2.8% | 0 | 9 | 1.9% | 6,963 | 6,963 | 7,000 |

**Table 3-5**
**Year 2020 Summer Weekday Daily Traffic Volume Projections**

**U.S. Route 13 Corridor**

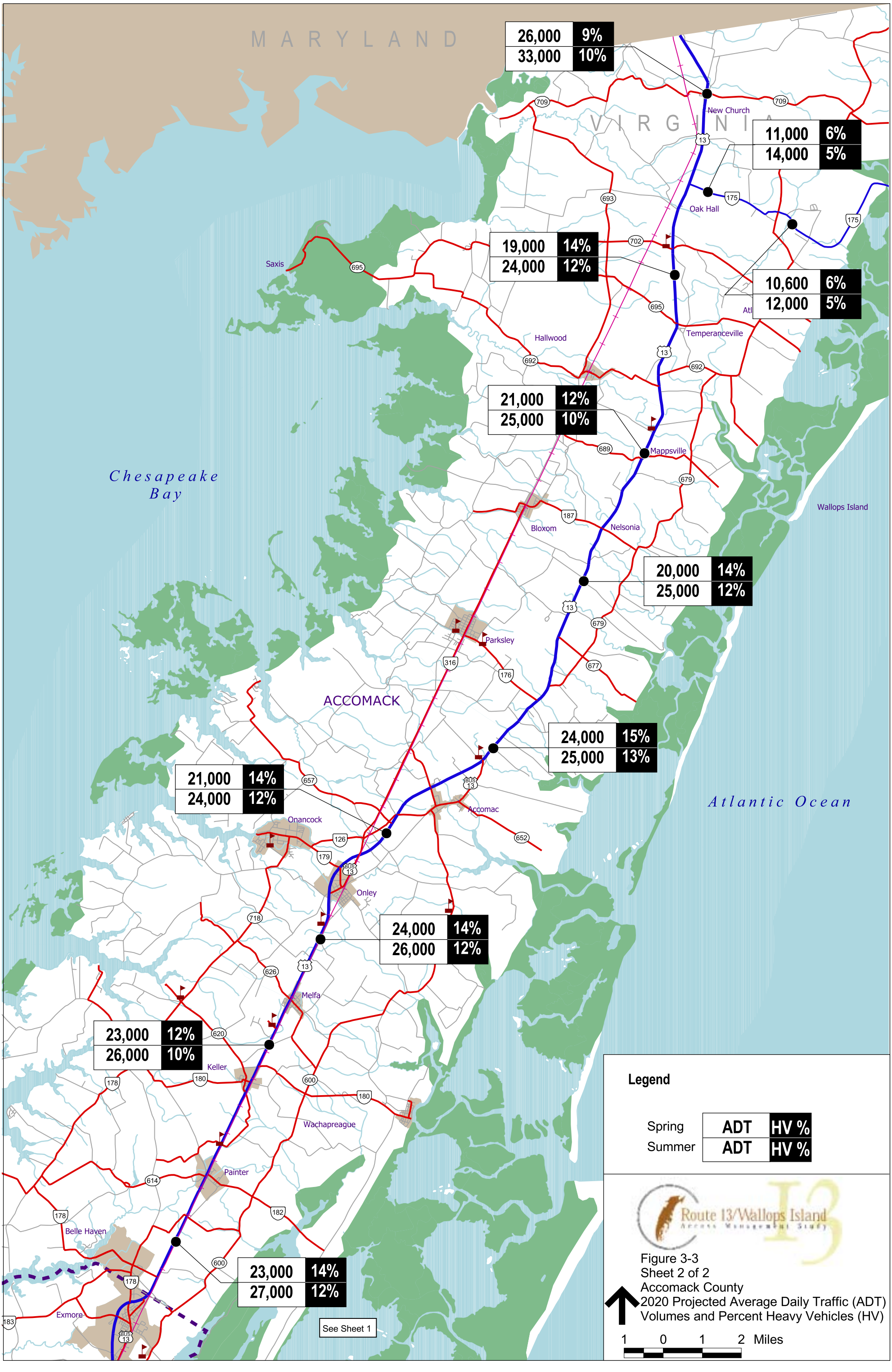
| Stations From | To | 2000 Existing Total Volume | 2000 Existing Thru Traffic | 2000 Existing Local Traffic | 2020 Thru Traffic Growth Rate* | 2020 Thru Traffic 2020 Thru Vol. | 2020 Local Traffic Land Use Zone** | 2020 Local Traffic Growth Rate*** | 2020 Local Traffic 2020 Local Vol. | Total 2020 Volumes Unrounded 2020 Vol | Total 2020 Volumes Rounded 2020 Vol. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Virginia/Maryland Border | Route 175 – T's Corner | 21,500 | 5,000 | 16,500 | 2.8% | 8,690 | 9 | 1.9% | 24,136 | 32,826 | 33,000 |
| Route 175 – T's Corner | Route 695 – Temperanceville | 18,000 | 5,000 | 13,000 | 2.8% | 8,690 | 9 | 0.7% | 14,993 | 23,683 | 24,000 |
| Route 695 – Temperanceville | Route 187 – Nelsonia | 19,000 | 5,000 | 14,000 | 2.8% | 8,690 | 8 | 0.7% | 16,147 | 24,837 | 25,000 |
| Route 187 – Nelsonia | Route 176 – Parksley | 19,000 | 5,000 | 14,000 | 2.8% | 8,690 | 8 | 0.7% | 16,147 | 24,837 | 25,000 |
| Route 176 – Parksley | N US 13 Bus – Accomac | 19,000 | 5,000 | 14,000 | 2.8% | 8,690 | 8 | 0.7% | 16,147 | 24,837 | 25,000 |
| N US 13 Bus – Accomac | N US 13 Bus – Onley | 18,000 | 5,000 | 13,000 | 2.8% | 8,690 | 7 | 0.8% | 15,322 | 24,012 | 24,000 |
| N US 13 Bus – Onley | Route 639 – Melfa | 19,000 | 5,000 | 14,000 | 2.8% | 8,690 | 6 | 1.0% | 16,940 | 25,630 | 26,000 |
| Route 639- Melfa | Route 180 – Keller | 18,500 | 5,000 | 13,500 | 2.8% | 8,690 | 5 | 1.3% | 17,487 | 26,177 | 26,000 |
| Route 180 – Keller | Route 181 – Belle Haven | 18,500 | 5,000 | 13,500 | 2.8% | 8,690 | 4 | 1.6% | 18,512 | 27,202 | 27,000 |
| Route 181 – Belle Haven | Route 609 – Nassawadox | 18,500 | 5,000 | 13,500 | 2.8% | 8,690 | 3 | 1.7% | 19,025 | 27,715 | 28,000 |
| Route 609 – Nassawadox | Route 628 – Machipongo | 14,000 | 5,000 | 9,000 | 2.8% | 8,690 | 2 | 2.2% | 13,916 | 22,606 | 23,000 |
| Route 628 – Machipongo | N US 13 Business – Eastville | 13,500 | 5,000 | 8,500 | 2.8% | 8,690 | 2 | 2.2% | 13,143 | 21,833 | 22,000 |
| N US 13 Business – Eastville | Route 636 | 12,500 | 5,000 | 7,500 | 2.8% | 8,690 | 2 | 2.2% | 11,597 | 20,287 | 20,000 |
| Route 636 | N US 13 Business – Cheriton | 11,800 | 5,000 | 6,800 | 2.8% | 8,690 | 1 | 2.7% | 11,532 | 20,222 | 20,000 |
| N US 13 Business – Cheriton | Route 184 – Cape Charles | 12,500 | 5,000 | 7,500 | 2.8% | 8,690 | 1 | 2.7% | 12,719 | 21,409 | 21,000 |
| Route 184 – Cape Charles | Route 704 – Kiptopeke | 12,500 | 5,000 | 7,500 | 2.8% | 8,690 | 1 | 2.7% | 12,719 | 21,409 | 21,000 |
| Route 704 – Kiptopeke | CBBT | 12,000 | 5,000 | 7,000 | 2.8% | 8,690 | 1 | 2.7% | 11,871 | 20,561 | 21,000 |

* Average annual growth rate based on 20-year trend at the CBBT.
** Land Use Zones used by the Accomack-Northampton Planning District Commission to Conduct Land Use Projections.
*** Average annual growth rate based on total projected change in local traffic.

**Route 175 Corridor**

| Stations From | To | 2000 Existing Total Volume | 2000 Existing Thru Traffic | 2000 Existing Local Traffic | 2020 Thru Traffic Growth Rate* | 2020 Thru Traffic 2020 Thru Vol. | 2020 Local Traffic Land Use Zone** | 2020 Local Traffic Growth Rate*** | 2020 Local Traffic 2020 Local Vol. | Total 2020 Volumes Unrounded 2020 Vol | Total 2020 Volumes Rounded 2020 Vol. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| U.S. Route 13 – T's Corner | Route 679 - Wattsville | 9,360 | 0 | 9,360 | 2.8% | 0 | 9 | 1.9% | 13,692 | 13,692 | 14,000 |
| Route 679 – Wattsville | Route 798 – Wallops Island | 8,960 | 0 | 8,960 | 2.8% | 0 | 9 | 1.9% | 13,107 | 13,107 | 13,000 |
| Route 798 – Wallops Island | Chincoteague Island | 5,890 | 0 | 5,890 | 2.8% | 0 | 9 | 1.9% | 8,616 | 8,616 | 9,000 |


Chesapeake Bay
Atlantic Ocean
Belle Haven
Exmore
NORTHAMPTON
Nassawadox
Weirwood
Birdsnest
Treherneville
Machipongo
Eastville
Cheriton
Cape Charles
Cape Center
Kiptopeke State Park
Chesapeake Bay Bridge Tunnel
178
182
600
183
BUS 13
618
13
609
617
622
625
628
630
634
636
639
680
184
643
624
646
23,000 14%
27,000 12%
See Sheet 1
Legend
Spring ADT HV %
Summer ADT HV %
Route 13/Wallops Island
Access Management Study
Figure 3-3
Sheet 1 of 2
Northampton County
2020 Projected Average Daily Traffic (ADT)
Volumes and Percent Heavy Vehicles (HV)
1 0 1 2 Miles


MARYLAND
VIRGINIA
26,000 9%
33,000 10%
11,000 6%
14,000 5%
19,000 14%
24,000 12%
10,600 6%
12,000 5%
21,000 12%
25,000 10%
20,000 14%
25,000 12%
24,000 15%
25,000 13%
21,000 14%
24,000 12%
24,000 14%
26,000 12%
23,000 12%
26,000 10%
23,000 14%
27,000 12%
See Sheet 1
New Church
Oak Hall
Saxis
Hallwood
Temperanceville
Mappsville
Bloxom
Nelsonia
Wallops Island
Parksley
ACCOMACK
Onancock
Accomac
Onley
Melfa
Keller
Wachapreague
Painter
Belle Haven
Exmore
Chesapeake Bay
Atlantic Ocean
Legend
Spring ADT HV %
Summer ADT HV %
Route 13/Wallops Island
Access Management Study
Figure 3-3
Sheet 2 of 2
Accomack County
2020 Projected Average Daily Traffic (ADT)
Volumes and Percent Heavy Vehicles (HV)
1 0 1 2 Miles

## Signalized Intersections

Twenty signalized intersections were evaluated along the U.S. Route 13 corridor within the study area. Level of Service (LOS) D conditions are projected to occur at the intersection of U.S. Route 13 with Route 175 during the summer evening peak hour. This congestion, however, can be easily mitigated with minor signal timing modifications. The intersections of U.S. Route 13 with Route 606 (Nassawadox), and Route 179 (Onley) are projected to operate at LOS C during both the spring and summer evening peak hours. The intersection of U.S Route 13 with Route 178 (Exmore) will operate at LOS C during the summer evening peak hour only. All other intersection locations are projected to operate at LOS A or B during the 2020 morning and evening peak hour periods.

## Unsignalized Intersections

Eight unsignalized intersections within the U.S. Route 13 study area were also analyzed to determine their adequacy in handling peak hour traffic. The results of the capacity analysis indicate that by the year 2020, the following intersections are expected to operate at a Level-of-Service D or worse:

- In Eastville, the northern Route 13 Business eastbound approach to U.S. Route 13 (opposite Route 630) is projected to operate at LOS F during the summer evening peak hour, LOS E during the spring evening peak hour and at LOS D during the summer morning peak hour.

- In Exmore, the southern U.S. Route 13 Business westbound approach to U.S. Route 13 is projected to operate at LOS D during spring and summer morning and evening peak hour periods.

- In Keller, the eastbound Route 180 approach to U.S. Route 13 is projected to operate at LOS D during the spring morning peak hour and the spring and summer evening peak hours.

- In Melfa, both the Airport Industrial Park roadway and the Eastern Shore Community College driveway approaches to U.S. Route 13 are projected to operate at LOS D during the summer evening peak hour. Spring counts were not conducted at these intersections.

- In Temperanceville, the westbound Route 695 approach to U.S. Route 13 is projected to operate at LOS E during the summer evening peak hour. Spring counts were not conducted at this intersection.

## Roadway Segments

A total of eleven roadway segments were assessed along the U.S. Route 13 corridor. The LOS analysis was performed for spring and summer conditions during the morning and evening peak hours. For all the roadway segments studied, LOS B operating conditions or better were determined to occur during each of the analysis conditions.

## 3.7 Future Traffic Conditions Summary

While recent population projections show a relatively flat growth trend on the Eastern Shore, recent U.S. Census data indicates that this trend may have already reversed itself, particularly in Accomack County. Traffic volumes have continued to rise on U.S. Route 13, sometimes in contrast to local population trends. National transportation statistics support this growth in trip making activity of a more mobile population. Given the potential for growth along the corridor, and the relatively under-served commercial market, significant changes in land use development along U.S. Route 13 and on the Eastern Shore, in general, is likely to occur. Recent growth in Accomack County and the reversal of the downward trend in Northampton County is evidence of this change. The selection of a varying growth rate appears to be the most realistic method to account for the likely change in travel activity for through and local traffic.

By the year 2020, however, the U.S. Route 13 corridor will continue to operate at overall good Levels of Service. Side-street congestion is expected to occur at several unsignalized intersections evaluated in this study, some of which may require signalization by 2020 (dependent on satisfaction of traffic signal warrants). Pockets of congestion are expected to occur at key signalized intersections, particularly at T's Corner, in Onley and in Exmore.

Traffic operations were not assessed using revised traffic forecsts in southern Northampton County, based on findings of the Chesapeake Bay Bridge-Tunnel Toll Impact Study. A review of these projections revealed that they would not significantly change the quality of traffic flow at the intersections and roadway sections evaluated.

# 4

# Access Management Principles and Potential Application to U.S. Route 13

## 4.1 Introduction

This section discusses access management techniques that have potential application on U.S. Route 13, describes their current practice in other areas, and offers recommended access management guidelines for their use. Despite the limited number of capacity problems foreseen through 2020 on U.S. Route 13, evolving roadway geometry, land use issues, and highway access could seriously degrade future corridor function. In addition, certain areas need better access management to address current deficiencies.

Before addressing specific measures, however, it is important to define the term "access management." Numerous definitions exist, but all focus on the process of balancing access to property with the need to preserve roadway function. As described by a recent National Cooperative Highway Research Program (NCHRP) report, access management is "…the process that provides (or manages) access to land development, while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity and speed."[5] Simply put, access management applies roadway and land use techniques to preserve the safety, function, and capacity of transportation corridors. In so doing, it provides for reasonable driveway access, and protects public investment in highway infrastructure.

## 4.2 VDOT's Role in Managing Access

To be effective, access management must consider both road design principles as well as land use planning principles. As such it requires a joint effort between VDOT and the appropriate localities. While VDOT is responsible for providing a safe transportation network, local jurisdictions are responsible for orderly growth patterns that minimize the impacts of land use on the transportation system.

5 Williams, Kristine M., AICP and J. Richard Forester, Synthesis of Highway Practice 233: Land Development Regulations that Promote Access Management, National Cooperative Highway Research Program, Transportation Research Board - National Research Council, National Academy Press, Washington, D.C., 1996, p.3.

■

### 4.2.1 Minimum Entrance Standards

While VDOT has no formal statewide access management practice in place, there are several areas where VDOT has taken an active role in the management of access on roadway facilities. To that end, road design standards provide warrants for the provision of left- and right-turn lanes. VDOT developed minimum commercial entrance standards in 1946. These standards have been updated several times over the past 55 years, and while they identify specific minimum design requirements, they do not address corridor function.

The VDOT Resident Engineer is responsible for maintaining the function and operations of roadways in his/her residency. In this capacity the Resident Engineer has discretionary access permitting authority to permit or deny access if it is not designed adequately. There is much discretion in this role, with only the Minimum Entrance Standards[6] as a guide. However, in most residencies throughout the Commonwealth, Resident Engineers require design standards that exceed the minimum. For example, along the U.S. Route 13 corridor, the provision of right-turn lanes is required for all commercial developments, regardless of right-turn warrants. Also, in the VDOT Fredericksburg Construction District, a district-wide access policy has been developed that provides a more stringent access requirement than the Commercial Entrance Standards.[7] A manual, providing guidelines and easy-to-use spreadsheets, provides for different access levels depending on several factors, including roadway classification, existing traffic volume, speed limit, and the intensity of the proposed use (vehicle trips per day).

In counties or cities which have ordinances or entrance standards which equal or exceed those of VDOT, then those of the county or city shall apply.[8] These existing VDOT practices positively impact access management by requiring turn lanes, and this, in turn, impacts the spacing of driveways. However, a more effective application of access management techniques will require the development of standards that VDOT can apply in a more systematic manner.

■

### 4.2.2 Statewide Access Management Program Consideration

Toward this end, the Virginia Transportation Research Council (VTRC) completed an extensive study in 1998 examining the development of a statewide access management program. This study provided recommendations to establish:

- an access management heirarchy of all state roadways,
- an access management code (similar to Colorado and New Jersey), and
- geometric standards and implementation procedures.

▼

6 Minimum Standards of Entrances to State Highways, Virginia Department of Transportation, 1998.
7 Site Access Guidelines, Virginia Department of Transportation, Fredericksburg District, 2000.
8 Minimum Standards of Entrance to State Highways, Virginia Department of Transportation, 1998, p. 5.

The recommendations of the VTRC study have not been implemented to date; however, its findings were well received by VDOT and consistency between the findings of the VTRC report and the efforts in the current U.S. Route 13 study have been maintained as much as possible.

■

### 4.2.3 Recent Access Management Studies

The Greene County (U.S. Route 29) Access Management Study, completed in 1999, was the first VDOT-funded study focusing on corridor-specific access management within the Commonwealth of Virginia. This study recommended limited access management standards, and then evaluated alternative roadway improvement concepts including frontage roads, reverse frontage roads and driveway consolidation. The focus of the study was the vicinity of the intersection of U.S. Route 29 with Route 33. Arterial standards recommended in this study were:

- Minimum access (driveway) spacing: 450 feet
- Median crossing spacing: 900 feet
- Minimum traffic signal spacing: 1,800 feet
- Desirable traffic signal spacing: 2,640 feet (one-half mile)

The Greene County access management study was more functional in nature and scope, and did not address the range of specific access management issues along the entire roadway corridor.

The U.S. Route 13/Wallops Island Access Management Study is the largest corridor-wide study prepared to-date within the Commonwealth. Unique to this study is the consideration of both sides of the access management equation: 1) roadway improvements, and 2) land use measures. This study seeks to apply access management concepts in the improvement of the existing U.S. Route 13 roadway, develop access management standards to guide future roadway improvements, and provide land use planning tools to assist the localities in developing land use control measures that help to preserve the future corridor function of the roadway.

## 4.3 Access Management Techniques

A wide array of techniques can be used to manage roadway access. Appropriate measures vary according to roadway classification and existing conditions. As a principal arterial, U.S. Route 13 may benefit from a certain set of techniques that recognize the highway's mobility function (to carry large volumes of traffic at relatively high speeds over relatively long distances). Furthermore, since land uses adjacent to U.S. Route 13 vary from agricultural to commercial, different techniques might be employed on different highway sections.

This section introduces specific access management concepts that offer potential to preserve and enhance the U.S. Route 13 corridor. Their impact on safety and traffic operations is also discussed, along with highlights of current practices from Virginia and other states. The relevance of these concepts to the U.S. Route 13 corridor is discussed, followed by the identification of specific guidelines suggested for consideration for application on U.S. Route 13 corridor.

■

### 4.3.1 Turning Treatments

Removing turning vehicles from through lanes reduces the conflicts associated with the speed changes necessary to make turns (acceleration and deceleration). As such, turn lanes can improve safety and reduce delays.

#### Left Turns

Because the majority of driveway-related accidents involve left-turning vehicles,[9] the NCHRP and most other sources focused on installation of left-turn lanes. Research study has found that the safety benefit of this technique has been quantified. The median accident rate reduction resulting from installation of left-turn lanes is 50 percent, although right angle accident rates show mixed results at unsignalized intersections.[10]

Turn lanes also benefit highway operations. The NCHRP[11] cites several studies documenting the delay reductions associated with left-turn lanes, and asserts that the "capacity of a shared lane…might be about 40 to 60 percent of that of a through lane." Based on this assertion, the NCHRP estimates that provision of left-turn lanes on a four-lane arterial could increase capacity by 33 percent.[12]

Given the potential impact of left-turning vehicles on highway safety and function, several states require left-turn lanes at all median openings on multi-lane, divided highways. The Florida DOT has such a requirement, and also mandates retrofit of existing openings as part of paving projects. Oregon and Texas require provision of left-turn lanes as part of new construction and reconstruction. Several left-turn warrant methodologies have been developed that indicate the need for a turn lane based on the volume of left-turning vehicles as a function of the volume of opposing traffic. The National Highway Institute (NHI) suggests that such warrants may be appropriate for rural highways.[13] The 1994 Highway Capacity Manual indicates the need for left-turn lanes where space permits when left-turn volumes exceed

▼

9 Gluck, Jerome, Herbert S. Levinson, and Vergil Stover, Report 420: Impacts of Access Management Techniques, National Cooperative Highway Research Program, Transportation Research Board - National Research Council, National Academy Press, Washington, D.C., 1999, p 88.
10 Loc. cit.
11 Ibid. pgs. 88-94.
12 Ibid. pgs. 93-94.
13 NHI Course No. 15255: Access Management, Location and Design - Participant Notebook, Prepared by S/K Transportation Consultants, Inc., U.S. Department of Transportation, Federal Highway Administration, National Highway Institute p. S3, 83.

100 vehicles per hour (vph), and recommends dual left-turn lanes when volumes exceed 300 vph.

Various standards also exist regarding the length of left-turn lanes. The standards are generally a function of vehicle speed and traffic volume, and are designed to allow turning vehicles to leave the travel lane, decelerate, and make the turning movement, accounting for queuing at the intersection. For a roadway with a speed limit of 35 mph or higher, VDOT requires a 200 foot stoppage distance plus a 200 foot taper as a minimum. Increased stoppage lengths may be warranted based on capacity analysis. The State of Colorado requires left-turn lanes with a 500-foot deceleration distance plus queue stoppage based on the volume of turning traffic, at a 50 mph design speed.[14] Ventura, California requires a 500-foot approach plus a 200-foot taper plus stoppage based on volume, at a 50 mph design speed.[15]

For all existing median crossovers that are to be maintained with full access, left-turn lanes should be provided. A priority ranking based on turning volumes and safety deficiencies should be developed to assist the VDOT in providing these facilities. Where development necessitates new crossovers consistent with an access management plan, the developer should provide left-turn lanes in both directions of travel. The length of turn lanes and tapers should be based on VDOT warrants, current standards, and design criteria (i.e., Road Design Manual).

## Right Turns and Use of Paved Shoulder

Similar warrants and design standards exist for right-turn lanes, although research suggests they are not as universally adopted as those for left-turn lanes.[16] Warrants identify threshold needs, whereas standards identify design specifications like length of turn lane at a specific design speed. Several states, including Virginia, have adopted these warrants, and others provide right-turn striping where wide shoulders exist. VDOT standards for right-turn dimensions are graduated by speed limit, with a 100-foot long turn lane with a 150-foot long taper required on roads under a posted 35 mph speed limit, and a 200-foot long turn lane with a 200-foot long taper when the posted speed limit is 35 mph or higher. For driveways with low volumes, the warrants provide for reduced requirements (taper or wide curb radius only).

Developing practical design solutions to adequately accommodate the mixture of local and through traffic on the U.S. Route 13 corridor was a major concern of this study. During the public involvement process, the need for improved, wider shoulders or right-turn lanes was identified frequently during both the Citizen Advisory Committee meetings, as well as at the first Public Information Meeting. A sentiment often expressed by the public was a fear of slowing down to turn right onto a side street, particularly when fast moving tractor trailers are coming up from

▼

14 Ibid. p. 7,19.
15 Ibid. p. 7,85.
16 Ibid. p. 3,87.

behind. The presence of low-density residential driveway clusters (a series of closely spaced homes, often with each home served by a loop driveway with two access points onto U.S. Route 13) was another concern of this study.

Right turn lanes should be required at all new commercial entrances, and at the entrances to new residential subdivisions. Their length should be based on volume criteria.

Where numerous commercial or residential driveways exist in close proximity, consideration should be given to using an expanded right shoulder as a continuous turn/auxiliary lane. Priority should be given to areas with greater than 10 driveways per mile; in these areas, where constraints permit, shoulders should be expanded to 12 feet as part of routine repaving.

■

### 4.3.2 Driveway Spacing and Consolidation

Driveway spacing is critical to highway function and focuses primarily on commercial driveways and entrances, but also addresses roadway intersections in the form of corner clearance (discussed in the next section). Because vehicles entering or leaving the highway at driveway locations operate at slower speeds than the prevailing traffic, driveways introduce increases in accident potential and travel time impacts. Managing driveway spacing offers enhancement potential for the entire corridor.

Analyzing the safety impacts of unsignalized intersections, the NCHRP[17] presents the results of several studies from various locations and found that "specific relationships vary, reflecting differences in road geometry… operating speeds, and driveway and intersection traffic volumes. Still, in every case, more access means more accidents." Focusing on rural highways, the NCHRP[18] finds that an "increase in access density from fewer than 15 access points to more than 30 access points per mile resulted in a 65 percent increase in the overall accident rate." Citing the 1994 Highway Capacity Manual (HCM), the NCHRP[19] also notes that the mere existence of unsignalized access points results in a measurable decrease in travel speed. As a result of motorists' perceptions, even when not in use, such entrances impact traffic operations.

Driveway spacing has historically been a function of lot size and driveway geometry. Individual access points were spaced in a manner sufficient to allow for the length of turning lanes required in a given situation. More recently, spacing standards have focused on traffic volume and speed. VDOT prefers shared driveways centered on property lines, and requires a minimum of 50 feet of separation where sharing does not occur. The Wisconsin Department of Transportation (WDOT) sets standards based on average daily traffic volume – for roadways carrying between 10,000 and 20,000 vehicles per day, WDOT requires spacing of 300 feet entrances and 1,000 feet

▼

17 Gluck, Jerome, Herbert S. Levinson, and Vergil Stover, Report 420 Impacts of Access Management Techniques, National Cooperative Highway Research Program, Transportation Research Board - National Research Council, National Academy Press, Washington, D.C., 199, pgs. 31-38.
18 Ibid. p. 38.
19 Ibid. p. 41.

for local streets. For highways carrying 20,000 to 30,000 vehicles per day, the requirements are 500 feet and 1,000 feet.[20] The New Jersey DOT bases spacing on speed, and for 50 mph requires 275 feet of separation.[21] The Montana DOT uses highway classification as its primary criteria. For divided roadways included in the National Highway System (NHS), MDOT requires 500 feet of spacing in developing areas, and 150 feet in developed areas.[22] All references reviewed provided guidelines for driveway separation ranging from 300 to 600 feet for a 55 mph roadway, such as U.S. Route 13.

For commercial driveways, as well as entrances to residential subdivisions, a minimum separation of 400 feet should be maintained. This figure has applicability to the majority of the corridor, and should be seen as a minimum – in some cases, greater separation may prove beneficial and effective. In certain areas, existing development patterns could make this standard unrealistic, and provisions need to be made for access to existing parcels of land. However, where multiple existing parcels develop as a single entity, as in the case of a shopping center, coordinated and shared access should be required. Furthermore, indirect access via secondary roads should be seen as a way to help implement the minimum standard. Finally, elimination and consolidation of sub-standard access points should be required in cases of redevelopment.

For new residential subdivisions, access from an internal road network should be required, with no new lots deriving direct access from U. S. Route 13. Furthermore, connections should be made to surrounding developments.

Driveway closures are another way of eliminating conflicts with an arterial that has too many entering access points. In certain applications, instead of closing an access point (driveway), access can be restricted to right-in and right-out turns from the arterial to a driveway and the overall safety of the arterial will be improved. Existing properties with multiple points of access onto U.S. Route 13 are candidates for this type of treatment.

For developments with access onto both U.S. Route 13 and a side street, consideration should be given to elimination of the U.S. Route 13 access point. This is dependent on the type of use, the size of the property, the current driveway density and the need for acceleration lanes, deceleration lanes or right-turn lanes on U.S. Route 13. For instance, if the side-street access will provide for full access onto the highway (at a median crossover), and the parking and internal circulation of the property can be easily modified, then consideration should be given to closing the U.S. Route 13 access point. Highway commercial uses (service stations, for instance) may argue that the direct access point onto U.S. Route 13 is vital to business. However, it should only be allowed to continue if the internal site impacts are not workable.

▼

20 NHI Course No. 15255: Access Management, Location and Design - Participant Notebook, Prepared by S/K Transportation Consultants, Inc., U.S. Department of Transportation, Federal Highway Administration, National Highway Institute, p. 7,11.
21 Ibid. p. 7,31.
22 Ibid. p. 7,53.

Some commercial properties fronting on U.S. Route 13 currently have no access control at all. At these locations, the implementation of a standard commercial entrance with curbing should be considered to focus access and reduce potential conflicts.

■

### 4.3.3 Corner Clearance

Corner clearance is a related issue to driveway spacing, and addresses the distance from roadway intersections to the nearest driveway entrance. A primary safety concern at or near controlled intersections is the reduction of interferences from side-street activity. The American Association of State Highway and Transportation Officials, (AASHTO) states that "driveways should not be situated within the functional boundary of at-grade intersections. This boundary would include the longitudinal limits of auxiliary lanes."[23] An intersection has a functional boundary, as shown in Figure 4-1, which is based on the storage needs for queuing vehicles, and acceleration and deceleration distance. Since the functional boundary of an intersection is much larger than the physical limits of the intersection, this issue can become a significant concern. Inadequate clearance can result in spillback across driveway entrances as well as backup in the intersection itself. On undivided cross-streets at signalized intersections, the potential impact of inadequate corner clearances is of particular concern. Vehicle spillback into the major street could result in areas with high traffic generators (gas stations, for instance) with inadequate corner clearances.

The NCHRP report[24] states that, although data are insufficient, it is concluded that:

- Accidents appear to increase as corner clearances decrease.
- Retrofitting corner clearances is both difficult and expensive, and a
- Proactive approach to establish a desired access location prior to subdivision and development, in conjunction with minimum frontage requirements that facilitate minimum clearances is required.

In current practice, corner clearance standards vary widely. VDOT prefers driveways to be at least 150 feet from intersections. The NCHRP report[25] cites the following examples of corner clearance standards. The Florida DOT requires 75 feet to 115 feet upstream, and 100 feet to 230 feet downstream. The New Jersey DOT requires 50 feet from an unsignalized intersection, and 100 feet from a signalized intersection, and the Colorado DOT requires 325 feet at a 40 mph speed limit.

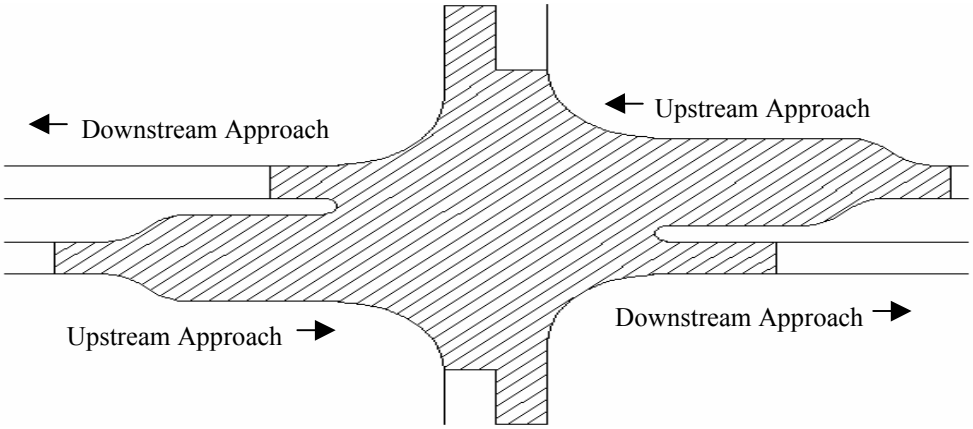
▼

23 American Associate of State Highway and Transportation Officials, A Policy on Geometric Design for Highways and Streets, 1994, p. 793.

24 Gluck, Jerome, Herbert S. Levinson, and Vergil Stover, Report 420: Impacts of Access Management Techniques, National Cooperative Highway Research Program, Transportation Research Board - National Research Council, National Academy Press, Washington, D.C., 1999, pgs. 65-67.

25 Ibid. p. 65.

**Figure 4-1**
**Intersection Functional Boundary**




Corner clearance applies both on the main roadway and on the intersecting side streets. They also can be applied to both the upstream and downstream side of an intersection. The standards for each will therefore be quite different. The provision of a restrictive median on the side street can also reduce corner clearance requirements.

A corner clearance of 400 feet should be adopted for use on U.S. Route 13 approaching an intersection (measured from the edge of the radius at the intersection). This will allow for the construction of a turn lane of 200 feet with a taper of 200 feet. Downstream of an intersection, a corner clearance of 250 feet should be required.

For side-street approaches to U.S. Route 13, a corner clearance of 250 feet should be adopted. This will allow for the construction of a turn lane of 100 feet with a taper of 150 feet. With the use of a restrictive median on the side-street approach and on a downstream approach, a corner clearance of 100 feet should be required.

Increases to these standards may be needed to provide for increased vehicle queuing at signalized intersections. For both U.S. Route 13 and the side-streets, reductions in these standards may be allowed if a traffic study is submitted that shows that year 2020 peak period 95 percentile queue lengths will not extend past the driveway location. The goal is to have no new driveways within the functional area of an intersection.

■

### 4.3.4 Sight Distance

A key consideration of appropriate access management treatments is the sight distance available at existing intersections, median crossovers and driveways. For the U.S. Route 13 corridor, the additional sight distance needs of heavy vehicles must be considered due to the relatively large volume of heavy vehicles in the corridor. VDOT minimum standards for a 55 mph roadway require a sight distance of 650 feet;

however, this is for highways with a relatively low composition of heavy vehicle volumes.[26] Heavy vehicles have longer stopping sight distances that may require longer distances.

On the U.S. Route 13 corridor, VDOT currently requires that minimum sight distance standards be met by all new development. The potential vehicle composition of the users of this facility should be considered in the selection of an appropriate standard. For instance, if a residential subdivision will be internally served by school buses, sanitation vehicles and moving vans, then the development's access points should be designed for these vehicles (even if they are infrequent), providing a sight distance of 1,000 feet. Existing driveways and cross streets with heavy vehicle use or known sight distance deficiencies should be re-evaluated for sight distance adequacy and corrective measures taken. Appropriate setback, landscaping, signage, and lighting requirements should be adopted by the Counties to help maintain sight distances and enhance highway safety in general.

■

### 4.3.5 Crossover Spacing and Consolidation

As is the case with driveway spacing, proper crossover spacing is important to the overall function of the highway system. In some cases, proper median spacing may result in elimination of median crossovers, and the consolidation of left-turning vehicles at specific intersections. Establishing proper crossover spacing has potential applications throughout the corridor where non-traversable medians exist.

Several studies from different jurisdictions that have implemented proper median spacing technique indicate positive safety records.[27] It is difficult to quantify the benefit of this strategy; however, as the safety record is complicated by median width and signal density. Operational effects also appear to be positive, although complicated by signal location and traffic volume.

Given the potential for crossovers to become signalized, VDOT desires to achieve a crossover spacing of 1,300 feet (roughly 0.25 miles). In practice, an absolute minimum spacing between crossovers of 900 feet has been used, especially in developed areas. As they do for driveway spacing, the Montana DOT bases crossover spacing on highway classification. For divided NHS roadways in developing areas, Montana DOT requires 0.5 miles for full access crossovers, and 0.25 miles for directional crossovers. For similar roads in developed areas, Montana DOT requires one-quarter mile for full access, and one-eighth mile for directional access.[28]

A median closure will eliminate conflicts between opposing travel lanes if an existing median opening has poor vertical or horizontal sight distance or the median opening

▼

26 Virginia Department of Transportation, Road Design Manual, Volume 1, 1998, p. C-12.
27 Ibid. pgs. 100-101.
28 NHI Course No. 15255: Access Management, Location and Design - Participant Notebook, Prepared by S/K Transportation Consultants, Inc., U.S. Department of Transportation, Federal Highway Administration, National Highway Institute, p. 7,53.

has geometric or spacing problems. When median crossovers are needed despite a less than desirable spacing (and they cannot be moved or closed), a more restrictive median treatment that limits the turning movements that can use the median crossover may be appropriate. More detail is provided in section 4.3.7.

Crossover spacing along the U.S. Route 13 corridor averages 1,320 feet and ranges from 230 feet to 1.5 miles. Thirty-nine percent of the crossovers are located with adjacent crossovers ranging from 500 to 900 feet. Only seven percent have spacing of one-half mile or more. Of the remaining 54 percent, roughly half have spacings between 900 feet and 1,300 feet and half are between 1,300 feet and one-half mile.

The target minimum spacing for median crossovers should be one-half mile for full access and one-quarter mile for directional crossovers. Except in rare cases, new crossovers not meeting the minimum spacing should not be allowed. Where new development is proposed, the potential need for additional crossovers should be a consideration in review and approval. In addition, where development is proposed at an existing crossover, provision of access to adjacent sites should be accommodated.

■

### 4.3.6 Median Type

The selection of an appropriate median type can be critical in providing for safe and efficient travel along a highway corridor. There are three roadway cross sections on the U.S. Route 13 corridor:

- four-lane undivided (which occurs only in Temperanceville with a 4-foot paved median),
- four-lane undivided with a two-way left-turn lane (which occurs in Painter, Keller, Melfa, Mary N Smith area, Nelsonia, Mappsville, and Oak Hall), and
- four-lane divided with a non-traversible median (concrete, grass or median barrier).

In selecting a median type, a balance is often needed between providing access to adjacent properties and ensuring adequate throughput capacity and travel speeds.

Although there are few before and after studies to provide quantifiable data, models consistently show that the presence of medians reduce traffic delay. Safety data have been quantified in a much more rigorous manner. Citing the ability of medians to reduce conflict points, the NCHRP notes that the median accident rate reduction attributable to installation of medians is 35 percent.[29] The National Highway Institute (NHI) states that "(w)ide non-traversable medians provide shelter for vehicles

▼

29 Gluck, Jerome, Herbert S. Levinson, and Vergil Stover, Report 420: Impacts of Access Management Techniques, National Cooperative Highway Research Program, Transportation Research Board - National Research Council, National Academy Press, Washington, D.C., 1999, p. 72.

making left-turns from or to a street. They also provide refuge for pedestrians attempting to cross the street."[30]

In four-lane roadway sections, research has shown that the selection of an appropriate median type is dependent on a number of factors, including number of access points, intensity of use of these access points, speed limit, environment (developed, developing, rural) and the provision of adequate shoulders. Guidelines have been developed to expedite this evaluation.[31] Two-way, left-turn lane (TWLTL) roadway sections seem to work best in two areas: 1) low volume conditions (generally less than 25,000 vehicles per day), and 2) roadway sections experiencing high driveway densities with low to moderate volumes, and with high left-turning volumes in relation to the overall traffic flow. Residential and low-density commercial areas are the prime examples of this type of roadside development. In both cases, TWLTL sections generally are posted for reduced travel speeds (25 to 45 mph).

By separating oncoming traffic, and by managing turning movements, non-traversable medians offer significant potential to improve roadway safety and operations. Medians exist along most of the U.S. Route 13 corridor, and this technique will help assess potential modifications and reconstruction. There are also cost/benefit considerations that distinguish between new construction and retrofit actions. This takes into account both the cost of travel, accidents, and costs of construction. This will be most relevant for the U.S. Route 13 corridor in areas with TWLTL roadway sections.

In addition, the design of a TWLTL section can also minimize safety concerns if appropriate shoulders are provided and the width of the center left-turn lane is adequately sized. VDOT standards call for a 12-foot minimum (16 -foot maximum) center left-turn lane.[32] The center turn lane is a shared space, so drivers tend to enter this area cautiously. Therefore, in areas with higher driveway densities, driver transitions into the turn lane will tend to occur at slower speeds. In addition, in these areas, the provision of a wider center turn lane (14 to 16 feet) is likely to result in fewer vehicles partially blocking the through travel lane.

■

### 4.3.7 Median Widening

As discussed in Chapter 2, a total of 200 (74 percent) of the 271 crossovers along the U.S. Route 13 corridor have median widths less than 40 feet. The VDOT design minimum for a depressed median is 40 feet on high speed roadways. In locations where school buses and tractor trailers make turns, an even wider median is needed in order to safely accommodate these vehicles in the median while they are

▼

30 NHI Course No. 15255: Access Management, Location and Design - Participant Notebook, Prepared by S/K Transportation Consultants, Inc., U.S. Department of Transportation, Federal Highway Administration, National Highway Institute, p. 1,9.

31 Bonneson, James, Patrick T. McCoy, Report 395: Capacity and Operational Effects of Midblock Left-Turn Lanes, National Cooperative Highway Research Program, Transportation Research Board - National Research Council, National Academy Press, Washington, D.C., 1997, pgs. 32-39.

32 Road Design Manual, Volume1, Virginia Department of Transportation, Location and Design Division, p.

performing a turn within the crossover. Based on the length of school buses, a 50-foot wide median is a suggested guideline. For tractor-trailers, a distance from 70 to 80 feet may be needed.

Ideally, all sub-standard width median crossovers should be widened; however, it is recognized that it may be fiscally impractical to do this at every median crossover in the corridor. Where physical constraints permit, additional right-of-way could be purchased to help meet this standard with either a full widening of the roadway section or a flare widening in the vicinity of the crossover.

A wider median is especially important in areas where school buses and large trucks make frequent turns – mainly at school locations, major employment centers, and major intersecting streets. In these locations, the larger vehicles require adequate space to pause in the median while waiting for an adequate gap in traffic flow. As such, these areas should be prioritized for improvement. Furthermore, in several sections between Painter and Onley, where the roadway section switches between a flush and a depressed median, the median width is sometimes less than 20 feet. These areas should be investigated for possible median widening; however, rail and right-of-way constraints could make improvements difficult and expensive.

There are very few places where tractor-trailers can now perform U-turns safely in the corridor. The consideration of U-turn turnouts for heavy vehicles should be considered in areas with high truck volumes, if the need for the U-turn cannot be eliminated entirely through other measures.

In general, the intensity of the side-street approach to U.S. Route 13, the intensity of heavy vehicle use and the cost to widen the roadway/right of way should be used as a guide in determining whether to widen the median at a particular intersection. Most side street intersections currently do not generate enough traffic to warrant the widening of the U.S. Route 13 right-of-way.

■

### 4.3.8 Directional Median Treatments

Where median crossover spacing is less than the guideline minimum, where roadway widening may not be feasible and where turning conflicts may occur, the use of directional median treatments is suggested. This includes the prohibition of one or more turns from using the median crossover for turns from either U.S. Route 13 or from the side street. This can be accompanied by the construction of channelized islands and can include the construction of median acceleration lanes. This treatment can be used in areas with narrow medians. Applications for median crossovers experiencing high levels of tractor trailers or school bus traffic are potential candidates. Directional median treatments, as shown in Figures 4-2 through 4-7, are techniques that have potential for implementation on the U.S. Route 13 corridor. These are:

**Figure 4-2**
**Left-turn Ingress from One Direction Only**

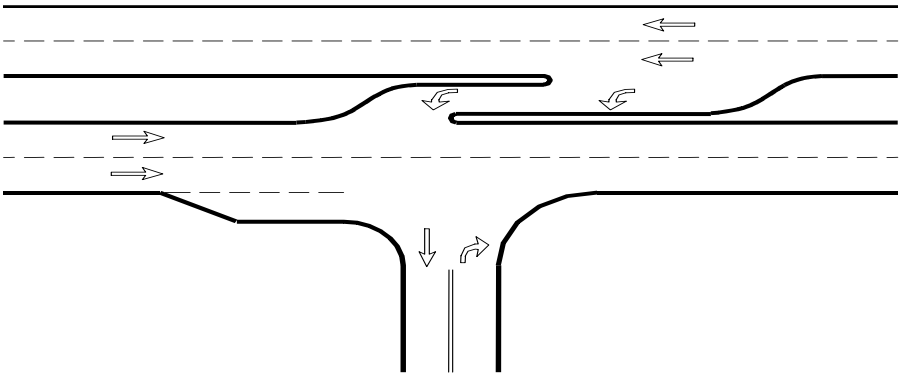


**Figure 4-3**
**Left-turn Egress from One Direction Only**

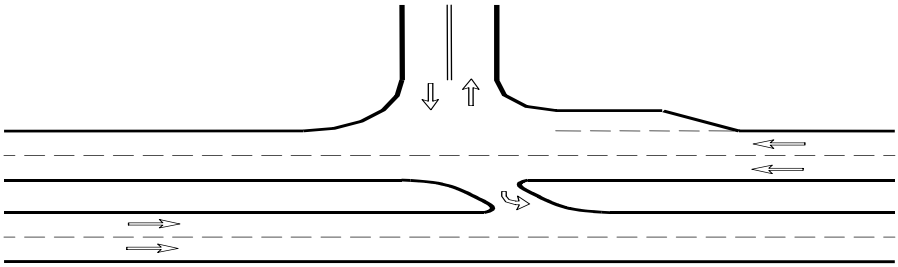


**Figure 4-4**
**Left-turn Ingress from Both Directions**

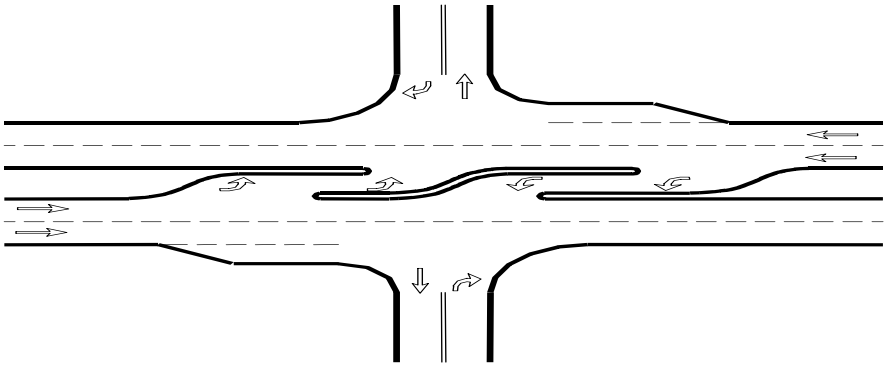


**Figure 4-5**
**Left-turn Ingress from One Direction & Left-turn Egress from One Approach**

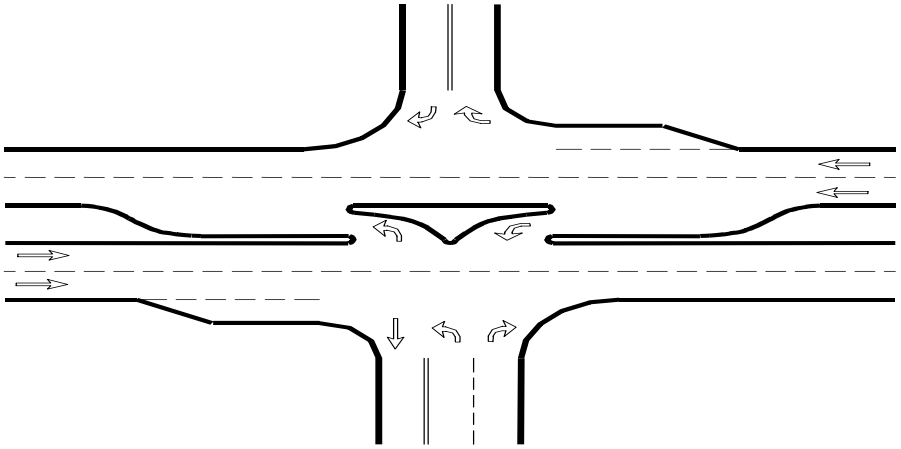


**Figure 4-6**
**Left-turn Egress from Opposing Approaches**

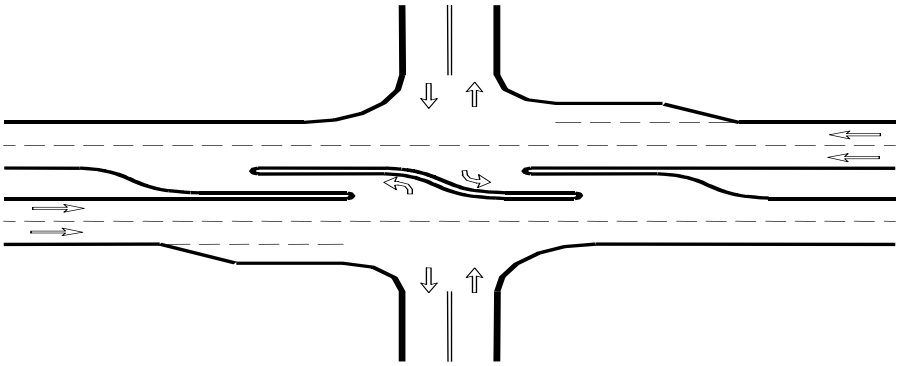
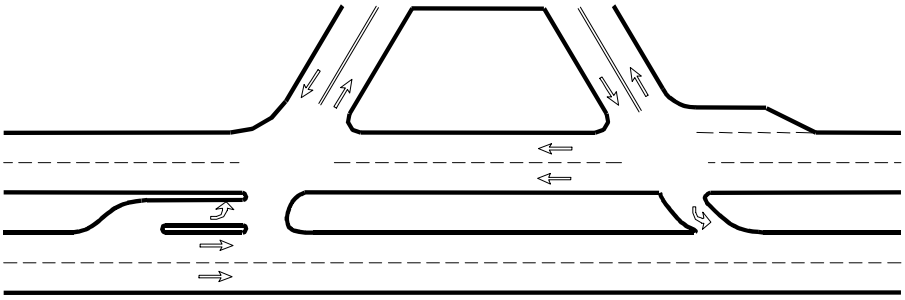


**Figure 4-7**
**Construction of Two Directional Access Points Instead of One Full Access Point**



The left-turn egress techniques effectively eliminate the need for vehicles to stop in the median. A vehicle turning left from a driveway would cross one direction of travel on the major road (in this case, U.S. Route 13) and then would enter a channelized acceleration lane within the median. The drawback of these techniques is that the acceleration lane would merge with the high-speed travel lane. Based on current VDOT standards the acceleration lane would be approximately 1500 feet long to allow the vehicle to merge at 55 mph from a stopped position. This design treatment has been used by the Maryland State Highway Administration on rural/seasonal highways, including U.S. Route 50 on the Eastern Shore.

■

### 4.3.9 Median Crossover Width

Median crossover width is an important roadway feature that can significantly affect roadway access. Although narrow medians do separate oncoming traffic, narrow median crossovers might not provide adequate shelter for turning vehicles or pedestrians. Since the majority of the corridor already benefits from the presence of medians, safety issues associated with median crossover width are a key factor.

The ideal width of the median is dependent on the presence of turn lanes in the median, and the vehicle composition and vehicle queuing needs for vehicles trying to perform a left-turn or U-turn from the median or trying to cross the highway from a side street. In rural areas, wide grassed medians are often used for stormwater conveyance.

■

### 4.3.10 Signal Spacing and Timing

The spacing of signalized intersections dramatically impacts safety and traffic operations. As emphasized by the Virginia Transportation Research Council (VTRC), "[s]ignalized intersections are not always thought of in the same way as driveways or commercial entrances, but they have just as much of an impact on traffic flow and safety."[33] Management of signal spacing includes planning for the frequency of signals, as well as the uniformity of their spacing. This technique could prove useful in managing access in some of the developed and developing areas in the U.S. Route 13 corridor, particularly where several traffic signals already exist.

The impact of signal spacing on travel time is also well documented. Optimal spacing depends on travel speed and cycle length, and the NCHRP[34] offers a matrix detailing these relationships. The data indicate that as speed and cycle length increase, so does desired spacing. In a straightforward statement of the relationship

▼

33 The Use of Access Management as a Transportation Improvement Strategy, Prepared by the Staff of the Virginia Department of Transportation Research Council for The Executive Leadership Group of The Virginia Department of Transportation, November 15, 1999, p. 8.

34 Gluck, Jerome, Herbert S. Levinson, and Vergil Stover, Report 420 Impacts of Access Management Techniques, National Cooperative Highway Research Program, Transportation Research Board - National Research Council, National Academy Press, Washington, D.C., 1999, p. 24.

between travel delay and signal spacing, the NCHRP[35] asserts that each signal added to 1 mile of roadway will result in a drop in operating speed of 2.5 to 2.0 mph. The NCHRP further suggests[36] that "traffic signals spaced at 2.0 miles or less typically create urban arterial conditions."

VDOT coordinates signal spacing with crossover locations. Crossovers spaced from 900 to 1,300 feet apart, as discussed above, are analyzed as new development occurs – they may be signalized if any one of 11 warrants is met (although in practice, peak hour warrants are typically discounted if no other warrants are met). For highway segments with speeds of 50 mph, the New Jersey DOT requires signal spacing ranging from 2,200 to 2,640 feet based on cycle length and the dedication of half of the green time to mainline traffic flow.[37] For divided primary roadway facilities, the Michigan DOT requires traffic signal spacing of ½ mile to facilitate mainline progression in developing areas and ¼ -mile spacing in developed areas.[38]

Minimum signal spacing should be one-half mile in developing areas, and one-quarter mile in developed areas. In all cases, signal timing should be coordinated to facilitate traffic flow. For the undeveloped sections of the corridor, two-mile spacing should be considered.

Along the undeveloped and developing sections of the highway, development should be carefully planned so as to minimize the need for additional signals, and to ensure that minimum spacing standards are maintained. Large developments (developments generating 1,000 ADT or more) should be required to submit traffic impact analyses to determine the need for and location of new traffic signals, among other issues.

In areas with existing traffic signals such as Exmore and Onley, coordination of traffic signal timing may result in an overall improvement in traffic operations. As these areas experience infill and redevelopment, existing driveways and circulation patterns should be reconfigured to complement the signal system to the maximum extent. This may involve closing existing driveways, rerouting traffic to secondary streets, and providing interparcel connections.

■

### 4.3.11 Alternatives to U.S. Route 13

The localities should develop long-term transportation plans that address the entire roadway system and consider at a more detailed level than this study, local road connections, improvements and extensions. Priority should be given to major

▼

35 Ibid. p. 27.
36 Ibid. p.40.
37 NHI Course No. 15255: Access Management, Location and Design - Participant Notebook, Prepared by S/K Transportation Consultants, Inc., U.S. Department of Transportation, Federal Highway Administration, National Highway Institute, p. 7,30.
38 Ibid. p. 7,53.

roadway feeder roadways, such as Bayside Road, major destinations, such as the Accomack Airport Industrial Park, and areas surrounding Exmore and Onley. By preventing trips on the main highway, alternative routes for local trips can protect highway capacity and function. The essential purpose of principal arterials is to carry a high percentage of through traffic. The extent to which short local trips are forced to access the main route, due to a lack of viable options, they interfere with this purpose. Alternatives can take a variety of forms, as follows.

## Local Roads

A connected system of local roads can support certain local trips that now must use U.S. Route 13 for only a short stretch of road. Often a few minor links can turn a disjointed network into a functioning local system. Such connections are designed for local traffic and relatively low speeds; they are not an alternative for through traffic. Instead, they offer connections to shopping centers and other destinations, and link residential areas to community activity centers.

Along the U.S. Route 13 corridor, there are several major cross streets that may be missing short roadway links to provide a more direct travel path that does not require travel on U.S. Route 13. An example of this is Bayside Road in Northampton County approaching Exmore. This road is a major feeder for residents living on the western side of the shore, however this road terminates just south of an existing traffic signal at Broadwater Road (Route 652). Route 652 provides access to Shore Plaza shopping center on the west and provides access across U.S. Route 13 to the east into the town of Exmore. The diversion of Bayside Road to connect into Route 652, instead of U.S. Route 13, would likely significantly reduce turning activity on U.S. Route 13 and potentially reduce the need for a future traffic signal.

## Inter-Parcel Connection/Internal Roadway System

Inter-parcel connection can also limit short trips on the main route. These often take the form of simple driveway connections between commercial sites, so that traffic moving from one to the other need not access the arterial. For commercial developments along a divided highway, having access at a median crossover, hopefully with a traffic signal in place, is a priority. Good planning of commercial developments should anticipate potential future expansions in the control and provision of access.

Large residential developments can also be planned to provide a minimum number of access points on the main highway by internalizing private driveways on local subdivision streets, which in turn connect to a feeder road that has direct and full access onto the main highway (again, preferably at a median crossover). It is important to also plan for future growth of residential development by planning for interconnections of the development with adjacent (potentially undeveloped) properties. This will ensure that the best and fullest use of the existing access point on the main highway is utilized.

In some localities within the Commonwealth and in some states, commercial and large residential developments are often allowed only to have indirect access onto a major roadway. On major highways, the Wisconsin DOT preserves the access priority at a median crossover through a signal for a through roadway connection, and allows a commercial development to have a right-in/right-out access onto the main road and/or a full access point on the side street.

## Frontage Roads

An effective treatment to consolidate the number of access points, and therefore conflict points, on an arterial highway can be achieved through the construction of a frontage road or a reverse frontage road. These concepts are depicted in Figures 4-8 through 4-10.

A frontage road is a local street (one-way or two-way) that serves multiple land uses (properties) and provides one to two points of access onto the main roadway. A frontage road can be constructed when adequate front yards exist to not impact the adjacent properties. This treatment is most appropriate for mid-block locations (between side streets). Frontage roads are awkward to design when they intersect with a side street due to corner clearance requirements. This requires the frontage road to bend back. A one-way frontage road, as shown below, works best as a mid-block solution.

**Figure 4-8**
**Frontage Road Concept**

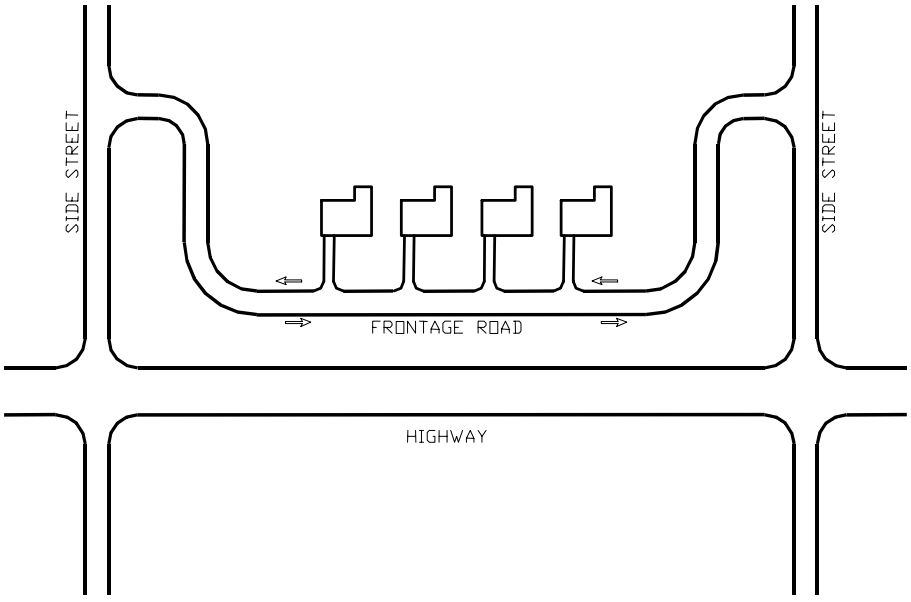


**Figure 4-9**
**One-Way Frontage Road Concept**

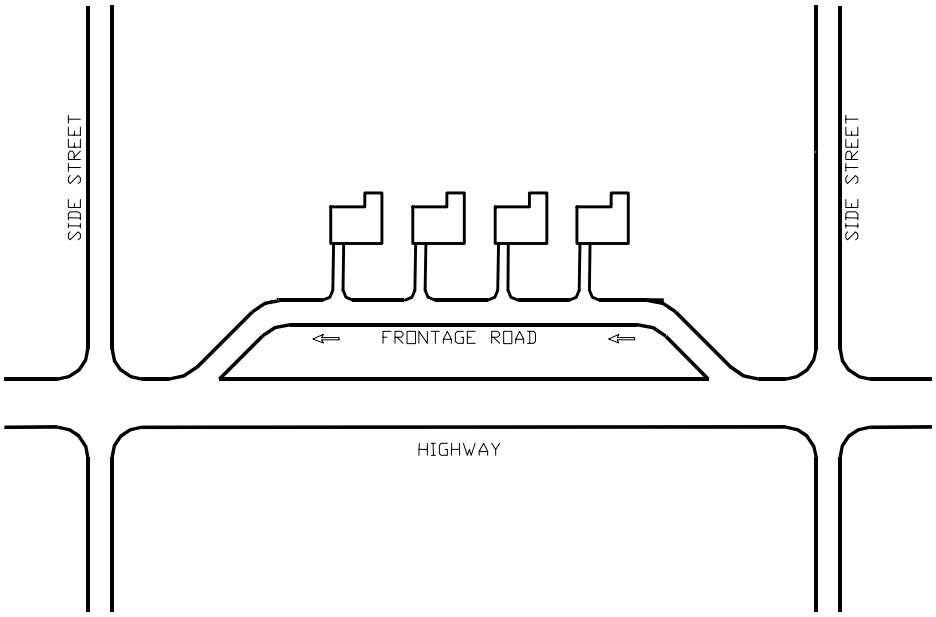
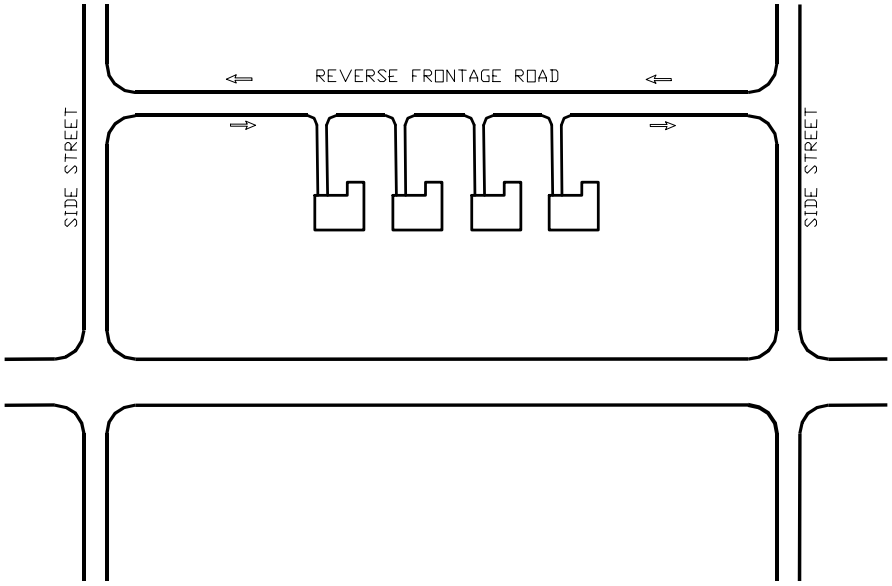



**Figure 4-10**
**Reverse Frontage Road Concept**



One of the strongest concerns raised during the public involvement process was the safety for school buses, and the children being transported, when a bus stops on U.S. Route 13 to pick-up or discharge a student at his or her driveway. Given the high percentage of heavy vehicles traveling on this road, there is a safety concern that stopped school buses may increase the risk for serious crashes in the future. The problem is that while a school bus is stopped, the visibility of the school bus can be blocked by one tractor-trailer. The provision of frontage or reverse frontage roads to serve residential driveway clusters can be an effective way to minimize access points on U.S. Route 13 and address the stopped school bus issue.

Frontage roads have a place in serving commercial development as well as residential access needs. When carefully designed to facilitate access and maintain signal operations, frontage roads can be a viable access management technique for large commercial developments. For developing areas, NCHRP[39] recommends reverse frontage, with 600 feet of separation between the frontage road and the main highway. For major activity centers, NCHRP[40] suggests that frontage roads can possibly be incorporated into ring roads.

The use of frontage roads and reverse frontage roads should be considered for implementation along the existing U.S. Route 13 corridor, and guidelines should be established to encourage their consideration for future development along the corridor. For residential uses, the provision of a frontage road should be considered when there are residential clusters of five homes or more within a quarter mile. Specific locations for frontage/reverse frontage roads evaluated and recommended along Route 13 are discussed in Chapters 5 and 6.

■

### 4.3.12 Land Use Controls

The access management literature asserts that revisions to local zoning standards are necessary. Humstone and Campoli[41] recommend zoning that requires shared access, and encourages compact centers as opposed to strip development. They also focus on subdivision regulations, suggesting that local ordinances require lot frontages and street layouts that recognize the intended function of the highway.

Sometimes, the enforcement tool available to the localities can address the access management goal in an indirect manner. For instance, the ability of the localities to provide zoning restrictions to prevent flag lots or to require minimum parcel frontages on the U.S. Route 13 corridor can significantly aid in the enforcement of driveway spacing standards. For instance, a minimum parcel frontage standard

▼

39 Gluck, Jerome, Herbert S. Levinson, and Vergil Stover, Report 420 Impacts of Access Management Techniques, National Cooperative Highway Research Program, Transportation Research Board - National Research Council, National Academy Press, Washington, D.C., 1999, p.122.

40 Loc .cit.

41 Humstone, Elizabeth and Julie Campoli, "Access Management: A Guide for Roadway Corridors, "Planning Commissioners Journal, Number 29, winter 1998, p. 6.

consistent with proposed driveway spacing standards and right-turn lane standards would suggest a minimum frontage standard of 400 feet.

One of the most effective tools in applying corridor-specific standards is the highway corridor overlay district (HCOD). This is a separate set of zoning regulations for parcels within a certain distance from a roadway, usually an arterial highway. An HCOD ordinance contains additional regulations that are over-riding, and in some cases, additive, to existing zoning regulations. HCODs involve standards governing access, visibility and corridor aesthetics, and they generally provide standards for number and location of access points, inter-parcel connections, size and location of signs, and landscaping and buffer requirements. For this study, the traffic and safety benefits of the HCOD are the critical benefits of this land use control technique.

Several localities within the Commonwealth have successfully implemented HCODs; however, often HCODs are implemented in response to an already congested roadway. U.S Route 17 in Gloucester County is a good regional example of an HCOD in effect. In Gloucester County, county officials and VDOT work together to maintain the through function of U.S. Route 17, and this coordination has worked well.

A model HCOD has been prepared for consideration by localities along the U.S. Route 13 corridor. This document is contained in Section 4.4 and the standards contained in the ordinance are consistent with the guidelines being developed in this chapter.

■

### 4.3.13 New Development vs. Retrofitting

According to the NCHRP,[42] "access management requires both retrofit and policy actions." In other words, a comprehensive access management plan will include recommendations to improve existing problem areas, as well as requirements to ensure that new development does not degrade the future highway corridor function. The NHI report[43] devotes an entire chapter to retrofit projects, detailing the benefits of the various techniques, and highlighting case studies from throughout the nation.

The application of access management guidelines is not as straightforward, however, on the existing roadway network. Given the current uses fronting U.S. Route 13 and the rural, agricultural character of the majority of the study area, consideration must be given to farm access and access to existing non-commercial roadside developments, such as churches and schools. While some of these types of uses may be replaced in the future with continuing development of the corridor, a best-fit (or retrofit) approach must be used to try to achieve the spirit of the crossover spacing standards when accommodating existing uses.

▼

42 Ibid. p.11.
43 NHI Course No. 15255: Access Management, Location and Design - Participant Notebook, Prepared by S/K Transportation Consultants, Inc., U.S. Department of Transportation, Federal Highway Administration, National Highway Institute, p. 1,63.

This study will be developing conceptual improvement plans to deal with existing development, and to the extent possible, access management techniques will be used to provide a more controlled access condition that may fall short of meeting the guidelines identified for new development. This is not counter-productive to the long-range plan, so long as new development is held to the higher standard including efforts to ultimately eliminate all crossovers with substandard spacing along the corridor.

As an example, a new shopping center or residential development could provide an access road that connects to an existing church property that has poor crossover spacing. This would allow for the closure of the crossover at the church property. This is a proactive process that cannot be designed in advance as adjacent development may or may not occur where planners or transportation engineers forecast. A coordinated effort on the part of the local county or municipal officials and VDOT will be needed to ultimately bring the U.S. Route 13 corridor up to standard.

In some cases, retrofit policies have been developed to encourage redevelopment in areas where access management standards cannot be met due to existing development, but where significant improvements could be realized as a result of new development. The Wisconsin DOT allows for reductions in required standards in these areas. This type of retrofitting is not likely to be appropriate for the U.S. Route 13 corridor.

■

### 4.3.14 Implementation/Coordination

Because access management deals with the relationship between transportation and land use, it requires cooperation between VDOT and local government agencies. The VTRC[44] recommends formal coordination early in the local planning process. Bowman and Rushing[45] suggest that VDOT should have a larger access planning role, encouraging local governments to address access in their comprehensive plans. They further recommend that VDOT adopt a comprehensive access management plan for primary highways, and revise their minimum standards.

VDOT and the localities should cooperate carefully to manage the U.S. Route 13 corridor. Some recommendations included in this section fall under the purview of the transportation agency, others fall under control of the local governments. Consistent application of the standards, by all parties and across jurisdictional boundaries, will produce greater success in preserving the corridor into the future.

▼

44 The Use of Access Management as a Transportation Improvement Strategy, Prepared by the Staff of the Virginia Transportation Research Council for The Executive Leadership Group of The Virginia Department of Transportation, November 15, 1999, p. iv.

45 Bowman, Donald L., and C. Colin Rushing, Final Report - Access management: Transportation Policy Considerations for a growing Virginia, Virginia Transportation Research Council, Charlottesville, Virginia, November 1998, p. 35.

The first step involves incorporation, by the localities, of an access management plan (one of the products of this study) into their comprehensive plans, followed by appropriate amendments to their land use ordinances. Pursuant to this strong local sanction, subsequent VDOT improvements should be consistent with the plan. Some access management techniques, such as crossover spacing and left-turn retrofits, will require diligent action on the part of VDOT. Where the plan recommends standards greater than VDOT minimum standards, VDOT should actively promote the greater provisions.

## 4.4 Highway Corridor Overlay District (HCOD)

This section provides a model overlay ordinance for managing land use in the U.S. Route 13 corridor. In conjunction with the roadway improvements recommended herein, a consistent approach to development management is recommended for the counties and towns along U.S. Route 13. Consistency among the localities will help ensure that isolated roadway segments do not develop in ways that negatively affect the facility as a whole. While roadway improvements are a critical element to maintaining the corridor's safety and function, land use decisions are also an important component, and can support or degrade investments in highway infrastructure. Simply put, effective access management requires roadway and land use management, based on coordination between localities and VDOT. The following section provides a model overlay district, designed for incorporation into the localities zoning ordinances.

### 4.4.1 Authority

Pursuant to the authority granted by the Code of Virginia, and in particular the legislative intent established in section 15.2-2200 and the purposes of zoning ordinances established in section 15.2-2283, the following standards are established.

### 4.4.2 Intent

The HCOD is intended to enhance the safety, function, and capacity of designated highways. As major through traffic routes, these highways represent significant community investments, and contribute to the public health, safety, and welfare. They provide access to jobs and schools, facilitate delivery of emergency services, and support the movement of goods and services. Furthermore, these corridors serve as first impressions of the community for tourists and the traveling public. Finally, as safe and accessible facilities, the corridors serve a vital economic development function, which the HCOD is intended to preserve.

■

### 4.4.3 Applicability

The HCOD shall apply to all developments abutting U. S. Route 13 and requiring site plan or subdivision review. The HCOD shall also apply to redevelopment projects, as defined herein, regardless of whether such redevelopment requires site plan or subdivision review. As an overlay district, the HCOD shall complement the requirements of the underlying zone, which shall remain in effect. Wherever the requirements of the HCOD conflict with those of the underlying zone, the greater or more stringent standard shall apply. For the purposes of this ordinance, U. S. Route 13 shall mean the mainline highway and bypass sections, and shall not mean sections of U. S. Route 13 Business.

For the purposes of this ordinance, large development projects such as shopping centers shall be considered individual development projects. Logical extensions of completed projects shall be subject to these regulations, regardless of whether they abut U.S. Route 13. For developments subject to these regulations, all required plans may be submitted as a single plan, provided that all information is clearly shown to meet the requirements outlined herein.

To ensure adequate coordination with VDOT regarding highway access management and traffic improvements, no site plan or subdivision plat shall be approved without a written finding from the VDOT Resident Engineer that the proposed roadway, driveway, and circulation systems are consistent with the U.S. Route 13 Access Management Plan.

■

### 4.4.4 Access

The purpose of this section is to manage vehicular and non-vehicular access. To achieve this goal, all site plans shall include an access plan drawn to the same scale as the site plan and showing the location and dimensions of all streets, driveways, crossovers, parking areas, access aisles, sidewalks, and any other relevant information.

Access to HCOD routes shall be provided by direct or indirect means, consistent with the following:

- Number of access points: Each tract of land recorded prior to *effective date* is entitled to one direct or indirect access point to the public roadway network provided that its location and design fulfill, as a minimum, the minimum corner clearance and minimum sight distance requirements of this ordinance. Where the roadway frontage of a tract of land is greater than 500 feet, an additional access point may be allowed, if it is determined that the access point will not adversely affect the capacity of the roadway. Any additional access point must be in compliance with all applicable sections of this ordinance. Where multiple tracts of land are developed as a single large entity, as in the case of a shopping center, office park, or similar development, they shall be treated as one tract of land for the purposes of determining the permitted number of access points.

- The minimum corner clearance of driveways from intersecting streets shall be 400 feet approaching the intersection. Downstream corner clearance shall be 250 feet minimum. For side street approaches to U. S. Route 13, the minimum corner clearance shall be 250 feet. At signalized intersections, corner clearances in excess of these minimum dimensions may be required, in consultation with VDOT. Where a traffic study is submitted that shows 20-year peak period, 95 percentile queue lengths will not extend past the driveway location, and corner clearances may be reduced, in consultation with VDOT.

- Minimum sight distances along the highway shall be provided to allow vehicles to safely turn left or right onto the highway. Sight distances provided along the HCOD shall be a minimum of 1,000 feet.

- Outparcels: All access to outparcels must be internalized utilizing the main access drive of the principal retail center. Access to the outparcel shall be as direct as possible, avoiding excessive movement across the parking aisles and queuing across surrounding parking and driving aisles. In no instance shall the circulation and access of the principal commercial facility and its parking and service be impaired.

- New residential subdivisions shall include an internal street layout which shall continuously connect to the street of surrounding developments to accommodate travel demand between adjacent neighborhoods without the necessity of using the highway.

- Median crossovers: Where a proposed development fronts an existing or planned median crossover, access from the development to adjacent sites shall be provided, so as to promote shared access and minimize demand for additional crossovers.

- Shared access and reverse frontage: Inter-parcel connections shall be provided to facilitate the local movement of traffic and minimize demand for local trips on the highway. Based on consultation with the VDOT Resident Engineer, inter-parcel access may take the form of direct driveway connections or reverse frontage roads.

- Pedestrian access: Pedestrian walkways shall be incorporated into each project so as to minimize conflicts with vehicular traffic. Pedestrian circulation systems shall connect uses within individual projects, and shall be extended to adjacent parcels where inter-parcel vehicular access is required.

■

### 4.4.5 Traffic Impact Analysis

All developments generating more than 1,000 average daily trips shall prepare and submit a traffic impact analysis. The projected number of average daily trips shall be based on trip generation rates as defined by the most recent publication of the Institute of Transportation Engineers "Trip Generation." In addition, a traffic impact analysis

may be required for developments generating 1,000 or fewer average daily trips when it is determined, in consultation with the VDOT Resident Engineer, that safety considerations warrant such analysis. The traffic impact analysis shall identify level of service impacts of the proposed development, based on a twenty-year demand projection, and shall be used to determine necessary improvements to support the development. At a minimum, the impact analysis shall address the following:

- Turn lane and access improvements
- Internal site circulation
- Shared access/access to adjacent sites
- Impacts to intersections and median crossovers
- Potential need for signalization
- Relationship of the proposal to the U.S. Route 13 Access Management Plan

■

### 4.4.6 Required Improvements

Required improvements, the need for which is generated by the proposed development, will be determined in consultation with the VDOT Resident Engineer, based on the following:

- The U.S. Route 13 Access Management Plan
- Applicable traffic impact analyses
- Highway safety and capacity

The developer shall be responsible for provision of the improvements, which shall be shown on site plans.

■

### 4.4.7 Setbacks

In order to preserve and enhance highway safety and efficiency, setbacks shall be provided for front, side, and rear yards on all developments subject to the HCOD. Setbacks shall remain free from all development, including buildings, parking areas, gas pumps, canopies, and similar structures and facilities. Signs shall be permitted in setbacks, consistent with the regulations outlined herein. Where necessary to accommodate an approved circulation plan, access driveways are permitted within setbacks. For large developments such as shopping centers, setbacks shall apply to the full perimeter of the project, not to internal property lines. Specific setbacks, which shall be shown on site plans, shall be as follows:

- Front yard: 100 feet from the right-of-way
- Side yards: 15 feet from the property line
- Rear yard: 20 feet from the property line

■

### 4.4.8 Signage

To manage roadway signage in a manner consistent with traffic safety and corridor appearance, the following standards shall apply. Site plans shall identify the number, location, size, and height of signs, consistent with the following:

- **Location:** No sign shall be located closer than 10 feet to the right-of-way of a designated HCOD route. Signs shall not obstruct sight distances as required herein.
- **Height:** The maximum sign height shall be 6 feet above grade. Signs may be placed on landscaped berms or structural bases no higher than 3 feet tall, provided that these support methods contain no wording, logos, or other advertising material. When constructed in this manner, sign height shall be measured from the top of such berm or base.
- **Construction:** Signs shall be ground mounted, monument type structures. No pole or pylon signs shall be permitted.
- **Landscaping:** Landscaping shall be integrated with installation of freestanding signs, and shall count towards the perimeter landscaping requirements contained in this section.

■

### 4.4.9 Lighting

The following lighting standards shall apply to all exterior lighting sources, including but not limited to lighting for parking, access drives, and walkways, gasoline canopy lighting, and internally and externally illuminated signs. Site plans shall include a lighting plan, drawn at the same scale as the site plan, to demonstrate compliance with the following standards.

- All lighting shall be designed, located, and arranged so as not to direct glare on adjoining streets or residential properties. The intensity at adjoining streets or residential properties shall not exceed 0.5 foot candles.
- Lighting fixtures shall comply with the shielding requirements of the table below. Excepted from these requirements are: roadway and airport lighting, lighting activated by motion sensor devices, temporary circus, fair, carnival, or civic uses, construction or emergency lighting, temporary lighting, and lighting associated with agricultural pursuits.
- For the purposes of this ordinance, a fully shielded fixture shall be defined as an outdoor lighting fixture that is shielded or constructed so that all light emitted is projected below a horizontal plane running through the lowest part of the fixture.

**Table 4-1**
**Table of Shielding Requirements**

| Fixture Lamp Type | Shielding Requirement |
|---|---|
| Low/High Pressure Sodium, Mercury Vapor | Fully Shielded |
| Metal Halide and Flourescent – over 50 watts | Fully Shielded |
| Incandescent – over 160 watts | Fully Shielded |
| Incandescent – 160 watts or less | None Required |
| Any light source of 50 watts or less | None Required |

Note: Incandescent includes tungsten-halogen (quartz) lamps.

■

### 4.4.10 Landscaping

Well planned and maintained landscaping will achieve several benefits in furtherance of this ordinance. Specifically, this section is intended to:

- Preserve and enhance the visibility of traffic on major highways
- Preserve and enhance the visual quality of designated corridors
- Reduce the volume and improve the quality of stormwater runoff
- Shade parking lots, reducing heat generation

Site plans shall include a landscaping plan, drawn to the same scale as the site plan, and showing the location, size, and description of all landscaping materials in relation to structures, parking areas, and driveways.

- Plant materials specifications: All plant materials shall be living and in healthy condition, and shall conform to the standards of the most recent edition of the "American Standard for Nursery Stock," published by the American Association of Nurserymen. In order to achieve the highest likelihood of survival, plants shall be suitable for climatic zone 7. In order to maximize plant success, and to minimize maintenance expense, plant materials shall be suitable for their location on an individual site. Such concerns as danger to structures, shade requirements, wind protection, water needs, and plant spacing shall be incorporated into the landscaping plan. Where appropriate, supplementary review guidelines and expert advice may be used in the review of landscaping plans.
- Minimum size standards:
  - Large deciduous trees – Large deciduous trees shall be of a species having an average minimum mature crown spread of greater than 30 feet. A minimum caliper of 2 ½ inches at the time of planting shall be required.

- ➢ Small deciduous trees – Small deciduous trees shall be of a species having an average minimum mature crown spread of greater than 12 feet. A minimum caliper of at least 2 ½ inches at the time of planting shall be required.
- ➢ Evergreen trees – Evergreen trees shall have a minimum height of 5 feet at the time of planting.
- ➢ Shrubs – Shrubs shall have a minimum height of 2 feet at the time of planting.

- ➤ Tree preservation: Preservation of existing trees shall be maximized. Except when otherwise necessary to provide access, or in accordance with accepted landscape practice, trees of 8 inches or greater diameter at breast height, located within any required setback, shall be preserved. Where any such tree is unhealthy, or needs to be removed in accordance with accepted landscape practice, its removal shall be indicated on the landscaping plan. Any healthy tree or shrub that is preserved may be credited toward the requirements of this section. All vegetation to be preserved shall be shown on the landscaping plan, and groups of trees and/or shrubs may be outlined as a single unit.

- ➤ Maintenance: The owner, or his agent, shall be responsible for the maintenance, repair, and replacement of all landscape materials required by this section. All plant materials shall be maintained in a healthy growing condition and free from debris and refuse at all times. All unhealthy plant material shall be replaced during the next planting season. All landscape areas shall be provided with a readily available water supply, which shall be shown on the landscaping plan. Water sources that require extending hoses over parking areas or access drives do not meet this requirement.

- ➤ Installation and bonding requirements: All landscaping shall be installed in accordance with accepted landscape practices. All areas approved for landscaping shall be enclosed with a visible barrier prior to the start of any site preparation or construction. Nothing shall be driven across, stored within, or otherwise intrude within these areas. Where this is not possible or where this requirement is violated, landscape areas shall be repaired by means of loosening compacted soil to a depth of 3 feet. Once completed, landscaping areas shall be protected from vehicular encroachment. When occupancy of a structure is desired prior to completion of the required landscaping, due to seasonal considerations, surety shall be provided in an amount equal to the costs of the landscaping. All landscaping shall be installed during the first planting season following occupancy, or the surety may be forfeited to the County/Town. This requirement does not preclude phasing of landscaping for larger developments, the timing of which shall be shown on landscaping plans.

- ➤ Perimeter landscaping: Landscaping shall be required at the outer boundaries of projects, or within the required setbacks, and shall be provided except where driveways or other openings may be required. For large development projects such as shopping centers, perimeter landscaping shall apply to the full perimeter

of the project, and not to internal property lines. The linear feet guidelines below are to be used to calculate the number of required plantings; they do not require that plantings be uniformly spaced. Rather, grouping of plants consistent with accepted landscape practice is encouraged. Specific requirements are as follows:

- At least 1 large deciduous tree for each 50 linear feet
- At least 1 small deciduous tree for each 30 linear feet
- At least 1 evergreen tree for each 30 linear feet
- At least 1 shrub for each 10 linear feet

- Parking lot landscaping: Parking lots containing five or more spaces shall be internally landscaped, so as to provide shade and screening, and in order to facilitate the safe and efficient movement of traffic. The area designated as required setbacks shall not be included as part of the required landscaping. Plantings shall be spaced and grouped consistent with accepted nursery standards, and shall not be located in a manner that impedes driver visibility. Specific requirements are as follows:
  - At least 20 square feet of landscaped area shall be provided per each parking space.
  - Landscaped areas shall contain no less than 100 square feet, and shall be no less than 9 feet in average width.
  - Trees shall be planted as follows: at least 1 small deciduous tree for every 100 square feet of landscaped area, or at least 1 large deciduous tree for every 200 square feet of landscaped area, or some combination thereof.
  - At least three shrubs shall be planted per each tree planted.
  - All landscaped areas shall be planted with vegetative groundcover or shall be mulched, so that no bare ground exists.
  - For double rows of parking spaces, landscaped islands shall be placed such that no row exceeds eight spaces in length. Single rows of parking spaces, separated by a continuous landscaped island, shall be encouraged.

- Beneficial plants: the following is a partial list of beneficial plants. In general, plantings should be native species, and should be selected for suitability to the Eastern Shore as well as to their specific location on site. The following list is adapted from the BayScapes program. It is not an exhaustive list, but provides examples of beneficial species.

- Large trees:
  - Red maple – *Acer rubrum*
  - River birch – *Betula nigra*
  - Red or green ash – *Fraxinus pennsylvanica*
  - Sweet gum – *Liquidambar styraciflua*
  - Tulip tree – *Liriodendron tulipifera*

- Black gum – *Nyssa sylvatica*
- White oak – *Quercus alba*

- Small trees/large shrubs:
  - Shadblow serviceberry – *Amelanchier canadensis*
  - Flowering dogwood – *Cornus florida*
  - Witch hazel – *Hamamelis virginiana*
  - Common elder – *Sambucus canadensis*
  - Highbush blueberry – *Vaccinum corymbosum*
  - Southern arrowwood – *Viburnum dentatum*

- Evergreen trees/shrubs:
  - American holly – *Ilex opaca*
  - Winterberry holly – *Ilex verticillata*
  - Northern bayberry – *Myrica pennsylvanica*
  - Common juniper – *Juniperus communis*
  - Eastern red cedar – *Juniperus virginiana*

- Small shrubs:
  - Fothergilla – Fothergilla gardenii
  - Inkberry holly – Ilex glabra
  - Compact Oregon grapeholly – Mahonia aquifolium

■

### 4.4.11 Redevelopment

In order to promote the orderly retrofit of existing developments that do not conform to the requirements of the HCOD, while encouraging reuse of previously developed properties, the following redevelopment standards shall apply. Given the varying conditions of existing development, some administrative flexibility is required in applying standards to redevelopment. The following standards provide guidelines for use in bringing nonconforming sites as close to conformance as possible. All trip generation shall be based on ITE methods as described herein.

- Access: Reconstruction, relocation, or elimination of access points shall be required under any of the following circumstances. In such cases, necessary improvements shall be identified in consultation with the VDOT Resident Engineer, and shall be designed to bring the site as close to compliance as possible with the access provisions of this ordinance.
  - The redevelopment will cause an increase of 10 average daily trips (ADT) and 20 percent or more.
  - The redevelopment will cause any turning movement to increase by 5 ADT and 20 percent or more.

- ➢ The redevelopment will cause an increase in use by vehicles exceeding 30,000 pounds gross vehicle weight of 10 vehicles per day or 20 percent or more.
- ➢ Structural enlargements, building improvements, or other site improvements are made resulting in an increase of 20 percent of building square footage or totaling 20 percent of current building value.
- ➢ As required to address identified safety deficiencies, based on consultation with the VDOT Resident Engineer.

- ➤ Traffic Impact Analysis: A traffic impact analysis shall be submitted for all redevelopment projects in which the proposed use will generate more than 1,000 ADT and increase existing ADT by 50 percent or more.

- ➤ Required Improvements: Improvements required to support the redevelopment shall be based on consultation with the VDOT Resident Engineer, the U.S. Route 13 Access Management Plan, required traffic impact analyses, and highway safety and capacity.

- ➤ Signage: Reconstruction, relocation, or elimination of freestanding signs shall be required under the following circumstances. Required improvements shall bring on-site signage as close to compliance as possible.
  - ➢ Structural enlargements, building improvements, or other site improvements are made resulting in an increase of 20 percent of building square footage or totaling 20 percent of current building value.
  - ➢ Any freestanding sign is re-faced, re-modeled, or otherwise altered.
  - ➢ Existing signs interfere with required site distances.

- ➤ Lighting: Where structural enlargements, building improvements, or other site improvements are made resulting in an increase of 20 percent of building square footage or totaling 20 percent of current building value, all lighting shall be brought into compliance with this ordinance.

- ➤ Landscaping: Where structural enlargements, building improvements, or other site improvements are made resulting in an increase of 20 percent of building square footage or totaling 20 percent of current building value, landscaping shall be brought as close to compliance as possible. This shall include appropriate landscaping of existing green space, as well as provision of additional green space to the extent that is does not interfere with traffic flow or required parking. Where additional green space is required, priority shall be given to establishing front yard green space.

## 4.5 Access Management Guidelines

This section provides specific recommendations for applying access management techniques to U. S. Route 13. It also suggests an administrative framework for implementation. A summary of access management guidelines is provided in Table 4-2. Chapter 5, Evaluation of Alternatives, discusses the process used to develop an overall plan for improving U.S. Route 13 and a portion of Route 175 that melds together general safety improvements, access management techniques and other types of roadway improvements.

**Table 4-2**
**Summary of Access Management Guidelines for the U.S. Route 13 Corridor**

| Criteria | Recommended Guidelines | Special Notes |
|---|---|---|
| **Left-Turn Lanes** | Construct at all full-access median crossovers | May not fully apply to directional crossovers |
| **Two-Way Left-Turn Lanes** | Provide 12 feet minimum, 14 feet desirable | Replace with non-traversible median when AADT exceeds 25,000 to 30,000 vehicles per day |
| **Right-Turn Lanes** | Require at all commercial entrances and side streets | Results in minimum lot frontage requirement |
| **Shoulders** | Widen/construct 10 feet wide min. outside and 3 feet min. median shoulders | Where residential driveway densities >10/mile, 12 feet min. outside shoulder |
| **Driveway Spacing** | 400 feet minimum between commercial entrances | Results in minimum lot frontage requirement |
| **Corner Clearance** | U.S. Route 13<br>400 feet – upstream of cross street<br>250 feet – downstream of cross street | Vehicle storage needs may increase the 400-foot upstream requirement |
| | Cross Street<br>250 feet – upstream of U.S. Route 13<br>100 feet – downstream of U.S. Route 13 | Use of restrictive median may reduce the 250-foot upstream requirement to 100 feet |
| **Crossover Spacing** | 0.5 miles – full access 0.25 miles – directional access | Procedure needed for variances/modifications |
| **Median Width** | ➤ Provide 50 feet minimum at major generators and cross streets by:<br>➢ Roadway widening<br>➢ Flare widening | Convert medians to directional access only or close median opening if median widening not feasible |
| | ➤ Widen crossovers and lengthen left turn lanes at locations with heavy vehicle considerations (buses, tractor trailers) | Convert medians to directional access only or close median opening if median widening not feasible |
| **Side-Street Connections** | Counties require new development to provide secondary access to side-streets where feasible<br>VDOT to construct new local road links | |
| **Signal Spacing** | Two miles in rural areas, 0.5 miles in developing areas, 0.25 miles in developed areas | |
| **Signal Timing** | Implement signal coordination in developed areas | |
| **Clear Zone** | Establish 30-foot recovery area beyond traveled way, where practical | In areas with curbing, minimum clear zone can be reduced to 6 feet |

# 5

# Evaluation of Alternatives

## 5.1 Introduction

Early on in the study process, the goal of the U.S. Route 13/Wallops Island Access Management Study was defined as the development of a plan "that VDOT and the jurisdictions can implement to make U.S. Route 13 a safer and more efficient transportation facility for the traveling public over the next 20 years" (see Chapter 1). Based on an iterative process of technical analyses and public involvement, an access management plan was developed to achieve this goal. There are three components to the U.S. Route 13/Wallops Island access management plan: 1) access management roadway design guidelines (Chapter 4, Section 4.5), 2) access management land use/zoning controls (Chapter 4, Section 4.4), and 3) recommended conceptual plans for improving the existing roadway (Chapter 6 and Appendix – Recommended Conceptual Plans) based primarily on the access management design guidelines established in Chapter 4.

The development of the concept plans required that consideration be given to improving both the existing and future access management conditions on the roadway, while still providing adequate access for existing homes and businesses. In some areas, balancing the needs of existing land uses with ideal safety improvements required a compromise in the absolute access management guidelines brought forth in this plan. The alternative, wholesale relocation of existing homes and businesses, was not considered practical or economically feasible. However, the access management plan as proposed will prevent unacceptable access management conditions associated with future development along the roadway. In general, the access management guidelines have been applied to the length of U.S. Route 13 in Virginia and portions of Route 175.

This chapter details the process used to develop and evaluate alternative improvement concepts and the findings that led to the selection of various improvements along U.S. Route 13 and Route 175. It discusses access management techniques that were evaluated to address specific corridor deficiencies, and discusses other potential safety-related improvements. For each corridor deficiency examined, this study seeks to implement basic safety improvements and access management solutions first, where practicable. In those areas where access management techniques were deemed insufficient or not practicable, other solutions

were evaluated including the construction of bypasses or reconstruction of intersections.

This chapter also presents a summary and evaluation of significant elements of these alternatives. Appropriate for a planning level study, potential impacts to wetlands, historic resources, businesses and residences are discussed in general terms and based on existing database information. Minor right-of-way takings and critical impacts to the function of residences or businesses were not assessed. For example, the roadway widening could impact a drain field for a septic system and in the case of roadside commercial ventures, could impact the viability of the business or impact underground structures, such as gasoline storage tanks. These features would need to be considered during future studies prior to implementation of a particular improvement. Prior to construction, more detailed investigations will be required for various features including hazardous materials, wetlands, water quality, and other sensitive environmental resources.

## 5.2 Alternatives Development Overview

A variety of alternatives and conceptual improvements were developed during the study based on a combination of engineering rationale and public involvement, as described below.

■

### 5.2.1 Role of Public Involvement

This study, which involved numerous incorporated communities, settlements, two counties and a regional planning agency, was a blend of both technical work and public involvement. Even before technical investigations began, a comprehensive public involvement program was developed which started with scoping interviews with elected officials, citizens, and government officials to give the study team a better idea of transportation conditions and needs of the traveling public on Virginia's Eastern Shore. Public involvement continued throughout the study in the form of public information meetings, town or community meetings, on-going coordination with elected officials from both counties, as well as regular meetings with the Citizen's Advisory Committee (CAC) and Technical Advisory Committee (TAC).

The CAC, made up of representatives from community groups, schools, public safety officials, business and other interests met a total of seven times during the study period. This group was regularly asked for observations on U.S. Route 13 travel conditions, was updated on the team's technical findings, and was instrumental in the development of alternative solutions for the corridor as described in this chapter. The TAC was made up of local, state, and federal agency representatives with expertise in the fields of planning and transportation, including road, public transit and rail.

Two rounds of public information meetings were also held during the study process in various locations in Northampton and Accomack Counties. The first series of meetings, held in May of 2001, was an opportunity for the public to review and provide comments on the early findings of the study team regarding existing/future traffic and the identification of problem areas in the corridor. The second series of public information meetings were held in November 2001 in Northampton County and Accomack County to solicit public comments on the preliminary alternatives developed along the corridor. Comments received at these meetings were used to refine and further develop alternative solutions along the corridor.

Critical to the development of alternatives was a series of five town meetings held in September 2001 to focus on initial improvement alternatives that were targeted to specific areas of the corridor. It was valuable to have a chance for in-depth analysis of these initial alternatives by the people that would be using them the most. At this stage in the study, the team was able to significantly modify and add to initial alternatives, which led to the development of the final set of alternatives presented in this report.

The alternatives that appear in this chapter are a direct result of the feedback that the study team received through the numerous opportunities for public involvement mentioned above. To highlight this, public opinion is a component featured in the description of each improvement alternative in this chapter. From initial comments about the safety of school buses on U.S. Route 13 and traffic law enforcement, to constructive suggestions for expanding the range of improvement alternatives in Machipongo and the Oak Hall and Temperanceville area, the citizens of the Eastern Shore have played an indispensable role in shaping the process and the results of this study.

■

### 5.2.2 Engineering Rationale

Existing and future conditions in the U.S. Route 13 corridor justify a need for a wide range of safety upgrades, access management techniques and other types of roadway improvements. Potential improvements and alternatives were developed throughout the corridor. In the following sections, the types of improvements are broken into three categories each of which is described in greater detail below: 1) Corridor-wide Safety Improvements, 2) Access Management Improvements, and 3) Other Improvements.

#### Corridor-wide Safety Improvements

Initially, existing roadway characteristics and traffic operations were assessed through field reconnaissance and data review, including the review of historic crash data along the U.S. Route 13 corridor. In addition, anecdotal evidence of roadway characteristics and traffic operations was collected through the first round of public information meetings and several meetings with the Citizen's Advisory Committee. One major finding of these efforts was that some corridor-wide deficiencies are

primarily safety related, and in some cases, not necessarily related to access management per se. These deficiencies included:

- Occurrence of accidents related to vehicles running off the road.
- Insufficient shoulder width in some areas to help accommodate farm vehicles, pedestrians, bicyclists, school buses that make stops on the road, and others.
- Location of major obstructions within the clear zone, which is 30 feet from the edge of traveled way.
- Lack of milepost markings, thus hampering emergency response to cellular telephone calls for roadside assistance and crash events.
- Poor visibility at night.
- Lack of travel lane delineation.
- Raised structures within the median and within the clear zone.

To address these deficiencies and in recognition of the amount of interstate traffic carried on U.S. Route 13, the following corridor-wide improvements were initially suggested:

- Installation of rumble strips in both the inside and outside shoulders.
- Widening of the outside shoulder to provide a minimum of 10 feet of pavement, and to provide 12 feet when driveway densities exceed 10 driveways per mile.
- Removal of obstructions located within the clear zone, where possible. This includes trees, headwalls, and large crepe myrtle bushes.
- Installation of warning signs at larger obstructions that cannot be economically relocated.
- Placement of milepost markers on U.S. Route 13 at every mile.
- Installation of raised pavement markers throughout the corridor to provide better visibility at night and during inclement weather conditions.
- Reconstruction of median drainage grates to make them traversable.

Many of the above improvements are standard on interstate facilities in the Commonwealth of Virginia. They are needed because of the high through traffic volumes experienced on U.S. Route 13 and because of its role in carrying interstate traffic on the Eastern Shore. Under current conditions, the road is performing all the functions of an interstate facility but without associated interstate road standards, access control, and level of state police staffing needed for enforcement.

Furthermore, the need for U.S. Route 13 to provide access to oversized farm vehicles during planting and harvesting seasons conflicts directly with the corridor's interstate function. U.S. Route 13 is also the "Main Street" of the Eastern Shore, and while future improvements in the capacity and design of parallel secondary roads

might help to reduce this need, this local function must be addressed in the development of roadway improvements.

### Access Management Improvements

Access management techniques, as described in detail in Chapter 4, were employed to the extent practicable to address existing and future deficiencies. In addition to some of the corridor-wide access issues discussed above (i.e., narrow shoulders), the primary access-related concerns identified during this study included:

- Difficulty in turning into and out of residential driveways;
- Concerns of Eastern Shore residents about the high rate of speed and aggressive nature of through traffic, particularly tractor-trailers.
- Vehicles parking illegally on U.S. Route 13;
- High number of median crossovers on U.S. Route 13;
- Ability of median crossovers to safely protect vehicles from oncoming traffic;
- Safety concerns for school buses and tractor-trailers to cross U.S. Route 13;
- School buses stopping on U.S. Route 13 to pickup and discharge students, and
- High number of driveways along entire corridor, particularly residential driveways.

To address these issues, the following access management techniques were identified for implementation, consistent with the guidelines established in Chapter 4:

- Construction of turn lanes
- Closure of excess median crossovers to channelize disruptions to U.S. Route 13 traffic.
- Conversion of existing median crossovers to restrict some turning movements (directional median crossover).
- Median widening at some median crossovers to more safely accommodate cross streets or driveways with high volumes, school buses or tractor-trailers.
- Provision of frontage roads or reverse frontage roads to consolidate residential driveways and reduce school bus stops directly on U.S. Route 13 .
- Provision of alternative secondary road access for selected properties fronting on U.S. Route 13.
- Reconstruction of undivided roadway sections to accommodate future traffic capacity, access and safety needs.

The implementation of the above techniques were considered throughout the U.S. Route 13 corridor, but only applied where a deficiency was noted.

### Other Improvements

Where access management techniques could not be applied to deficiencies, other geometric improvements were developed. These included:

- Realignment of intersecting secondary roads
- Bypasses
- Interchanges
- At-grade railroad crossings

Some of these improvements and various alternatives developed for these improvements were identified based primarily on traffic engineering issues, while others were developed more in response to public feedback. The specific alternatives are described in greater detail below.

## 5.3 Alternatives Evaluation

Following the identification and development of the various improvements and alternative improvement concepts, these were then evaluated in terms of effectiveness, and engineering.

■

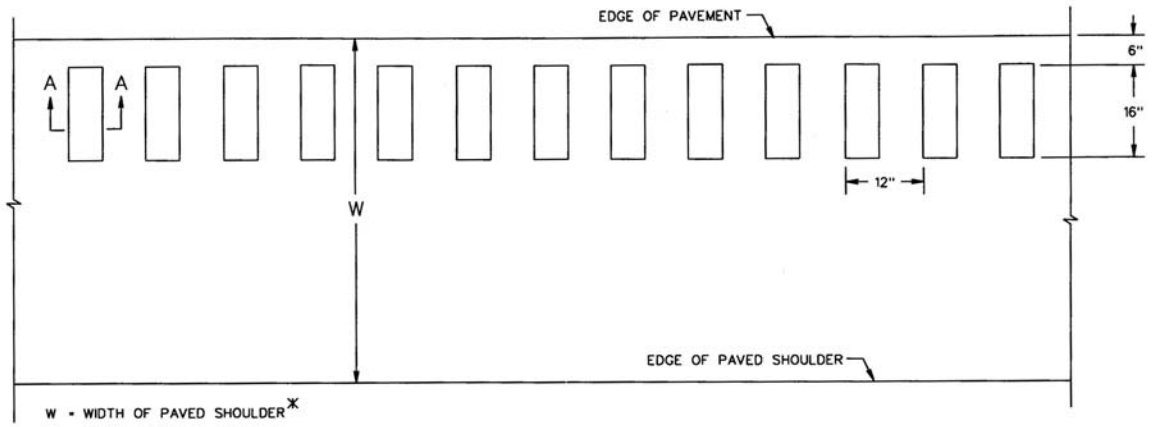
### 5.3.1 Corridor-wide Safety Improvements

#### Rumble Strips

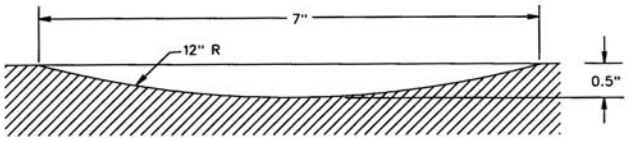
Rumble strips are perpendicular indentations in the shoulder, immediately adjacent to the travel lanes that provide an audible warning to vehicles inadvertently straying from the travel lanes. The standard VDOT design detail for rumble strips on asphalt pavement is shown in Figure 5-1. The rumble strip is 16 inches in width and is placed approximately 6 inches from the white edge line. Rumble strips are standard items for interstate construction today; however, they are not as frequently implemented on arterial corridors, primarily due to the narrow paved width and/or shallow depth of paved shoulders.

The only concern expressed about the addition of rumble strips was related to the potential danger for bicyclists who could lose control of their bicycle if they ride on a rumble strip. Given the proposed shoulder width (10 feet or more), there should be adequate room for the bicyclist to ride near the outside of the shoulder without having to ride on the rumble strip. Furthermore, no impacts to homes/businesses, or sensitive cultural and natural resources are expected as a result of installing rumble strips along the corridor.

**Figure 5-1**
**Rumble Strip Detail**




PLAN VIEW




SECTION A-A

NOTES

RUMBLE STRIPS SHALL BE PLACED CONTINUOUSLY AS DIRECTED BY THE ENGINEER.

RUMBLE STRIPS SHALL NOT BE PLACED WITHIN LIMITS OF BRIDGE DRAINAGE APRONS OR SPECIAL DESIGN SHOULDER SLOT INLETS.

RUMBLE STRIPS SHALL BE PLACED ON MAINLINE SHOULDERS ONLY.

* WHERE BICYCLES ARE NOT PROHIBITED, THE MINIMUM WIDTH OF THE OUTSIDE PAVED SHOULDER SHALL BE 8 FT.

| SPECIFICATION REFERENCE | RUMBLE STRIPS (ASPHALT SHOULDER) |
|---|---|
| 310<br>315 | VIRGINIA DEPARTMENT OF TRANSPORTATION |

The alternative to installing rumble strips would be to install raised pavement markers only (see below). While raised pavement markers do provide a certain level of audible warning to motorists who have veered off the road, they are intended more for added visibility. The combination of rumble strips and pavement markers is particularly effective in terms of enhancing overall safety on high speed corridors such as U.S. Route 13.

### Shoulder Widening

During the public involvement process, many people noted the lack of sufficient shoulder width in some areas for the accommodation of farm vehicles/equipment, other large vehicles, school buses that need to stop on U.S. Route 13, as well as bicyclists and pedestrians who travel along U.S. Route 13.

To address these concerns, a wider shoulder width (10 feet wide) was initially proposed throughout the entire corridor. In addition, two additional feet (12 feet total) were proposed in locations with driveway densities in excess of 10 driveways per mile. The 12-foot shoulder width in high driveway density areas will provide added safety and security to motorists turning into these driveways. The alternative would be to construct a consistent 10-foot wide shoulder regardless of driveway density.

During the public involvement process, no negative comments or concerns were raised about the proposed shoulder widening. Such a widening could potentially impact wetlands in isolated areas and all appropriate wetland/water quality permits would need to be obtained prior to construction. No adverse impacts to historic resources or significant impact to groundwater recharge areas are anticipated. Occurring within existing right-of-way, no relocations of homes or businesses are expected to occur as a result of this widening. On the contrary, the shoulder widening provides an added safety benefit to motorists turning into homes and businesses along the corridor.

### Relocation or Removal of Hazards in Clear Zone

The American Association of State Highway and Transportation Officials define "clear zone" to be the unobstructed, relatively flat area provided beyond the edge of the traveled way for the recovery of errant vehicles.[46] Obstructions located within the clear zone of a roadway can significantly increase the potential hazard for fixed object crashes. The provision of rumble strips, as discussed above, would help to correct drivers to some degree. However, there are obstructions along U.S. Route 13 that should be relocated or removed. During the course of the study, 209 obstructions were identified within the 30-foot clear zone. Of these, 130 (62 percent) occurred in the northbound direction and 79 (38 percent) occurred in the southbound direction.

▼

46 A Policy on Geomeric Design of Highways and Streets, 1994, AASHTO, p. 344.

Obstructions observed included utility poles, traffic signal poles, drainage headwalls, trees, large crepe myrtle bushes (while classified as a shrub, there are many such bushes on U.S. Route 13 large enough to stop a car traveling at 55 mph), billboards, and rail signal equipment. In addition to removal of such obstructions, the increased use of reflectors should be implemented for obstructions that cannot be economically relocated or removed.

In general, concerns expressed by the public about the relocation or removal of hazards in the roadway clear zone were related to the potential removal of trees providing shade to homes. Impacts to sensitive environmental features are not anticipated as a result of these efforts, but care should be taken so as not to relocate objects in wetlands or streams.

### Milepost Markers

Emergency response capabilities along the U.S. Route 13 corridor often rely on the cellular telephone calls from either drivers involved in crashes or passers-by. Given the high percentage of interstate travel on U.S. Route 13, many of these drivers are not familiar with the entire roadway and may have difficulty providing a detailed enough description for emergency response personnel to quickly pinpoint the crash location. The posting of milepost markers provides a uniform, linear referencing system to which most interstate travelers are accustomed.

No negative comments or concerns were expressed regarding the installation of milepost markers.

### Raised Pavement Markers

The use of raised pavement markers, similar to rumble strips, can aid in alerting drivers when they veer off the travel lanes. When a vehicle crosses over a raised pavement marker, an audible noise is made that acts to alert drivers to correct their travel path. In addition, the raised pavement markers are also extremely effective during night and inclement weather, particularly rainstorms, to provide more visibility to drivers.

This type of improvement is not expected to have any adverse environmental impacts nor was any concern expressed by the public.

### Drainage Grate Reconstruction

The existing drainage grates within the median on U.S. Route 13 present a potential obstruction hazard to vehicles running off the road and into the median. The existing grates, built to VDOT standards that are now superseded, expose approximately two feet of concrete inlet structure above ground level. The current design for drainage grates makes the grates flush with the existing ground level and therefore not a

potential obstruction hazard. Retrofit screens have been developed by VDOT and can be used to significantly reduce the obstruction hazard of these drainage structures.

■

### 5.3.2 Access Management Improvements

Throughout the U.S. Route 13 and Route 175 corridors, significant access management improvements were developed. The following sections provide a consolidated summary of those proposed improvements.

#### Construction of Turn Lanes

During the public involvement process, concern was raised about the hazard (perceived and real) of turning right into driveways or onto side streets. The high rate of speed and aggressive nature of out-of-state cars and tractor-trailers was frequently mentioned. Many local drivers indicated that they do not feel safe slowing down to turn, and feel that the existing shoulder is often inadequate to get their vehicle out of the travel lane safely while turning. While many sections of U.S. Route 13 provide an eight-foot wide right shoulder, this is not perceived as being wide enough. In addition to the shoulder widening discussed above, the construction of turn lanes in certain locations is also considered necessary.

While it is generally not anticipated that the construction of turn lanes will impact sensitive resources or homes and business, additional investigations may be necessary prior to construction depending on the location.

#### Median Closures

The existing U.S. Route 13 corridor contains a total of 271 median crossovers, of which 103 (38%) currently have no turn lanes, and 200 have narrow median widths (less than 40 feet). The desire to control access along the corridor recognizes that while many of these median crossovers serve existing residences and business, access onto and off of U.S. Route 13 needs to be planned and prioritized to minimize speed differentials and cross street left turns. The closure of selected crossovers, along with the improvement of the remaining crossovers, would help to achieve this result. Future development on U.S. Route 13 should be encouraged to locate and develop at locations with existing access via a median crossover.

During the public involvement process, significant concern was raised about this proposal, with arguments that U-turns would increase and make the road less safe as a result. It should be noted that many of the proposed crossover closures identified in this study were locations with either no current activity, locations with safety concerns, locations serving a very low density land use, or locations with alternative access. In some locations, local road connections, such as frontage roads and reverse frontage roads, were provided to compensate for the elimination of full access to residents or

businesses. The recommended median closures presented in Chapter 6 have attempted to minimize motorist inconvenience while providing a discernable safety benefit.

Median closures are not expected to have environmental impacts associated with them.

### Directional Crossover Treatments

The restriction of access at crossovers was carefully considered for application on the U.S. Route 13 corridor. Examples of directional crossover treatments were presented in Chapter 4. The primary directional crossover selected for this study was to restrict cross street traffic to right-in, right-out and then only allow U.S. Route 13 left turns in one direction. Areas with closely spaced intersections or where median widening may not be practical are candidates for this type of improvement. As shown in Table 5-1, only four directional crossovers were initially proposed.

**Table 5-1**
**Proposed Directional Crossover Improvements**

| Milepost | Land Use Served | Left-Turn Access | |
|---|---|---|---|
| | | NB | SB |
| MP 132.50 | Page Fischer Road (Route 703) | | ✓ |
| MP 132.44 at Route 703 | Arcadia High School* | ✓ | |
| MP 116.36 at Route 1530 | Accomack Office Park | ✓ | |
| MP 108.38 | Eastern Shore Community College* | ✓ | |

* Only if Alternative 1 is applied (widening on existing alignment).

These improvements are not expected to have environmental impacts associated with them.

### Localized Median Widening

Approximately 74 percent of the U.S. Route 13 corridor has substandard median widths (ranging from 20 to 40 feet in width). Given the location of major traffic generators directly on U.S. Route 13, such as the Eastern Shore Community College, public schools, major employment centers and churches, the ability to service sometimes high volumes of cross street traffic may be needed at certain locations. Many of these locations may ultimately require signalization, however, for some locations, this is uncertain and the safety concerns are preponderant.

A localized roadway widening option was developed to widen the median to either 50 feet or 80 feet in width to accommodate school buses and tractor-trailers, respectively. After a review of the above land uses, a total of 11 locations were selected for widening to 50 feet and 5 locations were selected for widening to 80 feet.

These proposed locations are shown in Table 5-2. While the median widenings are not expected to adversely impact sensitive resources, they should increase safety operations for the businesses, schools, Kiptopeke State Park and others.

**Table 5-2**
**Proposed Localized Median Widening Improvements**

| Milepost | Land Use Served | Widen to 50 feet | Widen to 80 feet |
|---|---|---|---|
| MP 132.17 at Horsey Road/Mocks Landing Road (Route 702) | Arcadia High School* | ✓ | |
| MP 131.18 | CS Fischer Poultry | ✓ | |
| MP 127.53 at John Tyler Road (Route 691N) | Eastern Shore Seafoods | | ✓ |
| MP 127.29 at Goton Town Road (Route 691S) | Kegotank Elementary School | | ✓ |
| MP 125.57 at Route 729 | Tomato Packing Plant near Finney Mason Drive (Route 729) | | ✓ |
| MP 125.13 at Route 775 | Pepsi Warehouse | | ✓ |
| MP 123.50 at Route 681 | Littleton Road/Mason Road (Route 681) | ✓ | |
| MP 123.09 | Gargatha Landing/Berry Road (Route 680) | ✓ | |
| MP 122.89 | Shore Medical | ✓ | |
| MP 105.24 | Central Middle School | ✓ | |
| MP 102.48 | Kuzzen's Six Ls Packing Co. | | ✓ |
| MP 89.54 at Young Street (Route 627) | Northampton Middle School | ✓ | |
| MP 86.58 at Bus Rt. 13 | Northampton High School | ✓ | |
| MP 78.00 at Route 684 | Kiptopeke Elementary School | ✓ | |
| MP 75.06 at Cape Center | Sting Ray's/ Eastern Shore Pottery | ✓ | |
| MP 72.41 at Arlington Road (Route 645) | Kiptopeke State Park | ✓ | |

* Indirect access provided off Horsey Road (Route 702).

## Frontage Roads

The construction of one-way, 16-feet wide frontage roads was developed and presented in several locations along U.S. Route 13. They are proposed to consolidate the number of driveway access points and simultaneously provide a safer facility than U.S. Route 13 for school buses to drop-off and pick up children. This issue was raised during the public involvement process as a major concern, especially in Northampton County. The locations where frontage roads were initially proposed are summarized in Table 5-3.

## Table 5-3
## Proposed Frontage Road Improvements

| Beginning Milepost | Direction | Length (feet) | Number of Driveways Reduced |
|---|---|---|---|
| MP 118.97 | SB | 800 | 12 |
| MP 118.09 | SB | 1,300 | 17 |
| MP 93.63 | SB | 550 | 0* |
| MP 91.86 | SB | 1,200 | 12 |
| MP 88.66 | SB | 1,000 | 5 |
| MP 88.15 (Alt. 2 only) | NB | 1,100 | 4 |
| MP 76.55 | NB | 500 | 0 |
| MP 76.22 | SB | 800 | 5 |

* This improvement would move the access for a church driveway to exit to the north opposite a tomato packing plant driveway at a median crossover.

### Reverse Frontage Roads

The use of reverse frontage roads has been considered where existing homes or businesses are located close to either the existing or proposed U.S. Route 13 alignment. Reverse frontage allows for the elimination of driveways on U.S. Route 13, but may not suit property owners because it requires the construction of driveway extensions on private property. The reverse frontage roads are typically local streets, with 24 feet of pavement and 3-foot graded shoulders. As shown in Table 5-4, reverse frontage treatments were proposed in 13 locations along U.S. Route 13.

## Table 5-4
## Proposed Reverse Frontage Road Improvements

| Milepost | Direction | Location | Length of Improvement |
|---|---|---|---|
| MP 125.98 | NB | Route 769 | 2300 feet |
| MP 125.57 | NB | Poultry Waste Management Facility | 900 feet |
| MP 121.06 | NB | South of W. Neck Road (Route 677) | 1000 feet |
| MP 120.61 | NB | Kinsey Road Route 738 | 670 feet |
| MP 114.00 | NB | Daugherty Road (Route 648) | 600 feet |
| MP 110.54 | SB | Dogwood Road/ (Route 639)* (Alternative 1) | 600 feet |
| MP 108.38 | SB | Community College to Route 1402 | 1,200 feet |
| MP 98.61 | NB | Route 618 to to Broad Water Road (Route 652) | 2,300 feet |
| MP 90.63 | NB | Trehereneville Road (Route 622) to Route 625 | 4,000 feet |
| MP 88.00 (Alt 1 only) | NB | Residences between Routes 1701 and 1702 | 1,800 feet |
| MP 84.34 | SB | Route 633 | 1,000 feet |
| MP 79.40 | NB | Route 184 to Route 641 | 2,000 feet |
| MP 75.00 | NB | Sting Ray's | 1,500 feet |

* Cul-De-Sac

### Alternative Access Improvements

Five locations along Route 13 were provided additional indirect access by connecting them to an existing side street that intersects with Route 13. These alternative access improvements would improve the safety and congestion on these roadways, and are shown in Table 5-5. Eight businesses would be impacted by these improvements.

**Table 5-5**
**Proposed Alternative Access Improvements**

| Milepost | Direction | Location | Length of Improvement |
|---|---|---|---|
| MP 116.08 | SB | Route 769 in Mappsville | 700 feet |
| MP 113.06 | SB | Chesapeake Square Plaza | 1,400 feet |
| MP 100.4 | NB | Crossover Access to Food City Plaza and Trawler Restaurant | 500 feet |
| MP 98.5 | SB | Bayside Road (Route 618) to Broadwater Road (Route 652) | 1,400 feet |
| MP 78.91 | NB | Food Lion at Route 184 | 950 feet |

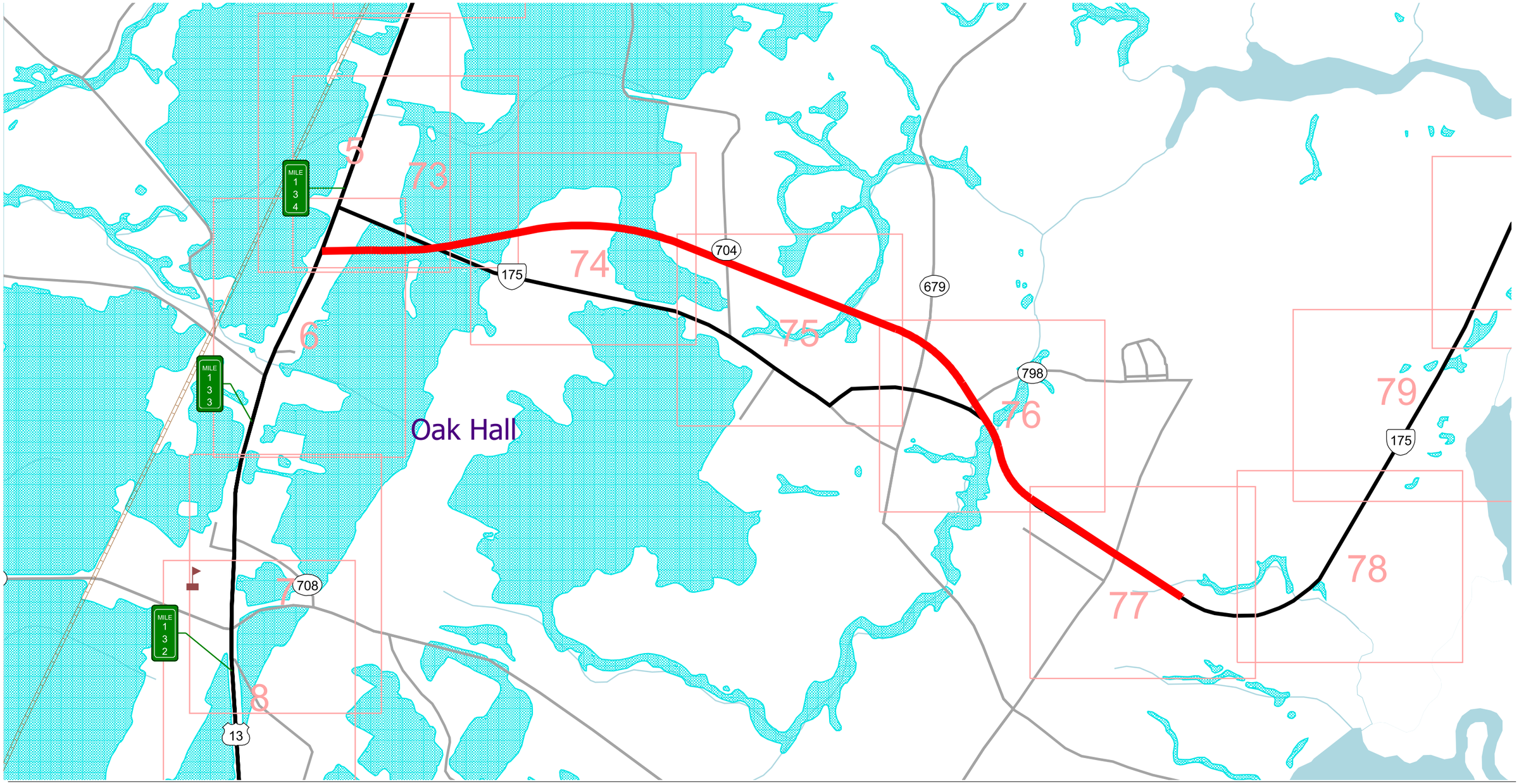
■

## 5.3.3 Other Improvements

As previously noted, this study first sought ways to implement basic safety improvements and access management solutions, where practicable. In those "problem areas" where minor safety improvements or access management techniques were deemed insufficient or not practicable, other types of improvements were evaluated. This section details the development of conceptual alternatives for major transportation improvements along the U.S. Route 13 and Route 175 corridors. For most locations, several alternatives were developed during the course of the study and overlaid on aerial photographs. This evaluation describes the type of improvements, provides an opinion of probable construction costs, and describes potential impacts and benefits associated with the various alternatives. The discussions have been grouped by geographic area for clarity and are presented in a north to south direction.

### 5.3.3.1 Route 175 Area

Two conceptual alternatives were initially presented for Route 175 from U.S. Route 13 to the crossing over Mosquito Creek. Alternative 1 would provide improved shoulders and turn lanes with localized widening of the existing roadway. Alternative 2 would be a new controlled access four-lane divided highway on new alignment between U.S. Route 13 and Wallops Pond. These two alternatives are conceptually depicted in Figure 5-2. The potential configuration of the intersection of Route 175 with U.S. Route 13 will depend on the selection of roadway improvement alternatives for both Route 175 and U.S. Route 13 through Oak Hall. Therefore, this section will not include a description of improvements at the U.S. Route 13/ Route 175 intersection, which will follow in a later sub-section.




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

Alternative 1
Improvements on Existing Alignment

Alternative 2 Bypass

NWI Wetlands

# Aerial Photo Number

**Figure 5-2**
**Route 175 Alternatives**

N

**Alternative 1: Widen Existing Roadway from U.S. Route 13 to Atlantic Road (Route 798)**

***Description.*** Beginning at U.S. Route 13, heading eastbound on Route 175, Alternative 1 would consist of the following:

- Construction of right-turn lane and left-turn lane at Coardtown Road (Route 704).
- Reconfiguration of Dream Road (Route 704) and intersection with Route 175 near the skating rink.
- Widening of Route 175 to provide opposing left-turn lanes at this intersection.
- Construction of right- and left-turn lanes at Fleming Road (Route 679).
- The roadway would continue as a three-lane roadway and intersect with Mill Dam Road (the western spur of Route 798) with left and right-turn lanes in all directions.
- After Mill Dam Road, the road would taper back to a two-lane section to cross Wallops Pond at the existing crossing location to minimize environmental impacts.
- After crossing Wallops Pond, the roadway would be widened again to provide a center lane as a continuous left-turn lane offering refuge for the left turn movements into residences and businesses to the west of Atlantic Road (Route 798).
- Construction of left and right-turn lanes at the intersection with Atlantic Road (Route 798).
- The roadway would taper back to two lanes to the east of Route 798.
- The provision of a 12-foot shoulder and ditch improvements on both sides of Route 175 from U.S. Route 13 would continue to just east of the NASA air station at Mosquito Creek.

***Safety and Transportation Benefits.*** Adding shoulders and improving the roadway with left and right-turn lanes at selected intersections would improve safety and provide a capacity of approximately 15,000 vehicles per day without major corridor relocation and reconstruction. Service life with this improvement would be approximately 20 years.

***Potential Impacts.*** The construction of this widening alternative would have minimal impacts to wetlands along the Route 175 corridor. No previously identified historic properties or threatened/endangered species were noted in the existing database information but additional investigations would be necessary prior to implementation. Alternative 1 would require some right-of-way acquisition along the existing roadway corridor, but significant property or business displacements would not be expected.

***Cost.*** This option, which involves widening the existing roadway from U.S. Route 13 to Mosquito Creek is projected to cost $6.1 million to construct.

**Alternative 2: New 4-lane Alignment from U.S. Route 13 to Atlantic Road (Route 798)**

***Description.*** Starting at U.S. Route 13, a new four-lane, divided roadway would be constructed to carry Route 175 traffic. It would be a controlled-access roadway, with intersections only in specific locations. The roadway alignment would start to the south of existing Route 175 intersection with U.S. Route 13 at T's Corner, and then proceed to the northeast, crossing to the north of existing Route 175 between T's Corner and the first group of residences encountered on Route 175. The alignment would run to the north of most of the existing development approaching Wattsville, and would skirt Wattsville to its north. Intersections would be provided at Coardtown Road (Route 704), Fleming Road (Route 679) and Mill Dam Road (Route 798). The alignment would merge with the existing Route 175 right-of-way to cross Wallops Pond at the current location, to avoid a costly bridge structure and minimize wetland impacts. The roadway would taper back to two lanes to the east of Atlantic Road (Route 798), and the 12-foot shoulder and ditch improvements would continue to Mosquito Creek.

***Safety and Transportation Benefits.*** This new four-lane highway would provide a safe, modern facility with capacity through the foreseeable future, handling approximately 40,000 vehicles per day west of Route 798. Expansion of the NASA facility or increased volumes to Chincoteague Island could predicate this alternative.

***Potential Impacts.*** Alternative 2 traverses existing farmlands, forest, and wetlands in this corridor. Impacts to these resources would be significantly greater with Alternative 2 than with Alternative 1. Implementation of Alternative 2 would require various local, state and federal approvals and permits. Given the extent of wetlands in this area, wetland permitting could involve a potentially rigorous permit process. Prior to any further development of this alternative, additional field investigations should be conducted to verify jurisdictional wetland areas and evaluate avoidance and minimization measures. Again, while no previously identified historic properties or threatened/endangered species were noted in the existing database information, additional investigations would likely be necessary prior to implementation.

In addition to the right-of-way needed for the section on new alignment, Alternative 2 will require right-of-way acquisition along Route 175 east of Wallops Pond from residences and businesses. The roadway's controlled-access portion would ensure that that section of the road remains a high-capacity facility, and would prevent strip development.

***Cost.*** This improvement is projected to cost $14.2 million to construct. It is important to note that this cost does not include an interchange with U.S. Route 13, which has been included with Oak Hall Alternative 5.

**Public Input on the Route 175 Alternatives**

Alternative 1 was generally favored by the public because it was viewed as less expensive than Alternative 2 and more likely to be approved and implemented in a timely manner. Most of those who liked Alternative 1 were interested in having a center turn lane. A four-lane highway on Route 175's existing alignment, also suggested, was not looked at as a viable alternative because of the potential land use impacts, especially at the intersections of Route 704, 679,and 798. Alternative 2 was generally discouraged in public comments because of its potential impact to farmland and other private property. However, the long-term viability was viewed as a positive feature of Alternative 2.

#### 5.3.3.2 Route 175 Intersection with U.S. Route 13

Given the multiple alternative options developed for both U.S. Route 13 and Route 175, it is logical that the development of improvements at the intersection of these two routes would be dependent on the improvements selected for each road. Three likely options include:

- **Alternative A—**Improving the existing intersection in the existing location.
- **Alternative B—**Constructing a new high-capacity, conventional intersection at a new location, possibly just south of the existing intersection.
- **Alternative C—**Constructing a grade-separated interchange, possibly just south of the existing intersection.

Figure 5-3 shows Alternative A, Alternative B and Alternative C conceptually.

If improvements are implemented, the connection type will be evaluated during a location study after the alignment improvement alternative is chosen.

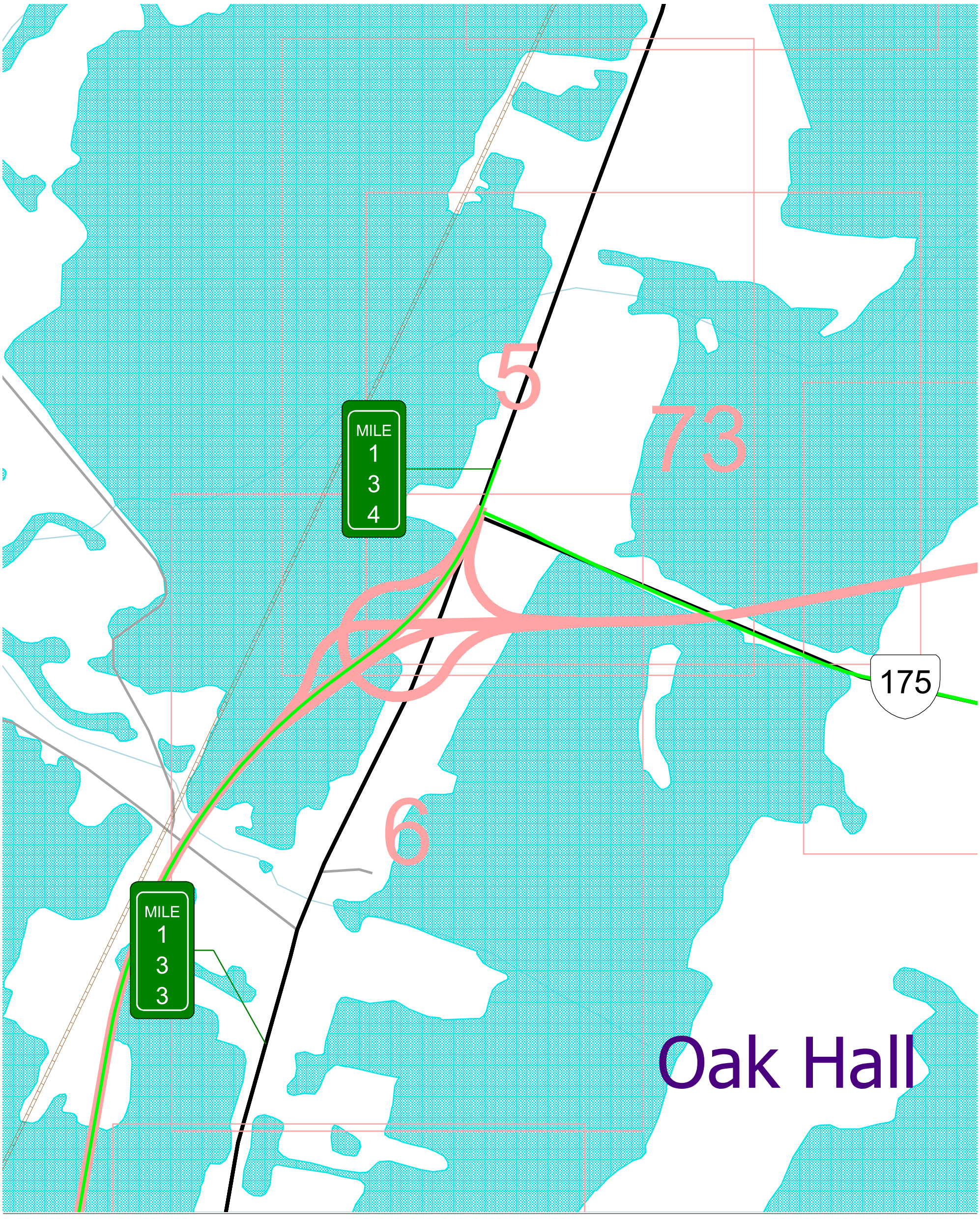
***Safety and Transportation Benefits.*** Alternative A will improve the overall safety and travel through the current intersection of U.S. Route 13 with Route 175.

Alternative B in addition to Alternative A improvements, provides a separation of traffic on U.S. Route 13 through the use of a simple flyover. This should improve safety if a bypass improvement is recommended to the south of T's Corner.

Alternative C being a full interchange eliminates the need for the existing traffic signal and provides the highest level of service through the intersection of U.S. Route 13 and Route 175.

***Potential Impacts.*** Alternative A will restrict access in the SE and NE quadrants of the existing intersection of U.S. Route 13 and Route 175.

Alternative B has the same impact as Alternative A and also requires the taking of additional right-of-way along U.S. Route 13 south of Route 175.




Route 13/Wallops Island Access Management Study

We Keep Virginia Moving

Alternative A
Improvements on Existing Alignment

Alternative B High Capacity Intersection

Alternative C Grade Seperated Interchange

NWI Wetlands

# Aerial Photo Number

N

**Figure 5-3**
**Route 175 Intersection with U.S. Route 13 Alternatives**

Alternative C will impact more property than the other two alternatives. An actual interchange location will determine the number of properties impacted.

***Cost.*** The cost of Alternative B is projected to be $4.0 million, and Alternative C is projected to cost $7.9 million to construct.

**Public Input on the Route 175 Intersection With U.S. Route 13**

There was a call for widening the turn lane on U.S. Route 13 and improving the shoulder on Route 175 eastbound to accommodate tractor-trailers turning right on Route 175. No other comments were provided with regard to the various interchange options.

#### 5.3.3.3 U.S. Route 13 between Oak Hall and Temperanceville

These two communities have been grouped together based on their proximity to each other and their similar access management and safety needs on U.S. Route 13. In some cases, a distinct solution or possible solutions were developed for each community that could be implemented independently of the selected solutions in the other community. There were also alternatives developed that spanned both communities. For comparison purposes, these two communities are presented together, and the start and end points of the proposed alternatives are coincident. By breaking out the alternatives this way, a joint Oak Hall/ Temperanceville alternative can be directly compared to the combination of one Oak Hall only alternative and one Temperanceville only alternative. In Oak Hall, a total of three alternatives were developed, and four alternatives were developed in Temperanceville. These alternatives are conceptually depicted in Figure 5-4.

### Oak Hall

The descriptions of Oak Hall alternatives will begin at the U.S. Route 13/Route 175 intersection and continue to just south of the Route 694 intersection, at approximately Milepost 131.7.

**Oak Hall Alternative 1: Improvements on Existing Alignment**

***Description.*** Alternative 1 consists of improvements on the existing roadway. Additional right-of-way would be required, although detailed right-of-way needs are unknown at this time.

The first median opening south of Route 175 would be closed due to its proximity to the U.S. Route 13/Route 175 intersection. The next opening to the south, approximately 1,400 feet from the intersection, would be upgraded to provide a full crossover with turn lanes for all movements. This crossover should be used to consolidate access for all properties between Route 175 and the power line easement.

Continuing south into Oak Hall, Alternative 1 improvements would include improved shoulders to a width of 12 feet, a 16-foot raised median, and an improved intersection with Withams Road (Route 703), including turn lanes for all movements. Both the northbound and southbound lanes would be realigned to provide the widened median. The median and shoulder improvements would continue south to the Route 702 (Horsey Road/Mocks Landing Road) intersection. Four existing median openings would be closed through town, with access consolidated at four remaining crossovers, which would all be upgraded with new turn lanes and improved geometry. For approximately 1,000 feet north and south of Route 702, the northbound lanes would be realigned slightly to the east to improve the existing curvature and reconstruct the intersection at Route 702. Jerusalem Road (Route 694) would be relocated to intersect at a new full crossover approximately 800 feet south of the existing intersection.

***Safety and Transportation Benefits.*** The Alternative 1 improvements will improve the safety and capacity of U.S. Route 13 by reducing conflict points, improving geometrics of both the mainline of U.S. Route 13 and intersections with local roadways.

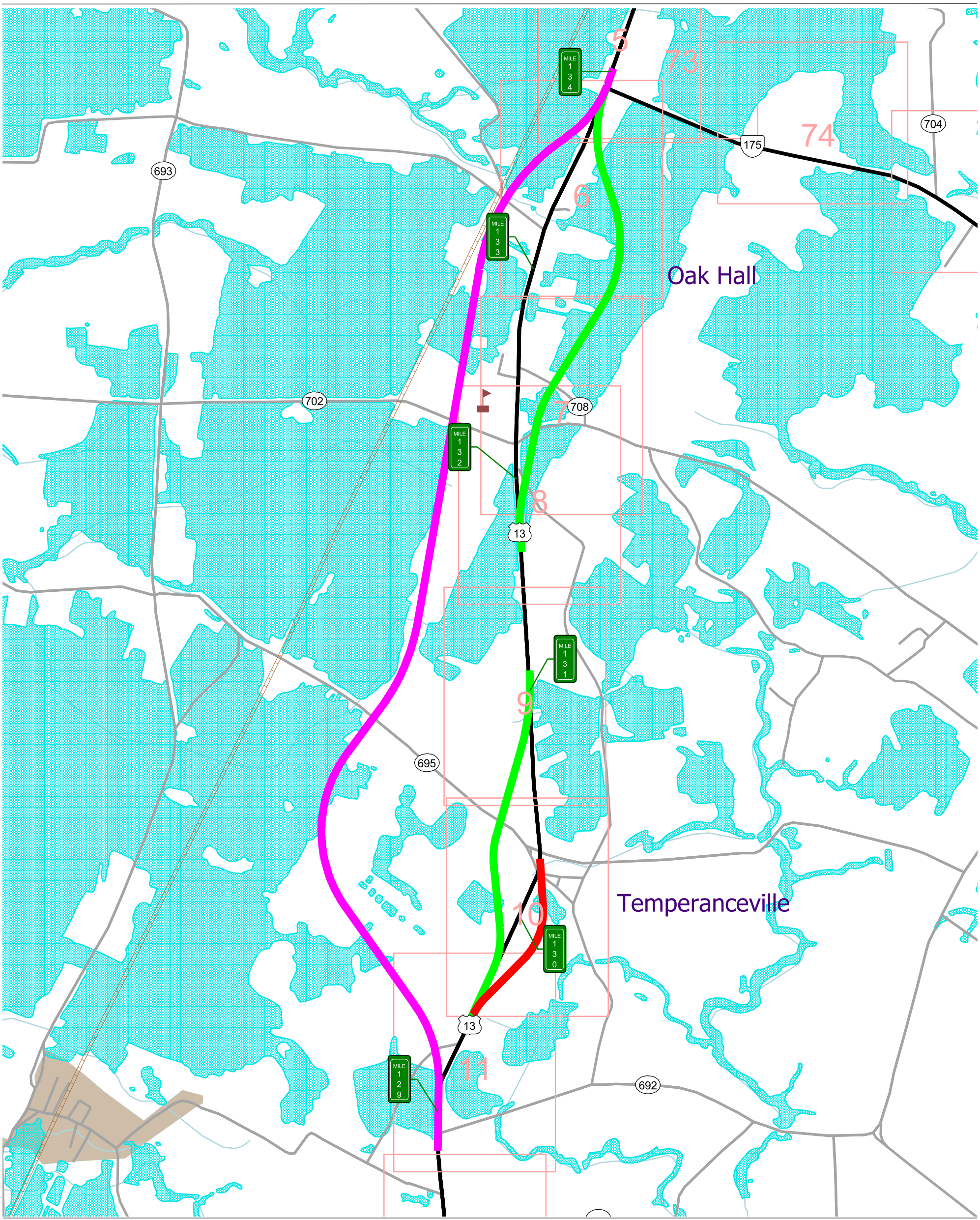
***Potential Impacts.*** New construction in currently wooded areas, while limited, could potentially impact forested wetlands. For example, the reconstruction of Route 702 and Route 694 near milepost 132 traverses areas mapped as forested wetlands by the National Wetlands Inventory database. More detailed investigations would be required for final design and permitting. Overall, potential impacts to natural resources can be expected to be far less with Alternative 1 than Alternative 2. No previously recorded historic sites were identified in this area.

As previously noted, additional right-of-way along U.S. Route 13 will be required to construct this alternative. While the right-of-way needs have not been quantified, the potential exists for business and residential relocations in areas where homes or businesses are in close proximity to the existing roadway right-of-way.

***Cost.*** This improvement is projected to cost $4.5 million to construct.

#### Oak Hall Alternative 2: Bypass to East

***Description.*** The second alternative for Oak Hall consists of a controlled-access four-lane, divided highway bypass on new alignment, skirting the town to its east. This highway would require approximately 200 feet of right-of-way. A cross-section detail of this bypass and all other bypasses considered by this study is shown in Figure 5-5. Just south of the intersection with Route 175, this bypass would curve to the east. A cul-de-sac would be provided on existing U.S. Route 13 to preserve access to properties. A new connection road would be constructed north of the power line easement to provide access to the existing corridor,and to the north side of town.This connection would include an at-grade intersection with turn lanes for all directions. Page Fisher Road (Route 703), due to its residential nature, would be bisected and provided with cul-de-sacs. This would restrict traffic to residents only. A full




Route 13/Wallops Island Access Management Study

We Keep Virginia Moving

Alternative 1
Improvements on Existing Alignment

Alternative 2

Alternative 3

Alternative 4 and 5

NWI Wetlands

# Aerial Photo Number

**Figure 5-4**
**U.S. Route 13 Corridor**
**Oak Hall and Temperanceville**
**Alternatives**

N

connecting intersection would be provided at Mocks Landing Road (Route 702) just to the south, approximately 500 feet east of existing U.S. Route 13. The bypass would connect again to existing U.S. Route 13 just south of the Jerusalem Road (Route 694) intersection. The existing U.S. Route 13/Jerusalem Road intersection would be eliminated; instead Jerusalem Road would be realigned to the north to connect with Mocks Landing Road. As on the north side of town, a cul-de-sac would be provided near milepost 132, to preserve access to all parcels along existing U.S. Route 13.

***Safety and Transportation Benefits.*** A bypass has the effect of separating through traffic from local traffic, which would benefit local residents by significantly reducing the volume of tractor-trailers and other faster moving vehicles. A bypass would increase the overall safety of the bypassed portion of U.S. Route 13, improving the ability of local drivers to make left turns comfortably, and to enter and exit driveways without fear of being hit while accelerating or decelerating. Reduced traffic volumes would also provide more of the roadway capacity for local drivers in normally congested areas, such as shopping center entrances and plant entrances, and for special events in the community.

Another advantage of a bypass alternative is evident when compared with alternative 1: improving U.S. Route 13 on its existing alignment. Improving U.S. Route 13 on its existing alignment would require some additional right-of-way acquisition in certain areas adjacent to the corridor, and could cause businesses and residences to relocate. Since bypasses are proposed for outside the corridor, it is less likely that an established business or residence would have to move as a result of its construction.

***Potential Impacts.*** An eastern bypass could have potentially significant impacts to forested wetlands that stretch along the entire area east of U.S. Route 13. As such, this alternative will require various local, state, and federal approvals and permits. No previously recorded historic sites or threatened/endangered species were identified in this area.

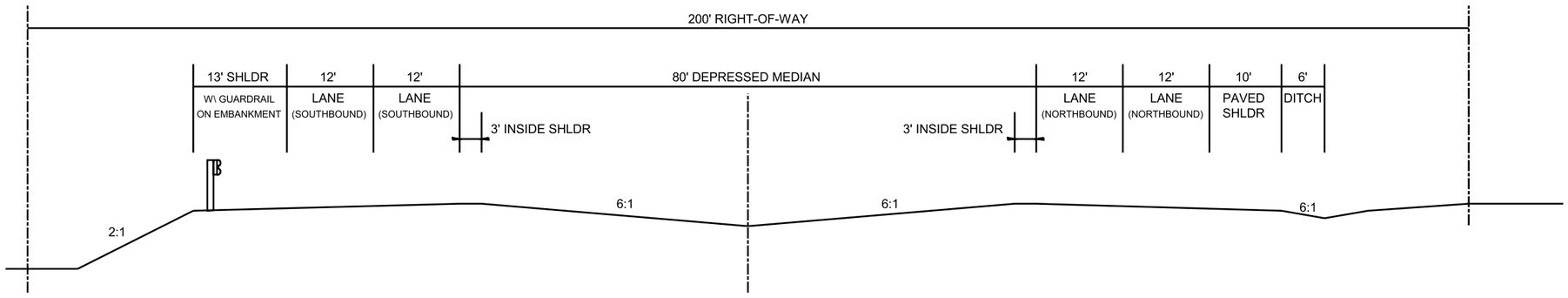
The advantage to any bypass alternative in this area, as opposed to widening U.S. Route 13, is that it would not involve direct right-of-way impacts to homes and business along U.S. Route 13. Indirectly, businesses currently along U.S. Route 13 could potentially experience economic impacts associated with the diversion of through traffic.

***Cost.*** These improvements are projected to cost $10.2 million to construct.

### Temperanceville

For the purposes of these descriptions, the Temperanceville area begins just south of the U.S. Route 13/ Jerusalem Road (Route 694) intersection, located at Milepost 131.7, and ends at the U.S. Route 13/Chesser Road (Route 692) intersection at approximately Milepost 128.9.

**Figure 5-5**
**Bypass Cross Section**




TYPICAL BYPASS CROSS SECTION (LIMITED ACCESS) (200' RIGHT OF WAY)

Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

**Temperanceville Alternative 1: Improvements to Existing Roadway**

***Description.*** Beginning just south of Jerusalem Road (Route 694), the first alternative would upgrade the crossover at Big Daddy Home Sales with turn lanes and a realigned driveway. Approaching the C. S. Fischer Poultry area, the existing crossover just north of the existing business access would be closed. The northbound lanes would be transitioned to the east to widen the median to 50 feet. In addition, the crossover currently at this group of businesses would be improved, with turn lanes adequate for trucks serving C. S. Fischer. South of this location, the northbound lanes would transition back to the existing alignment within approximately 1,500 feet.

The median opening at Milepost 130.8, just north of Gina's antiques, would be closed. Just south of this location, where the existing U.S. Route 13 median begins to narrow, improved 12-foot wide paved shoulders and a 16-foot wide raised median would be introduced. This cross section would continue through Temperanceville to Milepost 130. A full intersection would be provided at Route 695, and Old Route 695 at the Chevron station would have right-in/right-out access.

Between Milepost 130 and the Tyson plant entrance, the roadway would widen to provide an 80-foot wide median at the Tyson entrance. All turn lanes would be improved to a 350-foot length to facilitate truck movements. Existing median openings north and south of the Tyson entrance would be closed. The roadway would taper back to its existing width at the Route 757 intersection, where there would be turn lanes for all movements.

Entering the curve just south of Route 757, the northbound lanes would be transitioned eastward to lengthen the curve radius, thereby improving sight distance and the safety of the curve. Chesser Road (Route 692) would be relocated to the north with a new intersection with U.S. Route 13. Existing median openings at existing Chesser Road and to the south of Chesser Road would be closed.

***Safety and Transportation Benefits.*** Alternative 1 improvements will improve the safety and capacity of U.S. Route 13 by reducing conflict points, improving geometrics of both the mainline of U.S. Route 13 and intersections with local roadways.

***Potential Impacts.*** While the potential for impacts to wetlands is relatively minimal through this area, widening of the roadway could potentially encroach upon farmland which abuts either side of the roadway. No previously recorded historic sites or threatened/endangered species were identified in this area.

Similar to the Oak Hall area, additional right-of-way along U.S. Route 13 will be required to construct this alternative. While the right-of-way needs have not been quantified, the potential exists for business and residential relocations in Temperanceville where homes or businesses are in close proximity to the existing roadway right-of-way.

***Cost.*** This improvement is projected to cost $5.6 million to construct.

**Temperanceville Alternative 2: Bypass to West**

***Description.*** This alternative includes a controlled access four-lane divided highway bypass around Temperanceville, leaving the existing U.S. Route 13 roadway as-is within the bypass limits. The bypass would have four 12-foot lanes, depressed 80-foot median with 10-foot outside shoulders and access limited to existing crossroads.

Beginning just south of Jerusalem Road (Route 694), at Milepost 131.7, Alternative 2 includes the same improvements as Alternative 1 at Big Daddy Home Sales and the C. S. Fischer Poultry area. Widening and lane improvements for the Bypass roadway would begin to the north of C. S. Fischer Poultry, and would incorporate the improved intersection at this location.

Immediately south of C. S. Fischer Poultry, near Milepost 131, the bypass would enter a gentle curve to the west. Just north of Gina's Antiques, a full intersection would connect the bypass with existing U.S. Route 13, providing access to the north end of Temperanceville. The bypass would intersect Saxis Road (Route 695) with a full crossover and intersection approximately ¼ mile west of Route 695's existing intersection with U.S. Route 13. Proceeding south from Saxis Road , the bypass would curve to the east again and proceed nearly due south to tie back into existing U.S. Route 13 adjacent to the Tyson plant.

The Tyson plant would receive a modified driveway north of the plant, intersecting with the new bypass at a full crossover that would continue east as a connector to existing U.S. Route 13. The existing full access driveway for Tyson would be closed, and the southern entrance would remain as a right-in-right out only driveway. Even though the highway would be back on the existing alignment of U.S. Route 13 at this point, the southbound lanes would be relocated to provide a wider median and to set up a full crossover at Route 757. The median opening between the Tyson entrances and Route 757 would be closed. The southernmost group of improvements for Temperanceville under Alternative 2 involve realigning the northbound lanes of U.S. Route 13 at the curve near Milepost 129, thereby improving design speed and safety. Additionally, the intersection with Chesser Road (Route 692) would be realigned to the north and provided with adequate turn lanes.

***Safety and Transportation Benefits.*** The main feature of Temperanceville Alternative 2 is that it forms a four-lane, divided highway bypass around the town. The advantages of a bypass include improved safety within the bypassed portion of the Town, higher roadway capacity on U.S. Route 13 within the Town, a separation of local and through traffic, and less right-of-way impacts to homes and businesses within the Town.

***Potential Impacts.*** A western bypass around Temperanceville would traverse primarily through farmland and thus impact that resource. However, only limited wetland areas would be potentially impacted. No previously recorded historic sites or threatened/endangered species were identified in this area.

The advantage to any bypass alternative in this area, as opposed to widening U.S. Route 13, is that it would not involve direct right-of-way impacts to homes and business along U.S. Route 13. Indirectly, businesses currently along U.S. Route 13 could potentially experience economic impacts associated with the diversion of through traffic.

***Cost.*** This alternative is projected to cost $10.4 million to construct.

**Temperanceville Alternative 3: Bypass to East**

***Description.*** Temperanceville Alternative 3 includes a bypass to the east of town with four 12-foot lanes, depressed median with 10-foot outside shoulders and controlled access rights.

North of Temperanceville, the improvements to the C.S. Fischer and Big Daddy Homes access would be identical to those for Alternatives 1 and 2. The existing U.S. Route 13 roadway would be widened to a 4-lane divided highway with a 16-foot raised median from approximately adjacent to the Mason lodge south through an improved intersection with Route 695, which would be rebuilt with turn lanes for full access in all directions. South of this intersection, the alignment would continue nearly due south into the wooded area east of U.S. Route 13 and south of Route 2701. A cul-de-sac would be installed on Route 2701 to isolate the residential roadway from the new highway. From this area, the bypass would form a sweeping curve, passing east of the residences to the east of U.S. Route 13, and tying back to U.S. Route 13 immediately south of the Tyson plant. The Tyson access driveway would be lengthened and made into a high capacity intersection for truck access to and from U.S. Route 13. Alternative 3 includes the same improvements near Chesser Road (Route 692) and Route 757 as Alternatives 1 and 2.

***Safety and Transportation Benefits.*** Temperanceville Alternative 3 places a bypass to the east of the south side of town, resulting in less disruption to business frontages than Alternative 1, while keeping the through traffic on Route 13 at the main commercial intersection with Route 695.

***Potential Impacts.*** An eastern bypass around Temperanceville would impact both farmland and forested wetland areas located to the east of town. While no previously identified historic properties or threatened/endangered species were noted in the existing database information, additional investigations would likely be necessary prior to implementation.

The advantage to both bypass alternatives in this area, as opposed to widening U.S. Route 13, is that they would not involve the extent of direct right-of-way impacts to homes and businesses along U.S. Route 13. The eastern bypass, as shown, could potentially impact more homes and businesses through displacement than Alternative 2, the bypass to the west. Indirectly, businesses currently along U.S. Route 13 could potentially experience economic impacts associated with the diversion of through traffic.

***Cost.*** This alternative is projected to cost $6.6 million to construct.

## Combined Improvement Alternatives

Alternatives 4 and 5 feature the development of a joint bypass, also known as a controlled access roadway on new alignment. The bypass would start just south of the U.S. Route 13 intersection with Route 175 and would bypass Oak Hall and Temperanceville to the west, tying back to existing U.S. Route 13 south of the Tysons development in Temperanceville.

### Alternative 4: Western Bypass of Oak Hall and Temperanceville

***Description.*** Alternative 4 consists of a four-lane controlled-access highway bypassing both Oak Hall and Temperanceville to the west on approximately 200 feet of right-of-way. The connection between this new bypass and existing U.S. Route 13 would be a single flyover interchange that would allow southbound traffic to access existing U.S. Route 13 into Oak Hall via a slip ramp connection. Likewise, traffic moving northbound out of Oak Hall would use a slip ramp occupying the current location of the U.S. Route 13 northbound lanes. Thus movements to and from Oak Hall from the north would be direct. The connection between the bypass and Route 175 in this case would be an at-grade intersection in the existing location.

South of Route 175, the roadway would curve west to intersect Withams Road (Route 703) very near the railroad right-of-way. Withams Road would be elevated on embankment in this vicinity, and would bridge the railroad. Due to its proximity to the railroad, the intersection of Withams Road and the bypass would also be elevated on embankment.

South of Withams Road, the bypass alignment would head nearly due south on a straight alignment. After a conventional intersection with Horsey Road (Route 702), with turn lanes in all directions, the alignment would skirt the tree line behind the agricultural fields between Horsey Road and Saxis Road (Route 695), where there would be another conventional intersection with Saxis Road. South of this intersection, the bypass would curve to the east so as to skirt the Tyson plant to its west and south. A new connection driveway for Tyson would be constructed for Tyson's access with heavy truck accommodations. South of the Tyson plant, the bypass would curve to the south and tie back to the alignment of existing U.S. Route 13 near Milepost 129. Existing U.S. Route 13 would end in a cul-de-sac just south of the existing Route 757 intersection so as to provide access to all properties along existing U.S. Route 13.

***Safety and Transportation Benefits.*** Alternative 4 would remove through traffic from Oak Hall and Temperanceville, minimizing physical impacts on land uses adjacent to existing U.S. Route 13 and would result in a bypass of both towns. The decision to elevate Withams Road (Route 703) and its intersection with the bypass was chosen to minimize direct impacts to residential properties along Withams Road.

***Potential Impacts.*** As shown in Figure 5-4, potentially significant impacts to forested wetlands and farmland are associated with Alternative 4 given the length of this new corridor. Furthermore, there are limited opportunities to avoid such impacts. No previously recorded historic sites or threatened/ endangered species were identified in this area. However, further field investigations for both natural and cultural resources would be necessary during the design and permitting of this alternative.

As with the individual bypass alternatives, this larger bypass would result in less direct right-of-way impacts to homes and businesses along U.S. Route 13 within the towns. However, some homes or properties further outside the towns but within the footprint of the new alignment could potentially be displaced. Also, extensive right-of-way would be needed from property owners outside the towns.

***Cost.*** This alternative is projected to cost $25.0 million to construct.

**Alternative 5: Western Bypass of Oak Hall and Temperanceville with Interchange**

***Description.*** Alternative 5 is the same joint bypass concept as Alternative 4, except for a full interchange connection between Route 175 and the new bypass highway, rather than the limited movement interchange of Alternative 4. For this scenario, existing U.S. Route 13 would be terminated north of the power line easement, and Oak Hall access would be provided via Withams Road (Route 703) for all movements. Movements and access south of Route 175 would be the same as those for Alternative 4.

***Safety and Transportation Benefits.*** The safety and transportation benefits are similar to Alternative 4, but Alternative 5 uses a higher capacity solution for traffic passing through or interchanging with Route 175.

***Potential Impacts.*** Potential impacts associated with Alternative 5 are similar to those noted for Alternative 4 except all anticipated impacts would be correspondingly greater for Alternative 5 as a result of the additional interchange.

***Cost.*** This alternative is projected to cost $28.9 million to construct.

**Public Input on the Oak Hall and Temperanceville Alternatives**

At the Town Meeting in this area, attendees generally preferred a bypass over improvements to U.S. Route 13. At this meeting, citizens suggested that another bypass option, starting south of Tyson's, be developed – this led to the development of Alternatives 3 and 4. In addition, citizens suggested that another alternative be developed in the form of one larger bypass around both towns. This suggestion led to the development of Alternatives 4 and 5. Some citizens did favor the improvements to the existing roadway. At the subsequent Public Information Meeting, there was a mix of support for a bypass option and support for Alternative 1, the widening of existing U.S. Route 13.

### 5.3.3.4 U.S. Route 13 between Mappsville and Nelsonia

These alternatives are conceptually depicted in Figure 5-6.

**Mappsville Alternative 1: Improvements to Existing Corridor**

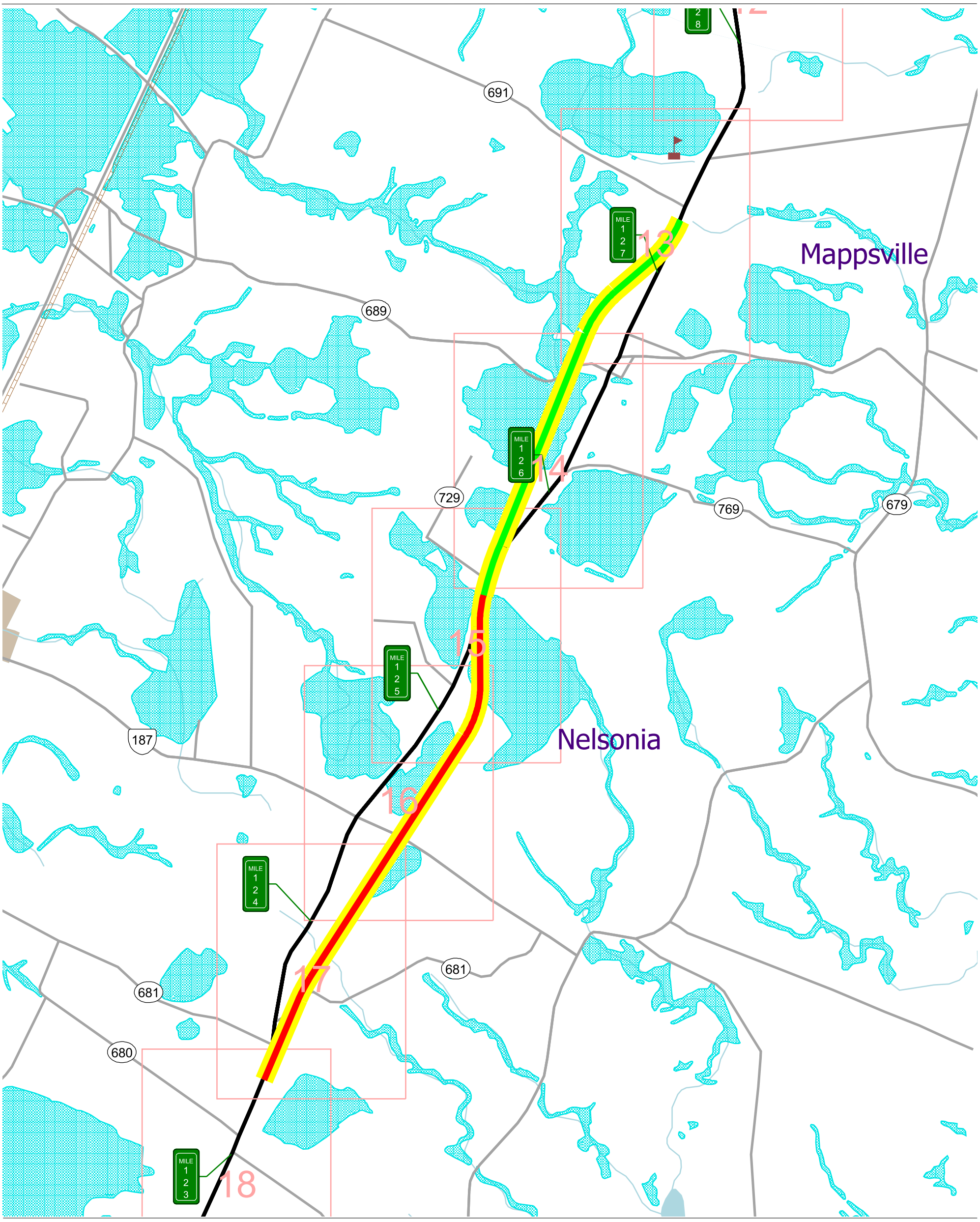
***Description.*** The Mappsville area begins at the northern boundary of the Metompkin District, at Milepost 128. Looking south from this location, U.S. Route 13 curves to the west, and approaches two intersections, the first serving the east leg of Route 691 (John Taylor Road) and Eastern Shore Seafood, the second, approximately 1200 feet to the south, serving the west leg of Route 691(Groton Town Road) and Kegotank Elementary School. The existing median at John Taylor Road is approximately 35 feet wide, and at Groton Town Road the median is merely a 12-foot continuous left-turn lane.

The Alternative 1 improvements would begin approximately 1,200 feet north of John Taylor Road, and the northbound lanes would be rebuilt to the east to provide an 80-foot wide median through the area, to south of Groton Town Road. Turn lanes, 350 feet long, would accommodate heavy vehicle movements at both intersections. The median would taper back and the lanes would meet the existing cross section approximately 2,000 feet south of Groton Town Road, near Milepost 127.

From Milepost 127 to Milepost 126, within the built-up portion of Mappsville, the existing continuous two-way left-turn lane would be removed in favor of a raised median. Localized widening would accommodate turn lanes for all movements at intersections with realigned Mappsville Road (Route 689) and Route 769. Additionally, 12-foot shoulders with curb and gutter would be added to U.S. Route 13 through this same area to serve as continuous right-turn lanes and buffer land uses from the highway.

A reverse frontage road system would provide better heavy vehicle access to the Stuckey's on the east side of U.S. Route 13 immediately south of Mappsville, directing the southbound motorist north to the improved intersection with Route 769 for the left turn movement. Directional turn lanes in the median at Milepost 126 would prevent left turns at this intersection, and the next median crossover to the south would be closed. Alternative 1 includes an improved northbound radius for the curve on U.S. Route 13 at Milepost 125.6, adjacent to the tomato packing facility on the west of the highway. This improvement would widen the median to 80 feet and provide a full crossover with 350-foot turn lanes for all movements to accommodate heavy vehicles. A second reverse frontage road system would provide access to the poultry facility northeast of the new intersection.

***Safety and Transportation Benefits.*** Alternative 1 will improve the safety and capacity of U.S. Route 13 by reducing conflict points, improving geometries on both the mainline of U.S. Route 13 and intersections with local roadways.




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

- Alternative 1 Improvements on Existing Alignment
- Alternative 2 Nelsonia Bypass
- Alternative 2 Mappsville Bypass
- Alternative 3
- NWI Wetlands
- # Aerial Photo Number

N

**Figure 5-6**
**Mappsville and Nelsonia Alternatives**

***Potential Impacts.*** Potential impacts associated with Alternative 1 are expected to be limited to small areas of wetlands, as well as farmland and right-of-way impacts to homes and businesses along U.S. Route 13 in Mappsville and near the other improvements. Improvements related to Alternative 1 could potentially impact wetlands primarily in the location of the proposed reverse frontage road.

***Cost.*** This improvement is projected to cost $6.4 million to construct.

**Mappsville Alternative 2: Upgraded Improvements to Existing Corridor**

***Description.*** Alternative 2 for the Mappsville area includes improvements similar to those in Alternative 1, yet with certain operational improvements. From Milepost 128 south past the Eastern Shore Seafood plant, the improvements would be identical to Alternative 1. The northbound lanes would be rebuilt to the east of their current location, and an 80-foot wide median would carry south past Groton Town Road(Route 691). However, rather than taper back to the existing section at Milepost 127, Alternative 2 would continue with a 16-foot raised median via a relocation to the west of both the northbound and southbound lanes. This improvement would also include new 12-foot paved shoulders, and would continue south to the Stuckey's, where the existing grass median resumes.

Mappsville Road (Route 689) would be relocated with an improved intersection at Mathew's Market, and Route 769 would be relocated at a new full crossover just north of its current intersection. The two median crossovers just south of Milepost 126 would be closed, and the northbound lanes of U.S. Route 13 would be realigned to provide an 80-foot wide median and a full crossover adjacent to the tomato plant at Milepost 125.6. To serve agricultural and heavy vehicles, a reverse frontage road would run parallel to and east of U.S. Route 13, from relocated Route 769 behind Stuckey's, to intersect with a new service road connecting to the new crossover at Milepost 125.6.

***Safety and Transportation Benefits.*** Alternative 2 will improve the safety and capacity of U.S. Route 13 similar to Alternative 1 and will provide additional protection for vehicles using the crossover as a result of the increased median width.

***Potential Impacts.*** Impacts for Alternative 2 would be similar to those for Alternative 1 with the exception of additional impacts associated with the longer reverse frontage road near the poultry waste management facility. The extension of the reverse frontage road in this area appears to traverse additional forested wetland areas.

***Cost.*** This improvement is projected to cost $6.2 million to construct.

**Mappsville Alternative 3: Bypass to West**

***Description.*** Alternative 3 is a western bypass of Mappsville starting on the north end south of Route 691. The Bypass parallels existing U.S. Route 13 to the west and connects back to U.S. Route 13 near the Tomato Packing Plant. A full intersection is provided with the Bypass and Route 689 and on the southern end a full intersection is provided with a connector road to existing U.S. Route 13 near the Poultry Waste Management Facility.

***Safety and Transportation Benefits.*** The main feature of Mappsville Alternative 3 is that it forms a four-lane, divided highway bypass around the town. The advantages of a bypass include improved safety within the bypassed portion of the Town, less congestion on U.S. Route 13 within the Town, a separation of local and through traffic, and less right-of-way impacts to homes and businesses within the Town.

***Potential Impacts.*** The entire alignment for a bypass alternative to the west traverses large areas of both farmland and forested wetlands. Impacts to these resources would be significantly greater with Alternative 3 than with Alternatives 1 and 2. Implementation of Alternative 3 would require various local, state and federal approvals and permits. No previously recorded historic sites or threatened/ endangered species were identified in this area. However, further field investigations for both natural and cultural resources would be necessary during the design and permitting of this alternative.

As with other bypass alternatives in the corridor, this bypass would result in less direct right-of-way impacts to homes and businesses along U.S. Route 13 within Mappsville. Indirectly, businesses currently along U.S. Route 13 could potentially experience economic impacts associated with the diversion of through traffic.

***Cost.*** This improvement is projected to cost $8.4 million to construct.

**Nelsonia Alternative 1: Improvements to the Existing Corridor**

***Description.*** Between the intersection at Milepost 125.6 and Route 775, two existing median crossovers would be closed, and the southbound lanes of U.S. Route 13 would be transitioned west to provide an 80-foot median and upgraded intersection with Sherwood Road (Route 775). This intersection would be modified to accommodate a new northern driveway for the Pepsi distributor, and the existing crossover at the Pepsi distributor would be closed. The roadway would transition back to the existing cross section approximately 1000 feet south of this intersection, at Milepost 125.

The crossover at the Christmas Shop would receive upgraded turn lanes. South of the Christmas Shop, Alternative 1 would include realigning the existing southbound lanes, replacing the existing continuous two-way left-turn lane with a new 16-foot raised median and adding 12-foot paved outside shoulders. This improvement

would continue south to the existing limit of the continuous two-way left-turn lane. Included is an upgrade of the Route 187 intersection to provide new turn lanes and reconfigure the signal. The southernmost improvements in the Nelsonia area include the realignment of the eastern leg of Route 681 (Littleton Road) to line up with the western leg of Route 681 (Mason Road) at a new intersection with a 50-foot median and turn lanes. These improvements taper back to the existing cross section approximately 1000 feet south of the new intersection.

***Safety and Transportation Benefits.*** Alternative 1 improvements will improve the safety and capacity of U.S. Route 13 by reducing conflict points, improving geometrics on both the main line of U.S. Route 13 and intersections with local roadways.

***Potential Impacts.*** Based on existing database information and mapping, impacts to wetlands, other sensitive resources and farmland are expected to be minimal. Additional right-of-way will be required from homes and businesses along U.S. Route 13 in Nelsonia but residential or business displacements are not anticipated.

***Cost.*** This improvement is projected to cost $4.9 million to construct.

**Nelsonia Alternative 2: Eastern Bypass**

***Description.*** Alternative 2 brings the through movement of U.S. Route 13 onto a bypass east of Nelsonia. South of the new crossover at Milepost 125.6, the mainline would be rebuilt to continue curving to the east, and would pass behind the Pepsi distributor. A connection roadway intersecting the new bypass would allow access back to existing U.S. Route 13 just north of Sherwood Road (Route 775).

After turning generally parallel to and running east of existing U.S. Route 13, the bypass would intersect Route 187 approximately 1000 feet east of existing U.S. Route 13. The bypass alignment would continue to the southwest, intersecting with the eastern leg of Route 681 (Littleton Road). Littleton Road would be extended to the existing lanes of U.S. Route 13 to provide access to the south portion of Nelsonia, and the western leg of Route 681 (Mason Road). The bypass ties back to existing U.S. Route 13 approximately at Milepost 123.3.

***Safety and Transportation Benefits.*** A bypass will remove through traffic from existing U.S. Route 13 and improve overall safety within the bypassed portion of the Town. The four-lane bypass will provide higher capacity than the widening of U.S. Route 13 on existing alignment. There will be less right-of-way impacts to homes and businesses along U.S. Route 13 near Nelsonia.

***Potential Impacts.*** Alternative 2 traverses existing farmlands, forest, and wetlands in this corridor. Impacts to these resources would be significantly greater with Alternative 2 than with Alternative 1. Implementation of Alternative 2 would require various local, state and federal approvals and permits. While no previously identified historic properties or threatened/endangered species were noted in the

existing database information, additional investigations would likely be necessary prior to implementation.

As with other bypass alternatives in the corridor, this bypass would result in less direct right-of-way impacts to homes and businesses along U.S. Route 13 within Nelsonia. Indirectly, businesses currently along U.S. Route 13 could potentially experience economic impacts associated with the diversion of through traffic.

***Cost.*** This improvement is projected to cost $8.2 million to construct.

**Mappsville and Nelsonia Alternative 3: Joint Bypass**

***Description.*** This Alternate provides a joint bypass of both Mappsville and Nelsonia with a single controlled access facility on approximately 200 feet of right-of-way. In Mappsville, the Joint Bypass is similar to the Mappsville Alternative 3 north of Kegotank Elementary School. However, just south of the improved intersection at Route 691 (Groton Town Road), the controlled access bypass would tie to the existing U.S. Route 13 lanes and immediately sweep to the west. Running approximately parallel to and 800 feet west of U.S. Route 13, the bypass would intersect with a relocated portion of Mappsville Road (Route 689), which would serve as a connector back to the existing U.S. Route 13 corridor in Mappsville.

Continuing south, the bypass would pass between the tomato facility and the existing home at approximate Milepost 125.6. Still a controlled access highway, the alignment would then sweep to the east into the Nelsonia area, passing behind the Pepsi distributor to the east. From this point, the Nelsonia portion of Alternative 3 is similar to Alternative 2 in Nelsonia.

***Safety and Transportation Benefits.*** This alternative combines the benefits of the Mappsville bypass and Nelsonia bypass.

***Potential Impacts.*** As shown in Figure 5-6, potentially significant impacts to forested wetlands and farmland are associated with Alternative 3 given the length of this new corridor. Furthermore, there are limited opportunities to avoid such impacts due to the extent of wetlands and farmland throughout this area on both sides of the road. No previously recorded historic sites or threatened/endangered species were identified in this area. However, further field investigations for both natural and cultural resources would be necessary during the design and permitting of this alternative.

As with the individual bypass alternatives, this larger bypass would result in less direct right-of-way impacts to homes and businesses along U.S. Route 13 within both towns. However, extensive right-of-way would be needed from property owners outside the towns.

***Cost.*** This improvement is projected to cost $16.6 million to construct.

**Public Input on the Mappsville and Nelsonia Area Alternatives**

Most of the comments received for this area pertained to Mappsville improvement alternatives. At the Town meeting conducted in this area, it was suggested that for Alternative 1, U.S. Route 13 be widened towards the west side rather than to the east. Suggestions to add a western bypass for Mappsville led to Alternative 3.

### 5.3.3.5 U.S. Route 13 in the Mary N. Smith Area

***Description.*** The roadway alignment of U.S. Route 13 between Accomac (starting at the northern intersection with Business Route 13) and Parksley Road (Route 176) is characterized by a meandering, curvilinear path with access and sight distance issues. A portion of this section (between MP 118.84 and 116.30) is undivided with a center two-way left-turn lane. There are a significant number of single-family homes here, particularly along southbound U.S. Route 13. The improvements developed for this roadway section involve three major efforts as shown in Figure 5-7 and Figure 5-8:

- Realignment of both northbound and southbound travel lanes to provide a straighter alignment.
- Construction of entire roadway section as a divided roadway.
- Signage to indicate the wider shoulders on U.S. Route 13 as a designated bicycle route between Business Route 13 and Metopkin Road (Route 679).

In addition, the existing acceleration lane from northbound Business Route 13 onto northbound U.S. Route 13 would be removed, due to poor sight distance. The intersection of U.S. Route 13 with Business Route 13 and Route 663 (Mary N. Smith Road) would be upgraded to provide improved turn lanes and a wider, 50-feet wide median. Also, on southbound U.S. Route 13, one-way frontage roads would be constructed at two locations, primarily using existing pavement from the southbound travel lanes, which would be relocated to the east.

***Safety and Transportation Benefits.*** The improved alignment and the provision of a median should improve overall safety of this section of U.S. Route 13. The purpose of designating U.S. Route 13 as a bicycle route in this area is to provide a signed connection between Route 600 in Accomac and Route 679, two routes currently proposed for bicycle accommodation in the regional bicycle plan.

***Potential Impacts.*** Based on existing database information and mapping, impacts to wetlands, other sensitive resources and farmland are expected to be minimal. Additional right-of-way will be required from homes and businesses along U.S. Route 13 but displacements are not anticipated. The construction of two frontage roads will impact the direct access to U.S. Route 13 but should make travel safer on U.S. Route 13.

***Cost.*** These improvements are projected to cost $7.0 million to construct.

**Public Input on the Mary N. Smith Alternative**

The need for safety improvements in this area was originally identified by the Citizen Advisory Committee (CAC) early in the study process and confirmed by subsequent field reconnaissance efforts. One of the issues specifically noted by the CAC was the difficulty in turning left out of Mary N. Smith Road due to restricted sight distance. In addition, the CAC noted poor sight distance for motorists traveling northbound on Business Route 13 with U.S. Route 13 northbound. No public comments were made with respect to the proposed improvements as described above.

### 5.3.3.6 Route 13 in the Whispering Pines Area

***Description.*** The improvement developed for this location involves the replacement of the existing flashing lights (which constantly flash) to warning signs that are signal activated. The second part of this improvement is the realignment of Business Route 13 (Tasley Road and Front Street) to intersect with U.S. Route 13 at a right angle. This proposed improvement is shown in Figure 5-9.

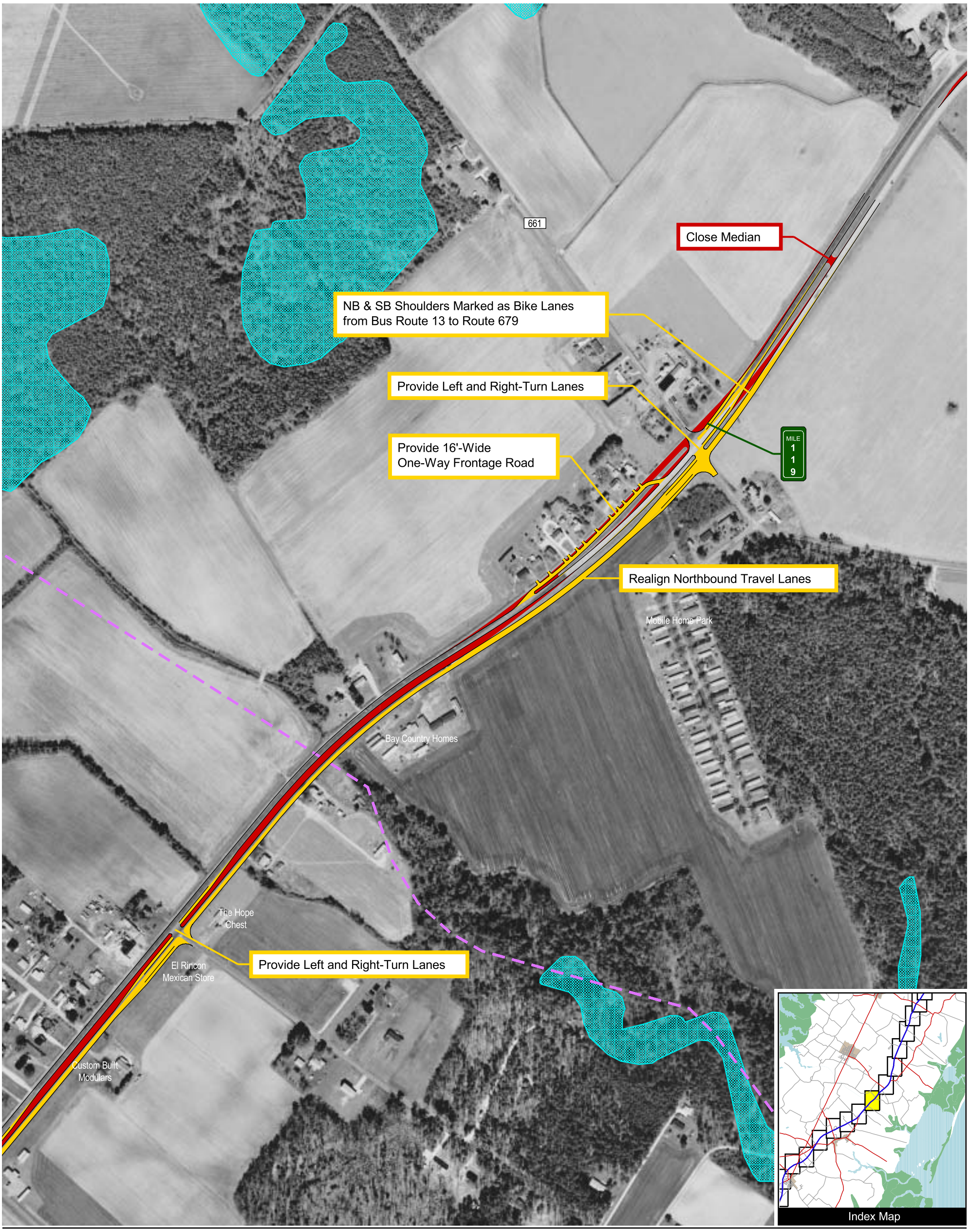
***Safety and Transportation Benefits.*** Throughout the study, Eastern Shore residents identified the Whispering Pines signal, located at the intersection of U.S. Route 13 with Business Route 13 (between Onley and Accomac), as a hazardous location. Vehicles have been frequently observed running the red light at this location, apparently as if they did not notice the traffic signal lights. This intersection has advance flashing signal warning signs in both directions, yet on two separate occasions the study team observed vehicles inadvertently running the red light nearly causing vehicular crashes.

***Potential Impacts.*** No wetlands are anticipated to be impacted by these improvements but field investigations should be conducted prior to construction to confirm this. No previously recorded historic structures or threatened and endangered species are located in this area. Impacts associated with this alternative appear to be limited to farmlands and right-of-way in the vicinity of the interchange realignment.

***Cost.*** This improvement is projected to cost $1.1 million to construct.

**Public Input on the Whispering Pines Alternative**

The Citizens Advisory Committee identified the Whispering Pines intersection as a major safety concern of the citizens of the Eastern Shore. No comments have been provided with respect to the proposed improvements as shown.




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

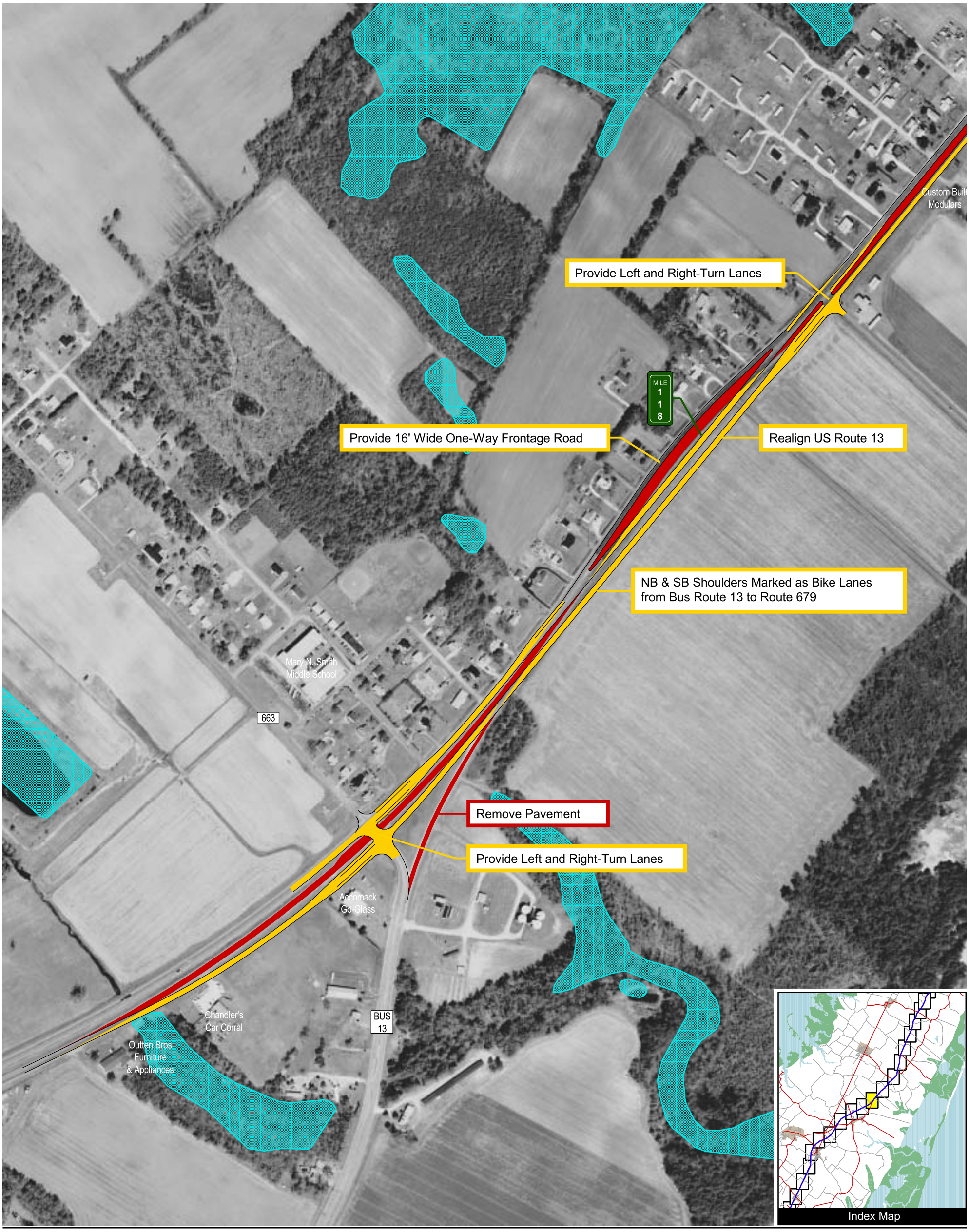
- New Pavement
- Pavement Removal
- Shoulder Widening to 12 feet
- Clear Vegetation
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland

**Figure 5-7**
**Sheet 22 of 80**
**County - Accomack**

N

Scale: 1" = 400'

Aerial imagery flown on March 29, 2000




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

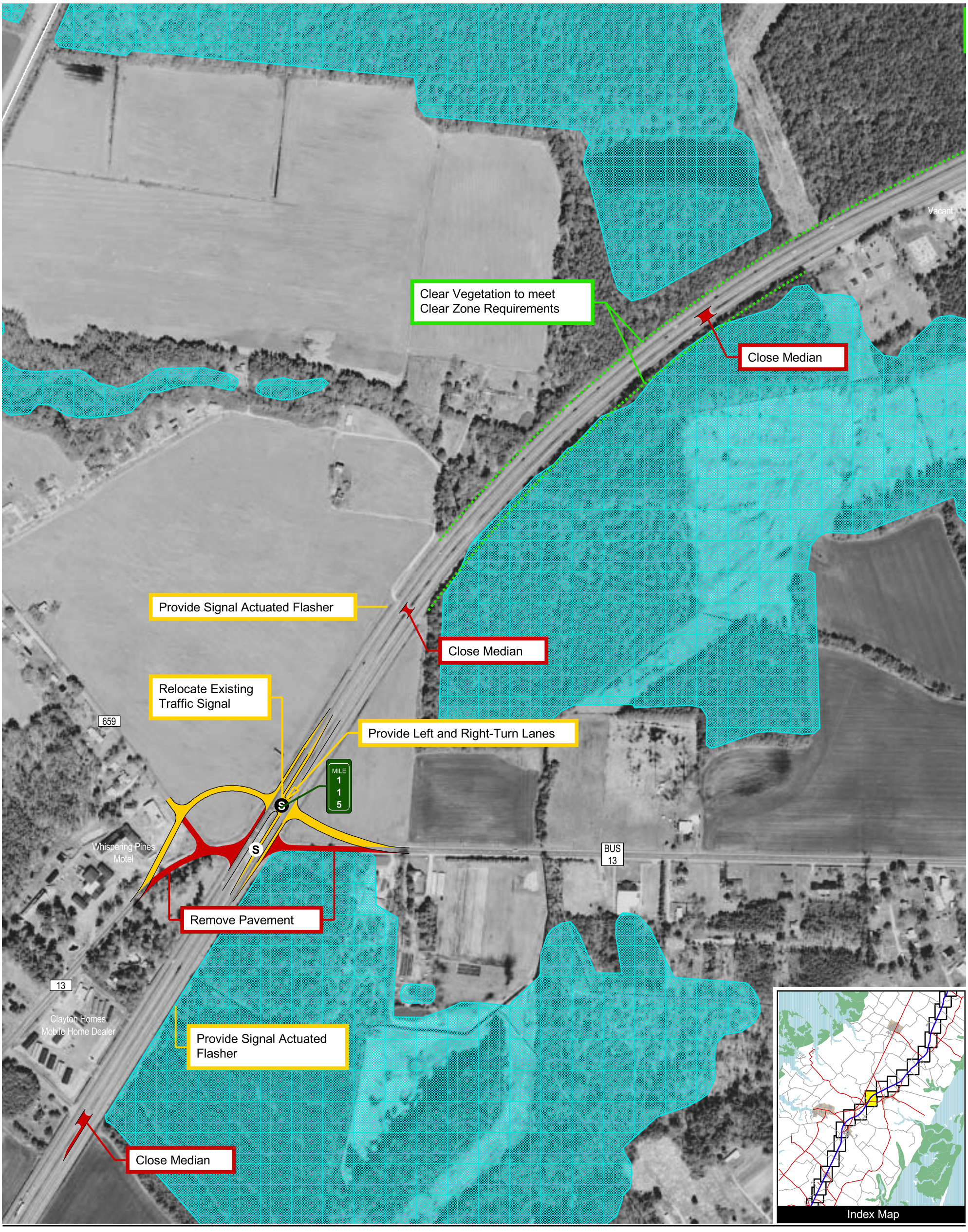
Aerial imagery flown on March 29, 2000

- New Pavement
- Pavement Removal
- Shoulder Widening to 12 feet
- Clear Vegetation
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland
- Historic

**Figure 5-8**
**Sheet 23 of 80**
**County - Accomack**

N

Scale: 1" = 400'




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

Aerial imagery flown on March 29, 2000

- New Pavement
- Pavement Removal
- Shoulder Widening to 12 feet
- Clear Vegetation
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland
- Historic

**Figure 5-9**
**Sheet 26 of 80**
**County - Accomack**

N

Scale: 1" = 400'

### 5.3.3.7 U.S. Route 13 in the Onley Area

***Description.*** U.S. Route 13 through Onley is surrounded by commercial development. To minimize travel on U.S. Route 13 between this development, a 24-foot local roadway connection is proposed between Chesapeake Square shopping center and Route 179. In addition, the existing left and right-turn lanes would all be improved to provide a minimum 12-foot width, 200 feet of storage, with a 200-foot taper. This improvement is shown in Figure 5-10.

***Safety and Transportation Benefits.*** U.S. Route 13 through Onley is congested as a result of traffic from Chesapeake Square shopping center and Four Corner Plaza. Chesapeake Square shopping center does not have direct access from Route 179, and as a result, traffic from Route 179 must turn north onto U.S. Route 13 for a very short distance, and then make a left turn into the shopping center. This stretch of road had one of the highest crash rates within the entire Eastern Shore. These improvements are recommended to take a portion of local traffic off U.S. Route 13 by facilitating travel between Route 179 and the Chesapeake Square shopping center.

***Potential Impacts.*** Based on available database information and mapping, no impacts to sensitive resources are anticipated as a result of this alternative. This should be confirmed in the field prior to construction.

***Costs.*** This improvement is projected to cost $2.0 million to construct.

**Public Input on the Onley Area Alternative**

The need for safety improvements in this area was identified by citizens throughout the study process. No comments have been received regarding the proposed improvements as presented.

### 5.3.3.8 U.S. Route 13 in the Melfa, Keller and Painter Area

For each town, two similar alternatives were developed. In order to provide improved roadway geometrics, the Eastern Shore railroad right-of-way is proposed to be either shifted to the east within the town boundary (Alternative 1), or relocated out of town (Alternative 2). These two alternatives are conceptually depicted in Figure 5-11.

The town of Melfa and some citizens from Melfa, Keller and Painter suggested a western highway bypass of their towns. These solutions were not studied in any detail. The impact on wetlands to the west of all three towns, and the barrier of a limited access highway on the west with the railroad left in its current location as an eastern barrier, were not viewed as a reasonable solution.

**Alternative 1: Shift Railroad Right-of-Way within Town**

***Description.*** The first alternative would shift the existing railroad right-of-way and railroad tracks by 30 feet to the east in order to provide an improved roadway cross section on U.S. Route 13. With this shift, a 20-foot wide median would be provided as shown in the proposed cross section detail in Figure 5-12. In the southbound travel direction, a 12-foot wide shoulder would be provided for access to existing businesses. A 10-foot wide shoulder would be provided on northbound U.S. Route 13, primarily for safety reasons.

***Safety and Transportation Benefits.*** The towns of Melfa, Keller and Painter developed directly on the rail line. U.S Route 13 was then built just to the west, parallel to the rail line, and by 1968, with the widening of U.S. Route 13 to a four-lane, divided roadway, the two transportation facilities were left too close together with little to no room for further improvement. The Eastern Shore railroad is currently a one-track railroad operating on a two-track (width) right-of-way, which is 66 feet wide. This makes the development of roadway improvements to U.S. Route 13 difficult to accomplish without the relocation of the Eastern Shore railroad.

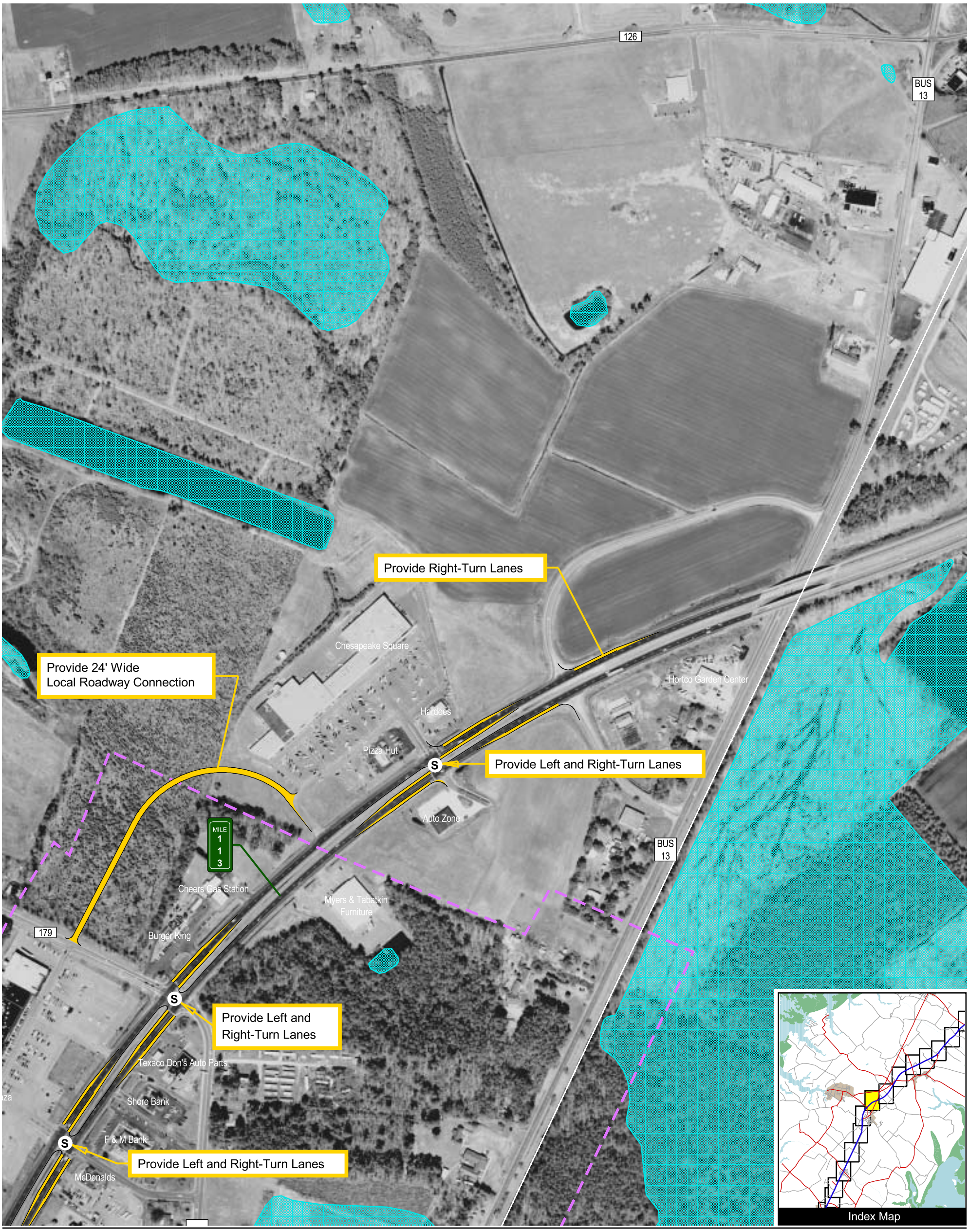
***Potential Impacts.*** Based on available database information and mapping, some impacts to sensitive resources are anticipated as a result of this alternative including wetlands, farmland and historic resources. Areas of wetlands, farmland and potentially significant historic sites are in close proximity to the existing railroad and could be affected depending on exact limits of these resources and the limits of construction needed. At this time, these impacts have not been quantified. Additional field investigations should be conducted to more accurately determine the limits of construction and potential impacts to these resources.

***Cost.*** This improvement is projected to cost $15.2 million to construct.

**Alternative 2: Relocated Railroad Right-of-Way Outside Town**

***Description.*** A second option would be the total removal/realignment of the Eastern Shore railroad to an undetermined alignment to the east of all three towns. With this option, the existing railroad right-of-way would be acquired and used for highway expansion. As shown in the cross section detail in Figure 5-12, this would allow for a 50-foot wide median with left and right-turn lanes.

***Safety and Transportation Benefits.*** The second rail relocation concept, Alternative 2, will allow for even greater flexibility for improvements on U.S. Route 13 and for accessible development along U.S. Route 13 than Alternative 1.




Route 13/Wallops Island Access Management Study

We Keep Virginia Moving

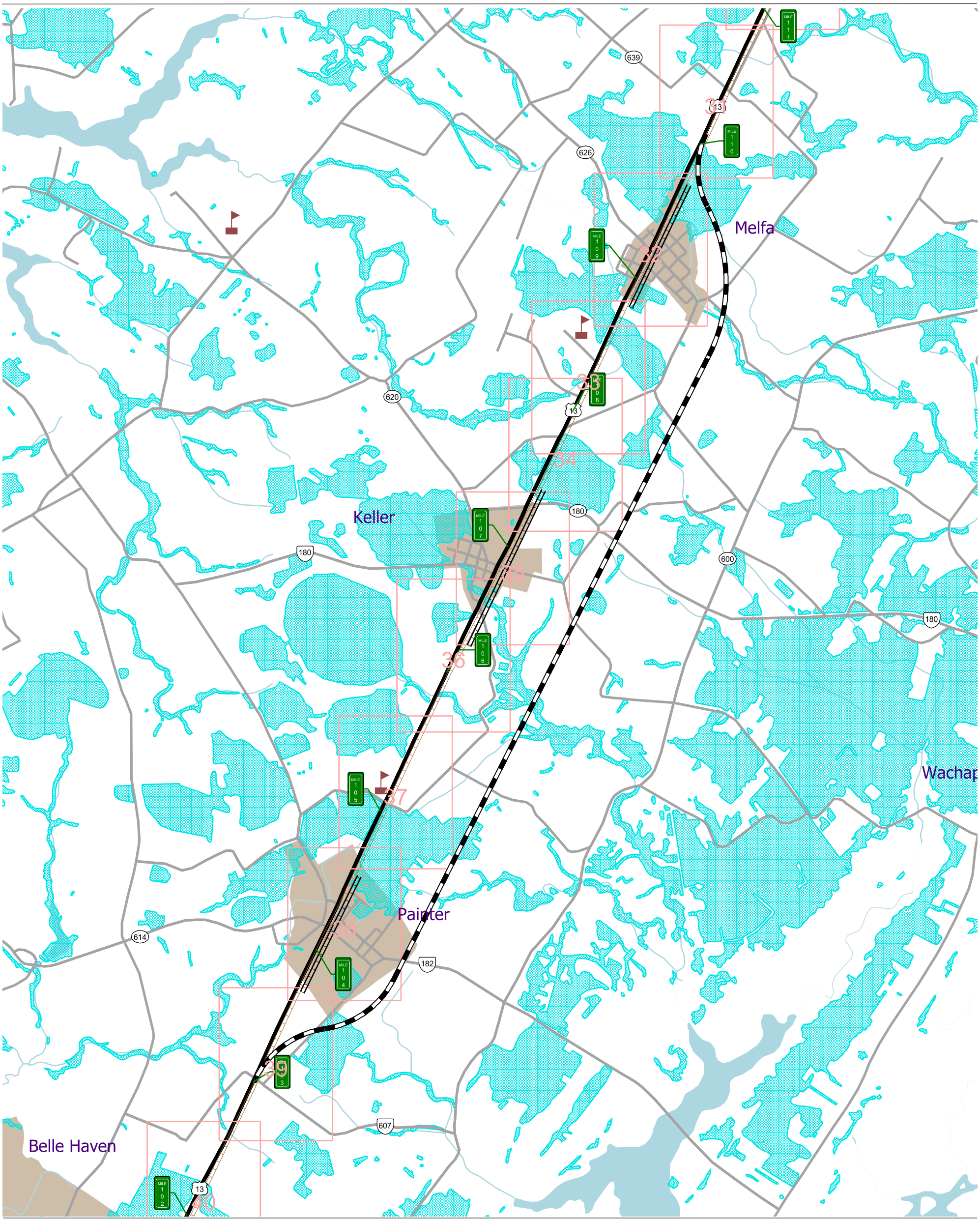
- New Pavement
- Pavement Removal
- Shoulder Widening to 12 feet
- Clear Vegetation
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland

**Figure 5-10**
**Sheet 28 of 80**
**County - Accomack**

N

Scale: 1" = 400'

Aerial imagery flown on March 29, 2000




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

U.S. Route 13
Improvements on Existing Alignment

Alternative 1 Shift Railroad ROW

Alternative 2 Relocate Railroad ROW

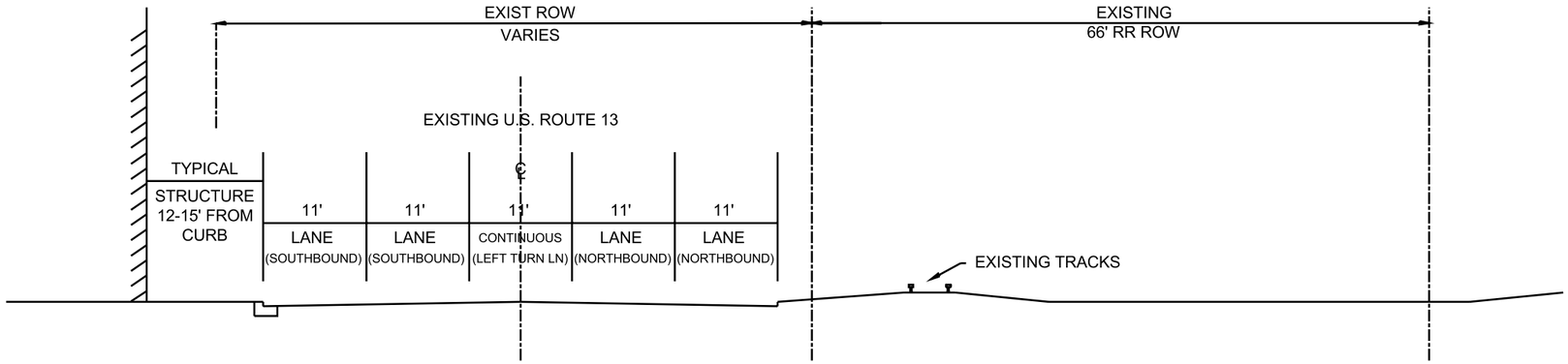
NWI Wetlands

# Aerial Photo Number

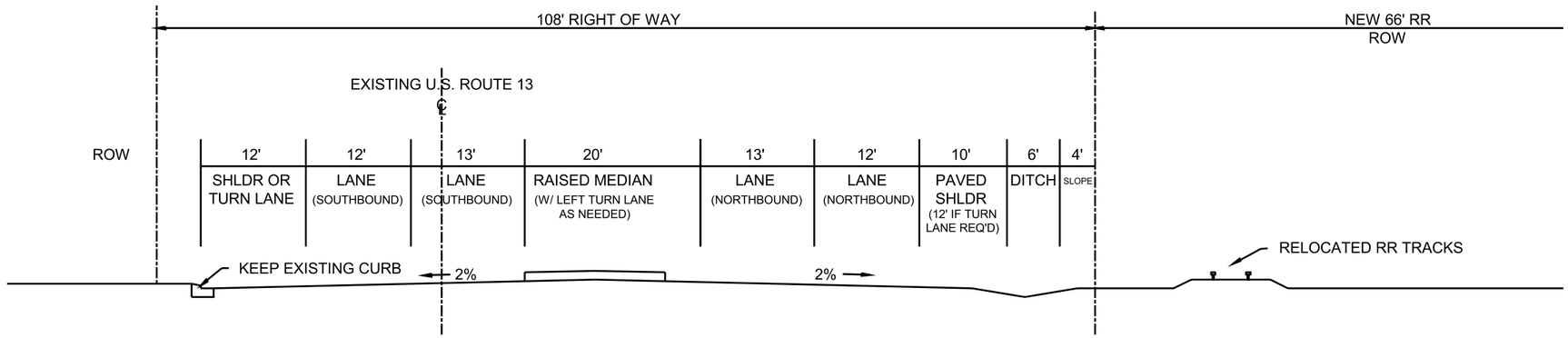
**Figure 5-11**
**Melfa, Keller, Painter Alternatives**

N

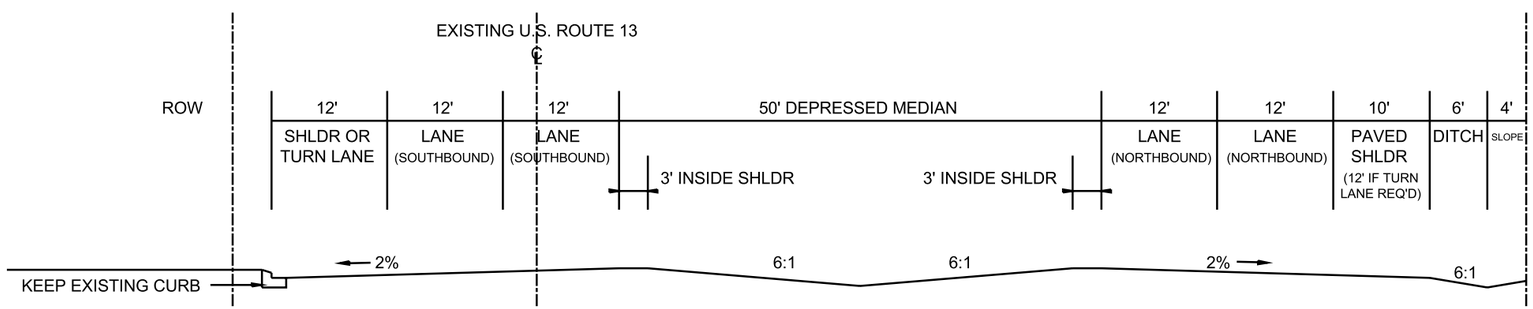
**Figure 5-12**
**Melfa, Keller, Painter Cross Sections**




EXISTING TYPICAL CROSS SECTION; PAINTER, KELLER, MELFA (EXISTING RIGHT OF WAY VARIES)
LOOKING NORTH




ALTERNATE 1
URBAN 20' RAISED MEDIAN, RAILROAD RELOCATED EASTWARD WITHIN CORRIDOR (108' RIGHT OF WAY)
LOOKING NORTH
PAINTER, KELLER, MELFA, NASSAWADOX




ALTERNATE 2
RURAL 50' DEPRESSED MEDIAN, RAILROAD RELOCATED EASTWARD OUT OF CORRIDOR (136' RIGHT OF WAY)
LOOKING NORTH
PAINTER, KELLER, MELFA, NASSAWADOX

Route 13/Wallops Island Access Management Study

We Keep Virginia Moving

***Potential Impacts.*** Based on available database information and mapping, some impacts to sensitive resources are anticipated as a result of this alternative including wetlands, farmland and historic resources. Areas of wetlands, farmland and potentially significant historic sites are in close proximity to the existing railroad and could be affected depending on exact limits of these resources and the limits of construction needed. At this time, these impacts have not been quantified. Additional field investigations should be conducted to more accurately determine the limits of construction and potential impacts to these resources.

However, the relocation of the rail line onto a new alignment could potentially have significant impacts to wetlands, farmland and other resources. For this reason, Alternative 2 is expected to have far greater impacts than Alternative 1.

***Cost.*** This improvement is projected to cost $30.6 million to construct.

**Public Input on the Melfa/Keller/Painter Area Alternatives**

The majority of comments related to improvements in this area were in favor of Alternative 1, realigning the railroad slightly as opposed to moving the railroad a substantial distance from its current location. Citizens were hesitant to support such a massive relocation without knowing the exact location, its potential impacts, and potentially prohibitive cost.

### 5.3.3.9 U.S. Route 13 in the Exmore Area

Alternative improvements have been prepared for southern Exmore in the vicinity of the Shore Plaza shopping center. Currently, two traffic signals are located on U.S. Route 13 very close together (900 feet) at the intersections of Broadwater Road (Route 652) and the shopping center main driveway. Given the amount of land available for future commercial development, roadway improvements and signal coordination to accommodate projected growth while maintaining reasonable travel speeds was given priority. In addition, because this area is a destination for shoppers from central and northern Northampton County, there was a desire to provide alternative access, where possible, so that customers could reach shopping locations without having to travel on U.S. Route 13.

**Alternative 1: Bypass Between Bayside Road and Broadwater Road**

***Description.*** The first concept provides a bypass roadway for drivers traveling between the Bayside Road (Route 618), Exmore and points north of Exmore. A local, two-lane road with 3 foot graded shoulders would connect Bayside Road with Broadwater Road. This road would end directly opposite an entrance to the Shore Plaza shopping center. Turn lane improvements would be constructed at the U.S. Route 13 intersections with Route 604, Broadwater Road and Route 1043. These proposed improvements are shown in Figure 5-13.

***Safety and Transportation Benefits.*** This alternative would keep current and future shopping center traffic from entering and exiting U.S. Route 13, which would maintain the flow of traffic on U.S. Route 13, thus improving safety and lowering travel time.

***Potential Impacts.*** Based on available mapping, most of the bypass alignment traverses forested wetlands and would therefore require local, state and federal permits. No other previously identified resources are located in this area. Additional investigations should be conducted for wetlands and other sensitive resources prior to implementation.

***Cost.*** These improvements are projected to cost $1.8 million to construct.

**Alternative 2: Relocate Shore Plaza Signal**

***Description.*** The second alternative maintains corridor capacity by relocating the existing traffic signal at the Shore Plaza shopping center to a new driveway 500 feet north. This proposed improvement is shown in Figure 5-14.

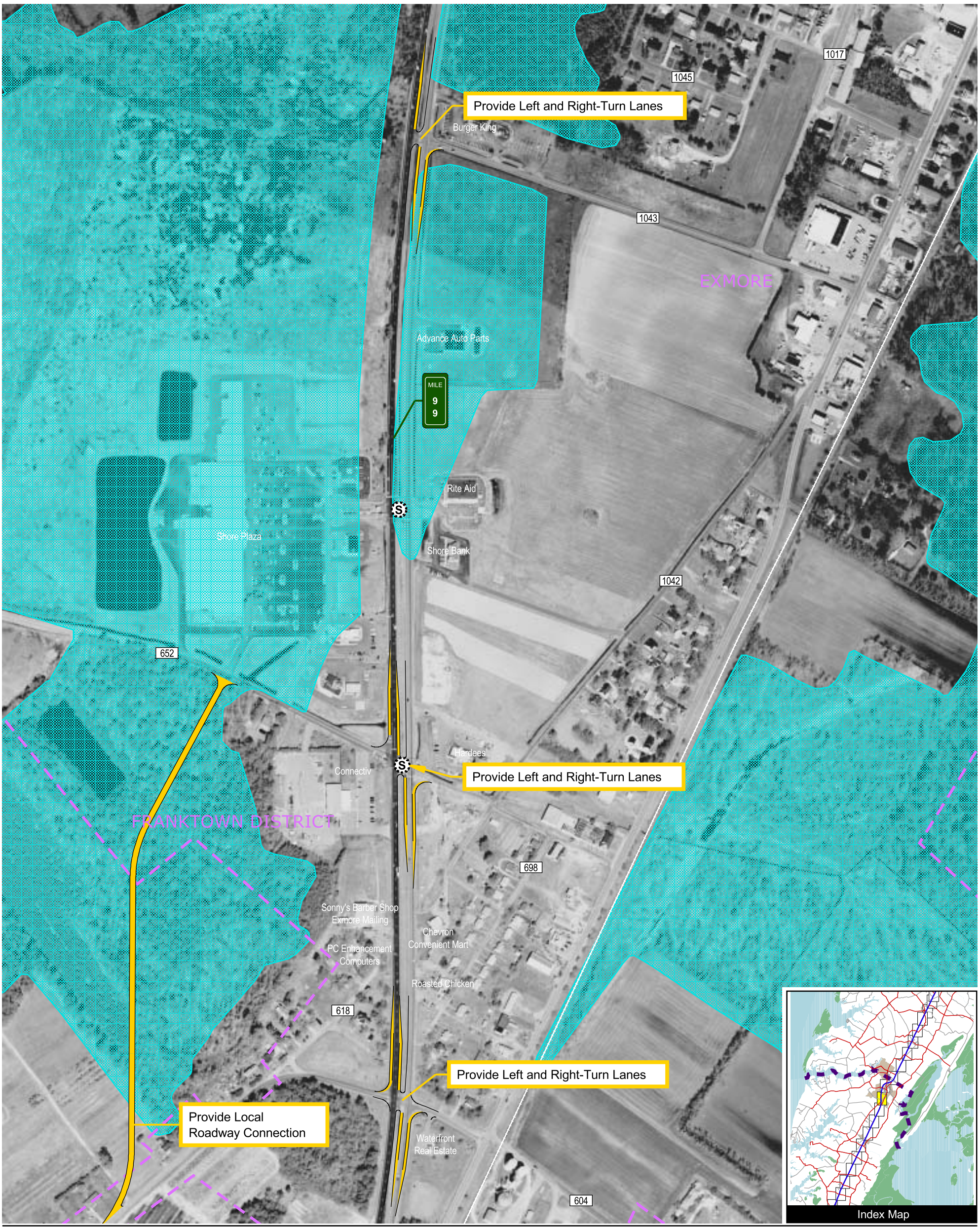
***Safety and Transportation Benefits.*** Alternative 2 would have the same benefit as Alternative 1, plus it would improve the close spacing to the Broadwater Road signal and the site design of the two businesses on the east side of the intersection. A Rite Aid pharmacy and a Shore Bank are located on the northeast and southeast quadrants of this intersection, respectively. The Rite Aid parking lot, however, extends almost directly to the intersection. This signal therefore cannot effectively be used for any future development on land behind these two businesses. The relocation of this signal would also serve any future development on undeveloped commercial property located just north of Shore Plaza.

***Potential Impacts.*** Given the existing development in this area, no impacts to natural or cultural resources are anticipated for this improvement.

***Cost.*** This improvement is projected to cost $2.8 million to construct.

**Public Input on the Exmore Alternatives**

No public comments have been provided on these alternative options to date.




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

- Proposed Traveled Way
- Alternative Improvement Concept
- Pavement Removal
- Shoulder Widening to 12 feet
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland

**Figure 5-13**
**Sheet 43 of 80**
**County - Northampton**
**Alternative 1**

N

Scale: 1" = 400'

Aerial imagery flown on March 29, 2000

Alternative 2
Relocate Intersection North by 250'

Provide Left and Right-Turn Lanes

Relocate Signal

Provide Left and Right-Turn Lanes

Provide Left and Right-Turn Lanes

Burger King
Advance Auto Parts
Rite Aid
Shore Plaza
Shore Bank
Hardees
Connectiv
Sonny's Barber Shop
Exmore Mailing
PC Enhancement
Computers
Chevron
Convenient Mart
Roasted Chicken
Waterfront
Real Estate

1017
1045
1043
1042
652
698
618
604

MILE 99

Index Map

Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

Proposed Traveled Way
Alternative Improvement Concept
Pavement Removal
Shoulder Widening to 12 feet
Existing Traffic Signal
Future Potential Traffic Signal
Municipal Boundaries
Right of Way
Business Names
NWI Wetland

Aerial imagery flown on March 29, 2000

**Figure 5-14**
**Sheet 43 of 80**
**County - Northampton**
**Alternative 2**

N

Scale: 1" = 400'

### 5.3.3.10 U.S. 13 in the Nassawadox Area

Two potential alternatives were developed for the Nassawadox area. In order to provide improved roadway geometrics, the Eastern Shore railroad right-of-way is proposed to be shifted within town (Alternative 1), or relocated out of town (Alternative 2). These two alternatives are conceptually depicted in Figure 5-15.

**Alternative 1: Shift Railroad Right-of-Way Within Town**

***Description.*** The first alternative would shift the existing railroad right-of-way and railroad tracks by 30 feet to the east in order to provide an improved roadway cross section on U.S. Route 13. With this shift, a 20-foot wide median would be provided as shown in the proposed cross section detail in Figure 5-12. Existing at-grade railroad crossings would be closed at Franktown Road (Route 609) and Route 712. In addition, in the southbound travel direction, a 12-foot wide shoulder would be provided for access to existing businesses. A 10-foot wide shoulder would be provided on northbound U.S. Route 13, primarily for safety reasons.

***Safety and Transportation Benefits.*** Similar to Melfa, Keller and Painter in Accomac County, Nassawadox developed directly on the rail line. U.S. Route 13 was then built just to the west, paralleling the rail line, and by 1968, with the widening of U.S. Route 13 to a four-lane, divided roadway, the two transportation facilities were left too close together with little to no room for further improvement. As with the railroad relocation recommended for the three towns to the north, the Eastern Shore railroad is currently a one-track railroad operating on a two-track (width) right-of-way, which is 66 feet wide. This makes the development of roadway improvements to U.S. Route 13 difficult to accomplish without the relocation of the Eastern Shore Railroad.

***Potential Impacts.*** Based on available database information and mapping, some impacts to sensitive resources are anticipated as a result of this alternative including wetlands, farmland and historic resources. Areas of wetlands, farmland and potentially significant historic sites (i.e., VA Eastern Shore Produce Exchange building near Route 609) are in close proximity to the existing railroad and could be effected depending on exact limits of these resources and the limits of construction needed. At this time, these impacts have not been quantified. Additional field investigations should be conducted to more accurately determine the limits of construction and potential impacts to these resources.

***Cost.*** This improvement is projected to cost $4.4 million to construct.

**Alternative 2: Relocated Railroad Right-of-Way Outside Town**

***Description.*** A second option would be the total removal/realignment of the Eastern Shore railroad to an undetermined location to the east of Nassawadox. With this option, the existing railroad right-of-way would be acquired and used for highway expansion. As shown in the cross section detail in Figure 5-12, this would allow for a 50-foot wide median with left- and right-turn lanes.

***Safety and Transportation Benefits.*** The second rail relocation concept considered for this study is thought to allow for even greater flexibility for improvements to U.S. Route 13 and improved safety along U.S. Route 13 than Alternative 1.

***Potential Impacts.*** Based on available database information and mapping, some impacts to sensitive resources are anticipated as a result of this alternative including wetlands, farmland and historic resources. Areas of wetlands, farmland and potentially significant historic sites (i.e., VA Eastern Shore Produce Exchange building near Route 609) are in close proximity to the existing railroad and could be effected depending on exact limits of these resources and the limits of construction needed. At this time, these impacts have not been quantified. Additional field investigations should be conducted to more accurately determine the limits of construction and potential impacts to these resources.

However, the relocation of the rail line onto a new alignment could potentially have significant impacts to wetlands, farmland and other resources. For this reason, Alternative 2 is expected to have far greater impacts than Alternative 1.

***Cost.*** This improvement is projected to cost $7.0 million to construct.

#### Public Input on the Nassawadox Alternatives

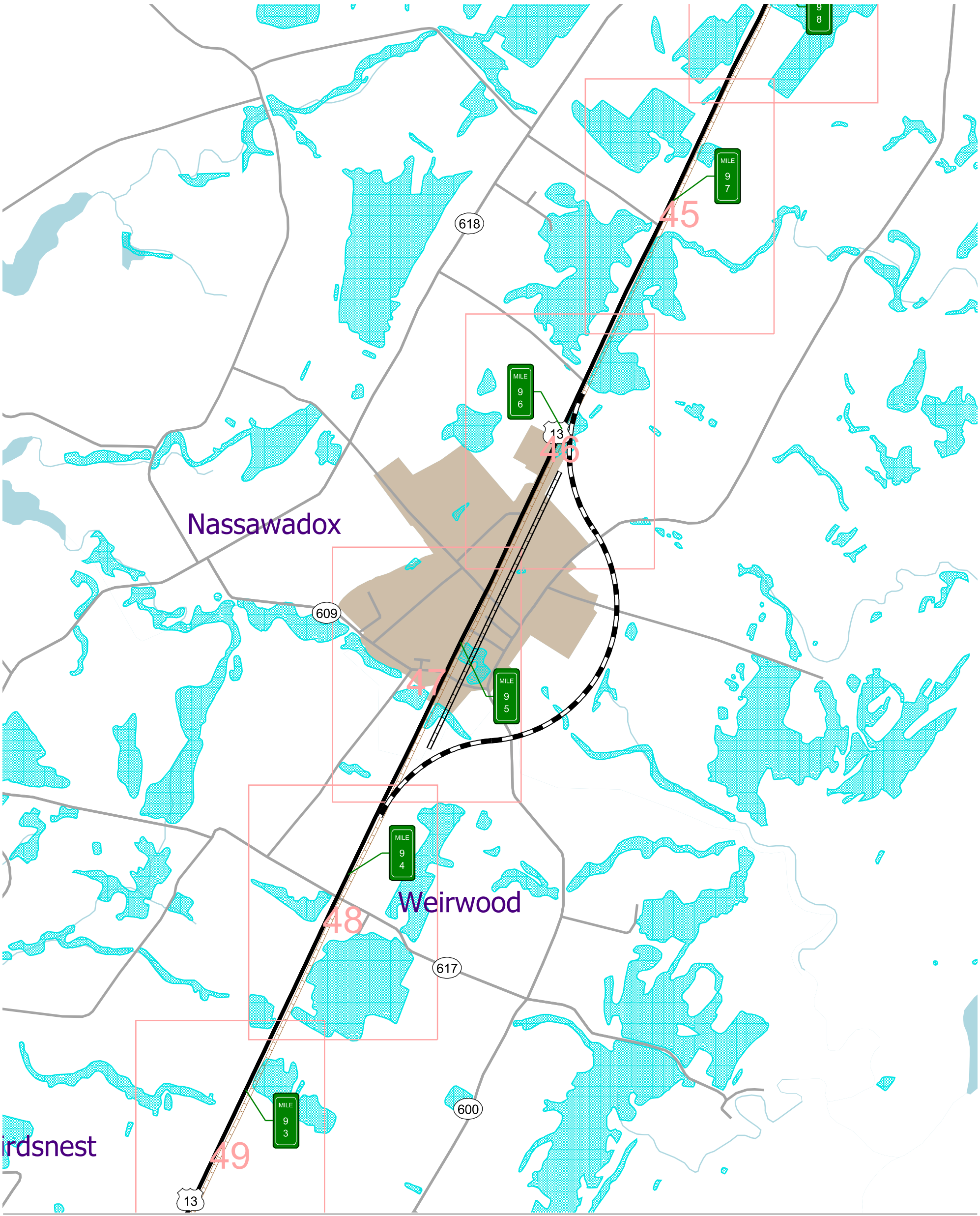
Input from the Citizen Advisory Committee and from the public meetings in November 2001 indicated a preference for Alternative 1. As with the Keller, Painter and Melfa railroad relocation alternative, there were concerns over the unknown effects of moving the railroad outside of the corridor, such as impacts on private property and the potentially prohibitive cost. There were suggestions for a highway bypass of Nassawadox, but an alternative was not developed because of the magnitude of potential impacts on environmentally sensitive areas, farmland and private property.

### 5.3.3.11 U.S. Route 13 in the Machipongo Area

A total of five improvement alternatives were developed for the Machipongo area, roughly the area between MP 90 and MP 89. The presence of Northampton Middle School immediately to the west on Young Street (Route 627) and commercial businesses (B&B Chevron and the Great Machipongo Clam Shack) on Route 627 to the east has made this section of U.S. Route 13 a significant cross roads in central Northampton County. The existing median crossovers, at Young Street and Machipongo Road (both Route 627) are only 30 feet wide.

#### Alternative 1: Route 627 Consolidated Median Crossing Near Clam Shack

***Description.*** The first alternative consists of the realignment of Young Street and Machipongo Road to intersect at one intersection. This improvement would also include the widening of U.S. Route 13 to provide a 50-foot wide median at this one improved intersection. This proposed improvement is shown in Figure 5-16.




Route 13/Wallops Island Access Management Study

We Keep Virginia Moving

U.S. Route 13
Improvements on Existing Alignment

Alternative 1 Shift Railroad ROW

Alternative 2 Relocate Railroad ROW

NWI Wetlands

# Aerial Photo Number

N

**Figure 5-15**
**Nassawadox**
**Alternatives**

***Safety and Transportation Benefits.*** This improvement would expand the existing median openings from 30 feet to 50 feet, allowing for more room for school buses and other vehicles to wait in the median until it is safe to make a left turn.

***Potential Impacts.*** Although minor, potential impacts to farmland may result from this alternative. No other impacts to natural or cultural resources are expected from this alternative.

***Cost.*** This improvement is projected to cost $4.3 million to construct.

**Alternative 2: Route 627 Consolidated Median Crossing At Young Street**

***Description.*** The second alternative is a variant of Alternative 1 with the creation of only one intersection of U.S. Route 13 with Route 627, but at the current Young Street intersection. The eastern leg would require realignment to the south of the Clam Shack. This proposed improvement is shown in Figure 5-17. This alternative has been further modified from what was presented at the Public Meetings by providing a southbound U.S. Route 13 directional access to Route 626.

***Safety and Transportation Benefits.*** Same benefits as Alternative 1. In addition, access to the B&B Chevron would be direct.

***Potential Impacts.*** Similar to Alternative 1, minor impacts to farmland may result from this alternative. No other impacts to natural or cultural resources are expected from this alternative.

***Cost.*** This improvement is projected to cost $4.2 million to construct.

**Alternative 3: New Local Roadway Connection to Route 618**

***Description.*** The third alternative provides better spacing between Wilsonia Neck Road (Route 628) to the south, Route 627 on the west and Route 627 on the east. A new access road would be constructed between U.S. Route 13 and Bayside Road (Route 618) approximately 1,200 feet north of Route 628 and a median crossover would be provided on U.S. Route 13 at this location. The Route 628 crossover would be closed. This would provide an approximate spacing of 1,200 feet between these three access points. Young Street would then be closed between Northampton Middle School and the access for the Barrier Island Center. All car and bus access to and from the school would then use the new roadway access. This proposed improvement is shown in Figure 5-18.

***Safety and Transportation Benefits.*** The access road provides even better spacing between Wilsonia Neck Road (Route 628) to the south, Route 627 on the west and Route 627 on the east.

***Potential Impacts.*** Similar to Alternatives 1 and 2, minor impacts to farmland may result from this alternative. No other impacts to natural or cultural resources are expected from this alternative. Access to Route 628 and Route 627 east will be restricted to right turns in and out from U.S. Route 13. Route 627 west (serving Northampton Middle School) would no longer access U.S. Route 13.

***Cost.*** This improvement is projected to cost $5.0 million to construct.

**Alternative 4: Variant of Alternative 3 Keeping Young Street Open**

***Description.*** The fourth alternative is identical to Alternative 3, except that Young Street (Route 627 west) between Northampton Middle School and the Barrier Island Center driveway would remain open for right turns in and out from U.S. Route 13. This proposed improvement is shown in Figure 5-19.

***Safety and Transportation Benefits.*** This alternative allows the west leg of Route 627 to serve Northampton Middle School traffic that desires to make right turns in or right turns out on to U.S. Route 13.

***Potential Impacts.*** Similar to previous alternatives, minor impacts to farmland may result from this alternative. No other impacts to natural or cultural resources are expected.

***Cost .*** This alternative improvement is projected to cost $4.9 million to construct.

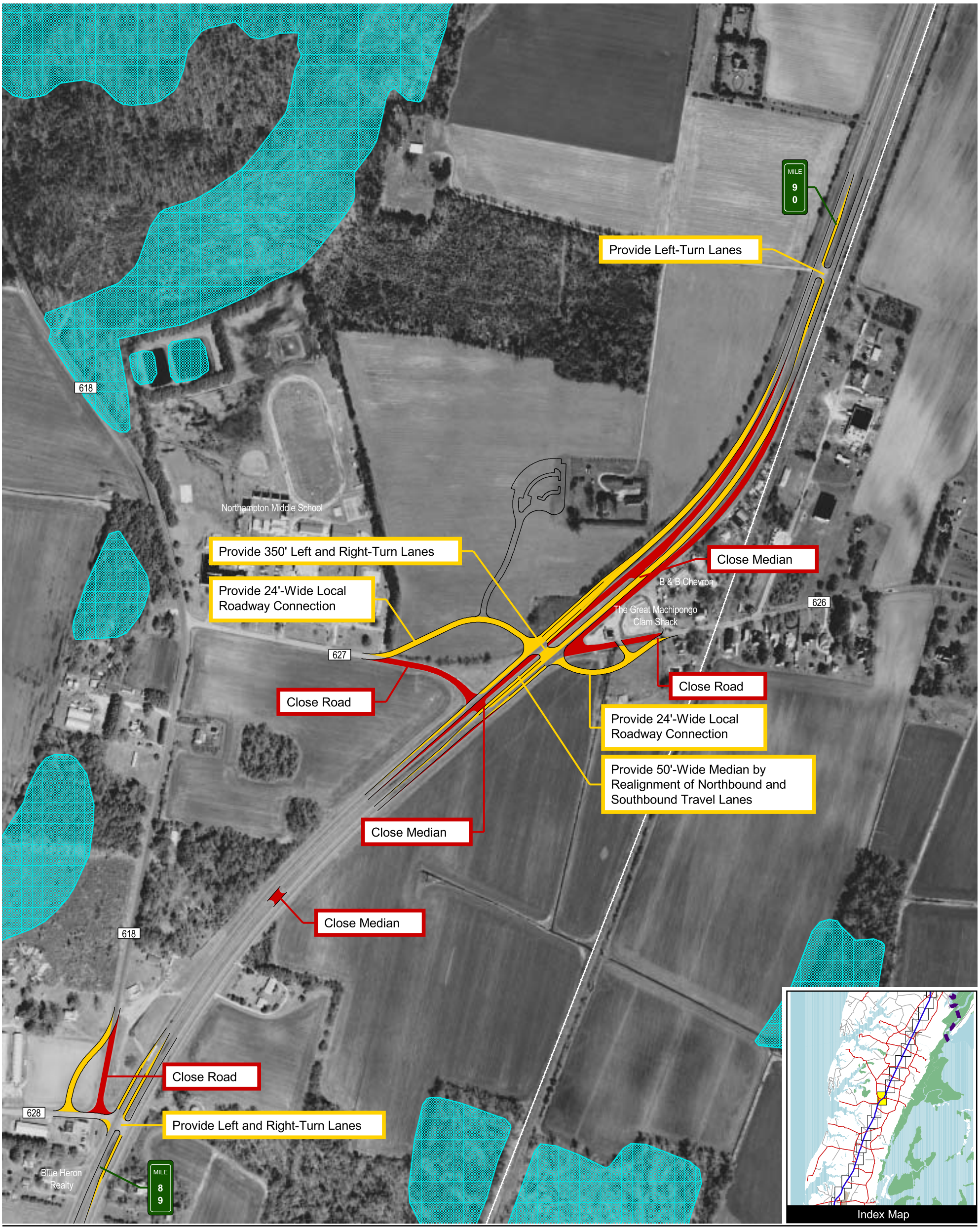
**Alternative 5: Route 627 Consolidated Median Crossing Near B&B Chevron/Island Barrier Center**

***Description.*** The fifth alternative proposes to relocate Young Street to the north to intersect directly opposite Route 626 just south of the B&B/Chevron station. The Wilsonia Neck Road (Route 628) crossover location would remain open with left and right-turn lane improvements. This proposed improvement is shown in Figure 5-20.

***Safety and Transportation Benefits.*** By leaving the Wilsonia Neck Road (Route 628) median open, the subdivision served by Wilsonia Neck Road will not be impacted. Leaving the median open at Route 626 will reduce the impact on the B & B Chevron and will still provide good direct access to U.S. Route 13 by the Northampton Middle School.

***Potential Impacts.*** Similar to previous alternatives, minor impacts to farmland may result from this alternative. No other impacts to natural or cultural resources are expected.

***Cost.*** This improvement is projected to cost $4.5 million to construct.




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

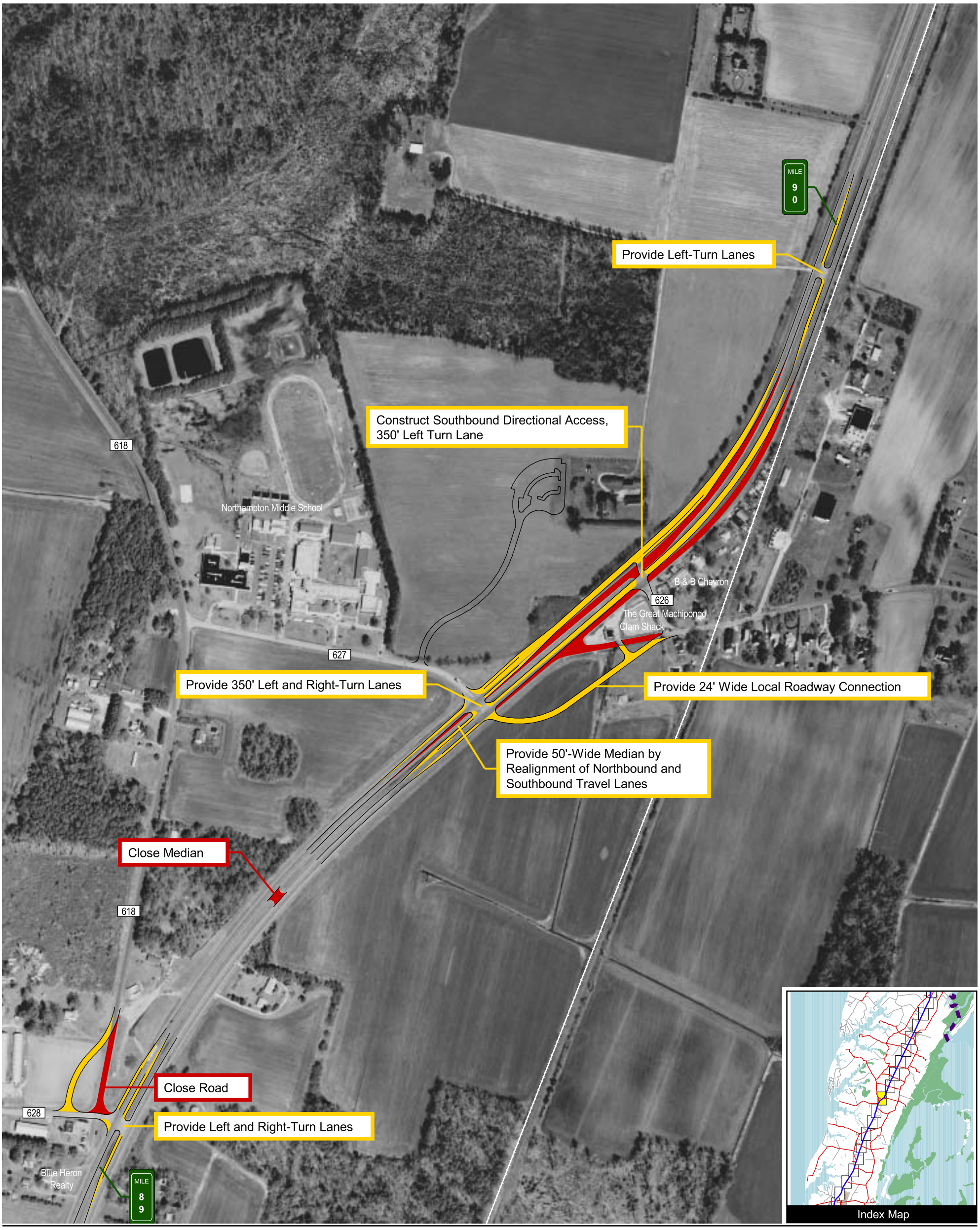
- Proposed Traveled Way
- Alternative Improvement Concept
- Pavement Removal
- Shoulder Widening to 12 feet
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland

**Figure 5-16**
**Sheet 52 of 80**
**County - Northampton**
**Alternative 1**

N

Scale: 1" = 400'

Aerial imagery flown on March 29, 2000




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

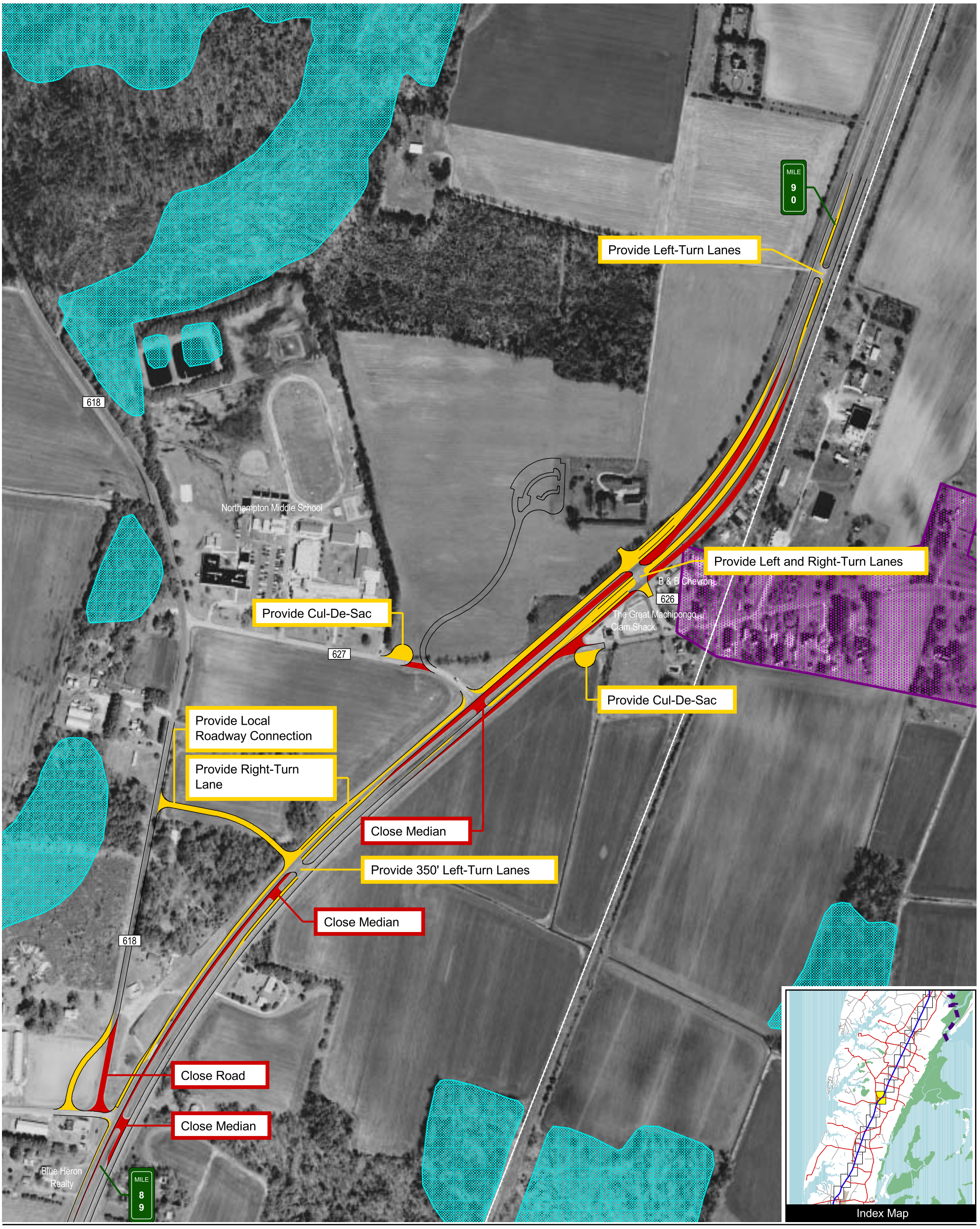
- Proposed Traveled Way
- Alternative Improvement Concept
- Pavement Removal
- Shoulder Widening to 12 feet
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland

**Figure 5-17**
**Sheet 52 of 80**
**County - Northampton**
**Alternative 2**

N

Scale: 1" = 400'

Aerial imagery flown on March 29, 2000




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

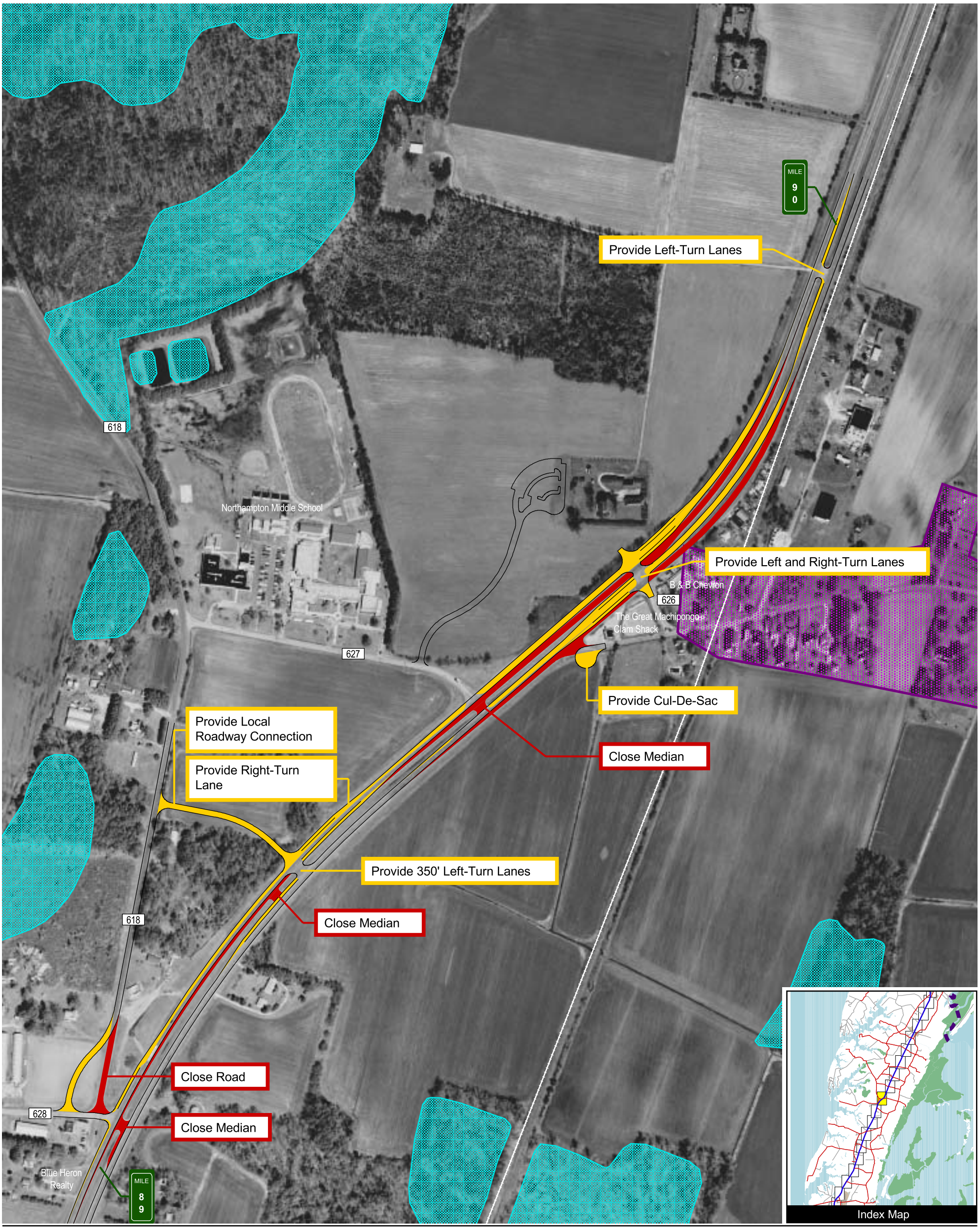
- New Pavement
- Pavement Removal
- Shoulder Widening to 12 feet
- Clear Vegetation
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland

**Figure 5-18**
**Sheet 52 of 80**
**County - Northampton**
**Alternative 3**

N

Scale: 1" = 400'

Aerial imagery flown on March 29, 2000




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

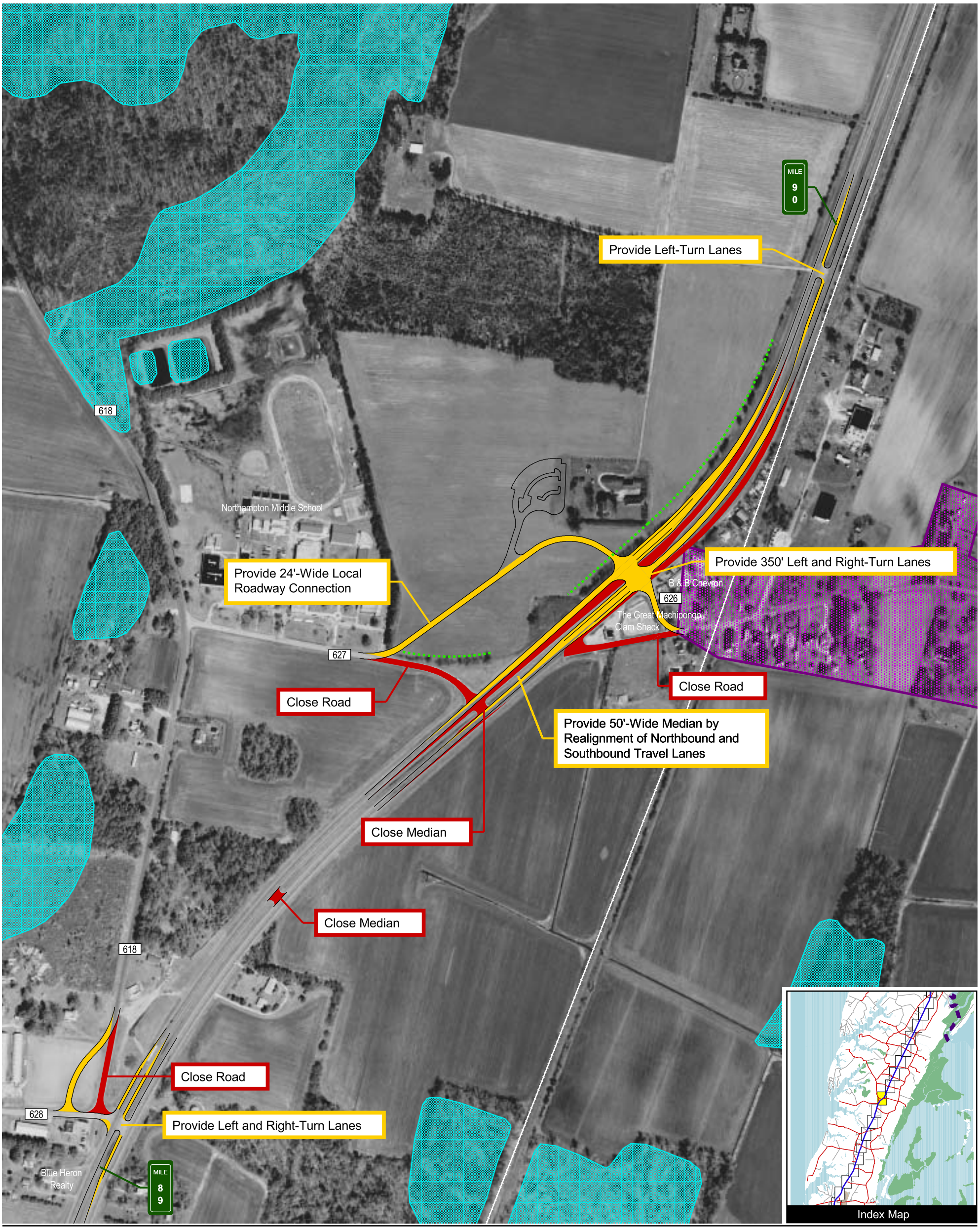
- Proposed Traveled Way
- Alternative Improvement Concept
- Pavement Removal
- Shoulder Widening to 12 feet
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland

**Figure 5-19**
**Sheet 52 of 80**
**County - Northampton**
**Alternative 4**

N

Scale: 1" = 400'

Aerial imagery flown on March 29, 2000




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

- Proposed Traveled Way
- Alternative Improvement Concept
- Pavement Removal
- Shoulder Widening to 12 feet
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland

**Figure 5-20**
**Sheet 52 of 80**
**County - Northampton**
**Alternative 5**

N

Scale: 1" = 400'

Aerial imagery flown on March 29, 2000

**Public Input on the Machipongo Alternatives**

During the public involvement process, Young Street was a major concern of Northampton County schools for providing safe access on and off U.S. Route 13 to the middle school. Potential impacts to planned access improvements for the Barrier Island Center were also a concern. Those improvements were taken into account, and are shown on all five alternative concept drawings. The closing of full access at Routes 626 and 628 was a major concern for some. As a result of these comments and others, Alternatives 4 and 5 were added. A petition was received supporting Alternative 5 over all other alternatives.

### 5.3.3.12 U.S. Route 13 in the Martins Siding Area

The area located between James Allen Drive (Route 628) and Bell Lane (Route 1701) is characterized by numerous single-family dwellings along U.S. Route 13. On the west side of the road, there are 6 residences with a total of 8 driveways (some homes have loop driveways with two access points). On the east side, there are 11 residences with a total of 12 driveways. Median crossovers exist at James Allen Drive, Martins Siding Road and Bell Lane. Crossovers at Martins Siding Road and between Martins Siding Road and Bell Lane are proposed to be closed, while left-turn lanes are provided at the remaining crossovers. Two alternatives were developed for this section of U.S. Route 13.

**Alternative 1: Closure of Martin Siding Lane and Construction of Frontage and Reverse Frontage Roads**

***Description.*** The first alternative was presented at the public information meetings (see Figure 5-21). This alternative calls for the construction of a frontage road along southbound U.S. Route 13, a reverse frontage road (or new local road) between Bell Lane and Martins Siding Road, and the closure of the existing northbound residential driveways on U.S. Route 13 between these two roads. The southbound one-way, 16-foot wide frontage road would reduce the number of driveway access points on U.S. Route 13 from eight to two. Similarly, the northbound improvements, similarly, would eliminate 12 access points by relocating these driveways to the reverse frontage road. This alternative also involves the closure of the median crossover at Martins Siding Road.

***Safety and Transportation Benefits.*** The three cross streets are located too close to each other for each of them to need crossover access. The construction of the reverse frontage road would allow residents of Martins Siding Road to reach Bell Lane where they could have full access onto and off of U.S. Route 13.

***Potential Impacts.*** The construction of the reverse frontage and frontage roads will require right-of-way acquisition from the immediately adjacent property owners but no displacements are anticipated from this alternative. In addition, no impacts to natural or cultural resources are anticipated. Field investigations should be conducted to verify this assumption.

***Cost.*** These improvements are projected to cost $2.0 million to construct.

**Alternative 2: Realignment of U.S. Route 13 at Bell Lane and Construction of Frontage Roads**

***Description.*** Alternative 2 was developed as shown in Figure 5-22. The northbound and southbound travel lanes would be shifted slightly to the west by rebuilding U.S. Route 13 in this area with flatter, higher speed curves. This would provide more room between the homes and the northbound travel lanes, thereby allowing for the construction of a northbound one-way, 16-foot wide frontage road.

***Safety and Transportation Benefits.*** This alternative improves the alignment of U.S. Route 13 and consolidates the driveways in a more conventional manner with less impact to developed properties.

***Potential Impacts.*** This alternative requires less right-of-way acquisition from property owners than Alternative 1.

***Cost.*** These improvements are projected to cost $1.1 million to construct.

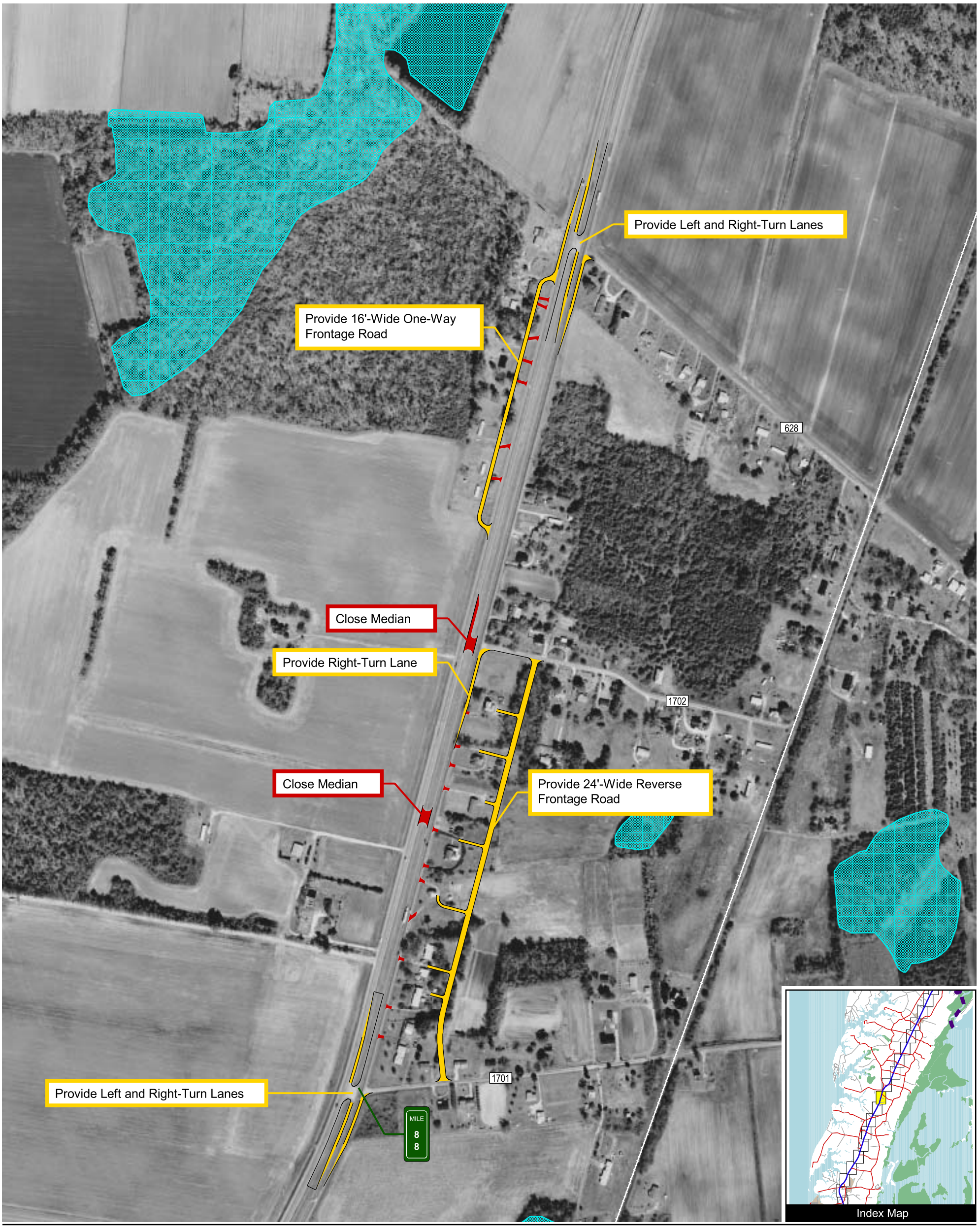
**Public Input on the Martins Siding Alternatives**

Comments received during the public involvement process dealt with the awkward alignment of the U.S. Route13/Bell Lane intersection and also indicated that a newly constructed home might be on the proposed alignment of the reverse frontage road in Alternative 1. In response to these concerns, the study team conducted a field investigation, which indicated that there were in fact alignment issues with the U.S. Route13/Bell Lane intersection, as proposed in Alternative 1. It was found that the new home, which was built after aerial base mapping was developed in March 2000, could be avoided with slight modification to the proposed U.S. 13/Bell Lane intersection.

### 5.3.3.13 U.S. Route 13 at Route 184

**Alternative 1: Grade Separated Interchange of U.S. Route 13 over Route 184 and the Eastern Shore Railroad**

***Description.*** This alternative proposes the construction of a fully directional, one-sided cloverleaf interchange. U.S. Route 13 would pass over both the railroad tracks and S. Bayside Road on structure. Ramps would be provided in both directions to access Route 184 to the west and Business Route 13 to the east. The ramps would be stop sign controlled. On- and off- ramps to the north of Route 184 would require the elimination of access rights to several current businesses on U.S. Route 13, including the auto parts store, the gas station, and the boat dealer. Proposed access roads were developed to provide alternate access to and from U.S. Route 13 and the local street system. These improvements are shown in Figure 5-23.




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

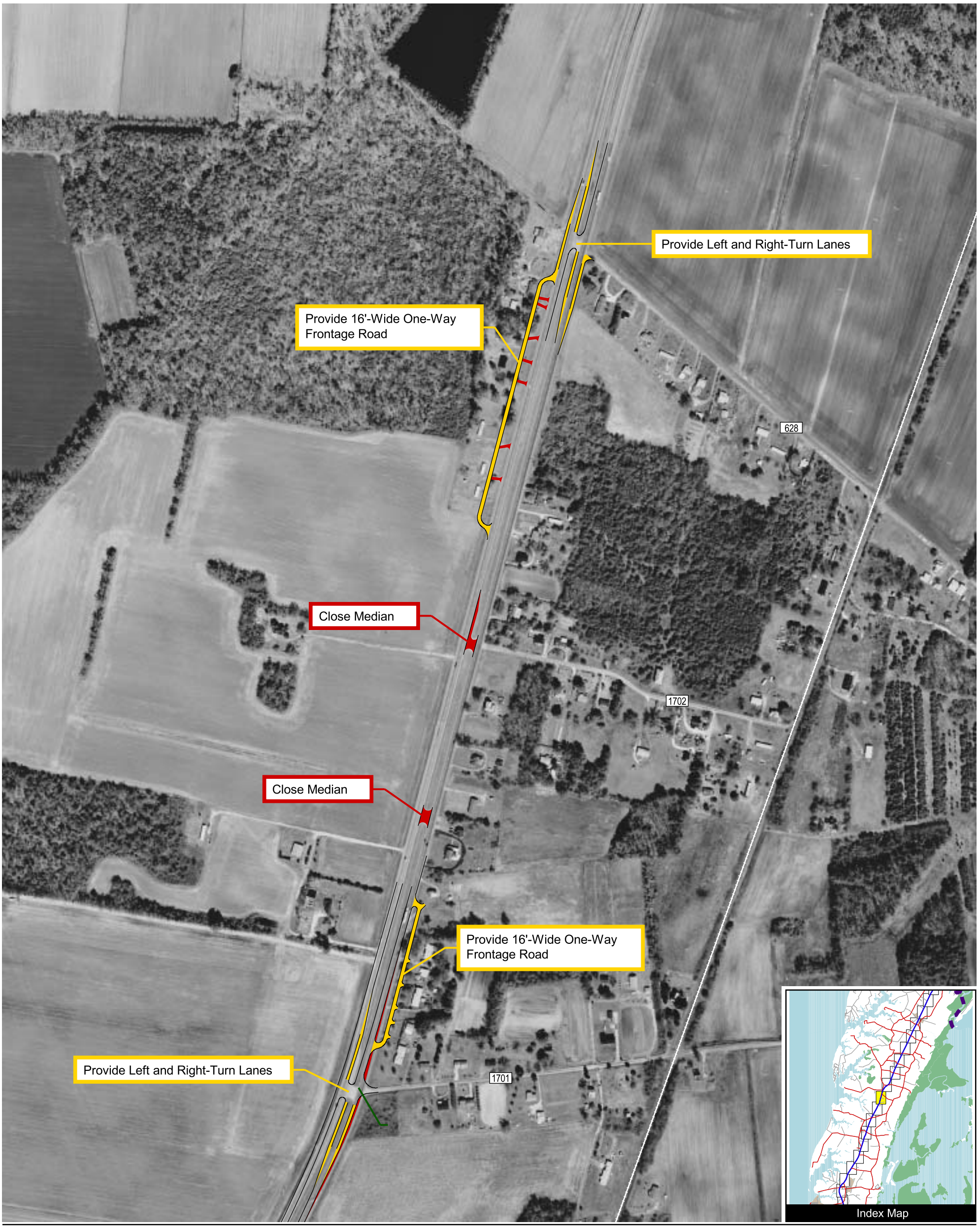
- New Pavement
- Pavement Removal
- Shoulder Widening to 12 feet
- Clear Vegetation
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland

Aerial imagery flown on March 29, 2000

**Figure 5-21**
**Sheet 53 of 80**
**County - Northampton**
**Alternative 1**

N

Scale: 1" = 400'




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

Aerial imagery flown on March 29, 2000

- New Pavement
- Pavement Removal
- Shoulder Widening to 12 feet
- Clear Vegetation
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland

**Figure 5-22**
**Sheet 53 of 80**
**County - Northampton**
**Alternative 2**

N

Scale: 1" = 400'

***Safety and Transportation Benefits.*** The intersection of U.S. Route 13 with S. Bayside Road and Business Route 13 is one of the most critical junctions along U.S. Route 13 in southern Northampton County. South Bayside Road (to the west of U.S. Route 13) provides the primary access to the town of Cape Charles, while Business Route 13 (on the east side) provides access to the town of Cheriton. This intersection is controlled by a traffic signal and is located immediately adjacent to the only at-grade rail crossing on U.S. Route 13. The Eastern Shore Railroad, beginning in Cape Charles at a barge ferry terminal and yard, parallels S. Bayside Road, crosses U.S. Route 13 and then curves north traveling parallel to U.S. Route 13. The future traffic operations projected for the year 2020 would require greater vehicle storage on northbound U.S. Route 13 than is available.

***Potential Impacts.*** To the south of the railroad tracks, access would be limited or severely restricted for the existing shopping center containing Dollar General, Food Lion and McDonalds. The current access driveway would be located in the vicinity of the existing Route 184 Ramps. Alternative access to Bayview Drive (Route 642) was proposed to compensate for the loss of full access at the shopping center driveway.

Other potential impacts for this alternative would be limited to farmland and right-of-way impacts.

***Cost.*** This interchange and related roadway improvements is projected to have a construction cost of $17.2 million.

**Alternative 2: Intersection Improvements/Grade Separation of the Eastern Shore Railroad**

***Description.*** A second alternative was developed to raise U.S. Route 13 to cross over the Eastern Shore Railroad, and then to move the S. Bayside Road intersection to the north by approximately 150 feet. This would require the elevation of the entire intersection and its approaches to meet the grade of U.S. Route 13 once adequate clearances over the railroad tracks are achieved. This concept is shown in Figure 5-24.

***Safety and Transportation Benefits.*** This alternative provides a grade separation between U.S. Route 13 and the railroad. The intersection of the two highways is improved.

***Potential Impacts.*** Based on available information and mapping, potential impacts for this alternative would be limited to farmland and right-of-way impacts.

***Cost.*** This improvement is projected to cost $11.1 to construct.

**Public Input on the Route 184 Alternatives**

When initially proposed to the Citizen Advisory Committee, Alternative 2 was not viewed favorably because members believed it would not result in any appreciable benefits for the cost. At that time, members of the committee suggested an interchange concept which led to the development of Alternative 1. The owner of McDonalds indicated Alternative 1 was unacceptable as shown.

### 5.3.3.14 U.S. Route 13 in the Cape Center Area

***Description.***

- The Cape Center area is located just north of Capeville Drive (Route 624) at approximately milepost 75.00.
- The southbound travel lanes would be shifted to the west in order to provide a wider median and median crossovers.
- Full left-turn storage lanes would be provided at 1) the northern entrance to Sting Ray's, 2) the Cape Motel, and 3) at a combined entrance to Sting Ray's and Eastern Shore Pottery. This concept is shown in Figure 5-25.
- An existing state road would be connected to a private road now traveling behind the residential properties (to the north of Sting Ray's) to form a reverse frontage road. This road would connect to Route 683 to the south, to the combined median opening south of Sting Ray's and to the median opening north of Sting Ray's.
- Four median crossovers would be closed, and a fifth median crossover would be developed.
- Two driveway accesses would be closed.

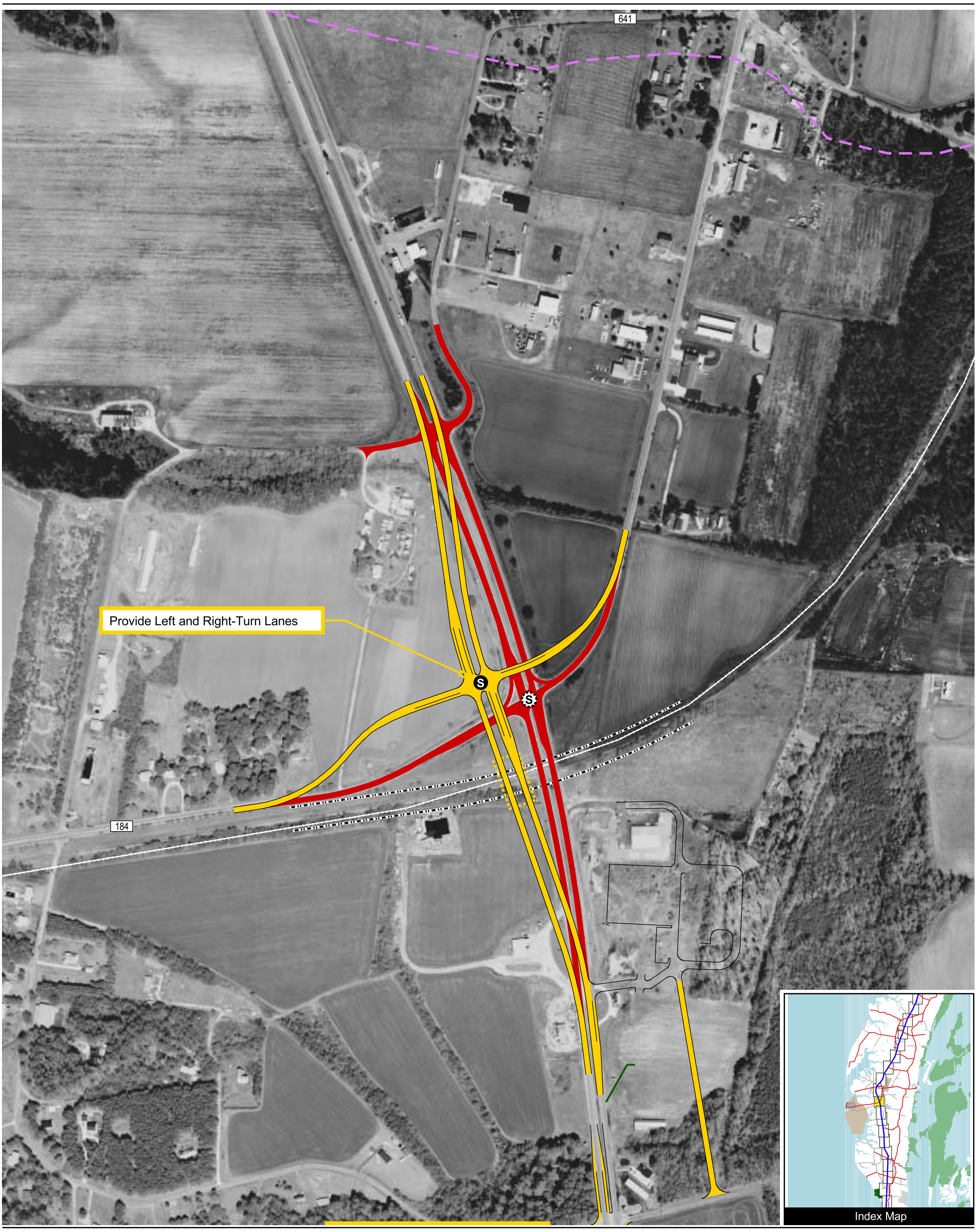
***Safety and Transportation Benefits.*** The Cape Center area is located approximately 1,800 feet north of Capeville Drive (Route 624) in southern Northampton County. This area is home to the Eastern Shore Pottery, Cape Center Exxon/Sting Ray's Restaurant, the Cape Motel, the Peacock Motel and several residences. In less than one mile, there are a total of 19 driveway openings in the northbound direction and 6 median crossovers. Two of these median crossovers have no turn lanes and the width of the median is only 20 feet. The primary goals of the proposed improvements are to 1) consolidate accesses to and from U.S. Route 13 and 2) to make those accesses safe, with turn lanes and a wider median. In order to consolidate accesses on U.S. Route 13 while preserving access to businesses along U.S. Route 13, a reverse frontage road is proposed. This would establish a safer alternative to U.S. Route 13 from which patrons can access the businesses. This reverse frontage road would connect to U.S. Route 13 at two intersections with turning lanes and a 50-foot wide median.

***Potential Impacts.*** No impacts to natural or cultural resources are anticipated as a result of these improvements.

***Cost.*** These improvements are projected to cost approximately $3.0 million to construct.

**Public Input on the Cape Center Alternative**

The public was concerned about the safety of entering and exiting the Cape Center Exxon/Sting Ray's Restaurant. No comments were received regarding the proposed improvement.




Route 13/Wallops Island Access Management Study

We Keep Virginia Moving

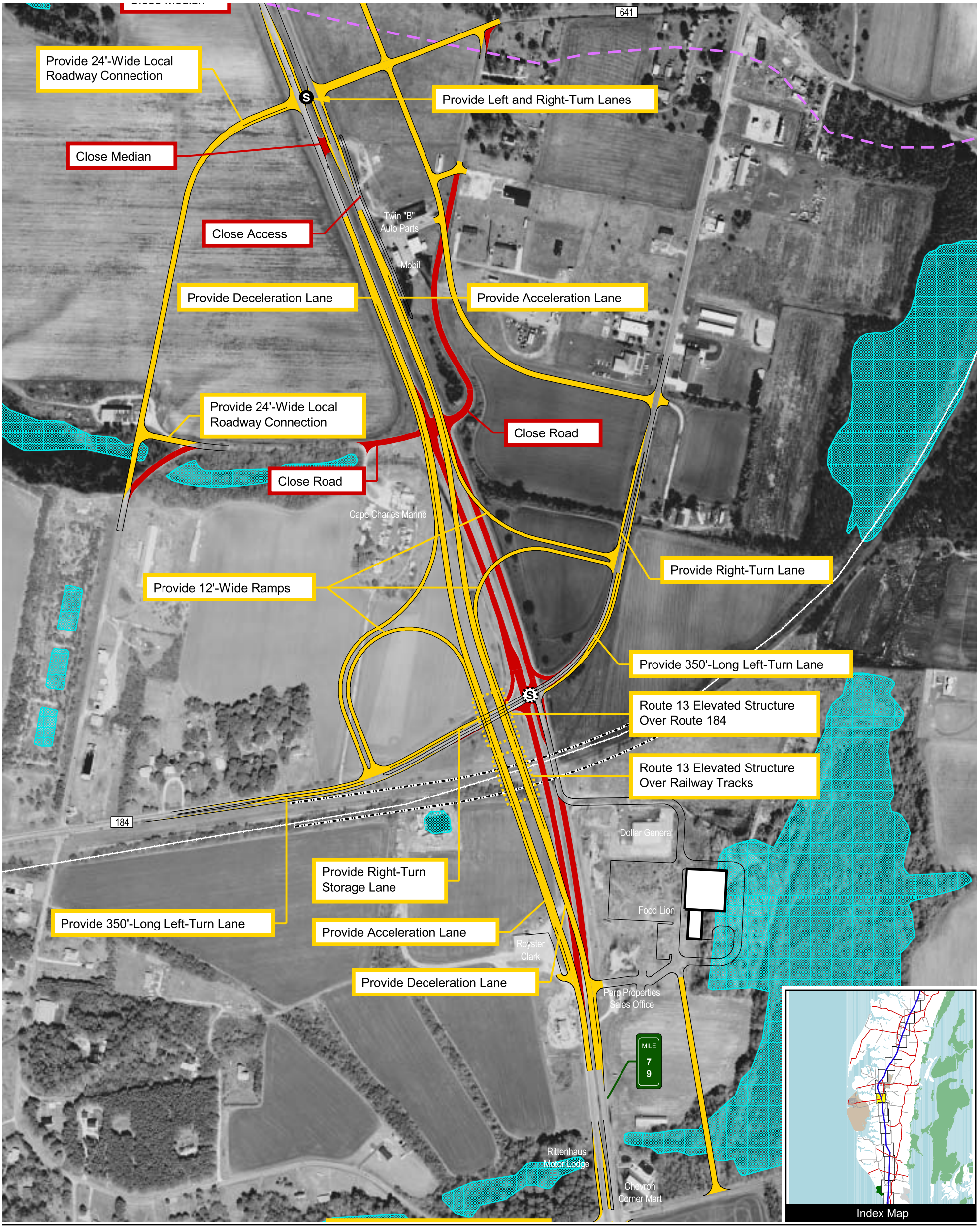
- New Pavement
- Pavement Removal
- Shoulder Widening to 12 feet
- Clear Vegetation
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland

**Figure 5-23**
**Sheet 62 of 80**
**County - Northampton**
**Alternative 1**

N

Scale: 1" = 400'

Aerial imagery flown on March 29, 2000




Route 13/Wallops Island Access Management Study

We Keep Virginia Moving

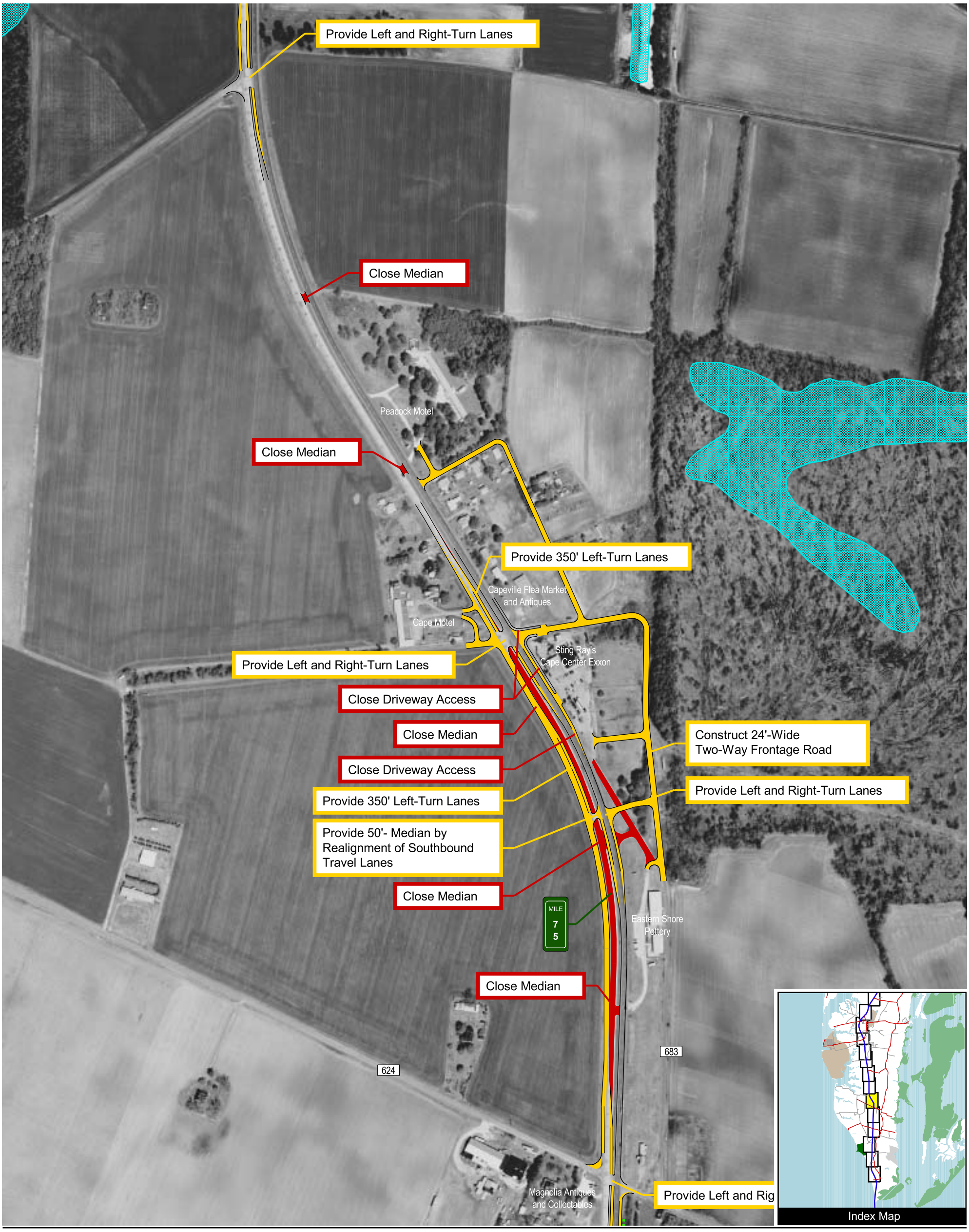
- New Pavement
- Pavement Removal
- Shoulder Widening to 12 feet
- Clear Vegetation
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland

**Figure 5-24**
**Sheet 62 of 80**
**County - Northampton**
**Alternative 2**

N

Scale: 1" = 400'

Aerial imagery flown on March 29, 2000




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

Aerial imagery flown on March 29, 2000

- New Pavement
- Pavement Removal
- Shoulder Widening to 12 feet
- Clear Vegetation
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland
- Historic

**Figure 5-25**
**Sheet 67 of 80**
**County - Northampton**

N

Scale: 1" = 400'

### 5.3.3.15 U.S. Route 13 in the Route 704 – Kiptopeke Road Area

***Description.*** The improvements developed for this area (see Figure 5-26) involve the following actions:

- Improvement of Arlington Road (Route 645) to function as the access road to Kiptopeke State Park.
- Closure of the Kiptopeke Road (Route 704) intersections and median crossovers at U.S. Route 13.
- The reconstruction of the existing Kiptopeke Road between U.S. Route 13 and Arlington Road into a local road to provide access to the 11 homes now located on the existing channelized right-turn lane.

***Safety and Transportation Benefits.*** The existing alignment of Kiptopeke Road was found to have several safety concerns. Kiptopeke Road is the primary access road into Kiptopeke State Park. This park experiences significant visitation, particularly from cars with boat trailers. The road is a four-lane, divided facility and intersects U.S. Route 13 at two closely spaced median crossovers. In the southbound direction, there is an off-ramp style right-turn lane for vehicles destined onto Kiptopeke Road.

The signage and design of these two locations is a problem, particularly in the northbound direction. A no left-turn sign is posted immediately in advance of the first crossover (which is the exiting, or eastbound travel lane for Kiptopeke Road). The second crossover, however, is located only 750 feet to the north with a left-turn lane. The no left-turn sign appears to confuse some drivers who interpret the sign to prohibit left-turns onto Kiptopeke Road entirely.

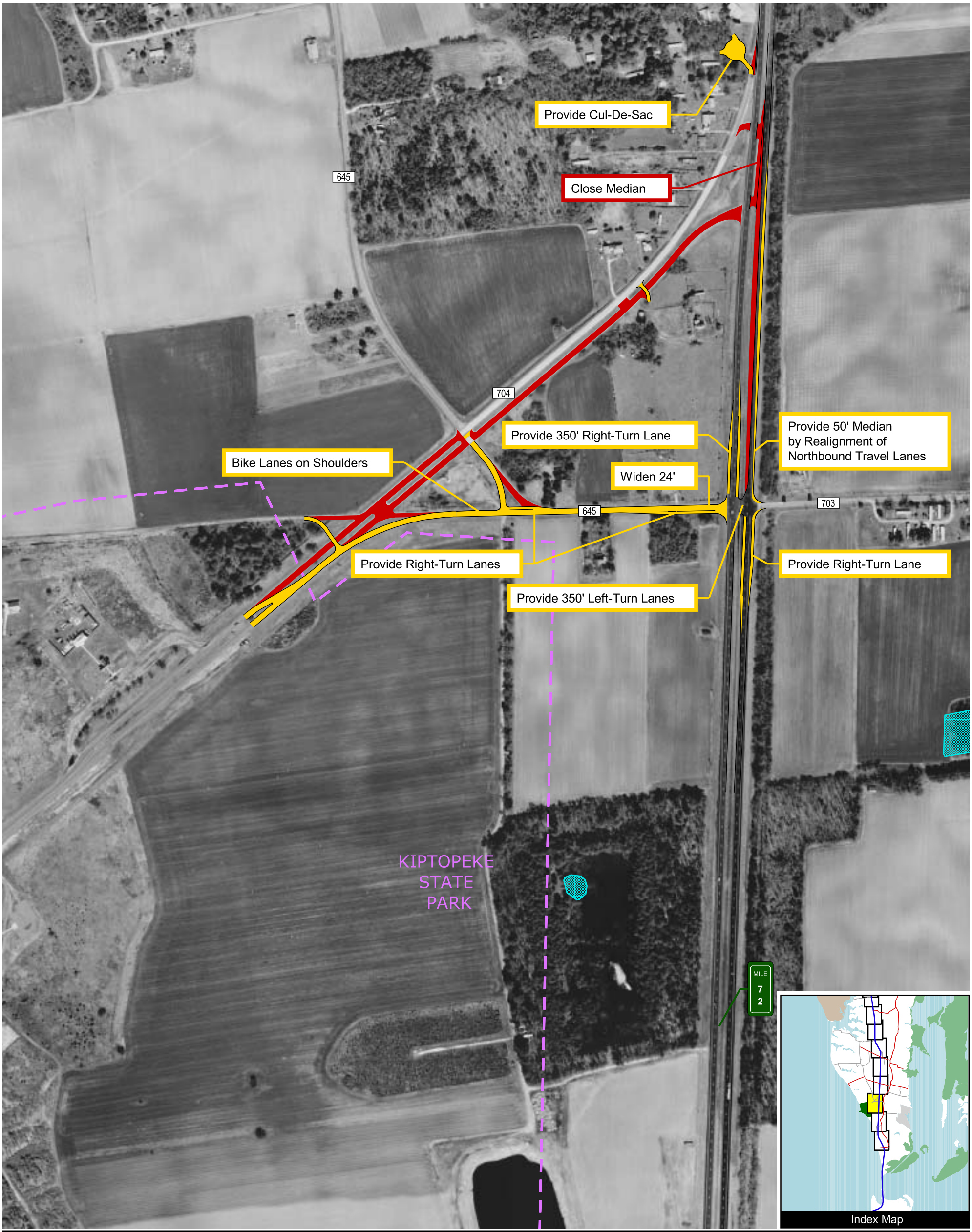
In addition, there are several single-family homes located on the southbound channelized right-turn lane which pose a potential safety hazard and requires these residents to turn right out of their homes, and then turn around at a narrow crossover on Kiptopeke Road which is located 650 feet to the west of U.S. Route 13.

***Potential Impacts.*** No impacts to natural or cultural resources are anticipated as a result of these improvements.

***Cost.*** These improvements are projected to cost approximately $3.1 million to construct.

**Public Input on the Route 704 - Kiptopeke Alternative**

Members of the Citizen Advisory Committee pointed out that northbound U.S. Route 13 traffic turning left into Route 704 was confused by the current geometrics of the existing intersection.




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

- New Pavement
- Pavement Removal
- Shoulder Widening to 12 feet
- Clear Vegetation
- Existing Traffic Signal
- Future Potential Traffic Signal
- Municipal Boundaries
- Right of Way
- Business Names
- NWI Wetland

Aerial imagery flown on March 29, 2000

**Figure 5-26**
**Sheet 70 of 80**
**County - Northampton**

N

Scale: 1" = 400'

## 5.4 Summary of Alternatives Evaluation

This chapter dealt with the process used to develop and evaluate alternative improvement concepts and the findings. Access Management techniques were evaluated to address specific corridor deficiencies along with potential safety-related improvements. This study first sought to recommend the implementation of basic safety and access management solutions, where practical. In those areas where access management techniques were deemed insufficient or not practical, other solutions were evaluated including reconstruction of intersections or the construction of bypasses.

Since this is a planning level study, potential impacts are discussed in general terms and based on existing database information. Minor right-of-way takings and impacts to abutting land uses were not assessed. Furthermore, field investigations should be conducted prior to any construction activities to ensure compliance with all appropriate local, state and federal rules and regulations.Table 5-6 on the following page summarizes the evaluation of the alternatives considered by this study.

## Table 5-6
## Summary: Evaluation of Alternatives

| | Crossover Closure | Median Widening | Turn Lane Improve | Mainline Realign | 12-Foot Shoulder | Frontage Roads | Wetland Impact | Clear Zone | Bypass Length | Cost (Millions) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Route 175** | | | | | | | | | | |
| Alt 1–Existing | N/A | 6,900 ft. | 6 | N/A | 67,200 ft. | | 11.3 ac | | | $6.1 |
| Alt 2–New Alignment | N/A | N/A | 5 | N/A | None | | 22.1 ac | | 19,000 ft. | $14.5 |
| **US Route 13 Oak Hall & Temperanceville** | | | | | | | | | | |
| Oak Hall Alt 1 (Existing) | 6 | 7,650 ft. | 7 | 2,400 ft. | 8,600 ft. | | | | | $4.5 |
| Oak Hall Alt 2 (East Bypass) | 2 | | 2 | | | | 34.4 ac | | 11,800 ft. | $10.2 |
| Temperanceville Alt 1 (Existing) | 5 | 5,600 ft. | 3 | 4,300 ft. | 8,750 ft. | | | | | $5.6 |
| Temperanceville Alt 2 (West Bypass) | 1 | | 3 | | | | 1.6 ac | | 9,300 ft. | $10.4 |
| Temperanceville Alt 3 (East-South Bypass) | 2 | | 3 | | | | 2.7 ac | | 4,600 ft. | $6.6 |
| **Combined Alternatives** | | | | | | | | | | |
| Alt 4–West Bypass of Oak Hall & Temperanceville | 1 | | 4 | | | | 38.5 ac | | 22,000 ft. | $25.0 |
| Alt 5–Alt 4 with Interchange | 1 | | 4 | | | | 38.5 ac | | 22,000 ft. | $28.9 |
| **Intersection of US Route 13 and Route 175** | | | | | | | | | | |
| At-grade | 1 | | 1 | | | | | | | |
| High-capacity Intersection | 1 | | 1 | | | | | | | |
| Interchange | 1 | | 1 | | | | | | | |
| **Mappsville & Nelsonia** | | | | | | | | | | |
| Mappsville Alt 1 (Existing) | 5 | 8,400 ft. | 4 | 2,800 ft. | 12,400 ft. | | | | | $6.4 |
| Mappsville Alt 2 (West Bypass) | 0 | | 2 | | | | 12.0 ac | | 8,800 ft. | $8.4 |
| Nelsonia Alt 1 (Existing) | 4 | 6,400 ft. | 5 | 2,800 ft. | 6,000 ft. | | 0.2 ac | | | $4.9 |
| Nelsonia Alt 2 (East Bypass) | 2 | | 3 | | | | 14.1 ac | | 11,600 ft. | $8.2 |
| Mappsville & Nelsonia Alt 3 (Joint Bypass) | 1 | | 6 | | | | 26.1 ac | | 20,400 ft. | $16.6 |
| **Mary N. Smith** | 1 | 9,600 ft. | 4 | 9,600 ft. | | 2,000 ft. | | | | $7.0 |
| **Whispering Pines** | 2 | 900 ft. | 1 | 900 ft. | | | | 4,100 ft. | | $1.1 |
| **Onley** | 1 | | 5 | | | | | | | $2.0 |

## Table 5-6
## Summary: Evaluation of Alternatives (Cont'd.)

| | Crossover Closure | Median Widening | Turn Lane Improve | Mainline Realign | 12-Foot Shoulder | Frontage Roads | Wetland Impact | Clear Zone | Bypass Length | Cost (Millions) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Melfa/Keller/Painter** | | | | | | | | | | |
| Alt 1–Shift RR within Town | 4 | 22,000 ft. | 12 | | 11,400 ft. | | | | | $15.2 |
| Alt 2–Shift RR outside Town | 4 | 36,950 ft. | 12 | | 28,300 ft. | | 10.6 ac | | | $30.6 |
| **Exmore** | | | | | | | | | | |
| Alt 1–Connector Bayside Rd to Broadwater Rd | 1 | | 6 | | | | | | | $1.8 |
| Alt 2–Alt 1 plus Relocate Signal Shore Plaza Signal | 2 | | 7 | | | | | | | $2.8 |
| **Nassawadox** | | | | | | | | | | |
| Alt 1–Shift RR within Town | 2 | 6,250 ft. | 3 | | 6,250 ft. | | | | | $4.4 |
| Alt 2–Shift RR Outside Town | 2 | 6,250 ft. | 3 | | 6,250 ft. | | 1.5 ac | | | $7.0 |
| **Machipongo** | | | | | | | | | | |
| Alt 1–Route 627 Consolidate Median at Clam Shack | 3 | 3,400 ft. | 4 | 3,400 ft. | | | | 1,400 ft. | | $4.3 |
| Alt 2–Route 627 Consolidate Median at Young St | 3 | 3,400 ft. | 3 | 3,400 ft. | | | | 1,200 ft. | | $4.1 |
| Alt 3–New Local Connection to Route 618 | 4 | 3,400 ft. | 5 | 3,400 ft. | | | | 1,200 ft. | | $5.0 |
| Alt 4–Variant of Alt 3 (Young St Open) | 4 | 3,400 ft. | 5 | 3,400 ft. | | | | 1,200 ft. | | $4.9 |
| Alt 5 Route 627 Consolidate Median near Chevon | 3 | 3,400 ft. | 3 | 3,400 ft. | | | | 1,400 ft. | | $4.5 |
| **Martin Siding** | | | | | | | | | | |
| Alt 1–Frontage & Reverse Frontage Roads | 2 | | 3 | | | 1,000 ft. | | | | $2.0 |
| Alt 2–Realign US Route 13 & Construct Frontage Rds | 2 | 1,200 ft. | 3 | 1,200 ft. | | 1,100 ft. | | | | $1.1 |
| **Route 184 Intersection** | | | | | | | | | | |
| Alt 1–Interchange & Grade Separation of RR | 5 | | 5 | 4,500 ft. | | | | | | $17.2 |
| Alt 2–Intersection Improve & Grade Separation of RR | 2 | | 4 | 3,000 ft. | | | | | | $11.1 |
| **Cape Center** | 5 | 3,100 ft. | 2 | 3,100 ft. | | | | | | $3.0 |
| **Kiptopeke Road** | 2 | 2,400 ft. | 2 | 2,400 ft. | | | | | | $3.1 |

# 6

# Study Recommendations and Action Plan

The approach being taken to improve the efficiency and safety of the U.S. Route 13 corridor is multi-faceted. First, this study recommends that VDOT implement the Access Management Guidelines set forth in Chapter 4. Second, this plan recommends that each locality along the corridor adopt the Highway Corridor Overlay District also discussed in Chapter 4. Finally, a series of roadway and safety improvements are recommended based on the alternatives analysis and public input process described in Chapter 5. This chapter summarizes the recommendations and defines the "Action Plan" for implementation of the improvement program.

## 6.1 Overview

To aid in the preparation of this plan, the study team relied heavily on input from local citizens and officials, those that experience the corridor on a daily basis. This input was particularly helpful in the identification of objectives for the plan and in the identification of existing transportation deficiencies. Each of the recommendations presented in this plan ultimately satisfy one or more of the defined objectives and address many of the current deficiencies described by the public. In addition, this plan addresses the anticipated future needs of the corridor based on projected growth and traffic volumes through 2020. In their entirety, all of the physical recommendations to the U.S. Route 13 and Route 175 roadway network are shown in a separate document referred to as the *Recommended Conceptual Plan*. The next section briefly describes the primary recommendations as they relate to the objectives originally set forth for this study, which are described in Chapter 1.

## 6.2 Study Recommendations

A wide range of actions has been recommended in this study to address existing, short-term and long-term corridor needs. A summary of study recommendations along the U.S. Route 13 and Route 175 corridors are summarized in Table 6-1 and graphically displayed in Figure 6-1, sheets 1 through 15. For each proposed action, the table also

presents a summary of how the improvement satisfies each of the study objectives. In many cases, each recommendation may either directly or indirectly satisfy more than one objective. In general, corridor-wide actions were developed to address either safety concerns or access management concerns. Many actions were identified to better accommodate heavy vehicles, such as tractor-trailers serving existing businesses and school buses. A few actions would result in significant increases in roadway capacity, such as a bypass, an interchange, and a significantly improved roadway cross section (i.e., wider shoulders). The most significant actions recommended in this study are those that help to implement a coordinated access management policy that:

- Involves close coordination between VDOT and the Eastern Shore local government bodies,
- Results in more cost-effective solutions, and
- Maximizes the useful life of the U.S. Route 13 and Route 175 corridors.

■

### 6.2.1 Rationale for Recommendation of Specific Alternative Concepts

The recommendations presented in this chapter generally present improvements on existing alignment (referred to as Alternative 1), as this was a major focus of the study. There were several locations, however, where alternatives were considered that either left the existing alignment or were developed in response to public comments received during the study. The potential impacts and benefits of these alternatives were discussed in great detail in Chapter 5. A discussion is presented below for those locations where Alternative 1 was not recommended.

In the Oak Hall/Temperanceville area, a total of five alternatives were evaluated. Alternative 4, the relocation of U.S. Route 13 onto a western bypass roadway (four-lane divided, limited-access), was recommended based on two factors: 1) strong public sentiment for a bypass of their communities, and 2) concerns of the potential impacts to homes and businesses along existing U.S. Route 13. This alternative would start to the south of Route 175 with a simplified interchange connecting existing U.S. Route 13 with a westerly bypass. This alternative would leave U.S. Route 13 in a southwesterly direction, heading south across Route 703 (Withams Road) and Route 702 (Horsey Road) at at-grade intersections, passing west of the Tysons plant in Temperanceville, connecting with existing U.S. Route 13 south of the Tysons plant.

South of Onley, two improvement alternatives were presented in the area of the existing median crossover near Suburban Propane. Alternative 1 left the existing median open with improved turn lanes. Alternative 2 which closes the existing median crossover and provides a 1,000 foot local connector road on the eastside of U.S. Route 13 connecting Suburban Propane and Edward Seafood Shoppe with the median crossover serving the YMCA. Alternative 2 provides better median spacing and is recommended.

In the town of Exmore, two improvement alternatives were presented for the Shore Plaza area. Alternative 1 proposed a new local roadway connection between Route 618 (Bayside Road) and Route 652 (Broadwater Road), while Alternative 2 proposed the relocation of the existing Shore Plaza traffic signal to 400 feet north of its existing location with the intent to improve signal spacing and provide access for future commercial development, expected on both sides of U.S. Route 13 over the next 20 years, to use this signal. The current location is constrained on the east side of U.S. Route 13 due to the placement of the Riteaid and Shore Bank buildings and parking lots. The recommended improvements through this area were a combination of both alternatives by: 1) providing the local roadway connection between Route 618 and Route 652, and 2) relocating the Shore Plaza traffic signal.

A total of five alternatives were developed for the Machipongo area, several in response to public comments. The intent of all alternatives was to consolidate crossover locations through this area while widening the median to better accommodate school bus traffic (from Northampton Middle School). Alternative 2 was recommended because it did the best job with minimumal improvements while providing good service to the school and existing businesses. Alternative 2 relocates Route 627 on the eastside south of the Clam Shack oppose Young Street (Route 627) on westside of U.S. Route 13. The median crossover at Route 626 is converted to a southbound U.S. Route 13 only left turn median opening. Alternative 2 also maintains a median crossover at Route 628 (Wilsonia Neck Road).

Two alternatives were developed for the Martins Siding area (just south of Machipongo). Alternative 2 was developed based on public comment, and involves the reconstruction of U.S. Route 13 through a horizontal curve to flatten out the curve and allow for the construction of a one-way frontage road on northbound U.S. Route 13 north of Bell Lane (Route 1701) in lieu of a reverse frontage road recommended in Alternative 1.

At the intersection of Route 184 with U.S. Route 13 two alternatives were developed. Alternative 1 provided a grade separation of the Eastern Shore Railroad but did not provide any separation between U.S. Route 13 and Route 184 traffic. Alternative 2 favored by the Citizens Advisory Committee provides separation of U.S. Route 13 traffic from the railroad and Route 184 and is recommended.

■

### 6.2.2 Improvement Costs

The implementation of all study recommendations will take many years to complete using conventional funding mechanisms, and are unlikely to be implemented all within the twenty-year planning horizon of this study. Table 6-2 presents a summary of the total costs associated with all recommended actions. In total, the study recommendations are projected to cost $139.3 million dollars (current dollars), with approximately 60 percent of the improvements occurring in Accomack County and the remaining 40 percent occurring in Northampton County.

## Table 6-2
## Summary of Recommended Improvement Costs

| Accomack County – U.S. Route 13 | | | | | |
|---|---|---|---|---|---|
| Milepost | | Opinion of Probable | Milepost | | Opinion of Probable |
| From | To | Cost | From | To | Cost |
| 137 | 138 | $630,000 | 118 | 119 | $3,483,000 |
| 136 | 137 | $2,200,000 | 117 | 118 | $3,404,000 |
| 135 | 136 | $305,000 | 116 | 117 | $1,165,000 |
| 134 | 135 | $3,200,000 | 115 | 116 | $474,000 |
| 133 | 134 | $93,000 | 114 | 115 | $1,040,000 |
| 132 | 133 | $3,720,000 | 113 | 114 | $1,301,000 |
| 131 | 132 | $3,825,000 | 112 | 113 | $1,107,000 |
| 130 | 131 | $4,360,000 | 111 | 112 | $2,506,000 |
| 129 | 130 | $5,270,000 | 110 | 111 | $463,000 |
| 128 | 129 | $1,256,000 | 109 | 110 | $1,870,000 |
| 127 | 128 | $2,500,000 | 108 | 109 | $3,756,000 |
| 126 | 127 | $3,413,000 | 107 | 108 | $1,128,000 |
| 125 | 126 | $4,575,000 | 106 | 107 | $4,007,000 |
| 124 | 125 | $900,000 | 105 | 106 | $2,606,000 |
| 123 | 124 | $2,735,000 | 104 | 105 | $1,174,000 |
| 122 | 123 | $2,336,000 | 103 | 104 | $420,000 |
| 121 | 122 | $1,375,000 | 102 | 103 | $1,811,000 |
| 120 | 121 | $1,570,000 | 101 | 102 | $523,000 |
| 119 | 120 | $973,000 | | | |
| Route 175 between U.S. Route 13 and Mosquito Creek | | | | | $6,100,000 |
| **Total Accomack County** | | | | | **$83,574,000** |

| Northampton County – U.S. Route 13 | | | | | |
|---|---|---|---|---|---|
| Milepost | | Opinion of Probable | Milepost | | Opinion of Probable |
| From | To | Cost | From | To | Cost |
| 100 | 101 | $1,149,000 | 84 | 85 | $1,065,000 |
| 99 | 100 | $560,000 | 83 | 84 | $424,000 |
| 98 | 99 | $1,960,000 | 82 | 83 | $361,000 |
| 97 | 98 | $131,000 | 81 | 82 | $193,000 |
| 96 | 97 | $712,000 | 80 | 81 | $463,000 |
| 95 | 96 | $2,971,000 | 79 | 80 | $20,155,000 |
| 94 | 95 | $1,152,000 | 78 | 79 | $1,216,000 |
| 93 | 94 | $769,000 | 77 | 78 | $1,251,000 |
| 92 | 93 | $381,000 | 76 | 77 | $259,000 |
| 91 | 92 | $1,990,000 | 75 | 76 | $2,839,000 |
| 90 | 91 | $1,482,000 | 74 | 75 | $811,000 |
| 89 | 90 | $4,357,000 | 73 | 74 | $814,000 |
| 88 | 89 | $1,921,000 | 72 | 73 | $3,200,000 |
| 87 | 88 | $546,000 | 71 | 72 | $239,000 |
| 86 | 87 | $1,653,000 | 70 | 71 | $351,000 |
| 85 | 86 | $193,000 | 69 | 70 | $127,000 |
| **Total Northampton County:** | | | | | **$55,695,000** |

## 6.3 Action Plan

The mismatch between the costs for all study recommendations and the amount expected to become available clearly indicates a need for prioritization of these improvements. Short-term improvements have been identified that address existing safety concerns and/or begin to implement the access management guidelines. Table 6-3 provides a summary of the short-term recommendations including the estimated costs of these actions.

**Table 6-3**
**Summary of Short-term Recommendations**

| Recommended Action | Milepost Location | Cost by County | |
|---|---|---|---|
| | | Accomack | Northampton |
| **Corridor-wide Actions** | | | |
| Adoption of Access Management Guidelines | NA | NA | NA |
| Adoption of Highway Corridor Overlay District Ordinances by localities | NA | NA | NA |
| Adoption of Recommended Concept Plan | NA | NA | NA |
| Install rumble strips in outside shoulders | NA | $ 74,000 | $ 64,000 |
| Install raised pavement markers in center dashed line only at 80 feet spacing | NA | $ 242,000 | $ 208,000 |
| Install milepost markers – every mile | NA | $ 8,000 | $ 7,000 |
| Drainage grate reconstruction in median at 120 Accomack and 82 Northampton locations | NA | $ 562,000 | $ 226,000 |
| Headwalls – 50-Accomack and 10-Northampton | NA | $ 70,000 | $ 14,000 |
| Turn lane Improvements | NA | $ 500,000 | $ 500,000 |
| **Site-specific Actions – Accomack County** | | | |
| Clear vegetation within clear zone | | | |
| — North of Route 710 near the Welcome Center | 138-136 | $ 26,500 | |
| — North of Route 692 | 129 | $ 6,500 | |
| — Between Route 662 and Business 13/Route 659 | 117-115 | $ 31,500 | |
| Intersection improvement – Route 175 at Route 679 | | $ 300,000 | |
| Intersection improvement – Route 175 at Route 798 | | $ 300,000 | |
| Localized median widening – U.S Route 13 at Route 738 | | $ 750,000 | |
| Construct reverse frontage road – Route 738 | | $ 250,000 | |
| **Site-specific Actions – Northampton County** | | | |
| Clear vegetation within clear zone | | | |
| — Between Route 617 and Route 620 | 94-92 | | $ 10,500 |
| — Between Route 703 and Route 630 | 88-87 | | $ 18,800 |
| — Between Route 624 and Route 646 | 75-73 | | $ 18,000 |
| Construct one-way frontage road – south of Route 628 | 89-88 | | $ 575,000 |
| Localized median widening – U.S. Route 13 at Route 684 | 78 | | $2,250,000 |
| **Total Short-term Improvements Cost** | | **$3,120,500** | **$3,891,300** |

The intent of this study was the development of a plan that included a vision, the tools and a framework for preserving the vital function of the U.S. Route 13 and Route 175 corridors well into the future. While improvements along the entire corridor may not be realized in twenty years, there will be a plan in place to deal with anticipated and unanticipated growth in the future wherever it does occur. As such, while the actual funding of some of the longer-range improvements may come from private sources through future development ventures, VDOT and the localities will have already defined the vision of how the U.S. Route 13 and Route 175 corridors can be accessed and improved and have clear and enforceable tools to maintain the integrity of the access management plan.

**Table 6-1**
**Summary of Study Recommendations**

| Location and Study Recommendation | Improvement Satisfies the Following Study Objective: | | | | Accommodation of: | | | Increases Capacity |
|---|---|---|---|---|---|---|---|---|
| | Improve Intersections | Improve Entrances and Exits | Improve Roadway Geometrics | Provide Additional Safety Features | Farm Vehicles and Buses | Local and Through Traffic | Bicycles and Pedestrians | |
| **Corridor-wide Actions** | | | | | | | | |
| ***Policy Actions*** | | | | | | | | |
| — Adoption of U.S. Route 13 Access Management Guidelines by VDOT | | ✔ | ✔ | | | | | |
| — Adoption of Highway Corridor Overlay District Ordinance by Localities | | ✔ | ✔ | | | | | |
| — Adoption of Recommended Concept Plan to guide future access decisions | | ✔ | ✔ | | | | | |
| ***Physical Improvements*** | | | | | | | | |
| — 10-foot outside shoulders on U.S. Route 13 as a minimum | | | | ✔ | ✔ | | ✔ | ✔ |
| — Rumble strips – outside and inside shoulders | | | | ✔ | | | | |
| — Raised pavement markers – center line only at 80-foot spacing | | | | ✔ | | | | |
| — Milepost markers – every mile | | | | ✔ | | | | |
| — Relocation or Removal of Hazards in Clear Zone | | | | ✔ | | | | |
| — Drainage Grate Reconstruction in Median – 202 total structures | | | | ✔ | | | | |
| — Move/consolidate crossovers – 70 locations | | ✔ | ✔ | | | ✔ | | ✔ |
| — Turn lane improvements at major intersections | ✔ | | ✔ | | | ✔ | | ✔ |
| **Maryland State Line to Route 175** | | | | | | | | |
| Clear vegetation in clear zone north of Route 710, near Welcome Center | | | | ✔ | | | | |
| Provide 12-foot shoulder on southbound U.S. Route 13 through New Church | | ✔ | ✔ | ✔ | | ✔ | ✔ | ✔ |
| Localized median widening – U.S. Route 13 at Route 710 in New Church | ✔ | | ✔ | | ✔ | | | ✔ |
| Realign Route 704 (east) intersection with U.S. Route 13 | ✔ | | ✔ | | | ✔ | | |
| Localized median widening – U.S. Route 13 at Route 704 | ✔ | | ✔ | | ✔ | | | ✔ |
| **Route 175 to Route 692 (Oak Hall and Temperanceville)** | | | | | | | | |
| Construct improved intersection on U.S. Route 13 at Route 175 | ✔ | | ✔ | | | | | ✔ |
| Construct four-lane, divided bypass between Route 175 and Route 692 | | | ✔ | | | ✔ | | ✔ |
| Realign Route 702 intersection with U.S. Route 13 | ✔ | | ✔ | | | ✔ | | |
| Clear vegetation in clear zone north of Route 692 | | | | ✔ | | | | |
| **Route 692 to Route 729 (Mappsville)** | | | | | | | | |
| Provide 12-foot shoulders on northbound U.S. Route 13 between Route 692 and Route 691 | | ✔ | ✔ | ✔ | | ✔ | ✔ | ✔ |
| Localized median widening – U.S. Route 13 at Route 691 | ✔ | | ✔ | | ✔ | | | ✔ |
| Construct median through Mappsville | | ✔ | ✔ | | | | | ✔ |
| Provide 12-foot shoulders on northbound and southbound U.S. Route 13 through Mappsville | | | ✔ | ✔ | | ✔ | ✔ | ✔ |
| Realign Route 689 intersection with U.S. Route 13 | ✔ | | ✔ | | | ✔ | | |
| **Route 729 to Route 681 (Nelsonia)** | | | | | | | | |
| Provide 12-foot shoulders on northbound and southbound U.S. Route 13 through Nelsonia | | ✔ | ✔ | ✔ | | ✔ | ✔ | ✔ |
| Construct medial through Nelsonia | | | ✔ | | | | | ✔ |
| Realign Route 681 intersection with U.S. Route 13 | ✔ | | ✔ | | | ✔ | | |

**Table 6-1**
**Summary of Study Recommendations (Cont'd.)**

| Location and Study Recommendation | Improvement Satisfies the Following Study Objective: | | | | Accommodation of: | | | Increases Capacity |
|---|---|---|---|---|---|---|---|---|
| | Improve Intersections | Improve Entrances and Exits | Improve Roadway Geometrics | Provide Additional Safety Features | Farm Vehicles and Buses | Local and Through Traffic | Bicycles and Pedestrians | |
| **Route 681 to Route 679** | | | | | | | | |
| Localized median widening – U.S. Route 13 at Route 680 | ✔ | | ✔ | | ✔ | | | ✔ |
| Localized median widening – U.S. Route 13 at Route 738 | ✔ | | ✔ | | ✔ | | | ✔ |
| Construct reverse frontage road – northbound at Route 738 | | ✔ | | | ✔ | ✔ | | |
| **Route 679 to Route Business 13/Route 663 (Mary N Smith Area)** | | | | | | | | |
| Realign Route 679 intersection with U.S. Route 13 | ✔ | | ✔ | | | ✔ | | |
| Construct median in North Accomac area, between Route 661 and Route 663 | | | ✔ | | | | | ✔ |
| Improve roadway alignment and widen median from Route 661 to Route 663 | ✔ | | ✔ | | ✔ | | | ✔ |
| Construct one-way frontage roadson southbound U.S. Route 13 at two locations | | ✔ | | | ✔ | ✔ | | |
| **Business 13/Route 663 to Route 639 (Accomac and Onley)** | | | | | | | | |
| Clear vegetation in clear zone between Route 662 and Business 13 | | | | ✔ | | | | |
| Realign Business Route 13 and Route 659 at Whispering Pines | ✔ | | | ✔ | ✔ | ✔ | | |
| Construct reverse frontage road – northbound at Route 648 | | ✔ | | | | ✔ | | |
| Construct access road between Route 179 and Chesapeake Square Shopping Center | | | | | ✔ | ✔ | | |
| Construct two-way frontage road – northbound at Route 1616 | | ✔ | | | ✔ | ✔ | | |
| Localized median widening – U.S. Route 13 at Route 680 (Nandua HS) | ✔ | | ✔ | | | | | ✔ |
| Provide 12-foot shoulders on southbound U.S. Route 13 north of Route 639 | | ✔ | ✔ | ✔ | | ✔ | ✔ | ✔ |
| **Route 639 to Route 607 (Melfa, Keller, Painter)** | | | | | | | | |
| Relocate railroad right-of-way in Melfa, Keller and Painter to the east to allow for roadway widening | | | ✔ | | | | | |
| Construct 16-foot-wide median through Melfa, Keller and Painter | | | ✔ | | | | | |
| Localized median widening – U.S. Route 13 north and south of Melfa | ✔ | | ✔ | | ✔ | | | ✔ |
| Construct directional median access at community college | ✔ | | | | | ✔ | | |
| Realign Route 734 (east) to intersect with industrial park access | ✔ | | ✔ | | | ✔ | | |
| Localized median widening – U.S. Route 13 north and south of Keller | ✔ | | ✔ | | ✔ | | | ✔ |
| Localized median widening – U.S. Route 13 at Central Middle School | ✔ | | ✔ | | ✔ | | | ✔ |
| **Route 607 to Route 618 (Exmore)** | | | | | | | | |
| Localized median widening – U.S. Route 13 at Bundick's Kuzzen's | ✔ | | ✔ | | ✔ | | | ✔ |
| Provide 12-foot shoulder on southbound U.S. Route 13 north of Route 181 | | ✔ | ✔ | ✔ | | ✔ | ✔ | ✔ |
| Construct access road to serve Food City plaza and Trawler restaurant | | ✔ | | | | ✔ | | |
| Construct local road connection between Route 618 and Route 652 | | | | | | ✔ | | |
| Future relocation of existing traffic signal | | | ✔ | | | | | |
| **Route 618 to Route 617 (Nassawadox)** | | | | | | | | |
| Provide 12-foot shoulder on southbound U.S. Route 13 through Nassawadox | | ✔ | ✔ | ✔ | | ✔ | ✔ | ✔ |
| Relocate railroad right-of-way in Nassawadox to the east to allow for roadway widening | | | ✔ | | | | | |
| Localized median widening – U.S. Route 13 through Nassawadox | ✔ | | ✔ | | ✔ | | | ✔ |

**Table 6-1**
**Summary of Study Recommendations (Cont'd.)**

| Location and Study Recommendation | Improvement Satisfies the Following Study Objective: | | | | Accommodation of: | | | Increases Capacity |
|---|---|---|---|---|---|---|---|---|
| | Improve Intersections | Improve Entrances and Exits | Improve Roadway Geometrics | Provide Additional Safety Features | Farm Vehicles and Buses | Local and Through Traffic | Bicycles and Pedestrians | |
| **Route 617 to Route 628 (Treherneville and Machipongo)** | | | | | | | | |
| Construct one-way frontage road on southbound U.S. Route 13 in Weirwood | | ✔ | | | ✔ | ✔ | | |
| Clear vegetation in clear zone between Route 617 and Route 620 | | | | ✔ | | | | |
| Construct one-way frontage road on southbound U.S. Route 13 in Treherneville | | ✔ | | | ✔ | ✔ | | |
| Construct access road between Route 622 and Route 625 | | | | ✔ | | ✔ | | |
| Provide 12-foot shoulder on southbound U.S. Route 13 south of Route 622 | | ✔ | ✔ | ✔ | | ✔ | ✔ | ✔ |
| Localized median widening – U.S. Route 13 at Route 627 | ✔ | | ✔ | | ✔ | | | ✔ |
| Realignment of Young Street (Route 627) | ✔ | | ✔ | | | ✔ | | |
| **Route 628 to 630 (Martin Siding)** | | | | | | | | |
| Construct one-way frontage road on southbound U.S. Route 13 in Martins Siding | | ✔ | | | ✔ | ✔ | | |
| Construct one-way frontage road on northbound U.S. Route 13 in Martins Siding | | ✔ | | | ✔ | ✔ | | |
| Localized median widening – U.S. Route 13 at Route 1701 | ✔ | | ✔ | | ✔ | | | ✔ |
| Clear vegetation in clear zone between Route 1703 and Route 630 | | | | ✔ | | | | |
| Localized median widening – U.S. Route 13 at Route 630 | ✔ | | ✔ | | ✔ | | | ✔ |
| **Route 630 to Route 642 (Cape Charles)** | | | | | | | | |
| Construct interchange on U.S. Route 13 at Route 184 | ✔ | ✔ | ✔ | | ✔ | | | ✔ |
| Construct access road between Route 642 at Food Lion Shopping Center | | ✔ | | | ✔ | | | |
| **Route 642 to Route 624 (Cape Center)** | | | | | | | | |
| Localized median widening – U.S. Route 13 at Route 684 (Kiptopeke ES) | ✔ | | ✔ | | ✔ | | | ✔ |
| Construct one-way frontage road on northbound U.S. Route 13 between Route 643 and Route 644 | | ✔ | | | ✔ | ✔ | | |
| Construct one-way frontage road on southbound U.S. Route 13 between Route 643 and Route 644 | | ✔ | | | ✔ | ✔ | | |
| Localized median widening – U.S. Route 13 at Cape Center | ✔ | | ✔ | | ✔ | | | ✔ |
| Construct reverse frontage road – northbound at Cape Center | | ✔ | | | | ✔ | | |
| **Route 624 to Route 600 (Kiptopeke)** | | | | | | | | |
| Clear vegetation in clear zone between Route 624 and Route 646 | | | | ✔ | | | | |
| Provide 12-foot shoulder on southbound U.S. Route 13 north of Route 646 | | ✔ | ✔ | ✔ | | ✔ | ✔ | ✔ |
| Localized median widening – U.S. Route 13 at Route 645 | ✔ | | ✔ | | ✔ | | | ✔ |
| Close Route 704 access onto U.S. Route 13 | ✔ | | ✔ | | | ✔ | | |
| Construct access road improvements on Route 645 | | ✔ | ✔ | | | | | |
| **Route 175 from U.S. Route 13 to Mosquito Creek** | | | | | | | | |
| Provide left-turn lanes as needed between U.S. Route 13 at Route 798 | | ✔ | ✔ | | | ✔ | | |
| Provide 12-foot shoulder on eastbound and westbound Route 175 | | ✔ | ✔ | ✔ | | ✔ | ✔ | ✔ |

MARYLAND

MILE 138

MILE 137

MILE 136

MILE 135

MILE 134

710

709

704

175

13

1

2

3

4

5

73

74

New Church

Route 13/Wallops Island Access Management Study

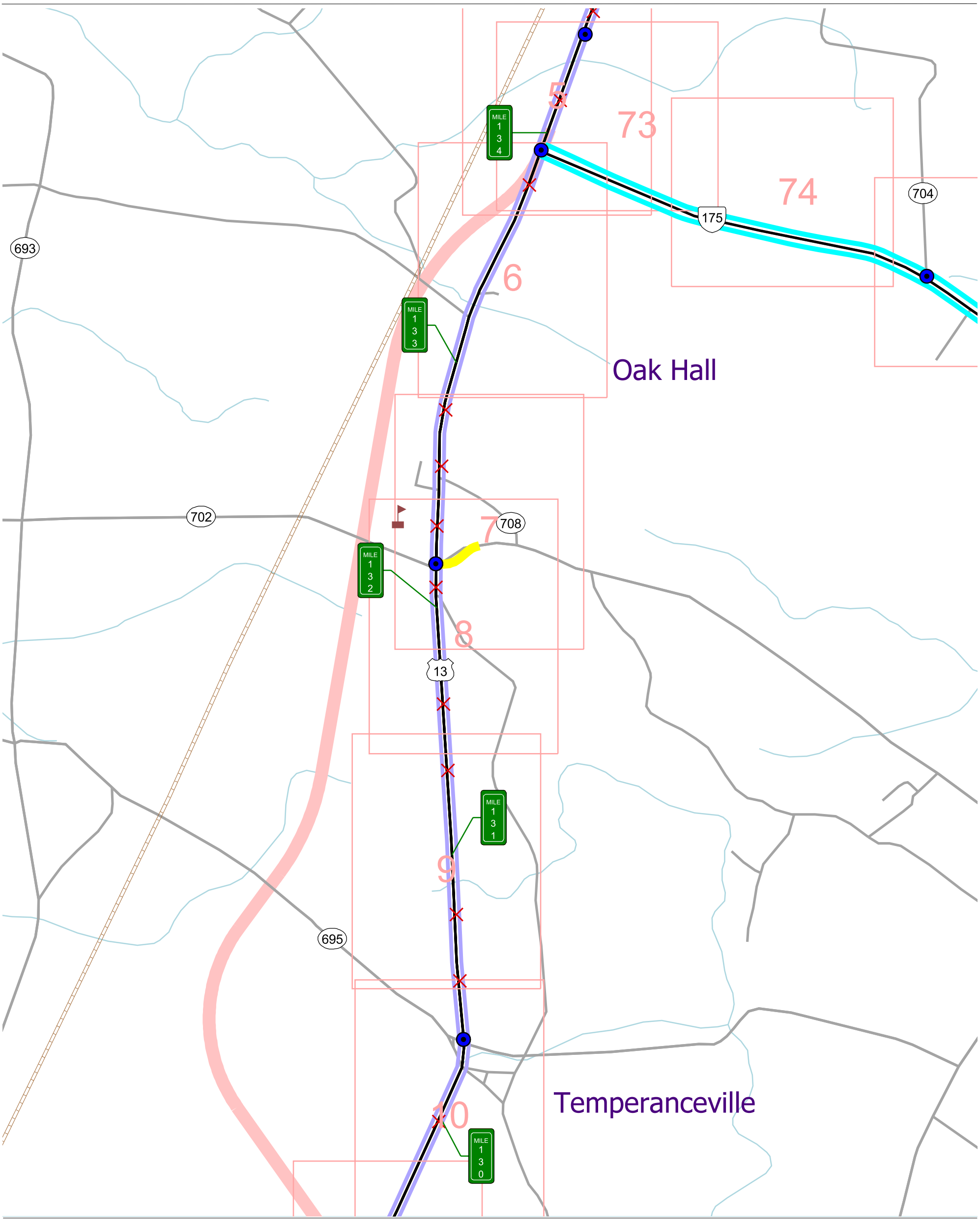
VDOT We Keep Virginia Moving

Median Closing
Clear Vegetation
Intersection/Turnlane Improvement
Relocated Railroad
Frontage/Reverse Frontage Improvements
Median Construction
Median Widening
12' Wide Right Shoulder
Roadway Improvement
Route 13 Bypass
10' Wide Right Shoulder
# Aerial Photo Number

**Figure 6-1**
**Sheet 1 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'




Route 13/Wallops Island Access Management Study

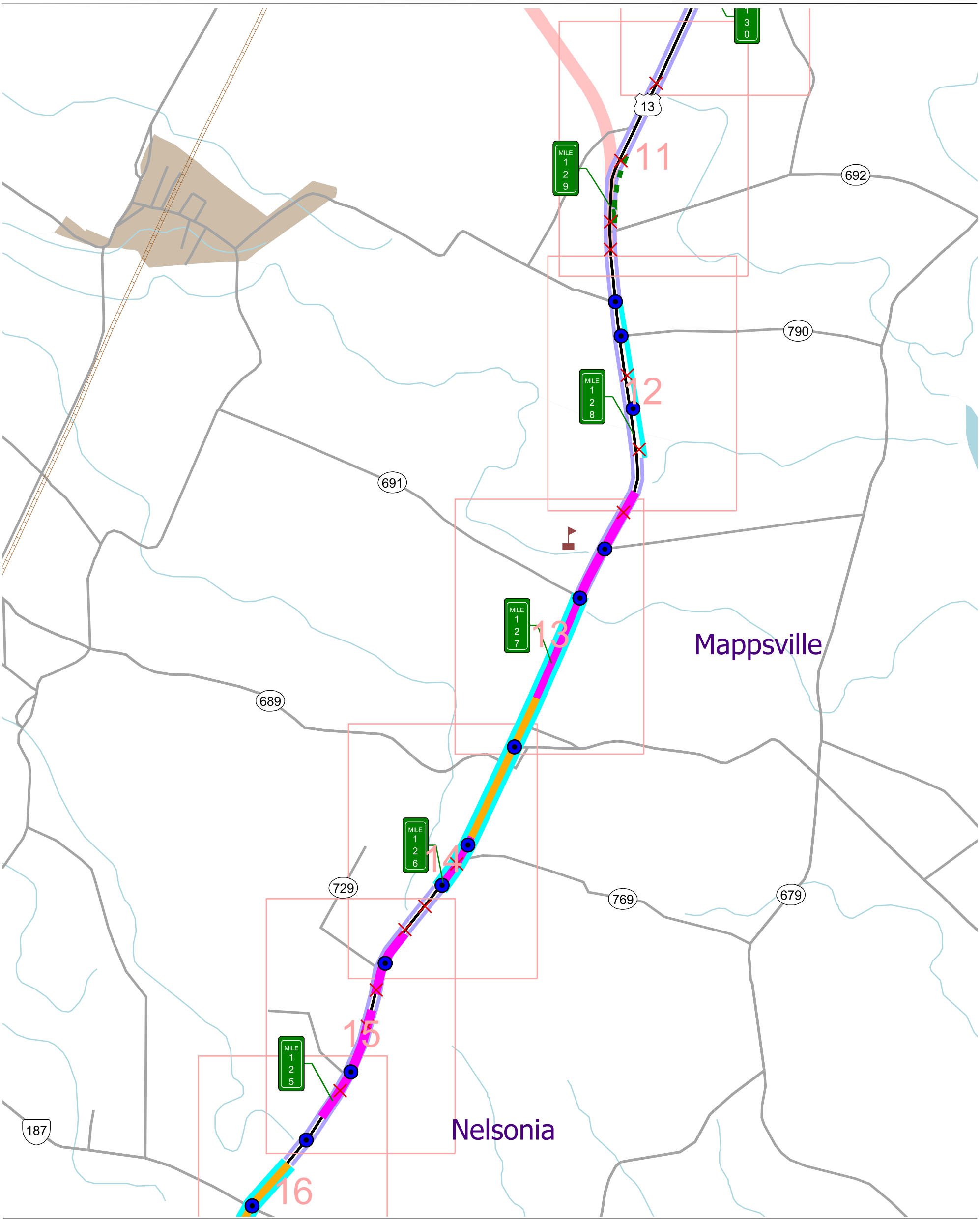
VDOT We Keep Virginia Moving

- Median Closing
- Clear Vegetation
- Intersection/Turnlane Improvement
- Relocated Railroad
- Frontage/Reverse Frontage Improvements
- Median Construction
- Median Widening
- 12' Wide Right Shoulder
- Roadway Improvement
- Route 13 Bypass
- 10' Wide Right Shoulder
- # Aerial Photo Number

**Figure 6-1**
**Sheet 2 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'




Route 13/Wallops Island Access Management Study

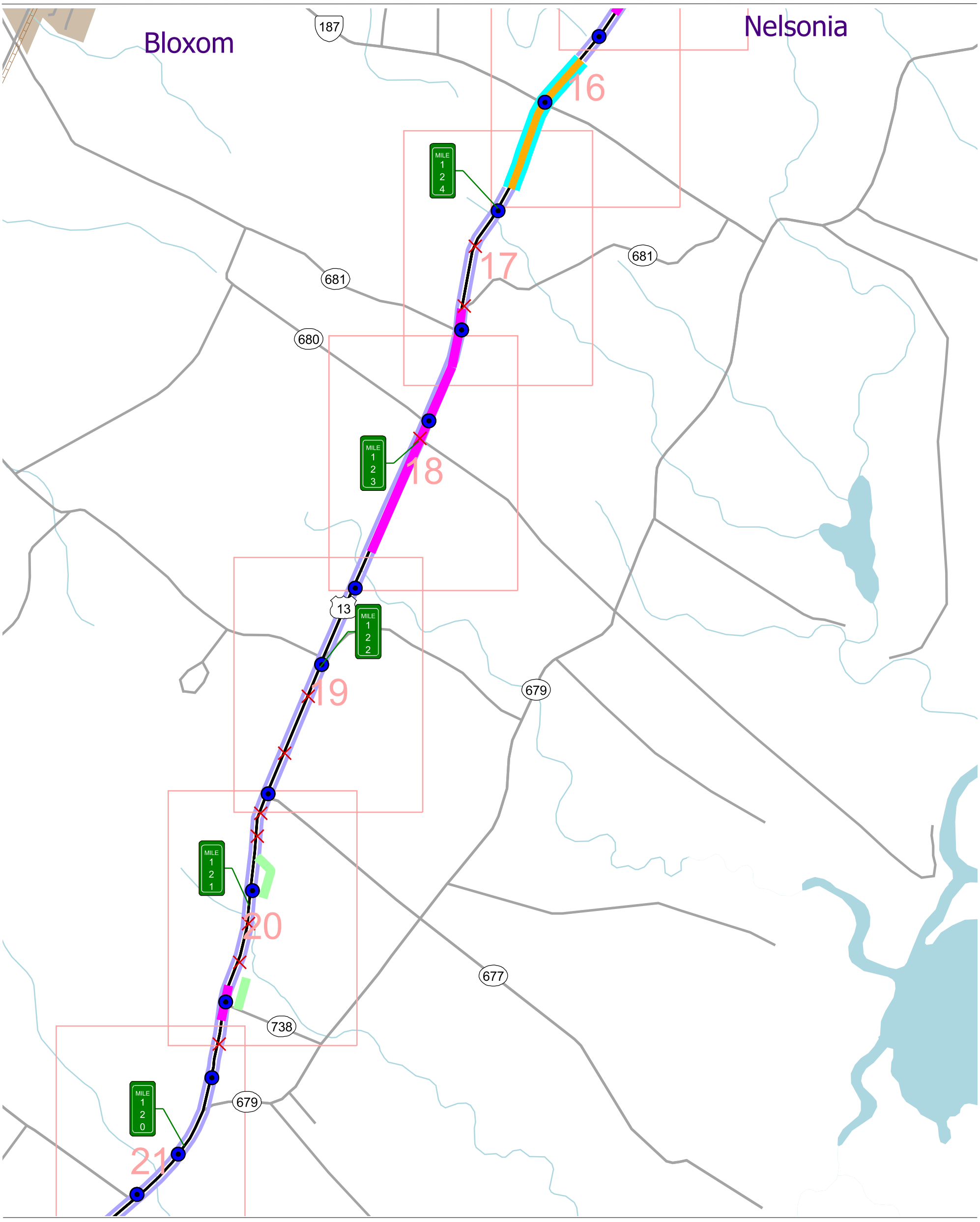
VDOT We Keep Virginia Moving

- Median Closing
- Clear Vegetation
- Intersection/Turnlane Improvement
- Relocated Railroad
- Frontage/Reverse Frontage Improvements
- Median Construction
- Median Widening
- 12' Wide Right Shoulder
- Roadway Improvement
- Route 13 Bypass
- 10' Wide Right Shoulder
- # Aerial Photo Number

**Figure 6-1**
**Sheet 3 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'




Route 13/Wallops Island Access Management Study

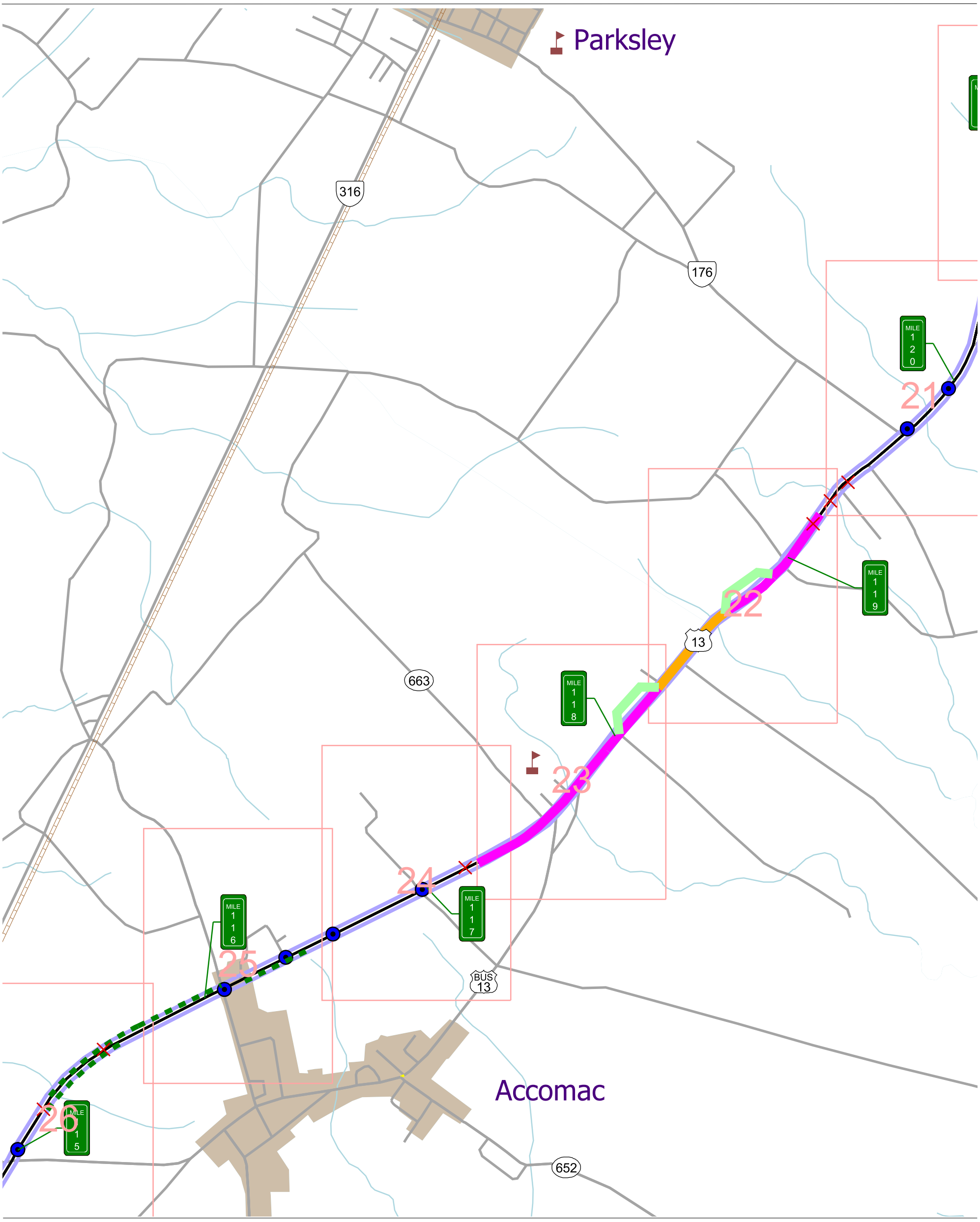
VDOT We Keep Virginia Moving

- Median Closing
- Clear Vegetation
- Intersection/Turnlane Improvement
- Relocated Railroad
- Frontage/Reverse Frontage Improvements
- Median Construction
- Median Widening
- 12' Wide Right Shoulder
- Roadway Improvement
- Route 13 Bypass
- 10' Wide Right Shoulder
- # Aerial Photo Number

**Figure 6-1**
**Sheet 4 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'




Route 13/Wallops Island Access Management Study

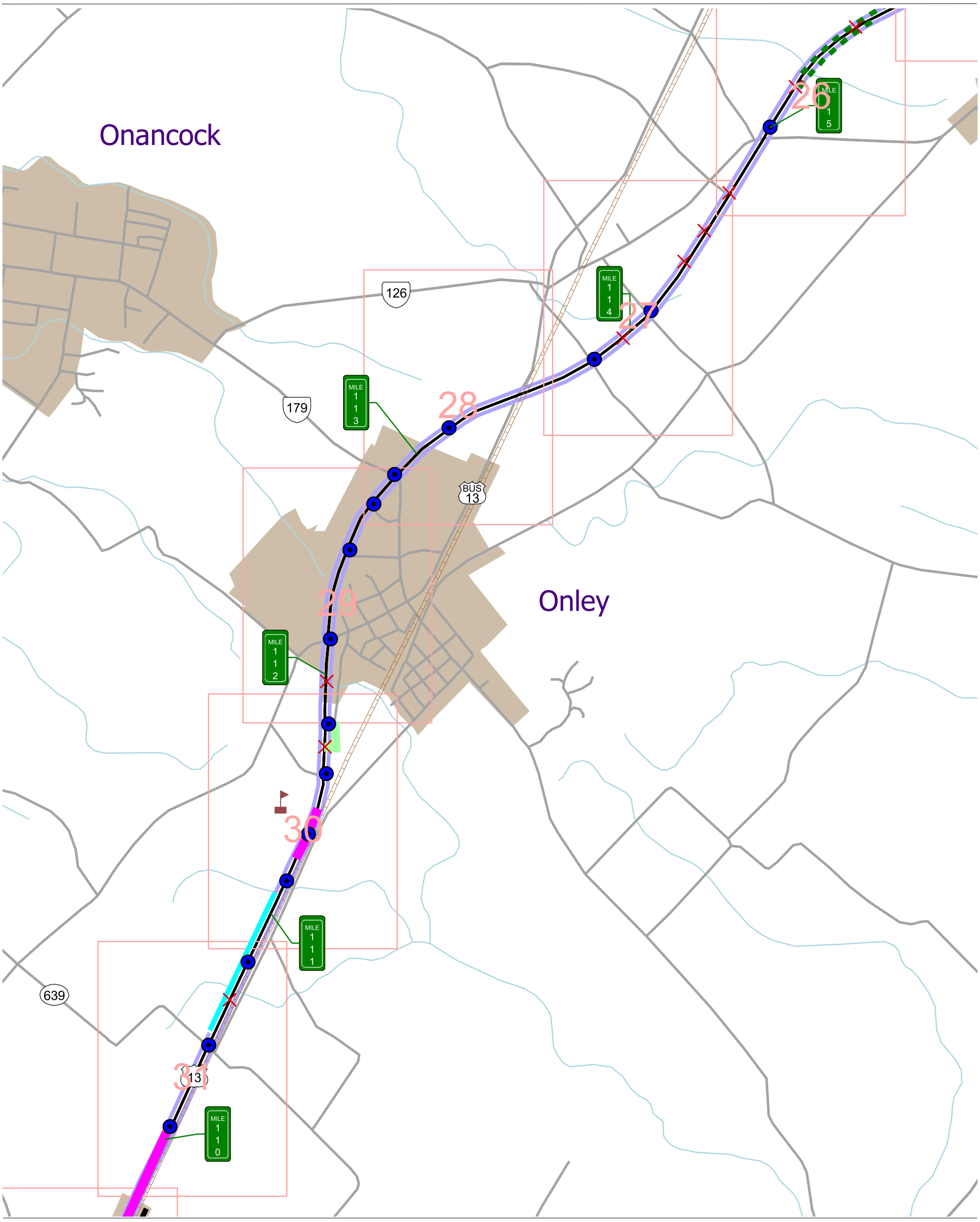
VDOT We Keep Virginia Moving

- Median Closing
- Clear Vegetation
- Intersection/Turnlane Improvement
- Relocated Railroad
- Frontage/Reverse Frontage Improvements
- Median Construction
- Median Widening
- 12' Wide Right Shoulder
- Roadway Improvement
- Route 13 Bypass
- 10' Wide Right Shoulder
- # Aerial Photo Number

**Figure 6-1**
**Sheet 5 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'




Route 13/Wallops Island Access Management Study

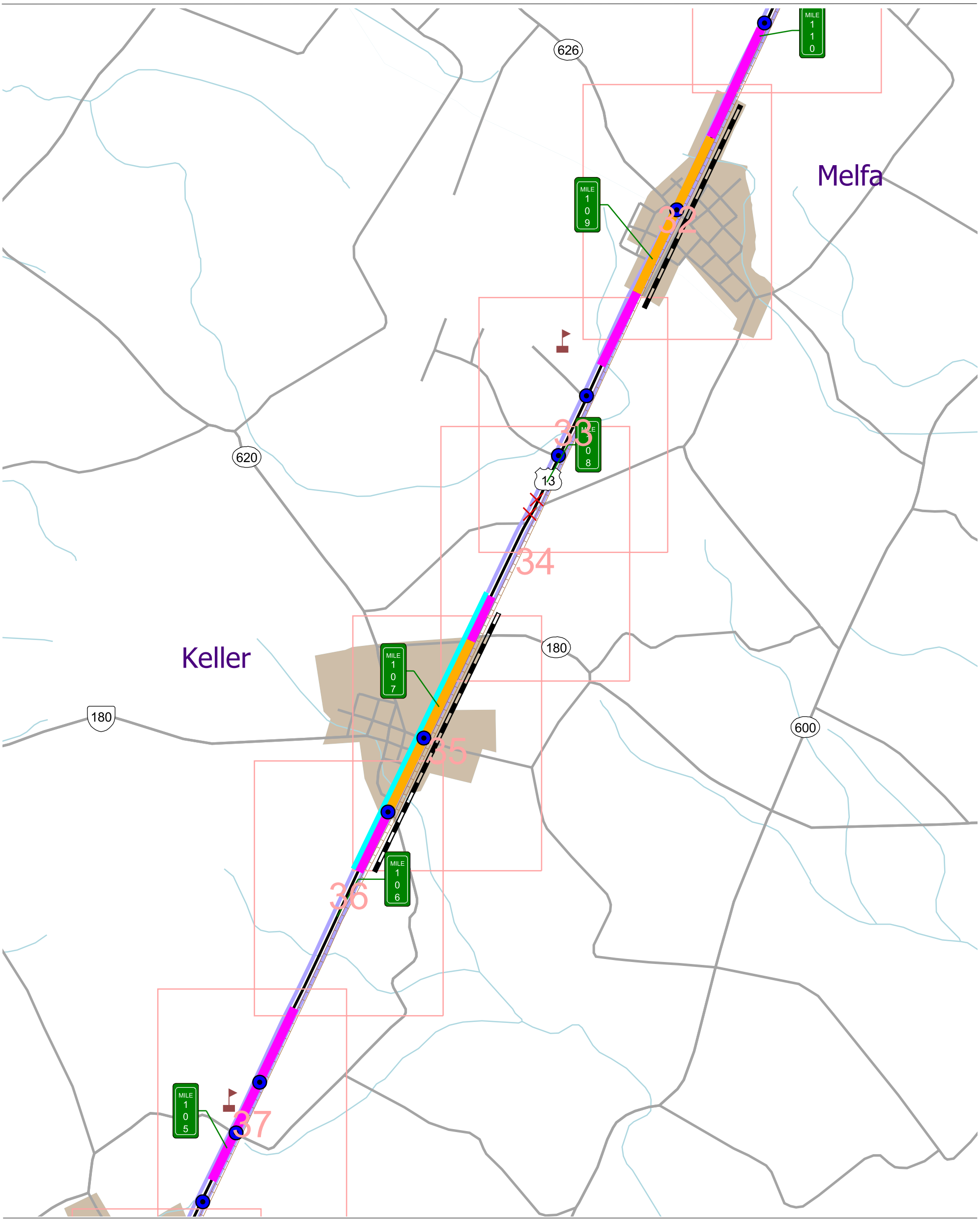
VHT We Keep Virginia Moving

- Median Closing
- Clear Vegetation
- Intersection/Turnlane Improvement
- Relocated Railroad
- Frontage/Reverse Frontage Improvements
- Median Construction
- Median Widening
- 12' Wide Right Shoulder
- Roadway Improvement
- Route 13 Bypass
- 10' Wide Right Shoulder
- # Aerial Photo Number

**Figure 6-1**
**Sheet 6 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'




Route 13/Wallops Island Access Management Study

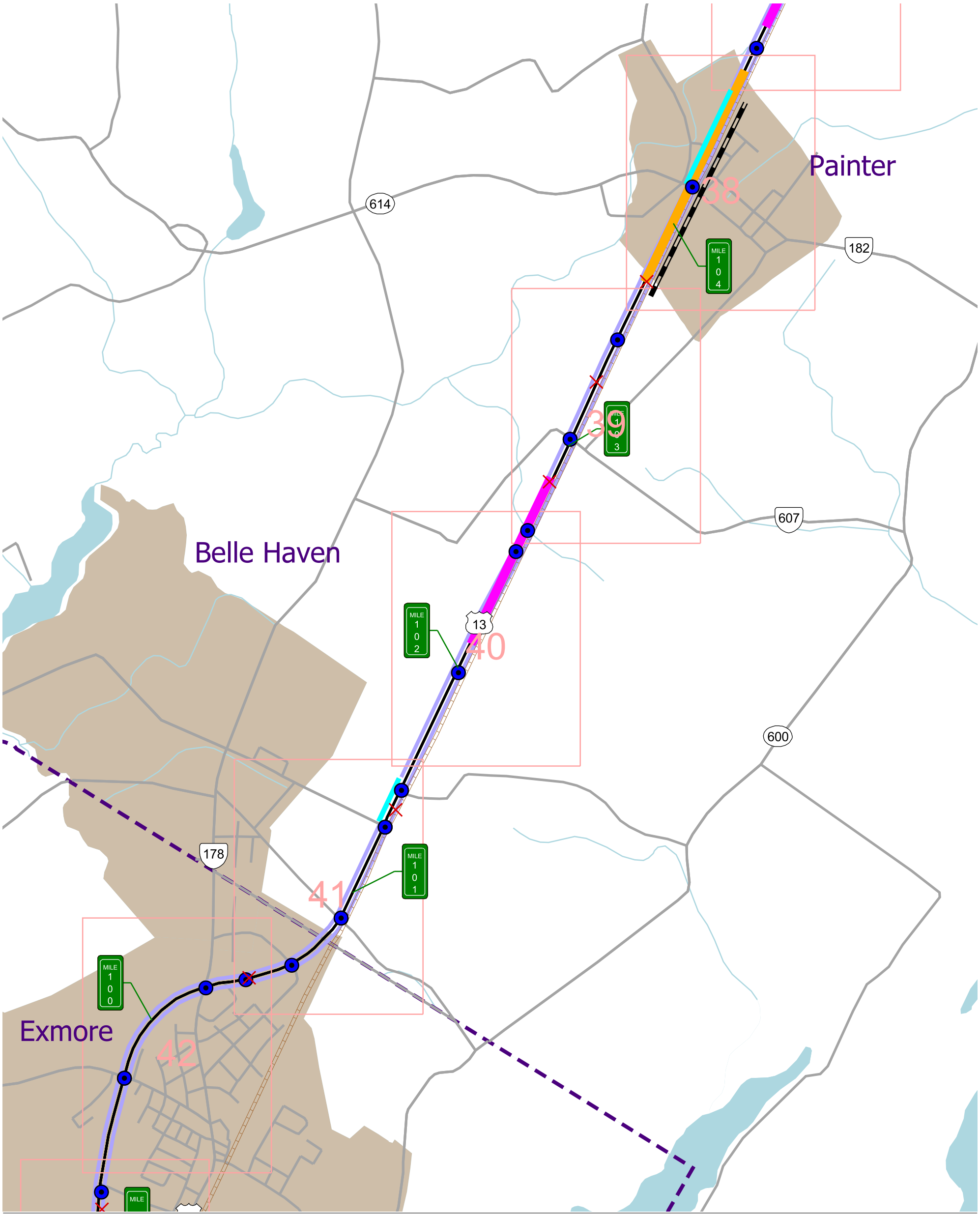
VDOT We Keep Virginia Moving

- Median Closing
- Clear Vegetation
- Intersection/Turnlane Improvement
- Relocated Railroad
- Frontage/Reverse Frontage Improvements
- Median Construction
- Median Widening
- 12' Wide Right Shoulder
- Roadway Improvement
- Route 13 Bypass
- 10' Wide Right Shoulder
- # Aerial Photo Number

**Figure 6-1**
**Sheet 7 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'




Route 13/Wallops Island Access Management Study

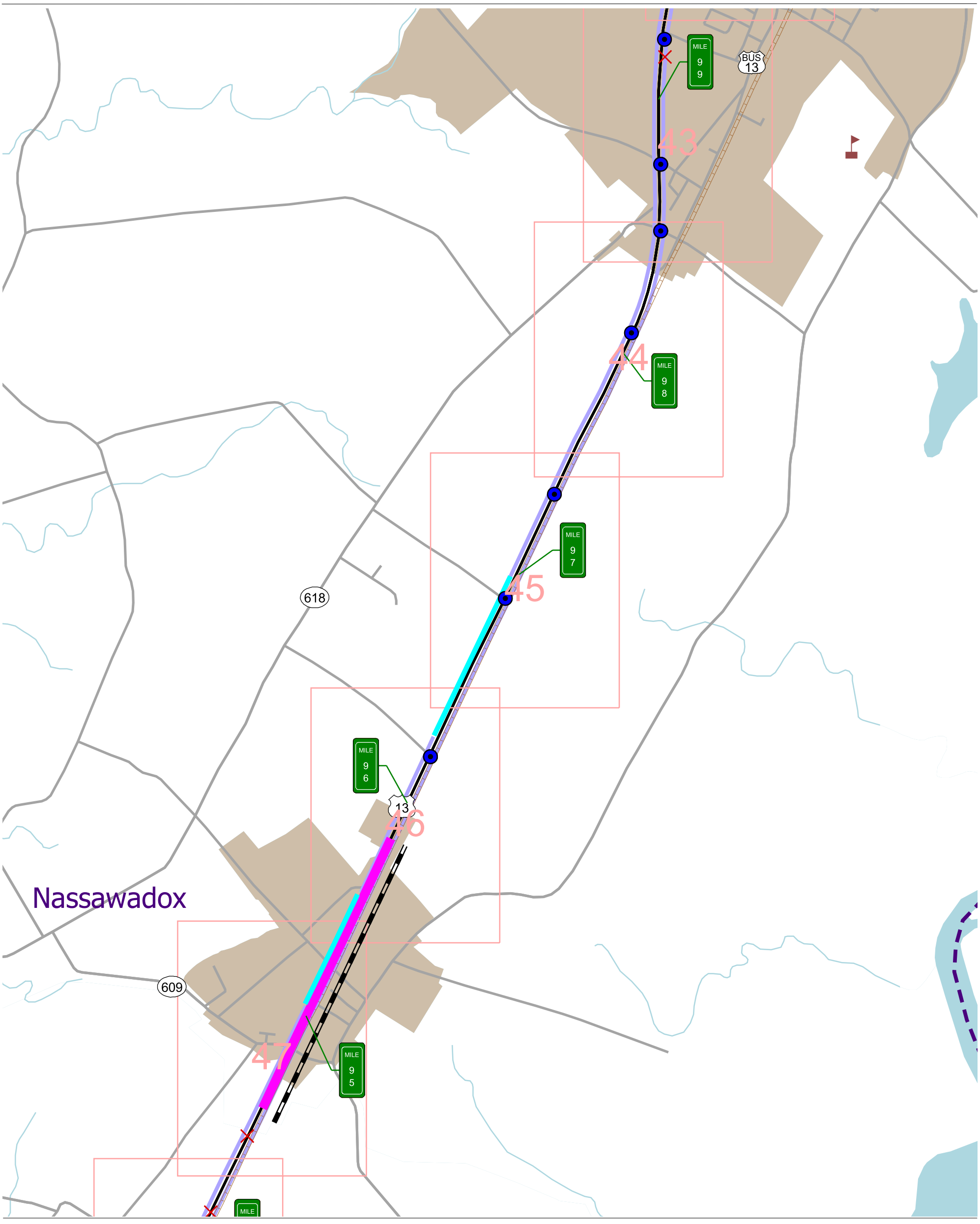
We Keep Virginia Moving

- Median Closing
- Clear Vegetation
- Intersection/Turnlane Improvement
- Relocated Railroad
- Frontage/Reverse Frontage Improvements
- Median Construction
- Median Widening
- 12' Wide Right Shoulder
- Roadway Improvement
- Route 13 Bypass
- 10' Wide Right Shoulder
- # Aerial Photo Number

**Figure 6-1**
**Sheet 8 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'




Route 13/Wallops Island Access Management Study

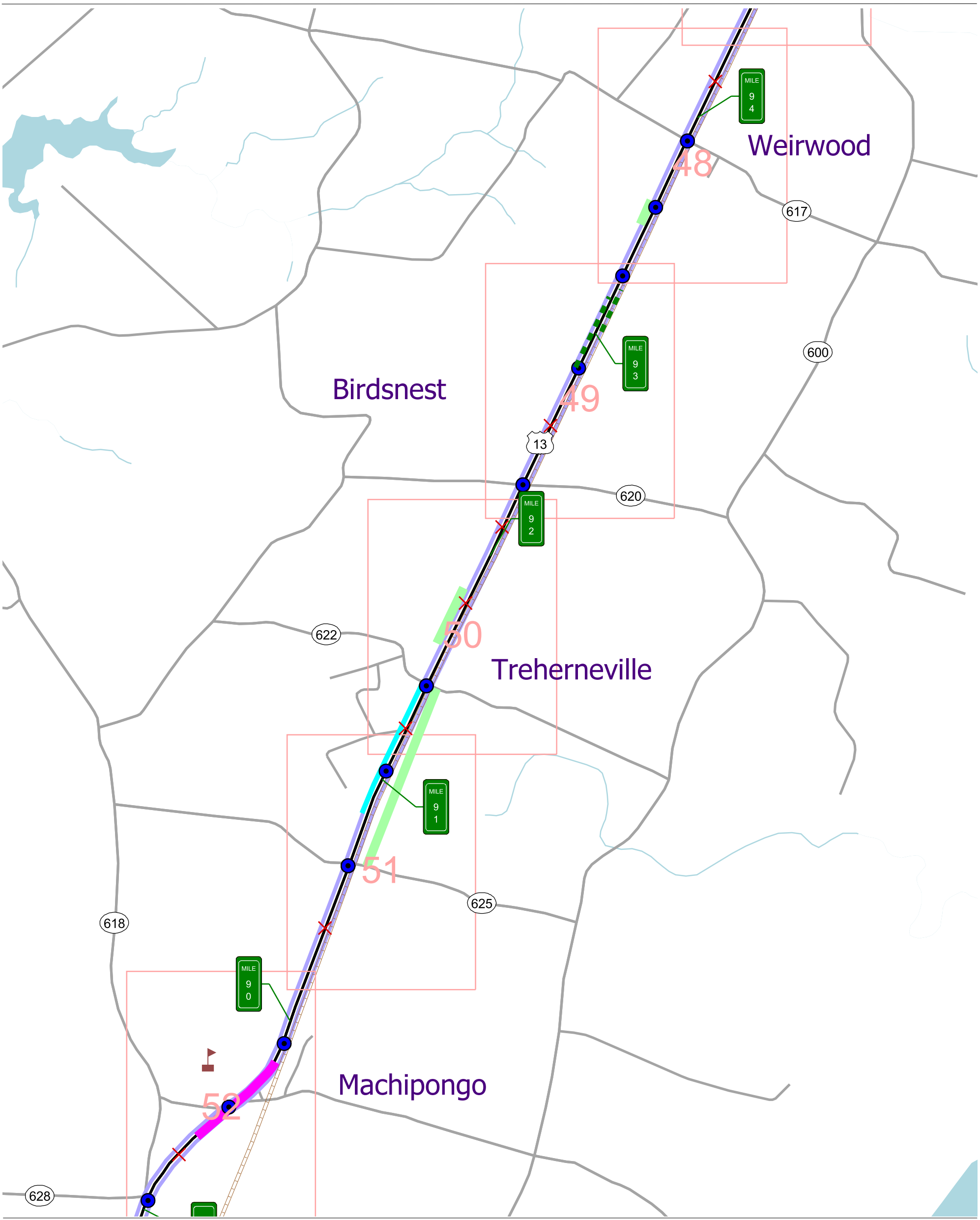
We Keep Virginia Moving

- Median Closing
- Clear Vegetation
- Intersection/Turnlane Improvement
- Relocated Railroad
- Frontage/Reverse Frontage Improvements
- Median Construction
- Median Widening
- 12' Wide Right Shoulder
- Roadway Improvement
- Route 13 Bypass
- 10' Wide Right Shoulder
- # Aerial Photo Number

**Figure 6-1**
**Sheet 9 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'



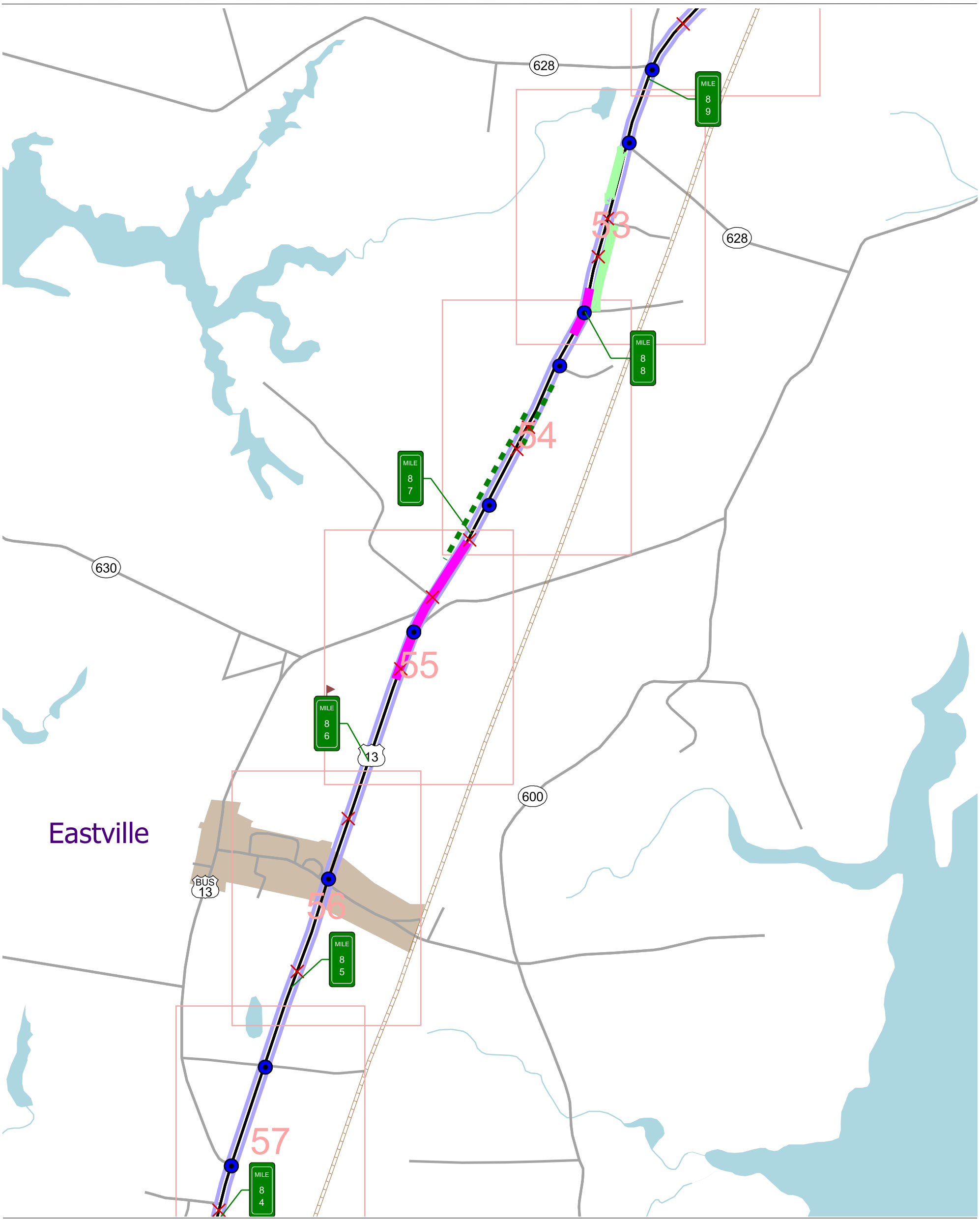

Median Closing
Clear Vegetation
Intersection/Turnlane Improvement
Relocated Railroad
Frontage/Reverse Frontage Improvements
Median Construction
Median Widening
12' Wide Right Shoulder
Roadway Improvement

Route 13 Bypass
10' Wide Right Shoulder
# Aerial Photo Number

**Figure 6-1**
**Sheet 10 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'




Route 13/Wallops Island Access Management Study

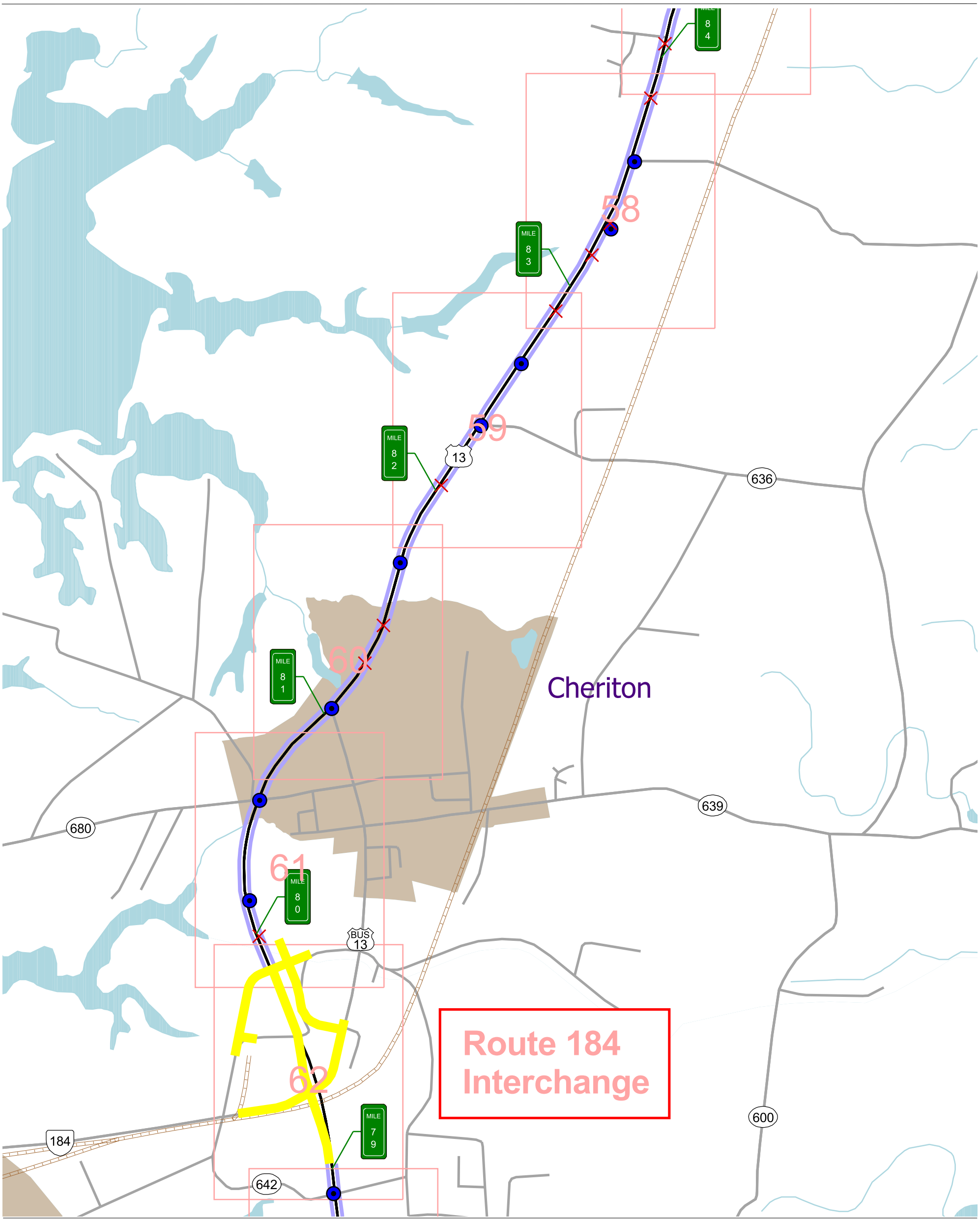
VDOT We Keep Virginia Moving

- Median Closing
- Clear Vegetation
- Intersection/Turnlane Improvement
- Relocated Railroad
- Frontage/Reverse Frontage Improvements
- Median Construction
- Median Widening
- 12' Wide Right Shoulder
- Roadway Improvement
- Route 13 Bypass
- 10' Wide Right Shoulder
- # Aerial Photo Number

**Figure 6-1**
**Sheet 11 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'




Route 13/Wallops Island Access Management Study

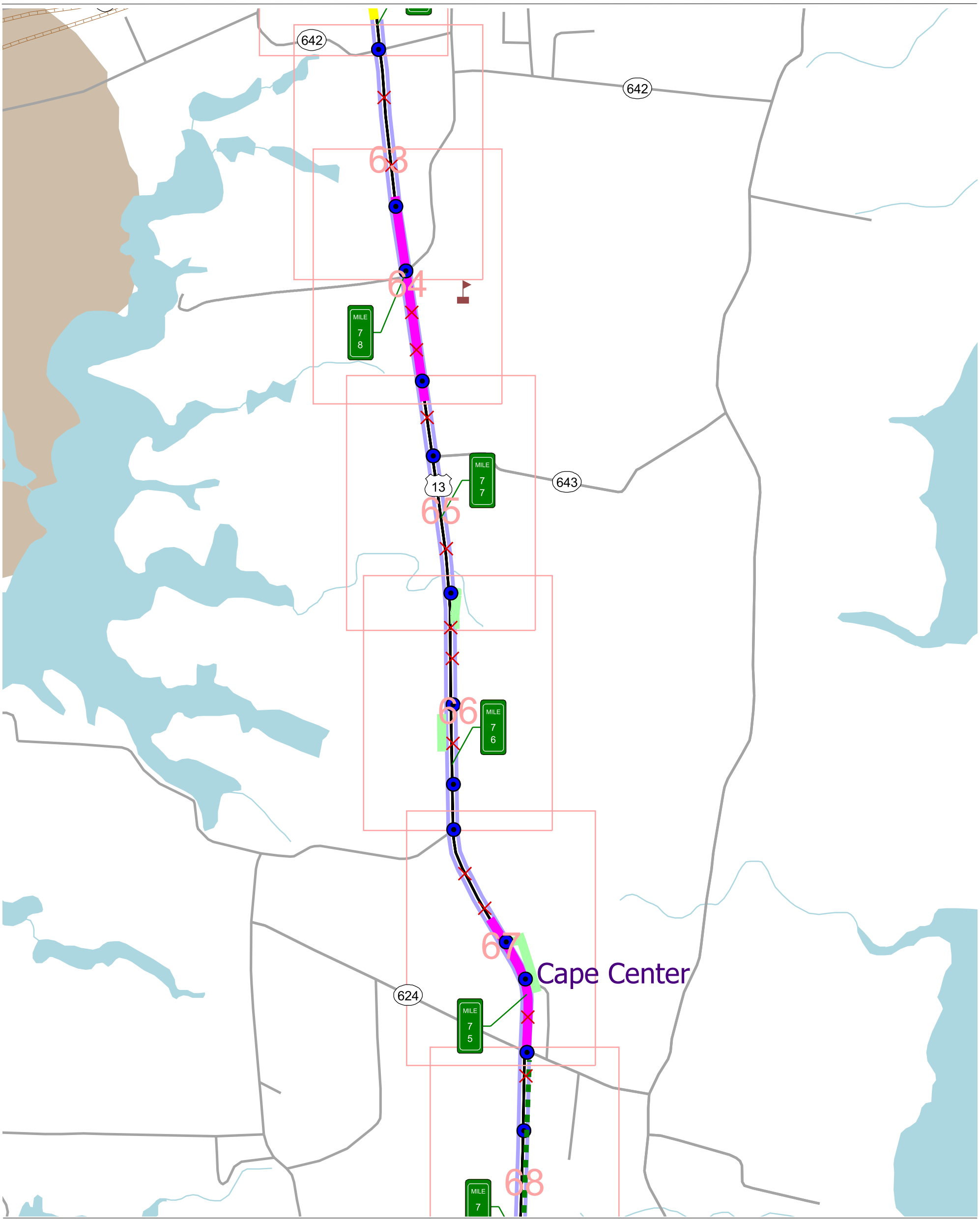
VDOT We Keep Virginia Moving

- Median Closing
- Clear Vegetation
- Intersection/Turnlane Improvement
- Relocated Railroad
- Frontage/Reverse Frontage Improvements
- Median Construction
- Median Widening
- 12' Wide Right Shoulder
- Roadway Improvement
- Route 13 Bypass
- 10' Wide Right Shoulder
- # Aerial Photo Number

**Figure 6-1**
**Sheet 12 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'




Median Closing
Clear Vegetation
Intersection/Turnlane Improvement
Relocated Railroad
Frontage/Reverse Frontage Improvements
Median Construction
Median Widening
12' Wide Right Shoulder
Roadway Improvement
Route 13 Bypass
10' Wide Right Shoulder
# Aerial Photo Number

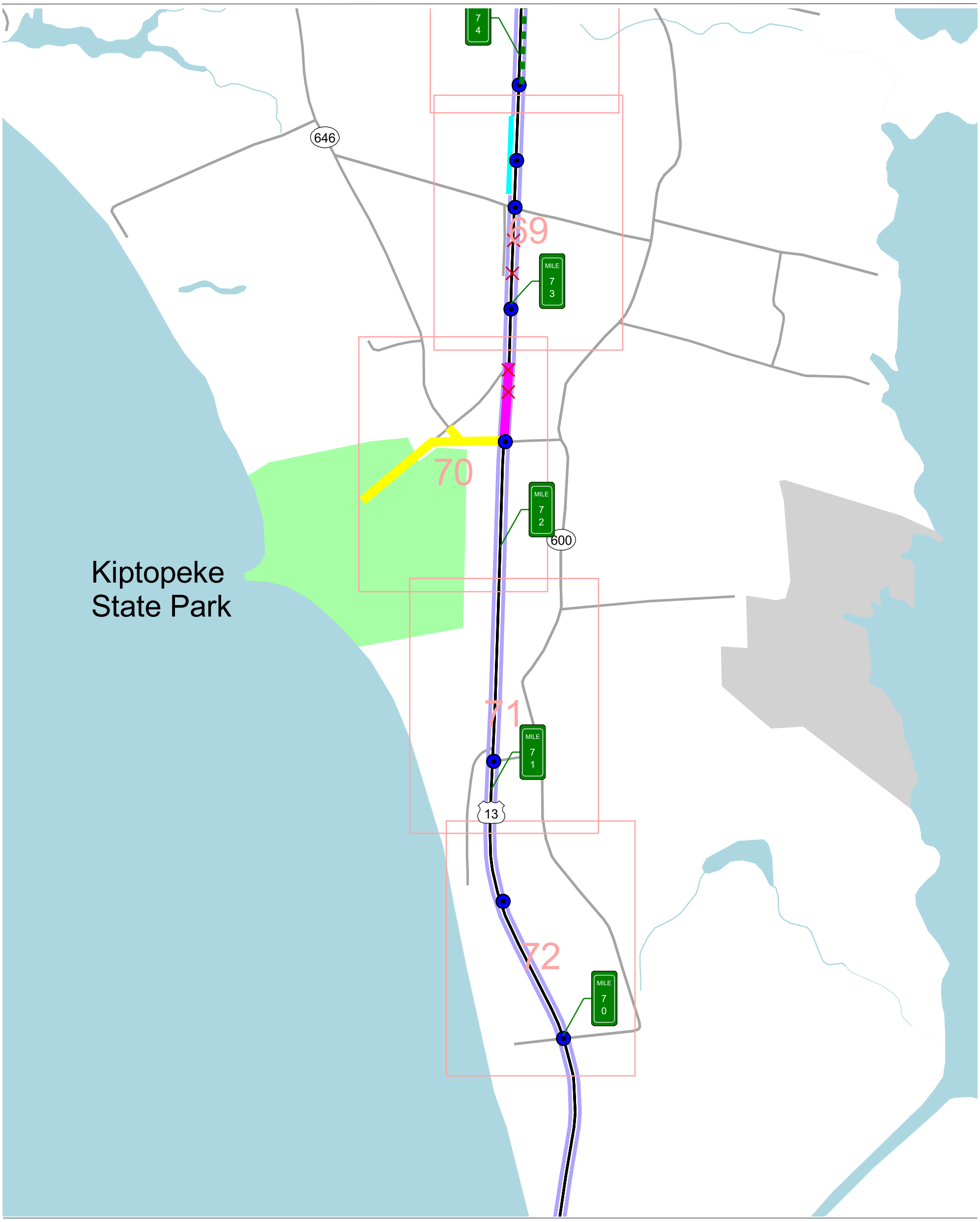
Route 13/Wallops Island Access Management Study

We Keep Virginia Moving

**Figure 6-1**
**Sheet 13 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'




Route 13/Wallops Island Access Management Study

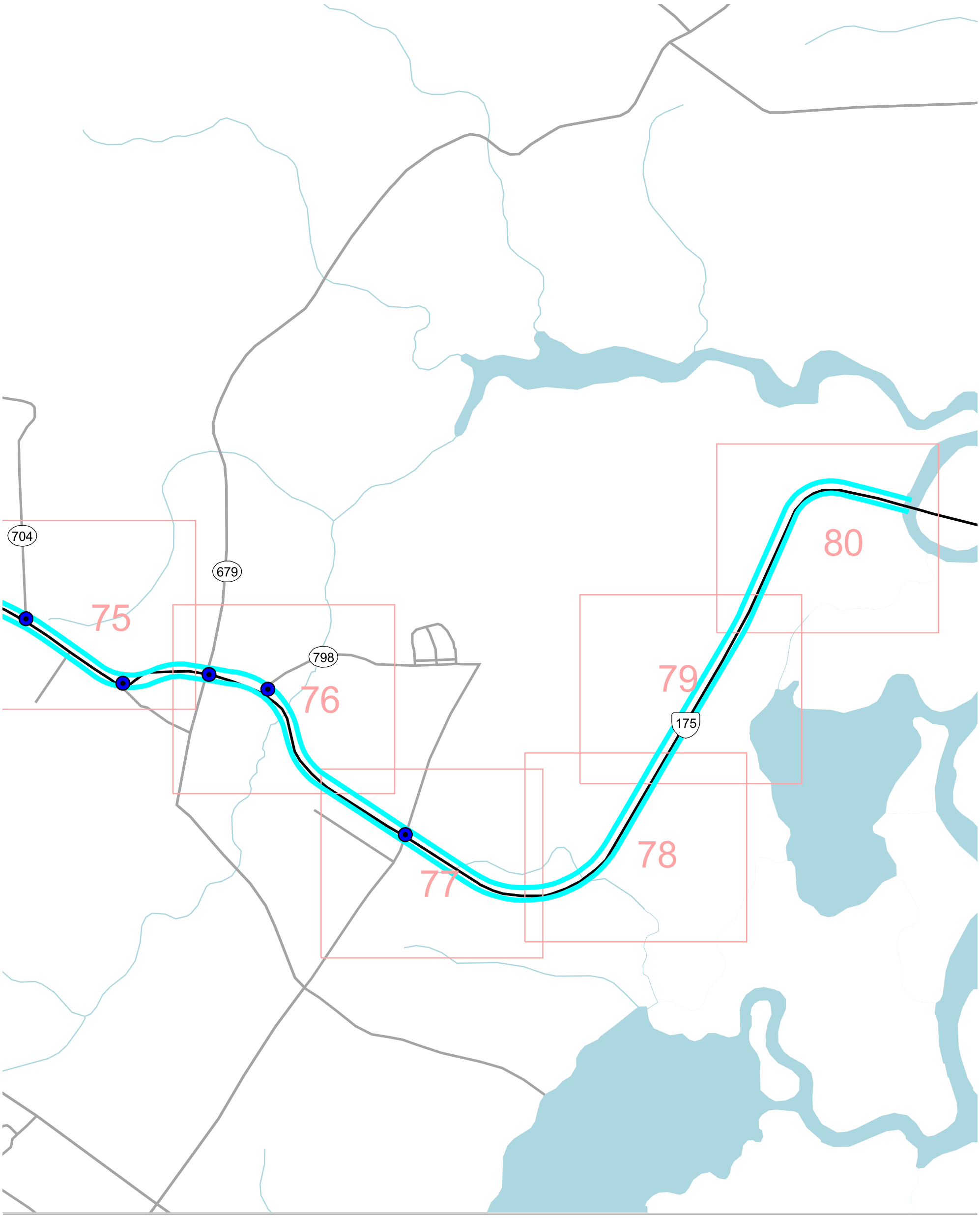
VDOT We Keep Virginia Moving

- Median Closing
- Clear Vegetation
- Intersection/Turnlane Improvement
- Relocated Railroad
- Frontage/Reverse Frontage Improvements
- Median Construction
- Median Widening
- 12' Wide Right Shoulder
- Roadway Improvement
- Route 13 Bypass
- 10' Wide Right Shoulder
- # Aerial Photo Number

**Figure 6-1**
**Sheet 14 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'




Route 13/Wallops Island Access Management Study

VDOT We Keep Virginia Moving

- Median Closing
- Clear Vegetation
- Intersection/Turnlane Improvement
- Relocated Railroad
- Frontage/Reverse Frontage Improvements
- Median Construction
- Median Widening
- 12' Wide Right Shoulder
- Roadway Improvement
- Route 13 Bypass
- 10' Wide Right Shoulder
- # Aerial Photo Number

**Figure 6-1**
**Sheet 15 of 15**
**Summary of Roadway Improvements**

N

Scale: 1" =2000'

Route 13/Wallops Island
Access Management Study

13