



Accomack-Northampton  
Planning District Commission

# **Chincoteague National Wildlife Refuge Alternative Transportation Study: Appendices**

**Prepared by**

**Volpe National Transportation Systems Center**

**55 Broadway, Cambridge MA 02142**

**[www.volpe.dot.gov](http://www.volpe.dot.gov)**

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## APPENDIX A – TRANSPORTATION ADVISORY GROUP

| TRANSPORTATION ISSUES AND PROBLEMS   | IDEAS AND POTENTIAL SOLUTIONS  |
|--|--|
| <p><b>(1) Congestion at critical access points</b></p> <ul style="list-style-type: none"> <li>• Bottlenecks at the refuge entrance</li> <li>• Congestion at the causeway</li> <li>• Backups at the beach parking lots</li> </ul> <p><b>(2) Beach Parking Limitations and Constraints</b></p> <ul style="list-style-type: none"> <li>• Constraints on the number of parking spaces</li> <li>• Tension between habitat management and parking lot maintenance</li> </ul> <p><b>(3) Safe Bicycle-Pedestrian Access</b></p> <ul style="list-style-type: none"> <li>• Gaps in existing bicycle paths forcing cyclists to the road</li> <li>• Lack of sidewalk or bicycle paths on causeway</li> <li>• Street widths that limit sidewalks or bicycle paths</li> </ul> <p><b>(4) Safety and Emergency Preparedness</b></p> <ul style="list-style-type: none"> <li>• “One way in/one way out” challenge for first responders</li> </ul> <p><b>(5) Traveler Information and Transportation Issues</b></p> <ul style="list-style-type: none"> <li>• Limited information available to visitors about backups, peak times, etc.</li> </ul> | <p><b>(1) Improve Bicycle Access</b></p> <ul style="list-style-type: none"> <li>• Complete/improve/widen bike trail on Beach Rd.</li> <li>• Improve transition from bike trail to causeway</li> <li>• Paved shoulders on Rt. 175 for non-auto use</li> </ul> <p><b>(2) Improve Automobile Access</b></p> <ul style="list-style-type: none"> <li>• Automated fee entry and/or congestion pricing</li> <li>• Parking garage</li> <li>• Relocate beach parking</li> <li>• Relocate beach parking <i>and</i> beach</li> <li>• Smaller or new causeway</li> <li>• Close down Assateague Island to automobiles</li> </ul> <p><b>(3) Consider Access by Other Modes</b></p> <ul style="list-style-type: none"> <li>• Incentives to hotels/motels to provide mass transit</li> <li>• Gondola</li> <li>• Ponies and wagons / horses and buggies</li> <li>• Monorail</li> <li>• Water transit               <ul style="list-style-type: none"> <li>• Ferry dock at Wallops Flight Facility</li> <li>• Canoes and kayaks</li> </ul> </li> <li>• Internal shuttle</li> </ul> |

## APPENDIX B - EXISTING CONDITIONS

**Table B-1: CNWR Fees and Fee Changes Between 2007 and 2008\***

| Type of Fee                               | Previous Fee    | Fee Change  | New Fee Total      |
|---|-----------------|---|--------------------|
| Daily Fee                                 | None            | \$5.00 (new)  | \$5.00             |
| Weekly Pass                               | \$10.00         | \$5.00  | \$15.00            |
| Refuge Annual Pass                        | \$15.00         | Expanded Amenity Fee<br>for beach parking<br>\$15.00*** | \$30.00            |
| Federal Duck Stamp**                      | \$15.00         |   | \$15.00 or \$30.00 |
| Interagency Annual Pass                   | \$80.00         | No change   | \$80.00            |
| Senior Pass****                           | \$10.00         | No change   | \$10.00            |
| Access Pass*****                          | Free            | No change   | Free               |
| Commercial Buses – 20 or fewer passengers | \$20.00 (1 day) | \$20.00   | \$40.00            |
| Commercial Buses – 21 or more passengers  | \$30.00 (1 day) | \$70.00   | \$100.00           |
| Oversand Vehicle Permit                   | \$70.00         | No change   | \$70.00            |
| Archery application fee                   | \$5.00          | No change   | \$5.00             |
| Firearm application fee                   | \$5.00          | No change   | \$5.00             |
| Archery Permit                            | \$20.00         | No change   | \$20.00            |
| Firearm permit                            | \$20.00         | No change   | \$20.00            |

\* Changes implemented March 1, 2008 unless otherwise noted. Entrance fees are per vehicle. Fee required for anyone over the age of 16.

\*\* The Federal Duck Stamp is an annual pass to National Wildlife Refuges that is valid from July 1 to June 30 of the following year. Hunters over the age of 16 must purchase a Federal Duck Stamp each year if they want to hunt migratory waterfowl. Revenue from the Federal Duck Stamps goes directly to the Migratory Bird Conservation Fund, which uses ninety-eight cents out of every dollar to purchase or lease wetland habitat for protection in the National Wildlife Refuge System.

\*\*\* Added to Federal Duck Stamp program July 1, 2008 as an option if such visitors want to park in the beach parking lots.

\*\*\*\* The Senior Pass is a lifetime pass for U.S. citizens or permanent residents age 62 and over. Admits the pass holder and passengers in a non-commercial vehicle at per vehicle fee areas and pass holder +3 adults at per person fee areas

\*\*\*\*\* The Access Pass is a lifetime pass for U.S. citizens or permanent residents with permanent disabilities (documentation required). Admits the pass holder and passengers in a non-commercial vehicle at per vehicle fee areas and pass holder +3 adults at per person fee areas.

Figure B-1. 2008 Fee Collection - Daily, Weekly, and Annual Passes Sold per Month.

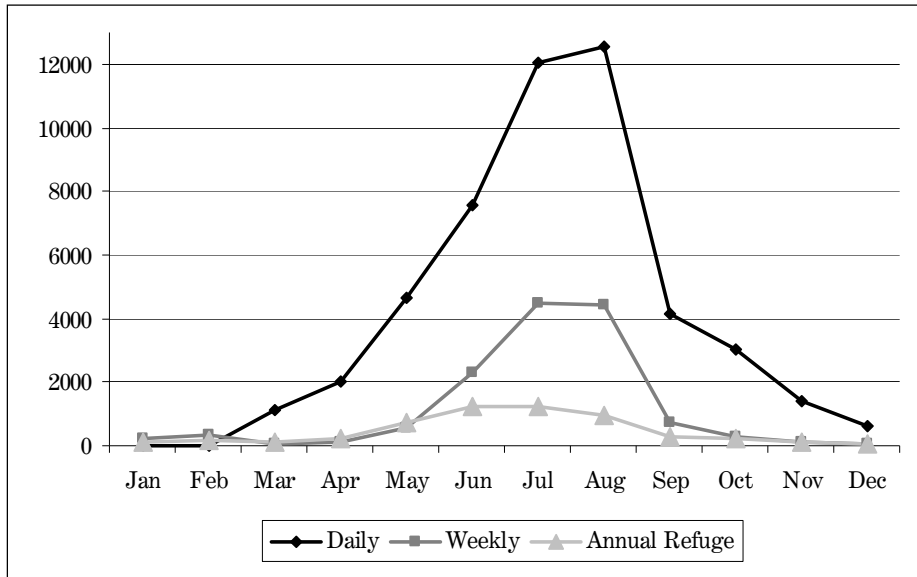
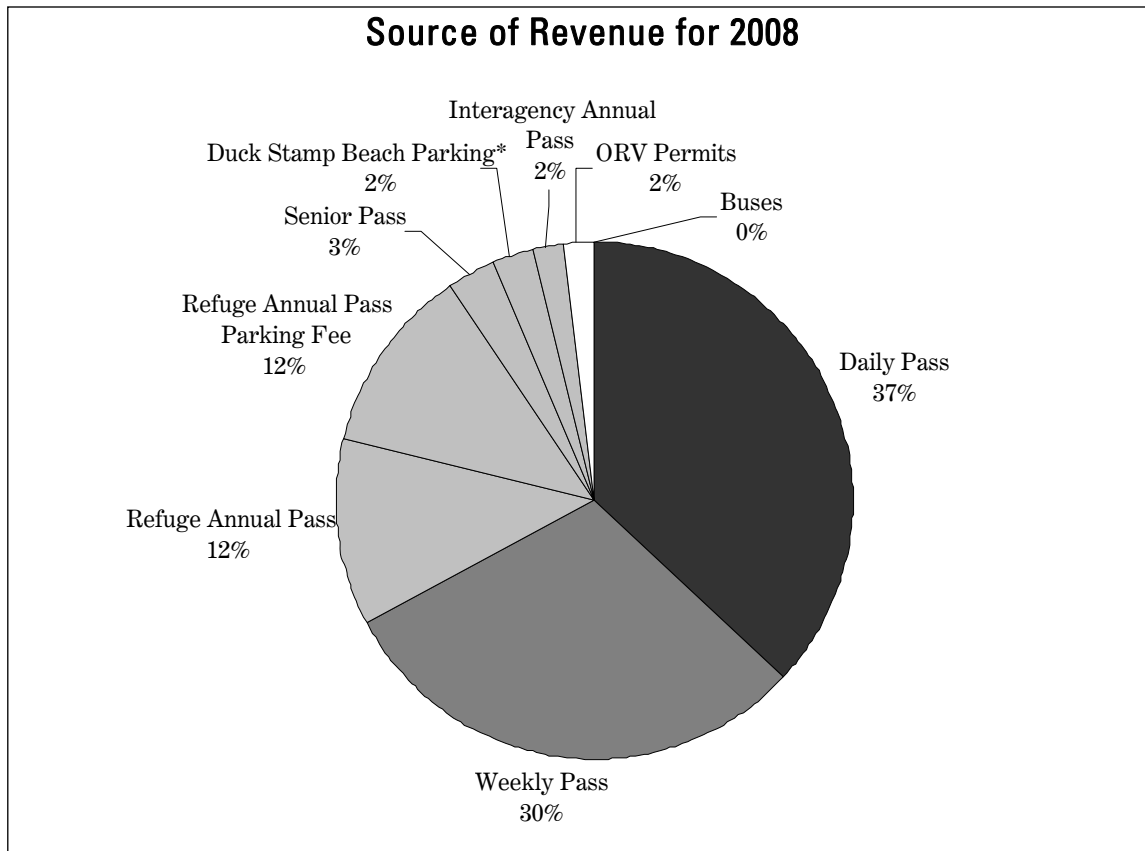


Figure B-2. Sources of CNWR Fee Revenue, 2008.



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# APPENDIX C - RELATED PLANS AND ANALYSES

Figure C-1. Transportation Planning Map, Town of Chincoteague Comprehensive Plan, 2009.

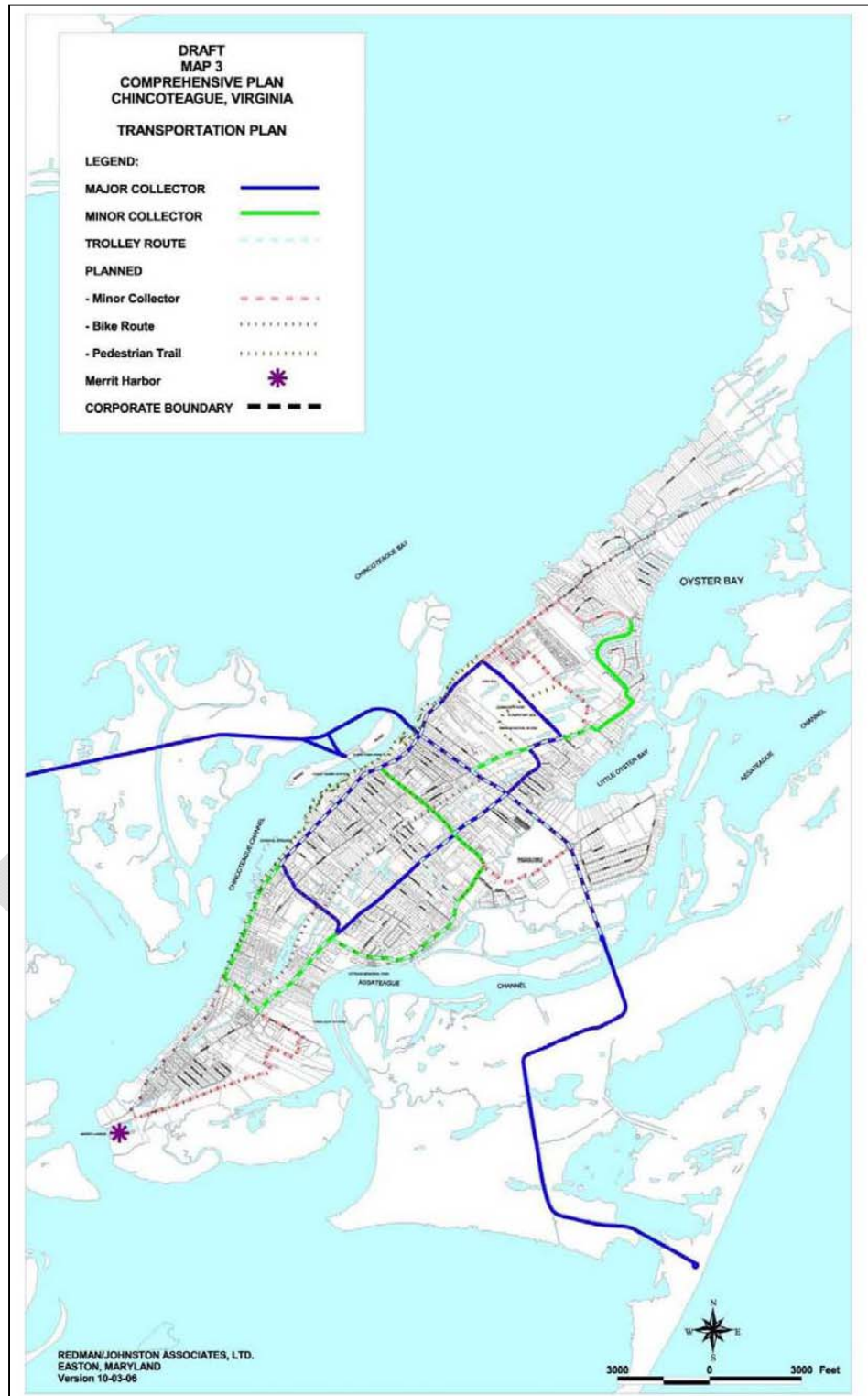
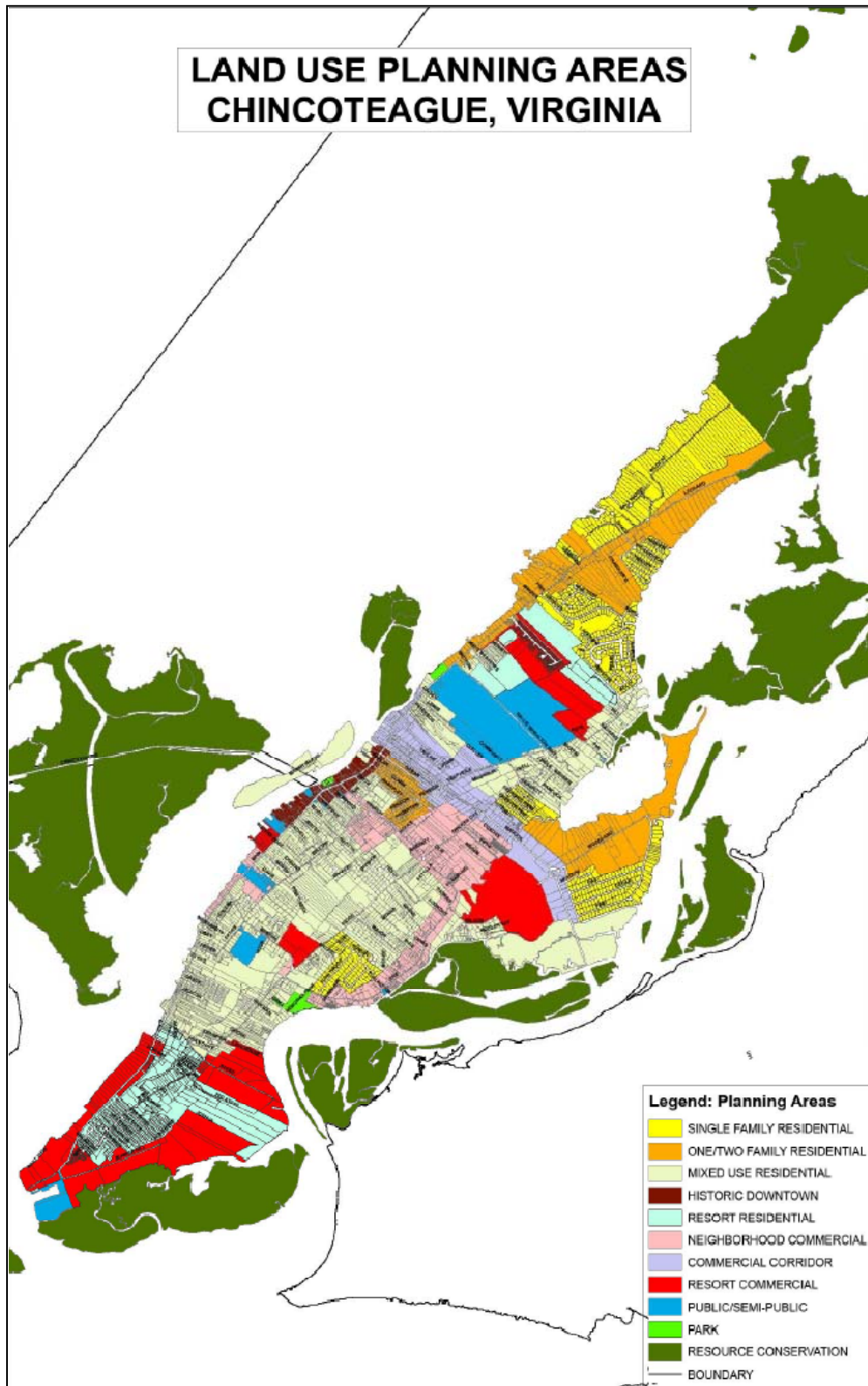


Figure C-2. Land Use Planning Map, Town of Chincoteague Comprehensive Plan, 2009.



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**Table C-1. Transportation Recommendations, from Town of Chincoteague Comprehensive Plan, 2009.**

| CHINCOTEAGUE TRANSPORTATION RECOMMENDATIONS |                 |                            |                     |  |               |                                  |                                |               |               |
|---|-----------------|----------------------------|---------------------|--|---------------|----------------------------------|--------------------------------|---------------|---------------|
| Facility Name                               | From            | To                         | Road Segment Length | Recommendation   | Cost(in 2000) | Existing Typical Section (Width) | Recom. Typical Section (Width) | Base Year ADT | Year 2020 ADT |
| NORTH MAIN ST                               | ROUTE 175       | MUNFORD ST                 | 0.03                | Post NO PARKING and stripe for bikeway (base year)   | 5,050         | R2 (30')                         | R2 (30')                       | 15,950        | 15,000        |
| NORTH MAIN ST                               | MUNFCRD ST      | CHURCH ST                  | 0.07                | Post NO PARKING and stripe for bikeway (base year)   | 11,750        | R2 (30')                         | R2 (30')                       | 15,950        | 15,000        |
| NORTH MAIN ST                               | CHURCH ST       | MADDOX BLVD                | 0.32                | Post NO PARKING and stripe for bikeway (base year)   | 53,860        | R2 (30')                         | R2 (30')                       | 15,950        | 15,000        |
| NORTH MAIN ST                               | MADDOX BLVD     | TAYLOR ST                  | 0.09                | Post NO PARKING and stripe for bikeway (base year)   | 15,150        | R2 (20')                         | R2 (20')                       | 2,050         | 3,500         |
| RIDGE RD                                    | BEEBE RD        | BUNTING RD                 | 0.74                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                           | 2,775,000     | R2 (18')                         | U2 (30')                       | 2,450         | 3,550         |
| RIDGE RD                                    | BUNTING RD      | ROSEDALE DR                | 0.65                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                           | 2,437,500     | R2 (18')                         | U2 (30')                       | 3,900         | 7,000         |
| RIDGE RD                                    | ROSEDALE DR     | CHURCH ST                  | 0.29                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                           | 1,087,500     | R2 (18')                         | U2 (30')                       | 2,050         | 3,600         |
| CHICKEN CITY RD                             | CHURCH ST       | MADDOX BLVD                | 0.41                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                           | 1,537,500     | R2 (18')                         | U2 (30')                       | 6,000         | 10,800        |
| CHICKEN CITY RD                             | MADDOX BLVD     | TEAL LANE                  | 0.07                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                           | 303,950       | R2 (18')                         | U2 (30')                       | 1,100         | 2,500         |
| CHICKEN CITY RD                             | TEAL LANE       | CIRCLE DR                  | 0.20                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                           | 868,420       | R2 (18')                         | U2 (30')                       | 1,100         | 2,000         |
| CHICKEN CITY RD                             | CIRCLE DR       | DEEP HOLE RD               | 0.11                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                           | 477,630       | R2 (18')                         | U2 (30')                       | 1,100         | 1,600         |
| CHURCH ST                                   | NORTH MAIN ST   | SCHOOL ST                  | 0.14                | Post NO PARKING and stripe for bikeway (base year)   | 7,890         | R2 (24')                         | R2 (24')                       | 6,000         | 10,800        |
| CHURCH ST                                   | SCHOOL ST       | WILLOW ST                  | 0.08                | Post NO PARKING and stripe for bikeway (base year)   | 4,510         | R2 (24')                         | R2 (24')                       | 6,900         | 12,400        |
| CHURCH ST                                   | WILLOW ST       | PENSION ST                 | 0.07                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                           | 286,400       | R2 (18')                         | U2 (30')                       | 6,900         | 12,400        |
| CHURCH ST                                   | PENSION ST      | ANDERTON AVE               | 0.05                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                           | 181,460       | R2 (18')                         | U2 (30')                       | 6,900         | 10,000        |
| CHURCH ST                                   | ANDERTON AVE    | RIDGE RD / CHICKEN CITY RD | 0.26                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                           | 943,540       | R2 (18')                         | U2 (30')                       | 5,400         | 9,700         |
| DEEP HOLE RD                                | PENSION ST      | OCEAN BLVD                 | 0.11                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                           | 412,500       | R2 (18')                         | U2 (30')                       | 3,850         | 5,600         |
| DEEP HOLE RD                                | OCEAN BLVD      | MADDOX BLVD                | 0.05                | Widen existing roadway with sidewalk and bicycle facilities (Virginia Transportation Development Plan) | 301,100       | R2 (18')                         | U2 (30')                       | 3,850         | 6,950         |
| DEEP HOLE RD                                | MADDOX BLVD     | TAYLOR ST                  | 0.07                | Widen existing roadway with sidewalk and bicycle facilities (Virginia Transportation Development Plan) | 421,600       | R2 (18')                         | U2 (30')                       | 2,700         | 3,900         |
| DEEP HOLE RD                                | TAYLOR ST       | CHICKEN CITY RD            | 0.30                | Widen existing roadway with sidewalk and bicycle facilities (Virginia Transportation Development Plan) | 1,806,900     | R2 (18')                         | U2 (30')                       | 2,700         | 4,850         |
| DEEP HOLE RD                                | CHICKEN CITY RD | CIRCLE DR                  | 0.13                | Widen existing roadway with sidewalk and bicycle facilities (Virginia Transportation Development Plan) | 783,000       | R2 (18')                         | U2 (30')                       | 2,800         | 5,050         |

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Table C-1 (continued).

| Facility Name   | From                     | To               | Road Segment Length | Recommendation  | Cost(in 2000)       | Existing Typical Section (Width) | Recom. Typical Section (Width) | Base Year ADT | Year 2020 ADT |
|---|--------------------------|------------------|---------------------|---|---------------------|----------------------------------|--------------------------------|---------------|---------------|
| DEEP HOLE RD  | CIRCLE DR                | FIR LANDING RD   | 0.15                | Widen existing roadway with sidewalk and bicycle facilities (Virginia Transportation Development Plan)        | 903,400             | R2 (18')                         | U2 (30')                       | 2,800         | 5,050         |
| WILLOW ST   | BUNTING RD               | JESTER ST        | 0.60                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                                  | 2,300,000           | R2 (18')                         | U2 (30')                       | 1,350         | 2,450         |
| WILLOW ST   | JESTER ST                | CLEVELAND ST     | 0.17                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                                  | 650,000             | R2 (18')                         | U2 (30')                       | 3,900         | 5,650         |
| WILLOW ST   | CLEVELAND ST             | CHURCH ST        | 0.13                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                                  | 500,000             | R2 (18')                         | U2 (30')                       | 3,900         | 7,000         |
| BEEBE RD  | MAIN ST                  | RIDGE RD         | 0.30                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                                  | 1,125,000           | R2 (18')                         | U2 (30')                       | 3,000         | 5,400         |
| MADDOX BLVD   | NORTH MAIN ST            | DEEP HOLE RD     | 0.38                | Post NO PARKING and stripe for bikeway (base year)  | 25,700              | R2 (33')                         | R2 (33')                       | 12,150        | 21,000        |
| MADDOX BLVD   | DEEP HOLE RD             | CHICKEN CITY RD  | 0.27                | Post NO PARKING and stripe for bikeway (base year)  | 18,230              | R2 (25')                         | R2 (25')                       | 13,250        | 22,000        |
| MADDOX BLVD   | CHICKEN CITY RD          | WOODLAND DR      | 0.51                | Stripe for bikeway (base year)  | 34,400              | R2 (30')                         | R2 (30')                       | 13,250        | 24,000        |
| MADDOX BLVD   | WOODLAND DR              | SHEEPSHEAD CREEK | 0.41                | Stripe for bikeway (base year)  | 27,700              | R2 (30')                         | R2 (30')                       | 4,850         | 8,800         |
| SOUTH MAIN ST   | BEEBE RD                 | BUNTING RD       | 0.79                | Post NO PARKING and stripe for bikeway (Base year)  | 133,010             | R2 (25')                         | R2 (25')                       | 3,550         | 5,150         |
| SOUTH MAIN ST   | BUNTING RD               | JESTER ST        | 0.77                | Post NO PARKING and stripe for bikeway (Base year)  | 129,640             | R2 (28')                         | R2 (28')                       | 7,500         | 13,500        |
| SOUTH MAIN ST   | JESTER ST                | CLEVELAND ST     | 0.17                | Post NO PARKING and stripe for bikeway (base year)  | 28,620              | R2 (28')                         | R2 (28')                       | 9,800         | 14,200        |
| SOUTH MAIN ST   | CLEVELAND ST             | ROUTE 175        | 0.03                | Post NO PARKING and stripe for bikeway (base year)  | 5,050               | R2 (28')                         | R2 (28')                       | 9,800         | N/A           |
| PENSION ST  | CHURCH ST                | CLARK ST         | 0.20                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                                  | 818,100             | R2 (18')                         | U2 (30')                       | 3,900         | 7,000         |
| PENSION ST  | CLARK ST                 | DEEP HOLE RD     | 0.01                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                                  | 41,000              | R2 (18')                         | U2 (30')                       | 3,900         | 7,000         |
| BUNTING RD  | MAIN ST                  | WILLOW ST        | 0.16                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                                  | 600,000             | R2 (18')                         | U2 (30')                       | 2,450         | 4,400         |
| BUNTING RD  | WILLOW ST                | RIDGE RD         | 0.42                | Widen existing roadway with sidewalk and bicycle facilities (year 2010/2020)                                  | 1,575,000           | R2 (18')                         | U2 (30')                       | 2,850         | 5,100         |
| INTERSECTION  | CHICKEN CITY RD/RIDGE RD | CHURCH ST        | NA                  | Reconstruct as one intersection and widen roadway to include sidewalk and bicycle facilities (year 2010/2020) | 400,000             | NA                               | NA                             | NA            | NA            |
| SHUTTLE SERVICE   | N/A                      | DOWNTOWN AREA    | NA                  | Establish shuttle service (base year)   | 600,000*            | N/A                              | N/A                            | N/A           | N/A           |
| <b>Total Cost*</b>  |                          |                  |                     |   | <b>\$24,037,120</b> |                                  |                                |               |               |
| *Total Cost does not include shuttle service recommendation |                          |                  |                     |   |                     |                                  |                                |               |               |

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## APPENDIX D - OUTREACH

**Table D-1. Concerns, Solutions, and General comments from the Public During Meetings on October 16, 2008.**

*Morning Session: 9:00 AM – 11:40 AM*

| Concerns / Issues   |   |
|---|---|
| Beach/Parking erosion   | Summertime/seasonal congestion (e.g. traffic to the beach on holiday weekends)  |
| Threats to ORV access   | Width of bicycle paths  |
| Possibility of beach parking disappearing   | Bicycles using the road instead of trails   |
| Storm evacuation  | Drivers not used to bicycles on the road  |
| Storm aftermath (reopening the beach after storms)  | Children on bikes presents a road safety issue  |
| Cost of transportation improvements   | Moped safety  |
| Tom's Cove aquaculture is not well protected  | Handicapped accessible spaces (e.g. limited width)  |
| Influx of tourists during holidays and events (e.g. Pony Swim)  | Quality of life and access to fishing for the handicapped   |
| Maintaining parking at the beach  | Tourists don't mind traffic   |
| Inadequate shoulders on the causeway (especially for bicycle safety)  | No vehicular access would be most detrimental to tourism (need access for families with coolers and beach gear)                   |
| Causeway elevation (including low spots) is safety issue  | Concerns about evacuation/Need plan ready to institute when vehicles cannot access the beach (or the exit).                       |
| No storm shelter  | Transportation for fisherman (especially gear) at all times of day  |
| Town could/should be more pedestrian friendly   | People do not come to Chincoteague for one asset - they come for beach, shops, seafood (many assets in many different locations). |
| Road conditions (e.g. surface pavement)   | Emergency access (not a big issue)  |
| Faint lines on roadways   | Pull off areas interfere with bicycle lanes   |
| Public accountability for use of entrance fee funds   | Funding and adequate revenue needed to make changes   |
| Beach accessibility for handicapped (both in terms of parking and access to the shoreline from parking areas) | Signs - do people read signs? How can they be more effective?   |
| Defining congestion (relative to other places)  | Impact of new bridge and traffic flow on Main St.   |

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| <b>Concerns / Issues (continued)</b>  |   |
|---|---|
| <p>Must understand users to understand transportation issues.<br/>Users include:</p> <ul style="list-style-type: none"> <li>- renters</li> <li>- motel/hotel guests</li> <li>- full item residents</li> <li>- weekenders</li> <li>- daily visitors (day trippers)</li> <li>- cyclists</li> <li>- pedestrians</li> <li>- delivery/commercial users</li> <li>- non-US/foreign visitors</li> <li>- 3-wheeled vehicles</li> </ul> | <p>Safety issues, including:</p> <ul style="list-style-type: none"> <li>- mixed uses (Town, Refuge, Causeway)</li> <li>- lack of bike lanes</li> <li>- emergency vehicle access</li> <li>- people not using bike lanes correctly and unsafe bike practices</li> <li>- wildlife impacts - viewing of wildlife/rubbernecking</li> <li>- Chincoteague causeway emergency access</li> <li>- Town of Chincoteague emergency access</li> <li>- lack of safe bike access in Town</li> <li>- parking at beach (not enough at peak times)</li> <li>- carrying capacity of beach</li> <li>- currently fewer parking spaces than there had been in the past</li> <li>- wildlife/visit conflicts over space</li> <li>- inability to maintain parking lot (cost/time to repair - solution must be sustainable)</li> <li>- lack of communication to visitors prior to getting to the Refuge/Park</li> </ul> |
| Must understand users' expectations   | Public wanting more access - bikes on service road  |
| Weather impacts on safety (i.e. thunderstorms)  | Are we building on a "failed area" - is the public beach the best area for parking  |
| Desire to use different modes of transportation (i.e. golf carts, mopeds)   |   |
| <b>Issues specific to the town</b>  |   |
| - mixed uses  | - congestion - Maddox Blvd. is "nightmare" at times - concerns that the new bridge will make it worse   |
| - lack of public transportation within town and to the refuge   | - Lack of parking, especially on Maddox Blvd  |
| - funding (where is the money coming from - homeowners? motel tax? Opportunities for federal and state funding?)  |   |
| Cruising/Sharking for parking   | Lack of education to bike users   |
| Lack of town sidewalk   | Litter problem - increase access and people will increase litter problems   |
| So few people use the trolley system  | Need sand sifting machine   |
| Should Main St. be closed to traffic?   | More signs  |
| No shoulders on causeway  | Pollution - alternative transportation needs to be alternative fuel, and source needs to be clean   |
| Causeway floods   | Mixed use concerns after 3 PM   |
| Lighting - too much or too little   | Lack of education to bike users   |

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| <b>Solutions</b>  |   |
|---|---|
| Public education, especially to avoid peak beach access times   | Use ADA matting   |
| Sand fencing to maintain beach  | There used to be a wooden access path to the water line (in summer only), which was accessible                  |
| Moving public beach to the north  | Need different options for different populations (vs. "one size fits all")                                      |
| Beach replenishment   | Rental options (e.g. Wildwood and rentals of umbrellas, chairs, kayaks, etc.)                                   |
| Creative funding (e.g. finding alternative sources)   | Accomack school buses   |
| Removable beach ramp to provide wheelchair access   | Park cars on wildlife drive with a shuttle to the beach   |
| Installing a jetty to protect the beach from erosion  | Move the beach parking north (4-5 mi. to more stable area)  |
| Add parking for seasonal residents  | Use ADA matting   |
| Add parking on Maddox Blvd.   | There used to be a wooden access path to the water line (in summer only), which was accessible                  |
| Eliminate the drainage ditches on Rt. 175 and bury pipes (to remove safety hazard)  | Need different options for different populations (vs. "one size fits all")                                      |
| Communication to beachgoers (e.g. full parking alerts)  | Rental options (e.g. Wildwood and rentals of umbrellas, chairs, kayaks, etc.)                                   |
| Improve bike access in and around refuge, and in and around town.   | Use E-Z Pass at booth entrances   |
| Parking for handicapped fisherman by ORV area (see map). Could possibly charge for parking.   | Think regionally (especially in terms of hospitality/tourism/customer service) - integrate and combine missions |
| Change traffic flow to close down Main St. to vehicles (make it pedestrian only for 3-4 blocks downtown), make Maddox Blvd. one way and use Ocean to come back, and consider circular vs. linear traffic flow | Find positive solutions to problems   |
| Consider gateway as positive, not negative  | Create parking garage (both Town and refuge) and transport to/from  |
| For first responders/emergencies, send ambulance in exit lane   | Use existing public lots for parking  |
| Add express lane at refuge entrance for those w/passes (however, people sometimes want to use the same booth to say hi to staff).   | Motel/hotel bus services  |

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| <b>Solutions (continued)</b>   |  |
|--|--|
| Create temporary storm shelters for mass transit   | Create single booths for pass access holders at refuge entrance                              |
| Expand trolley system  | Free use of bikes  |
| Pony carts   | Establish emergency lane (on/off refuge)   |
| Overhead tram systems throughout the town and refuge   | Create new bike lanes/sidewalk   |
| Create temporary storm shelters for mass transit   | Create more pull-offs on Refuge for wildlife opportunities                                   |
| Business rent electric cards with <i>charging</i> stations on stations   | Relocate public areas to more sustainable area   |
| Look for our windows of opportunity  | Concession that provide "staff" to people at beach   |
| Water transit system w/information system - run from mainland to Chincoteague Is and from Chincoteague Is to Assateague Is | Relax environmental concerns/rules   |
| Canoe/kayak water trail from north to south end  | Surfers and fisherman want access with their staff   |
| Pump sand to west side of island (but consider environmental impacts)  | Access that is quick, especially for locals with limited time constraints                    |
| Educate public about proper bike use   | Ability to maintain current uses   |
| Traveler information - use current radio station   | Use stickers on vehicles to speed up process (but there are concerns about misuse of passes) |
| Parking at Wallops Island - use water transportation to access refuge  | Increasing infrastructure for bikes - organized storage for bikes                            |
| Disney-type water ferries  | Racks/storage areas on new buses   |
| Create biking storage - stacking as opposed to strung out racks  | Concession that provide "staff" to people at beach   |
| Create small/compact car parking   | People get lots of info too close to the fee booths  |
| Have designative parking for scooters and motorcycles (especially in closures)   | Create phone # so people can call re: fees/other info  |
| Lined/painted parking spaces   | Get passes off-site (ATM)  |
| Create oversized parking areas   | Get info offsite (hotels/chamber)  |
| Parking attendants   | Post fee/other info on cable access channel  |
| Encourage carpooling (HOV lanes)   | Monorail or pod cars ("George Jetson cars")  |
| Consider location of fee booths  | Get coupon/commercial incentive to car pool  |

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| <b>Solutions (continued)</b>   |   |
|--|---|
| Lack of parking at crabbing area   | Change fee laws   |
| Crabbers parking in bike lane near bridge  | Park-n-ride lot for beach going   |
| Open Wildlife Loop for parking   | Lack of moped access to wildlife loop   |
| Search out/create new partnerships that might help with \$\$\$ (i.e. Ford funds staff person)  | Promote/allow for drop offs at beach w/shuttle system for driver from remote lot to beach |
| <b>Other Comments</b>  |   |
| "If it ain't broken, don't fix it" means current beach parking should be maintained (but what happens if there is a storm, too many people, etc.)  |   |
| Transition into new solutions (e.g. move beach parking north, but keep some southern parking open, and gradually transition to new parking areas). |   |

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**Table D-1 (continued). Evening Session: 6:00 PM – 8:30 PM**

| <b>Concerns / Issues</b>  |   |
|---|---|
| Fear of loss of access to the beach   | Congestion is only 2 months out of the year for four hours each day |
| Impact of restrictions to access on property values                                       | Confusion at fee booth about what pass to buy creates bottlenecks   |
| Ped-bike access through town  | Storm evacuation  |
| Transit/shuttle would be liable for visitor safety during storms                          | Congestion on Maddox Blvd. after evacuating from a storm event.     |
| Chincoteague offers the only public beach access between VA state line and Virginia Beach | 3-wheelers and scooters are a nuisance                              |
| Handicapped access to water line  | No separation between bicycles, pedestrians, and cars               |
| The highway between 13 and Chincoteague is only 2 lanes, but should be 4                  | Bike paths are poorly marked or difficult to find                   |
| Bicycles and mopeds on the causeway   | Bike paths are too gravelly for bikes with skinny tires             |
| Dangerous biking on causeway, Main Street, and to beach                                   | Lack of shoulders on 175 and low points on 175                      |
| Whole causeway road needs to be rebuilt (bridges, approach, etc.)                         | Emergency vehicle access (causeway, buses, etc.)                    |
| Open drainage ditches on 175  | Young kids and experienced riders                                   |
| Chincoteague lack of bike paths, esp. on Main Street                                      | Unfinished bike path from the refuge                                |
| Inadequate bike paths in Chinco - not well labeled  | Town bike committee - \$ to look at and include in Plan - Bike Plan |
| Lack of sidewalks/inconsistent sidewalks  | Congestion at fee booth   |
| Left turn from Church and Main Streets  | Potential to lose beach parking                                     |
| Trolley drivers have a wide vehicle combined with increased bike and moped use on Chinco  | How will people be removed from the beach during weather events     |
| Refuge bike path to bridge - WL Loop too narrow - ignore lines                            | Environmental impacts of buses, etc.                                |
| How can people get their stuff to/from the beach  | Resident rate for fees  |
| Carnival traffic - esp. at events, re: weather in Town                                    | Moped use of WL loop  |
| ORV access - losing potential spots   | Is there really a problem??   |
| Increased fees  | Are we overreacting?  |

**APPENDIX D**

| <b>Concerns / Issues (Continued)</b>  |  |
|---|--|
| Do tourists see these as problems?  | Bike path cross over NPS - signs block traffic   |
| Need to enforce bikes off sidewalk  | Evacuation during weather events   |
| Cars don't respect bikes- both vehicles and bikes need to be educated           | Reduced boating access   |
| <b>Solutions</b>  |  |
| Jetties or man-made reefs   | Offer fewer fee options or advance pass sales  |
| Facilitate, don't limit access to the beach                                     | Move parking to the Hook or another area   |
| Hotel passes or tokens for the beach  | Add another road north of Parking lot 1  |
| Express lane to the beach (EZ Pass type)  | Create a family-friendly bay beach as an option  |
| Widen road between bridge and booths  | Offer ferry access a new bay beach on east side (near Memorial) to create economic engine for town |
| Keep offering yearly pass   | If new bay beach is created, offer swan boats for recreation                                       |
| A place to park cars that won't get washed away                                 | Consider bike/ped routes from NASA   |
| Turn over the area from FWS to NPS, or vice versa.                              | Improve signage for bike path (painted on path)  |
| ORV pass to the north   | Enforce bicycle laws   |
| Parking area to the north   | Add another beach to the north   |
| Different paving materials on parking lots for easier maintenance (e.g. shells) | Widen and raise causeway   |
| Create one fee option for certain times of day                                  | Provide educational material to tourists - helpful hints from beach traffic                        |
| Metal landing stripe for surface stabilization                                  | Min/max speeds on causeway should be established   |
| Create dunes to stabilize area  | EZ pass access at gate   |
| Snow fencing in winter to catch sand and keep it from getting into the lot      | Like daily pass - nice to have   |
| Educate visitors #1 idea  | Increase boating access via floating docks   |
| ORV fee too much \$\$ - lower fees to increase access                           | Increase kayak access with a water trail   |
| Create artificial reefs to prevent beach erosion                                | Educate visitors (Denise Bowden)   |

**APPENDIX D**

| <b>Solutions (continued)</b>                          |  |
|---|--|
| Dunes? Beach vs. parking? What is right?              | Create pull-offs along causeways or observation areas  |
| 1 on, 1 off for parking                               | Widen causeway - concern over fatalities   |
| Better markings on bike lanes                         | Maintain beach parking (\$200K/year, possible use of mesh surfaces [WWII stuff])                                     |
| Educate cyclists re: bike lanes - brochures with lane | Provide beach access via boat  |
| Identify bike path with paint on road                 | Bike safety film was produced and played on PA channel   |
| Extend vehicle access down Toms Cove                  | Bike rental places hand out safety info  |
| Increase fee for parking lot maintenance              | <a href="http://www.chincoteague.com">www.chincoteague.com</a> , put out bike safety info and other educational info |
| What happens at refuge and park affects community     | Bike path safety - town of Chincoteague  |

APPENDIX D

Table D-2. Comments from the Public During Meeting on January 17, 2009.

| SOLUTION                  | STRENGTHS  | WEAKNESSES  | OTHER COMMENTS  |
|---------------------------|--|---|---|
| Express Lane at Fee Booth | <ul style="list-style-type: none"> <li>▪ Quicker, lessens congestion</li> <li>▪ Might sell more annual passes/Duck Stamps</li> <li>▪ Easy to implement</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Limited room, 1 lane from bridge</li> <li>▪ Confusion over fee structures (parking pass – some bought, some not)</li> <li>▪ Loss of control of what is in the vehicle (e.g., dogs)</li> <li>▪ Confusion over which lane to use and how to differentiate between types of passes (need strong education component)</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Use system in MD District as example</li> <li>▪ Retain separate, staffed booth and lane for information</li> <li>▪ Back-up only occurs during narrow window of time 12-2pm for 10 weeks</li> </ul>                     |
| Shuttle Bus               | <ul style="list-style-type: none"> <li>▪ Alternative if beach parking is not available</li> <li>▪ Good timing in terms of building a new, wider bridge</li> <li>▪ Better for environment</li> <li>▪ Allows opportunity to provide educational info</li> <li>▪ Possibility of using trolley as shuttle</li> </ul> | <ul style="list-style-type: none"> <li>▪ Need for early alert if beach parking is full</li> <li>▪ Visitors and users have large amounts of gear and often have a number of children to transport – this would be difficult to impossible with a shuttle</li> <li>▪ Not enough buses to accommodate demand</li> <li>▪ Storms mean large demand for use that would strain/outstrip shuttle capacity and require crowd management</li> <li>▪ Danger from lightning storms and the need for evacuation and shelter</li> <li>▪ Limited road surface limits bus-only lanes. Buses would be trapped in current traffic</li> <li>▪ Bus only useful as an alternative</li> <li>▪ On-going cost of operations</li> <li>▪ Riders would by-pass local businesses if parking off island</li> <li>▪ Shuttles in National Parks elsewhere changed the visitor experience negatively (although may have been necessary to accommodate the numbers of visitors allowed)</li> </ul> | <ul style="list-style-type: none"> <li>▪ Need shelters at beach</li> <li>▪ Liability of using public (school) lots</li> <li>▪ Combine with concessions program on beach?</li> </ul>   |
| Move beach parking north  | <ul style="list-style-type: none"> <li>▪ ORVs do not need stable parking surface</li> <li>▪ Maintains parking (which in turn maintains tourism and economy of Town and County)</li> <li>▪ More stable location (in terms of sand/land movement)</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Cost of new access road</li> <li>▪ ORV/OSV access</li> <li>▪ Service road would need to be upgraded</li> <li>▪ Need to address new environmental impacts</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Mono-rail system</li> <li>▪ Access via Wilderness Loop or Service Road</li> </ul>  |
| Biking/Ped Trails         | <ul style="list-style-type: none"> <li>▪ Improve safety</li> <li>▪ Improve access</li> <li>▪ Opportunity for education to promote use and promote safety through bike rental businesses and police</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Narrow roads</li> <li>▪ Narrow Town right of way</li> <li>▪ Funding (especially for Causeway)</li> <li>▪ Difficulty in educating bicyclists about correct use of road (right of way, multiple bicyclists across, etc.)</li> <li>▪ Limited ability for visitors to transport gear with bicycles</li> </ul>  | <ul style="list-style-type: none"> <li>▪ One-way streets are possibility</li> <li>▪ Contrast/disconnect between bicycle facilities on Refuge and in Town is a problem</li> <li>▪ Need designated, main E-W and N-S bike lanes/routes on Chincoteague</li> </ul> |

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| <b>SOLUTION</b>                 | <b>STRENGTHS</b>  | <b>WEAKNESSES</b>  | <b>OTHER COMMENTS</b>  |
|---------------------------------|---|--|--|
|                                 | <ul style="list-style-type: none"> <li>▪ There is a need/demand from tourism and from residents (especially kids and elderly) for Chincoteague to become more bicycle and pedestrian friendly</li> <li>▪ Visitors can use bicycles to go to beach (carry gear on bicycles or have one person take gear in car)</li> </ul> |  | <ul style="list-style-type: none"> <li>▪ Lack of bicycle/pedestrian routes on Causeway and in Town limits opportunity to bicycle/walk to Town and Refuge</li> <li>▪ Kids use biking as main transportation</li> <li>▪ Biking is very popular among visitors (see rental numbers) and residents and is increasing</li> <li>▪ Need a brochure with map that shows best/widest streets in Town for bicyclists to use (could this be included in the current bicycle path extension grant?)</li> <li>▪ Improve access via Route 175</li> </ul> |
| Mopeds/electric cars            | <ul style="list-style-type: none"> <li>▪ Alternative to gasoline-powered vehicle</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Dangerous to themselves and others – education needed</li> <li>▪ Traffic builds up behind them</li> <li>▪ More enforcement of laws</li> </ul> |  |
| Loading/unloading spot at beach | <ul style="list-style-type: none"> <li>▪ Potential to use pony corral area for alternative/overflow parking</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Similar problems as with shuttle, but offset because gear can be dropped off</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Consider status quo – is what we have now ok?</li> <li>▪ Move fee booths?</li> <li>▪ Provide wagons to move gear?</li> </ul>  |
| Parking Garage                  | <ul style="list-style-type: none"> <li>▪ Capacity</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Cost</li> <li>▪ Inconsistent with experience of Chincoteague and Assateague</li> </ul>  |  |
| Boat access                     | <ul style="list-style-type: none"> <li>▪ Alternative to car and need for parking</li> <li>▪ Increase access by more people to more parts of Assateague</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Control of visitation (fee enforcement)</li> </ul>  |  |

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**Table D-3. Comments from the Public During Pony Penning, Meeting on July 217, 2009.**

| <b>Brown Paper Notes</b>                              |   |
|---|---|
| Bus transit onto refuge                               | Rent a scooter  |
| Park and ride a bus                                   | Sell pass on boat (5+)  |
| Trolley-Pony Express (3)                              | Pony rides with carts (9)   |
| “EZ Pass” type lane for weekly or longer pass holders | Allow scooters on Wildlife Loop   |
| Electric Trams (3)                                    | Make pass available online for purchase   |
| Park & Ride a trolley/bus                             | Electric car spots with plug-ins  |
| Shuttle bus from hotels and stops around town         | Ski Lift/Gondola (2)  |
| Keep as is  | More bike trails  |
| Shuttle from beach to pony corral                     | Solar-powered transport   |
| More parking at beach                                 | More bike access in town  |
| Platform for short kids to take pictures              | Add sidewalks full length of Maddox (safety of tourists and revenue for retailers/stores) |
| More signage for pedestrians, bikes, cars             | Bike and sidewalk full-length of Maddox   |
| Use the shuttle bus on refuge                         | No cars – park-n-shuttle  |
| Walk – run- jog                                       | Remote onsite parking with shuttle for bike access for beach                              |
| Just perfect as is                                    |   |

## **APPENDIX E – PEER COMPARISON**

The purpose of the peer comparison was to collect data about transportation solutions at sites and recreational attractions that share some characteristics with CNWR. While the Refuge experiences its own unique challenges and opportunities, there are still several locations throughout the U.S. that can share valuable learning experiences and best practices. The process of selecting peers, the framework for peer assessment and case studies of the chosen locations are described in the following sections.

### **Peer Criteria and Selection**

The lists below describe the criteria for selecting peer locations, focusing on site characteristics and transportation issues considered relevant for the comparison to CNWR.

#### **Peer characteristics**

- Federal lands (e.g. National Park Service, Forest Service)
- Barrier island and/or environmentally sensitive area
- Multi-jurisdictional site with conflicting missions (e.g. habitat protection vs. tourism)
- Seasonal visitation
- Visitation rates similar to CNWR
- Strong links to a gateway community
- Limited parking and/or threatened parking
- Fee management system
- Multi-modal access (e.g. bike/ped, transit)
- “Gear heavy” visitors (e.g. active recreation area)

#### **Peer transportation issues**

- Congestion/bottlenecks
- Parking closures
- Economic or other impacts on gateway community
- Incident management
- Pedestrian/bicycle safety
- Emergency evacuation/shelter concerns
- Cooperation between town, county, state, federal officials

Peer sites were selected based on matching the criteria described above to locations discussed at last year’s TAG meeting and at the public meetings in October and January. Additional sites were discussed with CNWR staff and project partners. Based on this feedback, the following lands sites were chosen for the comparison:

- Gulf Islands National Seashore – Florida
- Cape Hatteras National Seashore – North Carolina
- Ocracoke Island – North Carolina
- Coast Guard Beach – Cape Cod, Massachusetts
- North Padre Island National Seashore – Texas
- Folly Beach - South Carolina

In addition, the following sites were investigated for specific issues:

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- Sanibel Island/Ding Darling National Wildlife Refuge for the bicycle trail system
- South Ponte Verde Beach for beach restoration
- Okemo Ski Resort for town-resort coordination on transportation management solutions

### **Framework for Assessment**

The primary focus of the comparison was to learn more about the specific transportation issues these sites have addressed, and to inform the alternatives being developed for CNWR. Interviews and research examined the following solutions:

- Pre-trip planning and communications
- Fee management system
- Private-public partnerships
- Innovative traffic management
- Park and ride facilities
- Emergency travel management
- Innovative parking management
- Alternative mode solutions to address congestion or parking (pedestrians/bicyclists/marine)
- Transit/Shuttle services
- Traveler and tourism services
- Economic benefits of through-traffic

Detailed summaries of the research conducted for all nine sites are provided below. These summaries are presented as case studies and include an overview of each location and its respective transportation issues and solutions. The research revealed that not all of the chosen locations were good peers for the study including North Padre Island National Seashore and South Pointe Verde Beach.

### **CASE STUDIES**

#### **Gulf Islands National Seashore/Fort Pickens, Florida**

Santa Rosa Island in Gulf Islands National Seashore (GUIS) is a barrier island approximately 50 miles long, between one-quarter to one-half mile wide. Visitation to this park is concentrated at Fort Pickens, an area of 1,700 acres located among the westernmost seven miles of Santa Rosa Island, near Pensacola Beach. Fort Pickens is the largest of four forts built to defend Pensacola Bay, Florida, and its navy yard. Construction of the fort began in 1829, was completed in 1834, and was used until the 1940s. Visitors are attracted to this location by the area's history as well as its diverse marine and land ecosystems. Many also come to the Fort Pickens area for the recreational opportunities including fishing, beaches, biking, hiking, surfing and camping.

During its peak operations, Fort Perkins attracted over 700,000 visitors per year. However, the damage sustained to Fort Pickens Road from a series of weather-related events severely limited access into the park and consequently drastically reduced visitation.

Understanding how GUIS worked to maintain access for visitors despite the loss of its main access road and to plan for future alternative transportation solutions is the focus of the peer comparison for CNWR.

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After being damaged by Hurricane Ivan in September 2004, Fort Pickens Road was to be rebuilt and put back in service in nine months; however, Tropical Storm Arlene caused further damage and the road reconstruction was delayed three months. Hurricanes Cindy and Dennis (2005) then destroyed sections of the newly-built road. Between 2004 and 2009, access to the park was available only by boat, ferry, all-terrain vehicles and hikers and bikers who had to travel over four miles through sand to reach their destination.

During the time of the road closure, several services were implemented for visitors:

- An all-terrain vehicle shuttle service (Harris & Squazzo, LLC) transported visitors in a six-seat vehicle on the remnants of Fort Perkins Road under a commercial-use authorization (CUA) from GUIIS. The service included hourly trips during the summer between 8am and 2pm, with stops at seven designated sites in the park. A roundtrip ticket was \$15 for an adult and \$10 for children under twelve, with additional charges for hauling diving and camping gear. The service has since been discontinued.
- Existing marine transportation operators serviced the park when the road was washed out. The main issue for this service was that they did not have a ramp for disembarking. The operators that provided service normally gave sightseeing tours; service to the park was only a small part of their services.

The reconstructed roadway opened on May 22, 2009. It includes a striped four-foot shoulder in each direction for biking. According to the National Park Service website, the speed limit was “permanently reduced to 35 miles per hour... to extend the life of the roadway since lower cost design standards were used.” Construction of the roadway was funded by emergency funds due to hurricane damage and built by the Florida Department of Transportation. At the opening of the roadway, it was turned over to the National Park Service.

Losing the only vehicular access road to the park heightened awareness of the park’s vulnerability to storm activity and encouraged partners to further pursue initiating a ferry service to Fort Perkins. There had been a high level of interest for over 30 years to establish ferry service to Fort Pickens with the following initiatives undertaken:

- The City of Pensacola is aggressively pursuing four different options for a pier/docking facility.
- There have been four feasibility studies for a ferry service and GUIIS recently received Transit in the Parks funding to do an Environment Assessment for a landing site. NPS wants to have the study in hand if a funding opportunity arises.
- The MPO prepared a study in 2001 which supported a ferry service. It has been determined to be financially feasible.

The service is planned to be a concession operation initially, and then be taken over by the National Park Service. The park has discussed using a floating dock, however there are legal issues involved with City/NPS liability. Funding is the issue. Planning for a future ferry service is a good example of a park and nearby community working collaboratively towards a solution.

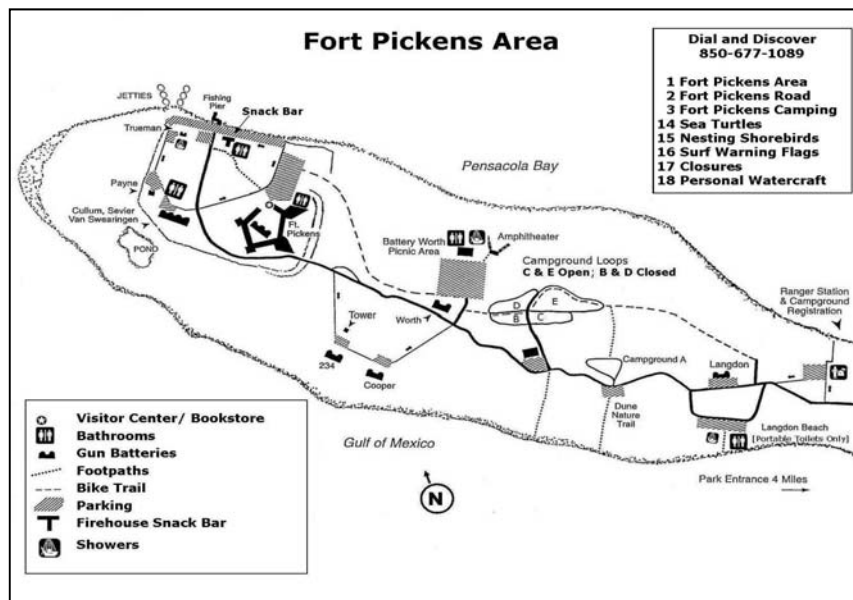
To provide further support for moving the ferry project forward, the *Fort Pickens/Gateway Community Alternative Transportation Study* was completed in February 2009. The purpose of the study was to focus on recommendations for: ferry route and dock investment, bicycle facility improvements, expansion of current transit and trolley routes, and contingency plans for short and

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long-term road closures. The goal of the study is to provide further support for transportation systems that will provide public access to the Fort Pickens Area during times of road closure and reduce motor vehicle use.

The study also discusses the potential extension of transit service into the park. Currently, a free seasonal beach trolley on Santa Rosa Island operated by the Santa Rosa Island Authority travels along Fort Pickens Road between the eastern edge of the Central Business District and Fort Pickens Gate, the park entrance. The service runs between May 16 and September 1 on Fridays (6:00 p.m. to midnight), Saturdays (noon to midnight), and Sundays (5:00 p.m. to 10:00 p.m.). This service caters primarily to visitors in need of transportation for dining and evening entertainment. Although there is interest in expanding the service into Fort Pickens, it is unlikely in the near future since the current service is facing cutbacks due to financial pressures.

To provide information on park limitations due to lingering damage from the hurricanes, NPS created a flyer for summer 2009 for Fort Pickens including a map of the park and information on park hours, rules, and camping instructions. The flyer provides an interesting model for CNWR as it shows how a park map can be modified to provide clear transportation instructions including parking locations. The map appears below:



### Cape Hatteras National Seashore

Cape Hatteras National Seashore is part of the Outer Banks, a barrier island which stretches approximately 72 miles along the North Carolina coastline, encompassing over 24,000 acres, and varying in width from between one and three miles. It begins at Nags Head to the north and ends at Ocracoke Island to the south. It was designated as the nation's first national seashore in 1937

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and established in 1953. Hatteras is comprised of a number of jurisdictions which include both federal and municipal lands and a number of sites offering recreational and historical opportunities for visitors and residents, including:

- Pea Island National Wildlife Refuge (Fish and Wildlife Service)
- Outer Banks Group – includes Cape Hatteras National Seashore, Fort Raleigh National Historic Site and Wright Brothers National Memorial (National Park Service)
- Towns/Villages (Avon, Buxton, Frisco, Hatteras, Ocracoke, Rodanthe, Waves, and Salvo)
- Dare County (North)
- Hyde County (Ocracoke)

There were 2,146,392 total recreational visits to Cape Hatteras in 2008.

Cape Hatteras is an interesting peer for CNWR due to its progress in implementing intelligent transportation systems to monitor traffic and flooding and inform travelers of travel conditions and emergencies. Parking issues and habitat protection are also issues that Cape Hatteras shares with CNWR. A case study for Ocracoke Island is also included in this report to address transportation issues specific to that part of Cape Hatteras.

Several interviews were conducted for the peer comparison study including two representatives from the NPS Outer Banks Group – Greg Robinson, Public Health Service Specialist and Steve Thompson, Chief Ranger – and Clay Willis, Highway Division 1 Environmental Specialist, from the North Carolina Department of Transportation.

Cape Hatteras has a long history of impacts from major weather events including hurricanes which have contributed to shoreline erosion and damaged parking lots, roadways and structures. An example of these effects was demonstrated in 1999, when the 205-foot Cape Hatteras Lighthouse built in 1870 was moved 2,900 feet along metal rails to prevent it from falling into the Atlantic Ocean. In 2009, three historic structures, known as the Bodie Island Lifesaving Station, its boathouse, and the former Bodie Island Coast Guard Station, will similarly be moved inland due to threats of shoreline erosion. Given this history, emergency evacuation is a critical component of traffic management on the island. NPS and the municipalities work closely with the North Carolina Department of Transportation's (NCDOT) Department of Public Safety to provide a coordinated effort in emergencies. The details of this coordination are outlined in the 2008 Hurricane Plan prepared by the National Park Service, Outer Banks Group.

NCDOT plays an active role in monitoring travel conditions and flooding on roadways throughout Cape Hatteras in an effort to inform visitors of travel conditions and emergencies. A webcam and a variable message sign (VMS) are located at Whalebone Junction, which is the northern entrance to the park. This location is a natural control point and the sign provides travelers important information regarding the condition of the ferry to Ocracoke and of roads (including closures). The webcam, along with others throughout the park, are installed and maintained by TrafficLand, a for-profit company, with no charge to the municipality, county or state. Standard messages on the VMS include information on road conditions including over

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wash, traffic crashes, and ferry shutdowns due to weather. Other traffic monitoring efforts include:

- A webcam is located further south at Rodanthe and monitored because the intersection is vulnerable to flooding. When flooding occurs, the road is closed and law enforcement officers direct traffic.
- New traffic counters were recently installed on five of the beach access ramps.

For non-traffic information, Highway Advisory Radio is used on Cape Hatteras to communicate to the public, e.g. riptide advisories.

Parking on Hatteras is an issue at all beaches. Continued erosion of the shoreline as well as management closures for habitat protection affects both current parking and access and future plans. There are no plans for beach restoration.

The NPS has a number of coordination issues with the towns specifically related to off-road vehicle (ORV) access and closing areas due to shorebird and turtle nesting. In 2008, as a result of a lawsuit by the Defenders of Wildlife and the National Audubon Society against the NPS, a Consent Decree was issued to increase the frequency and degree of monitoring and protection of certain shorebird and all sea turtle species. The lawsuit alleged inadequacies on the part of NPS in the management of protected species at Cape Hatteras including failure of the park to comply with the requirements of the ORV executive order and NPS regulations regarding ORV use. The Consent Decree provides for specific species protection mandates, namely increased monitoring and protective closures to vehicles, and requires the NPS to complete an ORV plan by December 31, 2010. A draft environment impact statement is expected to be released for public review in fall 2009. The process will incorporate input from the final report of the Negotiated Rulemaking Advisory Committee for Off-Road Vehicle Management for Cape Hatteras National Seashore, which was set up in 2006 by the Secretary of the Interior; its final report was released in March 2009. Although the committee did not reach consensus on an ORV management recommendation, the report includes detailed information, recommendations, and materials submitted by its diverse stakeholder members.

To address the issues listed above with restricted access, a link is provided on the NPS website to Google Earth which provides a Beach Access Report issued every Thursday and updated up to 5 times a week during breeding season. The link states: "Once you have downloaded Google Earth, you can click on this beach access map link and zoom-in to the shoreline area in which you are interested to see the current access status."

### **Ocracoke Island**

Ocracoke Island is part of the Cape Hatteras National Seashore. The entire island is owned by the National Park Service, except for the village of Ocracoke. During the summer months, Ocracoke Island gets congested during peak periods particularly due to the high number of day trippers going to the beach. The village of Ocracoke experiences some of the same issues as Chincoteague and CNWR, including traffic congestion during peak visitation, limited parking and vehicle conflicts with bicycles and pedestrians due to a lack of off-road facilities.

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Access to the island is by ferry only – three routes operate: Hatteras (free), Swan Quarter (toll) and Cedar Island (toll). North Carolina Department of Transportation (NCDOT) Ferry Division has security cameras at the docks for each route. The cameras are monitored 24/7 for incidents only, not traffic congestion. Most visitors bring cars on the ferry because it difficult to get around otherwise.

Congestion can be a safety issue since pedestrians, cyclists and vehicles must share the road which is difficult during peak times. There are no sidewalks in the village. Ocracoke is working in partnership with NCDOT to improve biking and walking on the island. NCDOT is seeking funding to improve on-road bicycle facilities from the NPS Pony Pens to the NPS campgrounds by widening the road 3 to 4 feet to accommodate bicyclists. The construction of the multi-use trail from the NPS' Campground to the NPS/Village of Ocracoke boundary has already been funded and construction is planned for fall 2009. The next phase for the trail from the camp grounds to the pony pen (7 miles) will be more difficult to move forward on due to environmental concerns.

There is limited parking in the Village of Ocracoke and no parking lots on the beach – on-street parking is provided near the 4 ramps to the beach and it is all free. There are 5 spaces for the lighthouse. There is no system to monitor parking activity which can lead to congestion for people searching for spaces.

Shuttle or transit service is not available on Ocracoke Island. In 2005, a study was conducted to determine the feasibility of implementing a transit system in Ocracoke. NCDOT Division of Public Transportation, Hyde County and the NPS worked together to create a partnership for providing a trolley service in the Village as well as between the Village and NPS sites - the beach, the lighthouse, the camp ground and the pony pens. The study articulated the goals of transit service including improving safety, reducing congestion and enhancing the visitor experience. The plan has not moved forward due to lack of a funding source for system operations.

In 2005, a Transportation Assistance Group (TAG) met to identify transportation issues in Ocracoke and make recommendations for action. In addition, Ocracoke was recently award a grant through the Federal Transit Administration under the Paul S. Sarbanes Transit in the Parks Program (formerly Alternative Transportation in Parks and Public Lands Program).

### **Cape Cod National Seashore – Cape Cod, Massachusetts**

Cape Cod National Seashore is located on 40 miles of shoreline on Cape Cod, a peninsula in Massachusetts which is cut off from the rest of the state by a man-made canal. Cape Cod acts as a barrier island shielding much of the Massachusetts coastline from Atlantic storms. The Seashore was established in 1961 to protect the natural, cultural, and recreational resources of over 43,500 acres in the Outer Cape, including land in six incorporated towns (listed from north to south): Provincetown, Truro, Wellfleet, Eastham, Orleans, and Chatham. The Seashore manages six beaches: Coast Guard Beach (Eastham), Nauset Light Beach (Eastham), Marconi Beach (Wellfleet), Head of the Meadow Beach (Truro), Race Point Beach (Provincetown), and Herring Cove Beach (Provincetown).

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The Seashore is accessible from the mainland only by one road, U.S. Highway 6, and otherwise by ferry via Provincetown, at its northern end. Over the past decade, the Cape Cod National Seashore has averaged between four and five million visits annually, with 60 percent of those visits coming during the peak season of June through September and mostly on weekends.

Similar to CNWR, the Seashore and its adjacent communities face a number of transportation challenges, namely limited access, seasonal congestion, parking shortages, and erosion of parking areas. However, through partnerships, the Outer Cape has been able to implement a number of transit and nonmotorized access solutions and is actively planning for improvements including: transit, bicycle access, and intelligent transportation systems (ITS) to aid in visitor information and emergency management.

In 1978, Coast Guard Beach experienced a significant erosion event when its parking area was destroyed in a powerful storm. A new parking lot inland was constructed at Little Creek with a free, park-operated shuttle providing access to the beach. (A small amount of parking for handicapped and for Eastham residents remains at the beach.) The seasonal shuttle operates Memorial Day weekend through the end of September, with daily service the third Thursday in June until Labor



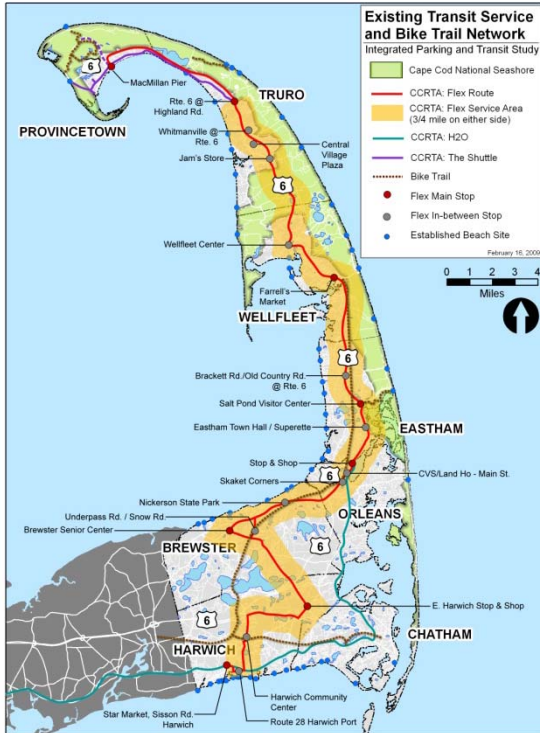
Day weekend and weekend service only the remainder of the time. The shuttle officially operates from 8:30am to 5:15pm but the service is extended to 5:30pm or later on busy evenings. Shuttle vehicles have a total capacity of 48 and consist of a gas-powered “power car” and trailer, both low-floor vehicles with an open configuration to accommodate beach gear. Previously, the Seashore had tried propane trams (retired due to the age of the vehicles), diesel school buses (issues with pollution), and battery-powered trams. The battery-powered trams were not successful due to insufficient power, inadequate range and poor reliability. Capital funding for the shuttle is provided through Federal Lands Highway while operations funding is supplied by both admissions fees and the general park operating budget.

The issue of emergency evacuation at Coast Guard Beach is a concern for the Seashore since it does not have the capability to evacuate all the people who are on the beach at peak times. The weather is closely monitored and staff is alerted when a storm is approaching. Storms usually first hit at Herring Cove; thus, Coast Guard Beach is usually the last NPS beach hit so there is time to warn visitors. Lifeguards follow the radio reports and communicate to visitors when a storm is approaching. The Seashore runs the shuttles as quickly as possible and directs people to the nearby shelter, but that can only accommodate a small fraction of visitors on the beach. The Seashore tries to warn visitors that they are at their own risk during major weather events.

Another parking area regarded at risk is located at Nauset Light Beach; it is predicted that Nauset Light will lose its bathhouses to erosion within 10 years and the entire parking area within fifteen to twenty years. According to Cape Cod coastal geologists, Nauset Light is at the edge of the strip of bluff that runs north from Coast Guard Beach and lacks separation or protection from dunes. In

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June 2009, several of the Seashore beaches were heavily impacted by a northeaster though the parking areas were not impacted.



In addition to the Coast Guard Beach shuttle described above, the local regional transit authority operates two services nearby which are described below.



In 2006, the Cape Cod Regional Transit Authority (CCRTA) began operating the Flex bus system on the Lower/Outer Cape, in partnership with the Cape Cod Commission, the regional planning agency, and the Seashore, which provided capital funding. Consisting of a fixed route integrated with a flexible, by-

request concept, the Flex bus adheres to a set route and schedule, but is able to deviate from the established route by three-quarters of a mile by rider request. The fixed route begins at Harwichport in Harwich, and continues through Brewster, Orleans, Eastham, Wellfleet, Truro, and Provincetown. Flex operates on two seasonal schedules: in summer, it runs seven days a week, from early morning through late evening, and in the winter it travels six days a week with no Sunday service. The ridership during the summer season is significantly higher than the rest of the year. The Flex buses are equipped with GPS and their real-time location can be viewed online. Operations funding comes from a town assessment based on the number of boardings per town.



The CCRTA also operates the Provincetown Shuttle, a seasonal bus line running from North Truro to Provincetown that serves both the Herring Cove Beach and the Province Lands Visitor Center, near Race Point Beach. It operates during the summer and fall months (May through October). The route is served by a traditional transit bus.

CCRTA is responsible for several other fixed routes throughout the rest of Barnstable County as well as an on-demand, paratransit service known as the “B-Bus.”

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Regarding intelligent transportation systems (ITS), the National Seashore owns a variable message sign that has used to provide real-time feedback on parking occupancy at Coast Guard, Nauset Light, and Marconi beaches. However, local residents and businesses have expressed concern about its appearance and impact on business so its future use is uncertain.

### **Padre Island National Seashore, Texas**

Padre Island National Seashore is a barrier island located along the south Texas coast about 30 miles from Corpus Christi, with over 65 miles of undeveloped coastline. An interview was conducted with the NPS superintendent, Joe Escoto, to discuss transportation at the park. Mr. Escoto indicated that the NPS is looking for ways to increase visitation which has decreased from approximately 730,000 per year in 2006 to 636,000 in 2008.

Traffic congestion is not an issue at the park and there is no public transit. Beaches are public highways in Texas; therefore driving is permitted on the beach except for a small designated pedestrian zone. During turtle nesting season, turtle patrollers are on the beach and vehicle speeds are reduced from 25 mph to 15 mph. The park has a hurricane plan which is updated every year; generally, NPS staff evacuates the park within 36 hours of an event by driving to public areas (e.g. campsites) and asking visitors to leave.

Based on the above summary, there were no specific issues or solutions at this site relevant to CNWR.

### **Folly Beach, South Carolina**

Folly Beach is a barrier island, six miles long and the closest beach to Charleston, South Carolina. As of 2009, Folly Beach's population is 2,333 people. Regional population including Charleston and North Charleston is 126,567. There are some similarities to CNWR including: one main thoroughfare through the town (Center Street), issues with pedestrian/bicycle safety and issues with traffic congestion during peak visitation. However, there are also some differences – the town is located adjacent to the beach and most parking is free and on the street. There is only one hotel in town; most visitors rent seasonal cottages.

Wilbur Smith Associates is currently working on a transportation study for the city funded by the Berkeley-Charleston-Dorchester Council of Governments. Will Letchworth is the study contact for this project. The study is near conclusion but has not yet been published. Mr. Letchworth indicated that the recommendations in the study will focus on improving pedestrian travel and reducing traffic congestion with the following interventions:

1. Reduce Center Street from a four-lane roadway (two lanes in each direction) to one lane in each direction with a center median, angled parking and wider sidewalks.
2. Limit access to side streets by gating them off during seasonal weekend peaks.

The final report is expected to be completed in the fall of 2009.

To reduce vehicle use for short trips, golf carts are allowed on all public roadways in Folly Beach with the exception of Center Street. A City ordinance describes the conditions of their use as follows:

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“Golf Carts must display a valid Highway Department sticker, be driven by a licensed driver, and have insurance. They cannot be driven on Center Street, only on secondary streets within 2 miles of owner’s residence, and only in daylight hours.”

Information regarding the ordinance is available on the City’s website and is provided at locations where golf carts are rented. The City website indicates that the “City of Folly Beach Ordinances Enforced with Fines not to exceed \$500.00.” There is no specific fine listed for improper use of golf carts.

Public transportation to Folly Beach was recently initiated for travel from nearby Charleston. The Charleston Area Regional Transportation Authority (CARTA) completed a two-month trial service in April and May 2009. Due to its success, the CARTA service resumed in late August on Saturdays and Sundays through October 18, to facilitate travel to the beach for students and other community residents during the early fall months. The ride is approximately fifty-five minutes long.

Peter Tecklenburg of CARTA was interviewed for the study. He indicated that the Folly Beach service evolved as the result of the efforts of an active student government at the College of Charleston wanting access to the beach. The students met with the CARTA board to understand why the service was not provided, despite the fact that Folly Beach is in the service area and contributes to its funding (\$0.05 cent sales tax charged County-wide). They also met with the City of Folly Beach to encourage them to pursue the service. The trial service was very successful, with some trips exceeding capacity and requiring extra buses. According to Mr. Tecklenburg, it is likely that the service will continue as a six month seasonal route next spring through fall.

### **Sanibel Island/Ding Darling National Wildlife Refuge**

Sanibel Island is a barrier island located on the Gulf Coast of Florida near the City of Fort Myers. The J. N. "Ding" Darling National Wildlife Refuge is located on the island and has been identified as one of the largest undeveloped mangrove ecosystem in the United States. It is world famous for its migratory bird population. Year round resident population in Sanibel in 2006 was 6,321 and the seasonal population was estimated to be between 10,000 and 14,000. On a yearly basis, an estimated 850,000 visitors travel to Ding Darling. The focus of the peer comparison for CNWR is the bicycle trail system developed by the City over thirty years ago. Jim Jordan, City of Sanibel Planning Director, was interviewed for this project.

The City’s Vision Statement clearly states its goal to preserve the island by protecting and enhancing its existence as a barrier island sanctuary, resisting pressures for increased development and guarding against human activities in other jurisdictions that might harm the island’s sensitive habitats including its surrounding aquatic ecosystems. These goals clearly complement the mission of the U.S. Fish and Wildlife Service at Ding Darling. Encouraging biking and walking and reducing automobile use contributes to maintaining the sanctuary.

Sanibel Island generally consists of two-lane roads with an extensive shared-use path system used by bicycles and pedestrians. There is no outdoor lighting on the island, including no traffic

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signals. Shared use paths are located all over the island and were mostly constructed between 1975 and 1996. Local citizens championed the initial effort and the paths were funded by the Town's capital improvement program.

In 2003, the City's Department of Public Works developed a Master Plan to identify long-term path extensions. In 2005, the City Council and the Sanibel Bicycle Club determined that a more comprehensive shared use master plan was needed. The Plan was completed in 2009 (paid for by the City and completed mostly in-house). The City's goal moving forward is to manage demand on the paths by increasing capacity where possible (widening from 4 to 8 feet), provide extensions as needed and connect cultural and institutional uses.

Since 2003, the City has completed over \$2 million worth of improvements to the paths financed through the capital program. Damage from Hurricane Charley in August 2004 was instrumental in promoting the improvements on Periwinkle Way. The Periwinkle Partnership (Sanibel Beautification Committee, Chamber of Commerce, Sanibel-Captiva

Conservation Commission) has worked to make improvements happen.

There is no parking on City streets so the paths provide a way to travel around the island. The City Manager worked with the City's Department of Management Information Systems to create an on-line interactive planning tool for the shared use paths -

<http://www.sanibeltrails.com/default.aspx>.

The City has also worked to improve pedestrian travel. The death of an elderly pedestrian led the City to install mid-block pedestrian crosswalks with pedestrian crossing signage. These crossings provide a higher sense of awareness for drivers; they generally stop for bicyclists and pedestrians waiting to cross at the crosswalks. No pedestrian fatalities have occurred since their installation.

Regarding traffic management strategies in the City, Mr. Jordan provided the following information:

- Traffic congestion on the island typically occurs between 2 and 6pm. During that time, police officers direct traffic at the intersections of Periwinkle Way/Causeway Road and Periwinkle Way/Casa Ybel Road.
- In the past, a variable message sign was posted before the Sanibel Causeway tolls to inform visitors if parking at the beaches was full. The sign was eliminated because of objections from the merchants on the island.
- Speed trailers are located on Causeway Road just past the bridge for traffic calming.
- In emergency situations, the City implements the following systems to notify residents and visitors: AM radio alerts, City website updates, automatic calling through 911 and reaching out to the local media.

The City of Sanibel Island is currently a partner with the J.N. "Ding" Darling Wildlife Refuge and Lee County Transit on a study funded by a grant through the Federal Transit Administration under the Paul S. Sarbanes Transit in the Parks Program (formerly Alternative Transportation in Parks and Public Lands Program).

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### **South Ponte Verde Beach**

South Ponte Verde Beach is located in Jacksonville, Florida just north of St. Augustine. Situated between the Intracoastal Waterway to the west and the Atlantic Ocean to the east, it is a beachfront community comprised of both vacation rentals and year-round residences. This site was investigated to determine if there are any demonstrated beach restoration strategies that might provide guidance for CNWR.

In response to beach erosion threatening beachfront homes, the South Ponte Veda – Vilano Beach Restoration Association, Inc. was formed for the purpose of “restoring, protecting, and nourishing the beaches of South Ponte Veda and Vilano Beach, including the coastal properties from South Ponte Veda Boulevard to Coastal Highway, and to the Vilano area.” In 2006 the Association began to work on solutions to replenish the beaches and preserve these homes. The Florida Department of Environmental Protection is working on a feasibility study which will evaluate alternative shoreline stabilization solutions as well as a recommended project design and costs.



Based on the above summary, it does not appear that there is any information or experience to date that would be relevant to CNWR.

### **Okemo Mountain Resort**

Okemo Mountain Resort is located in southern Vermont in the Village of Ludlow southeast of Rutland and northeast of Brattleboro. As a large New England ski resort, it attracts visitors from the larger metropolitan areas of New England and New York as well as local and regional day-trippers. Many visitors stay overnight at the resort and in the Village, which includes a number of visitor services including lodging, restaurants, equipment rentals and other retail establishments. In the 2008/09 ski season, Okemo hosted 604,000 skier visits. That figure does not include summer visitors including the golf course. The high period traffic for Okemo is during the winter season. Okemo offers an interesting peer comparison because of its effective working relationship with Ludlow and other nearby towns to address transportation issues which occur during peak ski season particularly on the rural roads leading to the resort and in the downtown commercial areas. These issues include:

- Heavy peaking of demand on weekend/holiday mornings and afternoons;
- Localized intersection congestion;
- Quality of life concerns for residents and visitors; and
- High accident locations in the area.

Limited parking at the resort is also an issue. Ted Reeves, P.E., Vice President for Development and Real Estate at Okemo Mountain Resort, was interviewed for this study.

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Existing mitigation efforts to address traffic congestion include deploying traffic control officers at key locations at peak travel times. A traffic management plan is put into place when the number of vehicles parked at the main parking lots exceeds 1,100. The plan includes notifying the Towns of Ludlow and Chester and the Windsor County Sheriff. Traffic details are then placed at key locations to override the traffic signals.

Okemo has also employed strategies to encourage skiers to arrive and depart at off-peak times. The first hour of lift operations are free to let skiers try out the conditions before they purchase a lift ticket. Okemo also offers the “Sunday Solution Morning Half-Day Lift Ticket” which is valid from 8 a.m. to 1:30 p.m. for Vermont and New Hampshire residents only. It allows local skiers to head home early, therefore missing the peak traffic, without paying for a full-day lift ticket.

A number of free shuttle services are provided by Okemo Mountain Resort to reduce traffic and parking congestion during peak periods. With the exception of the Okemo Resort Shuttle, which is provided primarily for resort patrons and guests, the services are also available to the general public including resort employees. The resort provides detailed schedules on line and at the resort. These services are paid for by Okemo as conditions of their permits with both the State of Vermont and the Village of Ludlow. The shuttles service the resort, and the towns of Ludlow and Proctorsville. Okemo also supports a regional service provider (Connecticut River Transit), which services a number of nearby towns (Bellows Falls, Springfield and Chester).

At the mountain, Okemo has a main parking area with shuttles transporting skiers from their vehicles to the slopes. Skiing is a gear-heavy sport which can make travelling from the parking area to the slopes difficult. The shuttles are equipped with side storage racks for skis and poles and overhead storage for bags. Ski ambassadors (volunteers) assist skiers with their gear both on and off the vehicle. At the lodge, there are coin-operated lockers and fee-charged Basket Room Storage in the basement areas to store personal items. The Basket Room also offers overnight and multi-day storage options for personal belongings.

# APPENDIX F - ALTERNATIVES

Table F-1. Alternative 2 Particulars.

| Alternative 2 - Maintain existing lots at the beach, address simple low cost/low effort improvements. |      |  |           |          |  |  |  |   |   |
|---|------|--|-----------|----------|--|--|--|---|---|
|   |      | Transportation Solutions   | Owner     | Partners | Implementation   | Time Frame   | Political  | Cost  | Comments  |
| Engineering/ Infrastructure   | EI 1 | Provide consistent pavement markings to indicate travel lanes, shoulders, and parking on Maddox Blvd and Main Street.  | VDOT      | Town     | MEDIUM. Minor infrastructure mods. VDOT planning and Town approval likely required.  | MEDIUM. One year for planning, then another construction                         | LOW. Should be non-controversial.  | MEDIUM. \$67,000 for capital/installation.  | Chincoteague 2020 Transp Plan unit cost of about \$200,000/mi is too high. "No parking" signs assumed 500' apart. |
|   | EI 2 | On Route 175 Causeway, install signage to indicate turning vehicles at Queens Sound.   | VDOT      | County   | LOW. Minor infrastructure mods. VDOT approval only.  | MEDIUM. One year for planning, then another construction season                  | LOW. Non-controversial. VDOT process low visibility.   | LOW. \$1,000 for capital/installation.  |   |
|   | EI 3 | Eliminate passing zones on the Route 175 Causeway.   | VDOT      | County   | MEDIUM. Road work is minor: striping work only. But process includes VDOT planning, and may include public hearing/process.                    | MEDIUM. One year for planning, then another construction season                  | MEDIUM to HIGH. VDOT planning may include Town and County review. Changing long-held driving habits may be controversial for some. | MEDIUM. \$29,000 for capital/installation.  |   |
|   | EI 4 | Install center lane and shoulder rumble strips along Route 175 Causeway.   | VDOT      | County   | MEDIUM. Significant effort to install "troughs" or Bott's Dots; may include reflective markers. VDOT planning. May include Town/County review. | MEDIUM. One year for planning, then another construction season                  | LOW. Should be non-controversial. VDOT process low visibility.   | MEDIUM. Center lane strip: \$36,000; shoulder strips \$23,000; \$69,000 total for capital/installation. |   |
|   | EI 5 | Improve handicapped accessibility through several interventions such as: install ADA matting to designate handicapped parking in beach parking lots, re-introduce a removable beach ramp to provide improved access to wheelchair users. | CNWR/ASIS | None     | LOW. CNWR manager decision. Minor capital cost. Installation/removal of minor, temporary, seasonal fixtures by CNWR staff.                     | MEDIUM. One year for planning and capital purchase. Installation following year. | LOW. Utterly non-controversial.  | LOW.  |   |

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Table F-1. Alternative 2 Particulars (continued).

| Transportation Solutions |      | Owner   | Partners  | Implementation   | Time Frame   | Political  | Cost   | Comments   |   |
|--------------------------|------|---|-----------|--|--|--|--|--|---|
| Traffic Management       | TM 1 | Provide off-site pass purchasing at public nodes (e.g., Chamber of Commerce, Virginia Welcome Center). Person-to-person transactions.   | CNWR/ASIS | Chamber of Commerce, Virginia Welcome Center(s), Town Hall | MEDIUM. Identify vending set-up needs; develop partnerships and operational plan; and provide funds transfer mechanism. Minimal or no new hardware.  | MEDIUM. One year to plan; another year to implement                    | LOW. Should be non-controversial; no public process necessary.                               | LOW  |   |
|                          | TM 2 | Provide pre-trip planning information on fees, peak beach visitation times, and options for beach access (including handicapped) through website and an 800 number.   | CWNR/ASIS | None   | LOW. Modify NPS and US FWS websites. Work with telephone company to set up 800 number. Minor ongoing effort to keep recorded message(s) up-to-date.  | LOW. One year  | LOW. Should be non-controversial; no public process necessary.                               | LOW  |   |
|                          | TM 3 | Provide pre-trip planning information on fees, peak beach visitation times, and options for beach access (including handicapped) at kiosk at the Virginia Welcome Center.   | CWNR/ASIS | VDOT   | LOW. Re-packaging and presentation of existing info. Minor ongoing effort to keep the information up-to-date.  | LOW. One year  | LOW. Should be non-controversial; no public process necessary.                               | LOW  |   |
|                          | TM 4 | Use existing CNWR AM radio frequency to deliver standard messages and updated traffic/parking information.  | CWNR/ASIS | None   | MEDIUM. Minor initial effort to package and present the desired information. Ongoing effort to keep the information up-to-date, especially on summer weekends, may require some procedural standard and the attention of a particular CNWR personnel. CNWR has found that equipment and operations issues have been a problem in the past (e.g., towers, transmissions). | LOW. One year  | LOW. Should be non-controversial; no public process necessary.                               | MEDIUM. Initial costs low, but operations and upkeep have been found to be significant efforts in the past.      |   |
|                          | TM 5 | Continue use of local FM radio station to deliver standard messages and updated traffic/parking information.  | CWNR/ASIS | FM Radio Station WCTG, 96.6                                | LOW. Minor effort to establish, as recent use of Station during hurricane was very effective. Traffic/parking updates should be the same as provided for CNWR's AM station.  | LOW. One year  | LOW. Should be non-controversial; no public process necessary.                               | VERY LOW   |   |
|                          | TM 6 | <b>Implement siren notification system in CNWR (including speakers at the beach) for emergency evacuation and/or storm warnings.</b>  | CWNR/ASIS | None   | MEDIUM. Moderate effort to acquire and install wiring/speakers for outdoor use, develop new procedures for use, and train staff. Annual effort to maintain equipment; possible need to remove each winter and re-install in spring, by CNWR staff.   | MEDIUM. One year to plan and secure funds; another year to install.    | MEDIUM. May be somewhat controversial for some; public education process may be necessary.   | MEDIUM. Acquisition of new hardware: ~\$35,000 for 2 units. Some new running costs for O/M and personnel effort. | According to vendor's information, for up to 1-1/2 mile radius. One vendor offers solar power option. |
|                          | TM 7 | Improve directional and informational signage at specific points on Chincoteague to supplement CNWR maps (e.g., Route 175 causeway/ Maddox Boulevard intersection, Chamber of Commerce rotary, Beach Road at CNWR rotary and after fee booths). | VDOT      | CNWR/ASIS/ Town of Chincoteague                            | MEDIUM. Design, acquisition, and installation of signs, with cooperative process among partners.   | MEDIUM. One year to plan and secure funds; another year to install.    | MEDIUM. May be somewhat controversial for some; public information process may be necessary. | MEDIUM. \$5,000 capital/installation. No significant running costs.  | Consistent with Shenandoah Nat'l Park sign cost estimates   |
|                          | TM 8 | Designate one booth for pre-purchased passes.   | CWNR/ASIS | None   | LOW. Operational change for CNWR; minor procedural development effort and training of personnel.   | MEDIUM. One year to plan/develop procedures; implement second year.    | LOW. Should be non-controversial; no public process necessary.                               | VERY LOW. No capital costs; may actually reduce running O/M costs.   |   |
|                          | TM 9 | Revise CNWR to clearly show all destinations, parking locations and shelters, and identify additional important notices including handicapped facilities, bicycling etiquette in the refuge and emergency evacuation procedures.                | CNWR/ASIS | None   | MEDIUM. Staff or contractor to develop graphics; contracted printing service on annual basis.  | MEDIUM. One year to plan/develop; new brochures available second year. | LOW. Should be non-controversial; no public process necessary.                               | LOW  |   |

APPENDIX F

Table F-1. Alternative 2 Particulars (continued).

| Transportation Solutions       |      | Owner   | Partners             | Implementation                      | Time Frame  | Political  | Cost   | Comments  |  |
|--------------------------------|------|---|----------------------|-------------------------------------|---|--|--|---|--|
| Parking and Parking Management | PM 1 | Provide designated area in existing beach parking lots for small motorized vehicles, including motorcycles, scooters and electric carts. Include storage lockers (could be used for bicyclists also).   | CNWR/ASIS            | Chamber of Commerce; rental outfits | LOW. Signage and temporary fencing or barriers. Setup and monitoring by CNWR/ASIS staff.  | One year to plan/develop procedures; implement second year                 | LOW. Should be non-controversial; no public process necessary.   | LOW   |  |
|                                | PM 2 | Add parking lot information to CNWR map and other online and print materials.   | CNWR/ASIS            | None                                | LOW. Staff or contractor to develop revised graphics; printing should continue as done currently.   | MEDIUM. One year to plan/develop; revised brochures available second year. | LOW. Should be non-controversial; no public process necessary.   | LOW   |  |
| Bicycles and Pedestrians       | BP 1 | Construct trail between the NPS bridge and the Chamber of Commerce traffic circle.  | CNWR/ASIS            | VDOT, Town of Chincoteague          | HIGH. Planning, design, contracting to build significant new infrastructure. Annual O/M effort going forward.   | Construction planned [2010]  | LOW. Project already approved and underway. No public process required from this point forward.              | HIGH. Capital project already paid for; significant O/M costs going forward.      |  |
|                                | BP 2 | Develop improved bicycle maps (including all Town and CNWR routes), signage (e.g., "Share the road"), and educational outreach materials, to be distributed by lodging and other businesses in Chincoteague.  | Town of Chincoteague | CNWR/ASIS/ Bicycle Rental Companies | MEDIUM. Town/CNWR staff or contractor to develop new map and graphics; contracted printing service; set-up with owners of distribution points (businesses in Chincoteague) and actual distribution. | MEDIUM. One year to plan/develop; new brochures available second year.     | LOW. Should be non-controversial; no public process necessary.   | LOW   |  |
| Transit                        | TR 1 | Shorten the existing green Pony Express Route to route that goes from Community Center to HS (via Hallie Wealton Drive), then along Main Street to Bunting, then up Ridge Road to Maddox, and to Oyster Museum and back via Deep Hole Road to the Community Center. Red route stays the same. | Pony Express         | CNWR/ASIS; Town of Chincoteague     | MEDIUM. Route planning, revised printed schedules, publicity, operational changes, re-scheduling of personnel.  | MEDIUM. One year to plan/develop procedures; implement second year.        | LOW. Should be non-controversial; no public process necessary.   | LOW developmental and incremental running costs.                                  |  |
|                                | TR 2 | Extend the route above as a pilot for May and September (weekends and holidays only, 9am-5pm or so) to sites within the Refuge: Wildlife Loop/Lighthouse, FWS VC, NPS VS/Beach. No new vehicles required.   | Pony Express         | CNWR/ASIS; Town of Chincoteague     | MEDIUM. Route planning, revised printed schedules, publicity, operational changes, re-scheduling of personnel.  | MEDIUM. One year to plan/develop procedures; implement second year.        | LOW. Should be non-controversial; no public process necessary.   | MEDIUM. No capital costs. Incremental running costs \$15,000 - \$25,000 per year. |  |
|                                | TR 3 | Implement a commercial special use permit for beach equipment concessions at beach (umbrellas, chairs, etc.) to provide gear for visitors who access beach by bicycle or walking.   | CNWR/ASIS            | Concessioners or CUP entities       | MEDIUM. New concessions paperwork & process. Minor infrastructure mods. at beach. Some annual effort by CNWR staff to monitor.  | MEDIUM. One year to plan/develop; implement second year                    | MEDIUM. May be mildly controversial for some Town businesses; some public outreach process may be necessary. | LOW developmental and incremental running costs.                                  |  |

APPENDIX F

Table F-2. Alternative 3 Particulars.

| Transportation Solutions    |       | Owner   | Partners                | Implementation  | Time Frame  | Political challenge  | Cost  | Comments  |  |
|-----------------------------|-------|---|-------------------------|---|---|--|---|---|--|
| Engineering/ Infrastructure | EI 6  | Construct shelters on the beach for emergencies/storms for visitors accessing the beach via transit and bike/ped.   | CWNR/ASIS               | None  | HIGH. Research, design, environmental compliance review, contracting, and placement. Significant O/M effort annually; may require removal of shelters each winter and re-installation each spring.                        | MEDIUM. 2 years to plan, fund, and acquire. Placement and operation in third year.           | MEDIUM. Non-controversial, but public process likely necessary as well as public outreach and education.  | HIGH. Capital cost ~\$30,000, for [3] 12' X 40' units, capacity: 100 each. Significant new running O/M costs.   |  |
|                             | EI 7  | Reconfigure Assateague Channel Bridge for three vehicle lanes, for transit vehicles and emergency vehicle access, and build new ~12-foot wide bridge to provide bicycle/pedestrian access into CNWR; includes A) widening Beach Road between bridge and fee booths at current location and B) further widening Beach Road to re-located fee booths if TM 10 occurs. | CNWR/ASIS               | None  | HIGH. Extensive effort to fund, research, conduct environmental compliance, contract for design and construction. Significant added O/M effort each year.   | HIGH. Up to 2 years to research, fund, and contract, plus 2 construction seasons             | HIGH. High profile task requiring public review process, involving environmentally sensitive land. However, transportation and safety benefits would be clear, possibly reducing controversy. | VERY HIGH. Planning and capital costs \$2.9M for (A) and \$6.2 for (B). ROM \$400K for EIS. Significant added O/M costs for new structure and road bed.                   |  |
|                             | EI 8  | Construct shoulders and additional emergency pull-off areas (as recommended in VHB Route 13 Corridor Study) on Route 175.   | VDOT                    | Accomack County/ Town of Chincoteague                                   | HIGH. High effort to research, fund, design, contract, and construct. Significant added O/M effort each year.   | HIGH. Up to 2 years to research, fund, and contract, plus 2 construction seasons.            | MEDIUM. High profile task requiring public review process, involving environmentally sensitive land. However, transportation and safety benefits would be clear and controversy low.          | VERY HIGH. Capital costs: Shoulders - \$5M; pullouts - \$68,000. Significant added O/M costs for expanded road bed.   |  |
| Traffic Management          | TM 10 | Relocate fee booths east, further from the bridge, to provide additional storage capacity for queuing vehicles and to accommodate an express lane.  | CNWR/ASIS               | None  | HIGH. Significant initial effort for planning, funding, contracting; then widening road and relocating existing booths. Added O/M effort for enlarged road footprint, none added for booths.                              | MEDIUM. Up to 2 years to research, fund, and contract, plus 1 construction season.           | HIGH. High profile task requiring public review process, involving environmentally sensitive land with endangered species habitat. Likely to be controversial.                                | HIGH. Capital costs: booth reloc - \$30,000; added lane (20' X 500') - \$130,000. Significant added O/M costs for expanded road bed.                                      | All Beach Road widening costs are linked to the EI 7, the Bridge widening solution.  |
|                             | TM 11 | Provide real-time information on parking availability at the beach and at off-site locations, through variable message signs at the foot of the Route 175 bridge into Chincoteague and the Chamber of Commerce traffic circle, using data obtained from vehicle detectors   | CWNR/ASIS               | Chamber of Commerce, VDOT, Town of Chincoteague                         | Medium. Significant initial effort to acquire hardware, and coordinate and place signs. Significant O/M effort yearly.  | MEDIUM. 2 years to coordinate, fund, and contract, plus 1 year to place and get operational. | HIGH. Probably will need public process. Businesses are often sensitive about use of such signs. Public education required.   | HIGH. Capital cost - \$152,000. Some added O/M costs for new eqpt.  | Parking lot sensor & controllers, 2 VM signs, power cable, software and work station |
|                             | TM 12 | Provide detailed information for visitors at hotels, campgrounds and the Chamber of Commerce on peak visitation times, options for beach access, and real-time information on beach parking/traffic conditions (likely via website).  | CWNR/ASIS/ Chincoteague | Chamber of Commerce (including member businesses), Town of Chincoteague | MEDIUM. Fairly high initial effort to coordinate publication, website development and information sharing. Some O/M effort yearly. Design and maintenance may be contracted out. Annual updates and printing of brochure. | MEDIUM. 1 year to coordinate and fund, plus 1 year to set up and get operational.            | LOW. Non-controversial. Coordination as businesses will have to be brought on board.  | LOW. Shared acquisition costs may minimize budget impact for any particular entity. Minor annual O/M effort to maintain website and publication upkeep and printing.      |  |
|                             | TM 13 | Install cameras to monitor traffic on the Route 175 causeway for improved incident management and variable message signs on Routes 175 (1) and 13 (2)   | VDOT                    | Accomack County/Town of Chincoteague/ TrafficLand                       | MEDIUM. Initial acquisition and set-up of camera and associated hardware/software, and some O/M effort yearly.  | MEDIUM. 1 year to coordinate and fund, plus 1 year to set up and get operational.            | LOW. Non-controversial, requiring no public process. Clear benefits and no significant drawbacks.   | HIGH. Capital cost - \$520,000. ~\$30K/yr added O/M costs for new eqpt.   | (10) cameras; (3) VMS; VDOT/ TrafficLand operation & maintenance.                    |
|                             | TM 14 | Implement special event and peak weekend traffic routing using variable message signs and/or traffic signal timing in response to real-time traffic conditions.   | VDOT                    | CNWR/ASIS/ Accomack County/ Town of Chincoteague                        | LOW effort, if acquisition and set-up of signs already accomplished for provision of beach parking info (TM11).   | MEDIUM. 2 years to coordinate, fund, and contract, plus 1 year to place and get operational. | HIGH. Probably will need public process. Businesses are often sensitive about use of such signs. Public education required.   | LOW, if signs already acquired for traffic and parking info purposes (TM11 & 13). If not, then HIGH acquisition costs. Low operating cost (pre-existing VDOT C&C center). |  |

Table F-2. Alternative 3 Particulars (continued).

| Transportation Solutions       |      | Owner   | Partners             | Implementation  | Time Frame   | Political challenge   | Cost   | Comments  |  |
|--------------------------------|------|---|----------------------|---|--|---|--|---|--|
| Parking and Parking Management | PM 3 | Construct new parking lot for beach north of current lots, of similar or reduced capacity, accessible by existing service road (requires environmental assessment). Site should be in a more protected area (limited severe weather impacts) with consideration for emergency access and shelter. | CWNR/ASIS            | None  | HIGH. Very high effort to, research, conduct environmental compliance, design, fund, contract, and construct new lots and remove/remediate old lots. Annual O/M effort should not increase and may decrease.   | HIGH. Up to 3 years to research, conduct NEPA, fund, and contract; plus 2 construction seasons.                   | HIGH. High visibility project involving extensive public review porocess, for work in environmentally sensitive area.  | VERY HIGH planning, design, and construction - \$1.6M. NEPA/EIS cost ROM estimated \$400K. O/M costs should not increase and may well decrease due to reduced parking lot damage from storms. | Damage assessment from November 2009 storm may remove this option from consideration.  |
|                                | PM 4 | Provide drop-off area for gear and people at beach parking lots. Driver would then return to satellite parking lot and bicycle or take a shuttle back to the beach (also consider in design for new lot).   | CWNR/ASIS            | Shuttle service provider, Town of Chincoteague                    | LOW. Minor planning and construction needs for small area w/minimal infrastructure.  | MEDIUM. 2 years. 1 year to coordinate and fund, plus 1 year to set up and get operational.                        | LOW. Non-controversial, with clear benefits and no significant drawbacks.  | LOW initial costs and added O/M costs.  |  |
|                                | PM 5 | Reduce parking capacity at beach front lots.  | CWNR/ASIS            | None  | HIGH. High effort to research, conduct environmental compliance (NEPA EA likely), design, fund, contract, and remove/remediate portions of old lots. Annual O/M effort should not increase and may decrease.   | HIGH. 2 years to plan and fund (after implementation of new CCP), plus 2 years to execute, including restoration. | HIGH. Highly visible, requiring public review process. Highly controversial, as reducing lots' capacity is a politically charged item for Town of Chincoteague and businesses. | Likely HIGH initial costs for planning, compliance, design, and site work (not estimated here). NEPA ROM estimate \$200K. O/M costs should not increase and may well decrease.                | Data collection to measure utilization and analysis to determine possible capacity reduction and mitigative actions. Damage assessment from November 2009 storm may affect implementation particulars. |
|                                | PM 6 | Close Assateague Island to personal vehicles during peak hours during peak season (July and August weekends, 10 am to 2 pm).  | CWNR/ASIS            | VDOT/ Accomack County/ Town of Chincoteague                       | LOW. No capital improvement. Some incremental yearly O/M effort. Probable need for public meetings from political standpoint.  | MEDIUM. 1 year to plan and conduct public process, plus 1 year to set up operation.                               | HIGH. Likely to be very controversial with Town and its business interests, as it is a significant change involving beach access by POVs.                                      | LOW. No capital cost. Likely low incremental operational cost.  | Possible pilot program as a pre-emptive strategy to complement satellite parking.  |
|                                | PM 7 | Designate existing community and public parking lots for peak seasonal beach parking, to be serviced by shuttle. Parking lots could include the parking lots at the Chincoteague Center and Town Hall, the High School, and the Elementary School.  | Town of Chincoteague | CNWR/ASIS/ Accomack Cty Public Schools / shuttle service provider | HIGH. Capital acquisitions may be minimal, but would be challenging program and operational coordination among several entities. Significant service development for the provider and O/M effort on the new route and to monitor satellite parking lots. | MEDIUM. 1 year to coordinate and fund, plus 1 year to set up operation.   | HIGH. Public planning and review process, likely in multiple for a. Some controversy for Town and its businesses, as is any significant change involving access by POVs.       | LOW. Likely no or low capital cost. Low incremental operational cost for CNWR and the partners, except the service provider, which would have significant added O/M costs.                    |  |
|                                | PM 8 | Implement ITS system to track real-time beach parking lot occupancy and feed into variable message signs.   | CWNR/ASIS            | VDOT/ Accomack County/ Town of Chincoteague                       | LOW. In conjunction with TM 11 and TM 14.  | MEDIUM. 2 years to coordinate, fund, and contract, plus 1 year to place and get operational.                      | HIGH. Probably will need public process. Businesses are often sensitive about use of such signs. Public education required.  | LOW. In conjunction with TM 11 and TM 14.   |  |

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Table F-2. Alternative 3 Particulars (continued).

| Transportation Solutions |      | Owner   | Partners                               | Implementation                  | Time Frame  | Political challenge  | Cost  | Comments  |   |
|--------------------------|------|---|--|---------------------------------|---|--|---|---|---|
| Bicycles and Pedestrians | BP 3 | Construct trail between the end of the Black Duck Trail and the beach to provide safe bicycle and walking paths in CNWR.  | CNWR/ASIS                              | None                            | MEDIUM. Initial effort to fund, conduct minimal compliance, design, contract, and construct. Small added O/M each year.             | MEDIUM. 2 years to plan and fund, plus 1 year to execute.                          | MEDIUM. Working in environmentally sensitive area, but providing non-controversial, non-polluting transportation benefit.                     | MEDIUM for start-up and trail construction. CNWR will have low incremental annual O/M effort.           | Need trail building cost data or estimation algorithm from FWS. |
|                          | BP 4 | Sidewalk improvements and/or construction along both sides of Maddox Blvd. to fill in gaps from Beach Road bridge to Chicken City Road (provide prioritized list).  | VDOT                                   | Town of Chincoteague            | HIGH. Initial effort to plan, get permits/approvals, fund, design, contract, and build. Significant added O/M effort for VDOT/Town. | MEDIUM. 2 years to fund, design, and contract; plus 1 construction season.         | HIGH. Highly visible project and public process. Controversial because of impacts on homes and businesses, but benefits of project will help. | VERY HIGH capital infrastructure construction cost - \$131,000. Significant added O/M costs thereafter. |   |
|                          | BP 5 | Install crosswalks, pedestrian pushbuttons, and signals for pedestrians and bicycles to safely cross at signalized intersections on Maddox and Main Streets, Chicken City Road, Deep Hole Road. Consider No Right Turn on Red restrictions and leading pedestrian signal timing (giving pedestrians a head start for crossing). Add high visibility crosswalks and signage at the Chamber of Commerce traffic circle. | VDOT                                   | Town of Chincoteague            | HIGH. Initial effort to plan, get permits/approvals, fund, design, contract, and build. Significant added O/M effort for VDOT/Town. | MEDIUM. 2 years to fund, design, and contract; plus 1 construction season.         | MEDIUM. Highly visible project and public process, but should not be controversial, because of obvious benefits of project.                   | HIGH capital and infrastructure construction cost - \$69,000. Significant added O/M costs thereafter.   |   |
| Transit                  | TR 4 | Create permanent daytime service into CNWR from May through September, weekends and holidays only. This route will also serve any new satellite parking areas. No new vehicles required.  | Pony Express or other service provider | CNWR/ASIS/ Town of Chincoteague | MEDIUM. Route planning, revised printed schedules, publicity, operational changes, re-scheduling of personnel.                      | MEDIUM. 2 years. 1 year to plan/develop procedures; implement second year.         | LOW. Should be non-controversial; no public process necessary.  | MEDIUM. No capital costs. Incremental running costs \$35,000 - \$50,000 per year.                       |   |
|                          | TR 5 | Modify existing Pony Express vehicles to add bicycle racks, and accommodation for other gear  | Pony Express                           | CNWR/ASIS/ Town of Chincoteague | MEDIUM. Planning, acquisition of hardware, publicity, minor operational changes.  | MEDIUM. 1 year to plan/acquire hardware/develop procedures; implement second year. | LOW. Should be non-controversial; no public process necessary.  | LOW capital cost - \$10,000 (includes installation on trolleys). Negligible running costs.              |   |
|                          | TR 6 | Implement a commercial special use permit for beach equipment concessions at beach (umbrellas, chairs, etc.) to provide gear for visitors who access beach by transit   | CNWR/ASIS                              | Concessioners or CUP entities   | MEDIUM. New concessions paperwork & process. Minor infrastructure mods. at beach. Some annual effort by CNWR staff to monitor.      | MEDIUM. One year to plan/develop; implement second year                            | MEDIUM. May be mildly controversial for some Town businesses; some public outreach process may be necessary.                                  | LOW developmental and incremental running costs.  |   |

APPENDIX F

Table F-3. Alternative 4 Particulars.

| Alternative 4 - Eliminate all parking at the beach, provide infrastructure, traffic and parking management improvements, and transit and bike/ped solutions (where appropriate, solutions from Alternatives 2 |                          |   |  |                                       |  |  |   |   |         |
|---|--------------------------|---|--|---------------------------------------|--|--|---|---|---------|
| Engineering / Infrastructure  | Transportation Solutions |   | Owner                                  | Partners                              | Implementation   | Time Frame   | Political   | Cost  | Comment |
|   | NONE                     |   |  |                                       |  |  |   |   |         |
| Parking and Parking Management  | PM 8                     | Construct new parking structure off-site, probably in the Town of Chincoteague, with shuttle service to the beach.  | CWNR/ASIS                              | None                                  | HIGH. Initial effort of funding, research, environmental compliance, design, contracting, and construction. Significant added O/M effort each year.  | HIGH. Up to 2 years to research, fund, and contract, plus 2 construction seasons   | HIGH. Highly visible project. Working in environmentally sensitive area. Need to build consensus among NPS and public.  | VERY HIGH planning and construction costs. For 500 space garage, national average of \$15,500/space, estimated construction cost = \$7,750,000. High added annual O/M costs = ~\$500/space = \$75,000/year.   |         |
| Bicycles and Pedestrians  | BP 6                     | Widen Route 175 causeway to provide shoulders for bicycle lanes and emergency vehicle access in both directions.  | VDOT                                   | Accomack County/ Town of Chincoteague | HIGH. Initial effort for funding, research, environmental compliance, design, contracting, and construction. Significant added O/M effort each year. | HIGH. Up to 2 years to research, fund, and contract, plus 2 construction seasons.  | HIGH. Highly visible project; many users of road. Working in environmentally sensitive land. Change to major roadway may be controversial, but has clear transportation benefits. | VERY HIGH capital and construction costs - \$2.8M. Environmental compliance process cost not estimated, but likely to be significant. Significant added annual O/M costs.   |         |
|   | BP 7                     | Provide bike lanes along both sides of Maddox Blvd. to fill in gaps from Main Street to the Chamber of Commerce traffic circle (eliminate on-street parking).             | VDOT                                   | Town of Chincoteague                  | HIGH. Initial effort of planning, permitting, funding, design, contracting, and construction. Minor added O/M effort each year.                      | MEDIUM. Up to 2 years to plan, fund, and contract, plus 1 construction season.     | MEDIUM. Highly visible road project. Change to major Town road may be controversial, but will have many advocates. ID'd in Chincoteague 2020 Transportation Plan.                 | MEDIUM. Construction costs \$24,000; minor added annual O/M costs.  |         |
| Transit   | TR 7                     | Include the parking garage in Green route.  | Pony Express or other service provider | CNWR/ASIS/ Town of Chincoteague       | MEDIUM. Route planning, revised printed schedules, publicity, operational changes, re-scheduling of personnel.                                       | MEDIUM. 1 year to plan/develop procedures; implement 2nd year.                     | LOW. Should be non-controversial; no public process necessary.  | LOW. No capital cost. Very low incremental running costs.   |         |
|   | TR 8                     | Purchase new vehicles (2) for service to CNWR and ASIS sites. Should consider alternative fuel vehicle equipped with bicycle racks that can accommodate gear more easily. | Pony Express or other service provider | CNWR/ASIS/ Town of Chincoteague       | HIGH. Major planning and acquisition process, publicity, significant operational/maintenance changes, especially with alternative fuel vehicles.     | MEDIUM. 2 years to plan/acquire hardware/develop procedures; implement third year. | LOW. Should be non-controversial; no public process necessary.  | HIGH capital cost \$400K - \$800K (\$200K - \$400K/vehicle depending on size and alt fuel type). \$3,000 for bicycle racks. Incremental running costs to operate and maintain new alternative fuel vehicles; likely some offset from fuel cost savings. |         |

## Cost Estimating Information and Data

### Siren Notification:

American Signal Corporation: [http://www.americansignal.com/outdoor\\_warning.php](http://www.americansignal.com/outdoor_warning.php) (date accessed October 27, 2009), POC: Duncan Kasukonis, Project Manager.

**TEMPEST (Tone only)** option ranges from \$10,000 to \$35,000

- T 112 – ½ mile to ¾ mile \$10,000
- T 121 – 1 mile radius \$12,000
- T 128 – 1 to 1 ½ mile radius \$17,000
- T 135 – 4 miles radius (\$35,000)

**ECLASS (Tone & Voice)** options range from \$9,000 to \$18,000(used for Tsunami warnings)

- ECLASS 1 (1 horn) \$9,000
- ECLASS 8 (8 horns) \$18,000

\*Installation (solar option) would be \$3500-\$4,000. Solar option can be used in lieu of power utilities.

Questions posed by vendor POC:

1. How large is the area they want covered (beach area or entire refuge)?
2. If it's just the beach area, how large is the strip of beach?
3. How many sirens do they want?
4. What kind of warning - tone only (large beeping noise), voice only, or combination of tone & voice.

### Emergency Shelters:

Data source: Rubb Building Systems – Emergency Relief Rapid Deployment Structures: <http://www.rubb.com> (date accessed October 27, 2009). Spoke with Gordon, Sales Rep.

Rubb is an international supplier of frame supported tents, shelters, warehouse buildings, aircraft hangars and a broad array of special purpose structures. According to the website, their products “feature a high strength frame system that is clad with a flexible, fire safe PVC membrane. All Rubb structures are designed for extended use in difficult climates and conditions and most of our products are also cost effectively relocated to meet changing requirements. Rubb has a been a major supplier to the aid and development market for over 25 years. The THA shelter is the workhorse of Rubb’s product range offering a rugged but economical solution for a wide range of aid and emergency relief applications.”

#### **TH Type Shelter (12ft x 40ft)**

- could accommodate up to approx 120 people standing room only
- anchor spikes
- galvanized steel frame
- PVC coated polyester
- Roof is translucent white
- One door
- Cost approx \$8,520
- Easy installation and portable

## Parking Garage

Data source: Victoria Transportation Institute, Transportation Cost and Benefit Analysis II – Parking Costs <http://www.vtppi.org/tca/tca0504.pdf> (date accessed October 29, 2009)

### Construction Costs

Parking facility construction costs are affected by size per space, size and shape of site (small and irregular shaped sites increase unit costs), number of levels (more levels increase unit costs), topography (slopes and poor soil conditions increase costs), design (exterior aesthetic treatments can increase costs), and geographic location. Structured parking involves a trade-off between construction and land costs. Structured parking typically becomes cost effective when land prices exceed about \$1 million per acre.

**Table F-4. Parking Structure Construction Costs**

| City          | Cost Per Space |
|---------------|----------------|
| Atlanta       | \$14, 028      |
| Baltimore     | \$14,479       |
| Boston        | \$17,947       |
| Charlotte     | \$12, 441      |
| Chicago       | \$17,869       |
| Cleveland     | \$15, 474      |
| Denver        | \$14, 774      |
| Dallas        | \$13, 281      |
| Detroit       | \$16, 049      |
| Kansas City   | \$15, 878      |
| Los Angeles   | \$16, 842      |
| Miami         | \$14, 043      |
| Minneapolis   | \$17, 079      |
| New Orleans   | \$13, 825      |
| New York      | \$20, 326      |
| Philadelphia  | \$17, 604      |
| St Louis      | \$15, 178      |
| San Francisco | \$19, 253      |
| Seattle       | \$16, 158      |

APPENDIX F

|                         |                  |
|-------------------------|------------------|
| <i>National Average</i> | <i>\$15, 552</i> |
|-------------------------|------------------|

**The estimated cost for a parking garage with 500 spaces, using the national average of \$15,500 per space, is \$7, 750,000.**

**Operation and Maintenance**

Operation and maintenance costs include cleaning, lighting, maintenance, repairs, security, landscaping, snow removal, access control (e.g., entrance gates), fee collection (for priced parking), enforcement, insurance, labor and administration. Parking facilities require resurfacing and repaving every 5-10 years, and parking structures require major reconstruction or replacement after 20-40 years, with higher maintenance costs in areas with harsh climates, particularly with frequent salt exposure. Parking structures may require elevators, fire control and mechanical ventilation. Private parking facilities must pay taxes and provide profits. The incremental cost of fee collection ranges from less than \$50 annually per vehicle for a simple pass system with minimal enforcement, to more than \$500 per space for facilities with attendants or automated control systems. A 1998 study found that typical annual costs per space ranged from about \$200 for basic maintenance of a surface lot, up to \$800 for a facility with tollbooth attendants. A 1996 survey found that commercial parking operating expenses average about \$500 annually per space, about half of which is associated with fee collection and security:

**Table F-5. Parking Structure Annual Operating Costs, per Parking Space**

|                                |             |
|--------------------------------|-------------|
| Cashiering Salaries & Benefits | \$120       |
| Management and supplies        | \$85        |
| Security                       | \$67        |
| Utilities                      | \$58        |
| Insurance                      | \$16        |
| Routine Maintenance            | \$19        |
| Structural Maintenance         | \$50        |
| Snow removal                   | \$4         |
| Equipment maintenance          | \$11        |
| Other expenses                 | <u>\$64</u> |
| <b>Total</b>                   | <b>\$</b>   |
| <b>494/year/space</b>          |             |

**Table F-6. Sample Parking Structure Annual Operating Costs**

|                              | <b>Fort Collins, CO</b> | <b>Phoenix, AZ</b> | <b>Boise, ID</b> | <b>Portland, OR</b> |
|------------------------------|-------------------------|--------------------|------------------|---------------------|
| <b>No. of parking spaces</b> | 903                     | 744                | 495              | 413                 |
| <b>Total operating</b>       | \$416, 400              | \$519, 100         | \$361, 800       | \$349, 400          |

**APPENDIX F**

|                       |       |       |       |       |
|-----------------------|-------|-------|-------|-------|
| <b>costs</b>          |       |       |       |       |
| <b>Cost per space</b> | \$461 | \$698 | \$731 | \$846 |

APPENDIX F

Table F-7. Cost Estimates for Infrastructure and Facility Solutions.

| Questions/Assumptions  | Alternative | Solution Identifier | Solution Description  | Cost Item   | Unit Cost (Labor, Materials, Equipment) |          | Units  | Construction Cost | Fully loaded cost (1.3 multiplier for design, engineering, mgmt. Does not include contingency) | Rounded Full Cost | Reference(s)   |
|--|-------------|---------------------|---|---|---|----------|--------|-------------------|--|-------------------|--|
|  |             |                     |   |   |   |          |        |                   |  |                   |  |
| Note: Chincoteague 2020 Transportation Plan assumes unit cost of about \$200,000/mi. This seems much too high.<br>Assume signs spaced 500 ft apart | 2           | EI 1                | Provide consistent pavement markings to indicate travel lanes, shoulders, and parking on Maddox Blvd and Main Street. | Re-stripe for bike lanes with durable pavement markings | \$9,400                                 | per mi   | 3.8    | \$35,250          | \$45,825   | \$46,000          | Shockoe Bottom, VA Transportation Plan 2020, Cost Estimates (2004).<br><a href="http://www.richmondgov.com/departments/publicworks/reports/SBDraftTransPlanPage48.pdf">http://www.richmondgov.com/departments/publicworks/reports/SBDraftTransPlanPage48.pdf</a> |
|  |             |                     |   | Post No Parking signs                                   | \$200                                   | per sign | 79     | \$15,840          | \$20,592   | \$21,000          |  |
|  | 2           | EI 2                | On Route 175, install signage to indicate turning vehicles at Queens Sound.   | Signage   | \$300                                   | per sign | 2      | \$600             | \$780  | \$1,000           | Shockoe Bottom, VA Transportation Plan 2020, Cost Estimates (2004).<br><a href="http://www.richmondgov.com/departments/publicworks/reports/SBDraftTransPlanPage48.pdf">http://www.richmondgov.com/departments/publicworks/reports/SBDraftTransPlanPage48.pdf</a> |
|  | 2           | EI 3                | Eliminate passing zones on the Route 175 causeway.  | Restripe 6" striping                                    | \$1.00                                  | per LF   | 22,176 | \$22,176          | \$28,829   | \$29,000          | Shockoe Bottom, VA Transportation Plan 2020, Cost Estimates (2004).<br><a href="http://www.richmondgov.com/departments/publicworks/reports/SBDraftTransPlanPage48.pdf">http://www.richmondgov.com/departments/publicworks/reports/SBDraftTransPlanPage48.pdf</a> |
|  | 2           | EI 4                | Install center lane and shoulder rumble strips along Route 175 causeway.  | Center lane rumble strips                               | \$1.25                                  | per LF   | 22,176 | \$27,720          | \$36,036   | \$36,000          | <a href="http://transportation.ky.gov/construction/sm/EST/Finals/072307est0010.html">http://transportation.ky.gov/construction/sm/EST/Finals/072307est0010.html</a>  |
|  |             |                     |   | Shoulder rumble strips                                  | \$0.40                                  | per LF   | 44,352 | \$17,741          | \$23,063   | \$23,000          | <a href="http://transportation.ky.gov/construction/sm/EST/Finals/072307est0010.html">http://transportation.ky.gov/construction/sm/EST/Finals/072307est0010.html</a>  |
| Consistent with Shenandoah Nat'l Park sign cost estimates  | 2           | TM 7                | Improve directional and informational signage at specific points on Chincoteague to supplement CNWR maps              | Signage   | \$700                                   | ea       | 5      | \$3,500           | \$4,550  | \$5,000           | Phone conversation with Shenandoah maintenance staff October 29, 2009. Park cost estimates assume \$34/SF  |

APPENDIX F

Table F-7 (continued). Cost Estimates for Infrastructure and Facility Solutions.

| Questions/Assumptions  | Alternative | Solution Identifier | Solution Description   | Cost Item  | Unit Cost (Labor, Materials, Equipment) | Units     | Construction Cost | Fully loaded cost (1.3 multiplier for design, engineering, mgmt. Does not include contingency) | Rounded Full Cost   | Reference(s)   |
|--|-------------|---------------------|--|--|---|-----------|-------------------|--|---|--|
| Can only provide a VERY rough estimate without additional information about bridge conditions and environment. | 3           | EI 7                | Widen Beach Road Bridge to provide an express lane into CNWR for transit vehicles and emergency vehicle access.  | Retain existing bridge and build new bridge with two additional lanes. | \$166 per SF bridge area                | 25,344    | \$4,194,432       | \$5,452,762  | \$5,500,000   | <a href="http://www.fhwa.dot.gov/BRIDGE/nbi/unit_cost.cfm">http://www.fhwa.dot.gov/BRIDGE/nbi/unit_cost.cfm</a><br><a href="http://www.virginia.dot.org/projects/resources/Staunton_plansummary_FINAL.pdf">http://www.virginia.dot.org/projects/resources/Staunton_plansummary_FINAL.pdf</a>   |
| Widen road approaching existing fee booths   |             |                     |  | \$475 per LF   | 740                                     | \$351,500 | \$456,950         | \$457,000  | <a href="ftp://ftp.dot.state.fl.us/LTS/CO/Estimates/CPM/summary.pdf">ftp://ftp.dot.state.fl.us/LTS/CO/Estimates/CPM/summary.pdf</a>   |  |
| Add pedestrian bridge.   |             |                     |  | 16 per SF bridge area  | 10,200                                  | 1,632,000 | 2,121,600         | \$1.5 to 3 million   | <a href="http://www.coa.unc.edu/ccds/bridge/precedent_summary.pdf">http://www.coa.unc.edu/ccds/bridge/precedent_summary.pdf</a>   |  |
| Widen approach road from existing fee booths to relocated fee booths   |             |                     |  | \$475 per LF   | 500                                     | \$237,500 | \$308,750         | \$309,000  | <a href="ftp://ftp.dot.state.fl.us/LTS/CO/Estimates/CPM/summary.pdf">ftp://ftp.dot.state.fl.us/LTS/CO/Estimates/CPM/summary.pdf</a>   |  |
| Would probably require an EIS.   |             |                     |  | Environmental Assessment   | \$400,000 ea                            | 1         | \$400,000         | \$400,000  | \$400,000   |  |
| VHB shows 12' shoulder from rt 13 to airport. This cost is consistent with VHB estimate.                       | 3           | EI 8                | Construct shoulders and additional emergency pull-off areas (as recommended in VHB Route 13 Corridor Study) on the Route 175.  | Add 12' right shoulder from Route 13 to Route 175 causeway             | \$600,000 per mi                        | 6.5       | \$3,900,000       | \$5,070,000  | \$5,070,000   | <a href="ftp://ftp.dot.state.fl.us/LTS/CO/Estimates/CPM/summary.pdf">ftp://ftp.dot.state.fl.us/LTS/CO/Estimates/CPM/summary.pdf</a><br><a href="http://www.fhwa.dot.gov/files/technology/GRSM-Stabilized-Grass-Pulloffs-report.pdf">and Route 13 Wallops Island Access management study, 2002</a>  |
| Add stabilized grass emergency pull-off areas every 1.5 miles from Route 13 to Route 175                       |             |                     |  | \$6,500 per pull off (585 sf)  | 8                                       | \$52,000  | \$67,600          | \$68,000   | <a href="http://www.fhwa.dot.gov/files/technology/GRSM-Stabilized-Grass-Pulloffs-report.pdf">http://www.fhwa.dot.gov/files/technology/GRSM-Stabilized-Grass-Pulloffs-report.pdf</a> |  |
| Very rough estimate -- is there anyone who might be able to verify this estimate?                              | 3           | TM 10               | Relocate fee booths east, further from the bridge, to provide additional storage capacity for queuing vehicles and to accommodate an express lane.   | Relocate fee booths (labor, equipment, utility relocation)             | \$25,000 ea                             | 1         | \$25,000          | \$32,500   | \$33,000  |  |
| Construct paved approach area 100 ft   |             |                     |  | \$10 per sf  | 10,000                                  | \$100,000 | \$130,000         | \$130,000  |   |  |
|  | 3           | PM 3                | Construct new parking lot for beach north of current lots, accessible by existing service road (requires environmental assessment). Site should be in a more protected area (limited severe weather impacts) with consideration for emergency access | Construct parking lot (1000 spaces)                                    | \$1,200 per space                       | 1,000     | \$1,200,000       | \$1,560,000  | \$1,560,000   | <a href="http://www.bicyclinginfo.org">http://www.bicyclinginfo.org</a><br><a href="http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/Transportation_Plans/Albemarle/Appendix-E_Cost_Estimates.pdf">http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/Transportation_Plans/Albemarle/Appendix-E_Cost_Estimates.pdf</a> |
| Environmental Assessment   |             |                     |  | \$400,000 ea   | 1                                       | \$400,000 | \$400,000         | \$400,000  |   |  |
|  | 3           | PM 5                | Reduce parking capacity at beach front lots.   | (Don't demolish or remove material)                                    | no cost                                 |           |                   |  |   |  |

APPENDIX F

Table F-7 (continued). Cost Estimates for Infrastructure and Facility Solutions.

| Questions/Assumptions  | Alternative | Solution Identifier | Project Description   | Cost Item  | Unit Cost (Labor, Materials, Equipment) |                   | Units  | Construction Cost | Fully loaded cost (1.3 multiplier for design, engineering, mgmt. Does not include contingency) | Rounded Full Cost | Reference(s)   |
|--|-------------|---------------------|---|--|---|-------------------|--------|-------------------|--|-------------------|--|
|  |             |                     |   |  |   |                   |        |                   |  |                   |  |
|  | 3           | BP 4                | Sidewalk improvements and/or construction along both sides of Maddox Blvd. to fill in gaps from Beach Road bridge to Chicken City Road (provide   | Sidewalk improvements: fill gaps                                   | \$50,000                                | per mi            | 0.5    | \$25,000          | \$32,500   | \$33,000          |  |
|  |             |                     |   | Sidewalk construction  | \$150,000                               | per mi (one side) | 0.5    | \$75,000          | \$97,500   | \$98,000          | <a href="http://ftp.dot.state.fl.us/ITS/CO/Estimates/CPM/summary.pdf">http://ftp.dot.state.fl.us/ITS/CO/Estimates/CPM/summary.pdf</a>  |
|  | 3           | BP 5                | Install crosswalks, pedestrian pushbuttons, and signals for pedestrians and bicycles to safely cross at signalized intersections on Maddox and Main Streets, Chicken City Road, Deep Hole Road. Consider No Right Turn on Red restrictions and leading pedestrian signal timing (giving pedestrians a head start for crossing). Add high visibility crosswalks and signage at the Chamber | Crosswalks   | \$3,500                                 | per 4-way         | 3      | \$10,500          | \$13,650   | \$14,000          | <a href="http://www.dot.state.fl.us/planning/policy/costs/costs-D3.pdf">http://www.dot.state.fl.us/planning/policy/costs/costs-D3.pdf</a><br><a href="http://safety.fhwa.dot.gov/intersection/resources/fhwasa09020/chap_3.cfm">http://safety.fhwa.dot.gov/intersection/resources/fhwasa09020/chap_3.cfm</a> |
|  |             |                     |   | Pedestrian signals   | \$11,000                                | per 4-way         | 3      | \$33,000          | \$42,900   | \$43,000          | <a href="http://www.dot.state.fl.us/planning/policy/costs/costs-D3.pdf">http://www.dot.state.fl.us/planning/policy/costs/costs-D3.pdf</a><br><a href="http://safety.fhwa.dot.gov/intersection/resources/fhwasa09020/chap_3.cfm">http://safety.fhwa.dot.gov/intersection/resources/fhwasa09020/chap_3.cfm</a> |
|  |             |                     |   | Signal retiming  | \$3,000                                 | ea                | 3      | \$9,000           | \$11,700   | \$12,000          | <a href="http://www.itsbenefits.its.dot.gov/its/benecost.nsf/0/5551ECB16B1BC9698525725F007A75D0">http://www.itsbenefits.its.dot.gov/its/benecost.nsf/0/5551ECB16B1BC9698525725F007A75D0</a>  |
|  | 4           | BP 6                | Widen Route 175 causeway to provide shoulders for bicycle lanes and emergency vehicle access in both directions.  | Widen road for shoulder + bike lane (excl. bridges). 12' each side | \$600,000                               | per mi            | 3.5    | \$2,100,000       | \$2,730,000  | \$2,730,000       | <a href="http://www.nysphysicalactivity.org/site.../6.../costdata/states_costest.xls">www.nysphysicalactivity.org/site.../6.../costdata/states_costest.xls</a>   |
|  |             |                     |   | Restripe 6" striping   | \$1.00                                  | per LF            | 36,960 | \$36,960          | \$48,048   | \$48,000          | <a href="http://www.aot.state.vt.us/ProgDev/Documents/LTF/ReportSharedUsePathandSidewalk021006/2_06costreport_FINAL.pdf">http://www.aot.state.vt.us/ProgDev/Documents/LTF/ReportSharedUsePathandSidewalk021006/2_06costreport_FINAL.pdf</a>  |
| Note: Chincoteague 2020 Transportation Plan assumes unit cost of about \$200,000/mi. This seems much too high. | 4           | BP 7                | Provide bike lanes along both sides of Maddox Blvd. to fill in gaps from Main Street to the Chamber of Commerce traffic circle (eliminate on-street parking).   | Re-stripe for bike lanes with durable pavement markings            | \$9,400                                 | per mi            | 1.1    | \$10,340          | \$13,442   | \$13,000          | <a href="http://www.aot.state.vt.us/ProgDev/Documents/LTF/ReportSharedUsePathandSidewalk021006/2_06costreport_FINAL.pdf">http://www.aot.state.vt.us/ProgDev/Documents/LTF/ReportSharedUsePathandSidewalk021006/2_06costreport_FINAL.pdf</a>  |
|  |             |                     |   | Post No Parking signs  | 250                                     | per sign          | 33     | \$8,297           | \$10,786   | \$11,000          | Shockoe Bottom, VA Transportation Plan 2020, Cost Estimates (2004).  |

APPENDIX F

Table F-8. Cost Estimates for ITS Solutions.

| Project Description   | Cost Item                                    | Unit Cost (Labor, Materials, Equipment) |            | Units | Construction Cost            | Fully loaded cost (1.3 multiplier for design, eng'g, mgmt. Does not inc.contingency) | Rounded Full Cost | Reference(s)   |
|---|--|---|------------|-------|------------------------------|--|-------------------|--|
| Parking management system: parking lot occupancy relayed to VMS near entrance station and downtown Chincoteague (1)   | Parking lot sensors                          | \$ 10,000                               | per site   | 1     | 10,000                       | 13,000   | \$ 13,000         | Smart Parking in Downtown DC (DC BID) <a href="http://www.downtowndc.org/programs/transportation/issue-briefs/number-1#description">www.downtowndc.org/programs/transportation/issue-briefs/number-1#description</a><br>San Jose's Parking Guidance System (Spencer) <a href="http://www.dksassociates.com/admin/paperfile/ITE-2001-PGS-Paper.pdf">http://www.dksassociates.com/admin/paperfile/ITE-2001-PGS-Paper.pdf</a><br>Detailed costs of the advanced parking management system operational test in St. Paul, MN, 2001 (RITA) <a href="http://www.itsbenefits.its.dot.gov/its/benecost.nsf/ID/F1112FA098133F3C85256DB100458923?OpenDocument&amp;Query=Capp">http://www.itsbenefits.its.dot.gov/its/benecost.nsf/ID/F1112FA098133F3C85256DB100458923?OpenDocument&amp;Query=Capp</a><br>Parking Systems Technologies (ITS Decision) <a href="http://www.calccit.org/itsdecision.serv_and_tech.Parking_Systems_Technologies/parking">www.calccit.org/itsdecision.serv_and_tech.Parking_Systems_Technologies/parking</a> |
|   | Parking lot controller                       | \$ 8,000                                | per site   | 2     | 16,000                       | 20,800   | \$ 21,000         |  |
|   | Variable Message Sign                        | \$ 20,000                               | per sign   | 2     | 40,000                       | 52,000   | \$ 52,000         |  |
|   | Power  | --                                      |            |       |                              |  |                   |  |
|   | Twisted pair cable                           | \$ 2                                    | per LF     | 9,300 | 18,600                       | 24,180   | \$ 24,000         |  |
|   | Software                                     | \$ 40,000                               | per system | 1     |                              | 40,000   | \$ 40,000         |  |
|   | Computer work station                        | \$ 2,000                                | per comp.  | 1     |                              | 2,000  | \$ 2,000          |  |
|   |  |   |            |       | <b>Parking System Total</b>  |  | <b>\$ 152,000</b> |  |
| Route 175 and 13: Variable message signs for incident management, traffic advisories, etc. (2)  | Full matrix variable message sign            | \$ 50,000                               | per sign   | 3     | 150,000                      | 195,000  | \$ 195,000        | TMC central hardware costs (RITA) <a href="http://www.itsbenefits.its.dot.gov/its/benecost.nsf/ID/47C7F45CDAF371EA852573E90068CF64?OpenDocument&amp;Query=Capp">http://www.itsbenefits.its.dot.gov/its/benecost.nsf/ID/47C7F45CDAF371EA852573E90068CF64?OpenDocument&amp;Query=Capp</a>  |
|   | Power  | --                                      |            |       |                              |  |                   |  |
|   | T1 communication to VDOT traffic mgmt center | \$ 15,000                               | per year   |       | -                            | -  | \$ 15,000         |  |
|   |  |   |            |       | <b>VMS Total</b>             |  | <b>\$ 210,000</b> |  |
| CCTV Traffic cameras on Rt 175 causeway (3)   | Camera, pole mount, cabinet, pull box        | \$ 25,000                               | per camera | 10    | 250,000                      | 325,000  | \$ 325,000        | Laredo TX Regional ITS Deployment Plan (2003) <a href="http://san-antonio.tamu.edu/4451/Laredo%20Regional%20ITS%20Deployment%20Plan.pdf">san-antonio.tamu.edu/4451/Laredo%20Regional%20ITS%20Deployment%20Plan.pdf</a><br><a href="http://san-antonio.tamu.edu/4451/LaredoDeploymentHandout.pdf">http://san-antonio.tamu.edu/4451/LaredoDeploymentHandout.pdf</a><br>TMC central hardware costs (RITA) <a href="http://www.itsbenefits.its.dot.gov/its/benecost.nsf/ID/47C7F45CDAF371EA852573E90068CF64?OpenDocument&amp;Query=Capp">www.itsbenefits.its.dot.gov/its/benecost.nsf/ID/47C7F45CDAF371EA852573E90068CF64?OpenDocument&amp;Query=Capp</a>  |
|   | Power  | --                                      |            |       |                              |  |                   |  |
|   | T1 communication to VDOT traffic mgmt center | \$ 15,000                               | per year   |       | -                            | -  | \$ 15,000         |  |
|   |  |   |            |       | <b>Rte 175 Cameras Total</b> |  | <b>\$ 340,000</b> |  |
| <b>NOTES:</b>   |  |   |            |       |                              |  |                   |  |
| (1) Assume existing power lines can be used and cable can run through existing conduit.   |  |   |            |       |                              |  |                   |  |
| (2) Assumes one sign in each direction on Rte 13 approaching 175 and one sign on 175 approaching the causeway; existing power lines and transmission lines can be used  |  |   |            |       |                              |  |                   |  |
| (3) Assume cameras are spaced 2000 feet apart on Route 175; existing power lines and transmission lines can be used. Also, TrafficLand does not install cameras or communications lines. They host traffic camera video so that agencies that have traffic camera systems can get it onto the web for internal or public use. TrafficLand reserves the right to sell the video to news outlets. |  |   |            |       |                              |  |                   |  |

## APPENDIX F

### Cost Estimates for Transit Solutions.

#### SUMMARY

- Bicycle rack modification of existing trolleys (3): \$5000 (may be additional costs to fit to trolley)
- New alternative fuel vehicles with bicycle racks (2):
- \$800,000 (\$200-400,000 per vehicle depending on size and alt fuel)
- \$3,000 for bicycle racks
- Revised green route: no cost savings or extra expenses (same hours, slightly shorter route)
- Weekend extension of Green Route (May and September weekends/holidays only): \$15,000-25,000/year
- Permanent extension of Green Route (May through September weekends/holidays only): \$35,000-50,000/year

#### METHODOLOGY

##### Capital Costs

##### **Bicycle rack modification of existing trolleys (3)**

*Methodology:* market/web research

*Results:*

- Several systems with bike racks on trolleys (Tahoe Area Transit Authority; Elkhart, IN; Charlottesville, VA; Cape Cod RTA; Williamsburg, VA)
- No cost estimates available for trolley bike racks (could pursue and call leads)
- Cost estimate for bus-mounted racks: \$1400 per rack; add 20% to cover planning and contract management; may be additional costs to modify racks to fit trolleys

*Sources:*

- (\$1600/ bus mounted rack) <http://www.sacog.org/regionalfunding/fundingprograms/pdf/2008/winners/YOLOBUS.pdf>
- (\$1000/ bus mounted rack) <http://lscs.com/projects/ridgecrest/final/Appendix%20E.pdf>
- (\$1400/ bus mounted rack) <http://www.onmilwaukee.com/buzz/articles/busbikeracks.html>



<http://www.williamsburgva.gov/index.aspx?recordid=767&page=273>

**New alternative fuel vehicles with bicycle racks (2)**

Methodology: market/web research; GSA; previous work; see memo by Gabe Lopez-Bernal for NEBE:  
[\\Vfs998\publiclands\NPS\NPS-NERO\\_Projects\NEBE\memos\MEMORANDUM\\_DRAFT\\_v5.doc](\\Vfs998\publiclands\NPS\NPS-NERO_Projects\NEBE\memos\MEMORANDUM_DRAFT_v5.doc)

- Would not recommend propane or CNG
- Hybrid Electric: \$200-400,000
- Hydrogen cell: \$600,000
- Electric: \$20,000 for small 15-passenger/ \$300,000 for larger 22-passenger
- Clean diesel: \$200-300,000

## APPENDIX F

### **Operations Costs**

#### *Methodology:*

- Calculate existing cost per vehicle mile/hour (see cost info below) and then calculate new costs
- Examine National Transit Database for comparables.

#### **EXISTING CHINCOTEAGUE ROUTES** (see

[\\Vfs998\publiclands\FWS\Chincoteague\\_Study\Data\\_and\\_Analysis\transportation\Trolley\Town\\_Brochure.pdf](\\Vfs998\publiclands\FWS\Chincoteague_Study\Data_and_Analysis\transportation\Trolley\Town_Brochure.pdf))

#### ***Red Route***

- 9.1 miles (round-trip), 27 minutes, 22 stops round-trip (3 overlap stops)
- (alternating 8.5 miles, 21 stops round trip?)
- 75 days of service
- 5:25-9:38pm (~4 hours): 300 hours total
- Frequency ~30 min
- 9 trips/day?
- <http://snurl.com/t804r>

#### ***Green Route***

- 8.8 miles (round-trip), 26 minutes, 22 stops round-trip (1 overlap stop)
- 95 days of service
- 5:02-10:25pm (~5.5 hours) except July 4 (5pm-12am), 29 (3pm-12am), 30 (8am-1pm) and 31 (6am-1pm), and Oct 10 (10am-11pm): 536.5 hours total
- Frequency ~30 minutes
- 11 trips/day?
- <http://snurl.com/t804z>
- Total hours (approximate): 836.5
- Total miles (approximate – hours x 2 trips/hour x 9 miles): 15,075

#### ***Trolley Budget (FY10)***

- Fund 70 - Trolley
- Trolley Grants \$ 47,900
- Program Income \$ 7,500
- Transfer from General Fund \$ 20,000
  
- *Total Fund 70 \$ 75,400*

#### ***Trolley Expenses (FY10)***

- Salaries \$ 33,000
- Benefits: Social Security \$ 2,500
- Expenses
- Insurance & Bonding \$ 900
- Signs/Printing/Advertising \$ 5,000
- Fuel \$ 8,000
- Equipment Repairs/Maintenance \$ 9,000
- Other Expenses \$ 5,000

## APPENDIX F

- Rent \$ 12,000
- Subtotal \$ 39,900
- Total \$ 75,400
- **Cost per hour: \$90.14**
- **Cost per mile: \$5**

### NEW ROUTES

#### *Revised Green Route*

- From Community Center to HS (via Hallie Wealton Drive), then along Main Street to Bunting, then up Ridge Road to Maddox, and to Oyster Museum and back via Deep Hole Road to the Community Center. 7.5 miles (round-trip) / 22 minutes. Assume same hours and frequency as above.
- <http://snurl.com/t8057r>
- *Reduction in miles of 1.5 per trip (1,609 miles total) but no reduction in time so no savings. Cost neutral.*

#### *Weekend extension pilot of Green Route*

- May and September weekends and holidays 9am-5pm (for FY10, 11 days in May, 9 days in Sept). Route extends beyond Oyster Museum down Maddox Boulevard to Beach Road to beach and then back. 13.8 miles (round-trip) / 40 minutes. Same hours and frequency as above? Would require 2 trolleys (so 3 in operation at once – one for Red, two for Green).
- <http://snurl.com/t805d>
- *Additional 160 hours, 4416 miles or \$14,500-22,000.*
- Weekend extension permanent of Green Route: May through September weekends and holidays (for FY10, 47 days).
- *Additional 376 hours, 10378 miles or \$34,000-52,000.*

APPENDIX F

Table F-9. Alternative 1 Assessment.

| Transportation Status Quo    |   | Protection and conservation of natural, historic, and cultural resources | Optimization of the transportation system's operational efficiency to improve visitor mobility, safety, and accessibility | Sustainability of transportation system, to minimize congestion and pollution | Improvement of the visitor experience, in particular the understanding and appreciation of fish and wildlife resources | Financial sustainability | Fostering and sustaining partnerships | Consequences   |
|------------------------------|---|--|---|---|--|--------------------------|---------------------------------------|--|
| Engineering / Infrastructure | Lack of consistent pavement markings to indicate travel lanes, shoulders, and parking on Maddox Blvd and Main Street.   | 2  | 2   | 2   | 2  | 2                        | 2                                     | Less efficient multi-modal travel, safety problems   |
|                              | No shelters on the beach for emergencies/storms   | 2  | 1   | 2   | 2  | 2                        | 2                                     | Exposure, especially for visitors accessing the beach via transit and bike/ped. Barrier to people using transit and non-motorized modes. |
|                              | Beach Road Bridge lacks bypass capability to easily accommodate transit vehicles and emergency vehicles.  | 1  | 1   | 2   | 2  | 2                        | 2                                     | Emergency response delays during congested conditions. Limitation of transit opportunities due to delays.                                |
|                              | Route 175: Lack of shoulders and emergency pull-off areas (as recommended in VHB Route 13 Corridor Study) on Route 175. Lack of signage for Queens Sound turn. Lack of speed control interventions. Lack of real time traffic/emergency monitoring. | 2  | 1   | 2   | 2  | 2                        | 2                                     | Unsafe road conditions. Emergency response difficulties. Poor access for bicycles/pedestrians.   |
|                              | Lack of siren notification system at CNWR beach for emergency evacuation and/or storm warnings.   | 2  | 1   | 2   | 2  | 2                        | 2                                     | Lack of advanced warning. Exposure of visitors. Mass exodus resulting in congestion and traffic delays.                                  |
|                              | Limited handicapped accessibility at CNWR beach   | 2  | 2   | 2   | 2  | 2                        | 1                                     | Poor public perception. Negative visitor experience.   |
| Traffic Management           | No off-site pass purchasing; no provision at fee booths for pre-purchases.  | 2  | 2   | 2   | 2  | 2                        | 1                                     | Lack of promotion; inconvenience; booth delays.  |
|                              | Limited traffic management measures, special event and peak weekend traffic routing using variable message signs.   | 2  | 1   | 1   | 2  | 2                        | 2                                     | Increased congestion; negative visitor experience; air quality impact.   |
|                              | No pre-trip planning information on fees, peak beach visitation times (no website, 800 number)  | 2  | 1   | 2   | 2  | 2                        | 1                                     | Exacerbates congestion at peak times. Delays at fee booths.  |
|                              | Poor real time traffic/parking information over existing CNWR AM radio, FM radio, website, and other ITS features.  | 1  | 1   | 1   | 2  | 2                        | 1                                     | No notification system for full beach parking lots. Results in traffic delays, visitor frustration, increased emissions, and congestion. |
|                              | CNWR emergency notification is on a case-by-case basis.   | 2  | 1   | 2   | 2  | 2                        | 2                                     | Response by CNWR staff is labor and time intensive. Coordination may be difficult.   |
|                              | Available CNWR maps do not clearly show parking locations, shelters, handicapped facilities, and emergency evacuation procedures.   | 2  | 2   | 2   | 2  | 2                        | 2                                     | Delays at the fee booths. Extra driving in the Refuge; poor visitor experience.  |

APPENDIX F

Table F-9 (continued). Alternative 1 Assessment.

| Transportation Status Quo      |   | Protection and conservation of natural, historic, and cultural resources | Optimization of the transportation system's operational efficiency to improve visitor mobility, safety, and accessibility | Sustainability of transportation system, to minimize congestion and pollution | Improvement of the visitor experience, in particular the understanding and appreciation of fish and wildlife resources | Financial sustainability | Fostering and sustaining partnerships | Consequences   |
|--------------------------------|---|--|---|---|--|--------------------------|---------------------------------------|--|
| Parking and Parking Management | Existing unpaved beach parking lots.  | 1  | 1   | 1   | 2  | 1                        | 2                                     | Storm damage annually. Long term shoreline changes may result in loss of the parking lots.   |
|                                | No designated offsite beach parking .   | 1  | 1   | 1   | 2  | 2                        | 2                                     | No parking options during summer peak days or when beach lot capacity is reduced due to severe weather. Limits potential of transit into the Refuge.                     |
| Bicycles and Pedestrians       | Gaps in bike trails and lanes, in particular between the Town of Chincoteague and CNWR.                       | 2  | 1   | 1   | 1  | 2                        | 2                                     | Unsafe conditions. Barrier to bicycle use.   |
|                                | Sidewalk gaps on main Town thoroughfares. Lack of crosswalks, pedestrian signals at signalized intersections. | 2  | 1   | 1   | 2  | 2                        | 2                                     | Unsafe conditions. Barrier to pedestrian use.  |
|                                | Poorly developed bicycle maps and signage, and limited distribution of educational outreach materials         | 2  | 1   | 2   | 2  | 2                        | 2                                     | Unsafe behavior. Barrier to bicycle use.   |
| Transit                        | No transit service to CNWR.   | 1  | 1   | 1   | 1  | 2                        | 1                                     | No mitigation of beach traffic congestion. No alternative access to beach or other Refuge sites, in particular when beach lot capacity is reduced or when lots are full. |
|                                | Trolleys do not accommodate bicycles or other recreational gear.  | 1  | 1   | 1   | 1  | 2                        | 1                                     | Barrier to bicycle use and potential of transit to beach.  |
|                                | Current transit routes overlap and are long and circuitous.   | 2  | 1   | 1   | 2  | 1                        | 2                                     | Discourages ridership.   |
| <b>Score</b>                   |   | 1.7  | 1.2   | 1.6   | 1.9  | 1.9                      | 1.7                                   |  |

Table F-10. Alternative 2 Assessment.

| Transportation Solutions    |      |   | Protection and conservation of natural, historic, and cultural resources | Optimization of the transportation system's operational efficiency to improve visitor mobility, safety, and accessibility | Sustainability of transportation system, to minimize congestion and pollution | Improvement of the visitor experience, in particular the understanding and appreciation of fish and wildlife resources | Financial sustainability | Fostering and sustaining partnerships | Consequences   |
|-----------------------------|------|---|--|---|---|--|--------------------------|---------------------------------------|--|
| Engineering/ Infrastructure | EI 1 | Provide consistent pavement markings to indicate travel lanes, shoulders, and parking on Maddox Blvd and Main Street.   | 2  | 4   | 2   | 3  | 2                        | 4                                     | Best transportation practice. Minimal added O/M cost.  |
|                             | EI 2 | On Route 175, install signage to indicate turning vehicles at Queens Sound.   | 2  | 4   | 2   | 2  | 2                        | 5                                     | Important safety item; does not affect other criteria. Low initial cost. Very low to zero added O/M cost.                                |
|                             | EI 3 | Eliminate passing zones on the Route 175 causeway.  | 2  | 4   | 2   | 2  | 2                        | 4                                     | Important safety item; does not affect other criteria. Low initial cost. Minimal added O/M cost.   |
|                             | EI 4 | Install center lane and shoulder rumble strips along Route 175 causeway.  | 2  | 4   | 2   | 2  | 2                        | 3                                     | Important safety item; does not affect other criteria. New road feature may add significant O/M cost.                                    |
|                             | EI 5 | Improve handicapped accessibility through several interventions such as: install ADA matting to designate handicapped parking in beach parking lots, re-introduce a removable beach ramp to provide improved access to wheelchair users.                            | 2  | 3   | 2   | 4  | 2                        | 4                                     | Modest improvement has significant VE benefit at low initial cost and minor added O/M cost (install/remove each year).                   |
| Traffic Management          | TM 1 | Provide off-site pass purchasing at public nodes (e.g., Chamber of Commerce, Virginia Welcome Center).  | 2  | 3   | 3   | 3  | 3                        | 3                                     | Modest transportation benefit; quicker more efficient transactions for visitors. Some new admin, accntg, and tech burden for CNWR staff. |
|                             | TM 2 | Provide pre-trip planning information on fees, peak beach visitation times, and options for beach access (including handicapped) through CNWR and other partner websites, and an 800 number.  | 2  | 4   | 4   | 4  | 3                        | 5                                     | Minimal burden; yearly or so updates   |
|                             | TM 3 | Provide pre-trip planning information on fees, peak beach visitation times, and options for beach access (including handicapped) at kiosk at the Virginia Welcome Center and other locations.   | 2  | 3   | 3   | 4  | 3                        | 5                                     | Modest item and modest benefit. Minimal O/M burden --> yearly updates likely required.   |
|                             | TM 4 | Use existing CNWR AM radio frequency to deliver standard messages and updated traffic/parking information.  | 2  | 4   | 3   | 4  | 2                        | 3                                     | Good traffic/parking info outlet. New activity and CNWR staff burden. No new partnership.  |
|                             | TM 5 | Continue use of local FM radio station to deliver standard messages and updated traffic/parking information.  | 2  | 4   | 3   | 4  | 4                        | 3                                     | Good traffic/parking info outlet. New activity by CNWR staff. High potential for enhanced partnership.                                   |
|                             | TM 6 | Implement siren notification system in CNWR (including speakers at the beach) for emergency evacuation and/or storm warnings.   | 2  | 5   | 2   | 2  | 2                        | 4                                     | Important safety item; no transportation or visitor experience benefit. Initial cost to put in place and low O/M costs to follow.        |
|                             | TM 7 | Improve directional and informational signage at specific points on Chincoteague to supplement CNWR maps (e.g., Route 175 causeway/ Maddox Boulevard intersection, Chamber of Commerce rotary, Beach Road at CNWR rotary and after fee booths).                     | 3  | 3   | 3   | 3  | 3                        | 5                                     | Modest effort w/co-applicants. Modest benefits. Low initial cost and negligible running costs.   |
|                             | TM 8 | Designate one booth for pre-purchased passes.   | 3  | 3   | 3   | 3  | 2                        | 5                                     | Reduces congestion at entrance. Low cost CNWR action.  |
|                             | TM 9 | Create simple map for distribution at fee booths which clearly shows all destinations, parking locations and shelters. Identify additional important notices including handicapped facilities, bicycling etiquette in the park and emergency evacuation procedures. | 3  | 3   | 3   | 4  | 2                        | 4                                     | Modest reductions in congestion and driving times in CNWR. Inexpensive, and similar to existing CNWR activity.                           |

APPENDIX F

Table F-10 (continued). Alternative 2 Assessment.

| Transportation Solutions       |      |   | Protection and conservation of natural, historic, and cultural resources | Optimization of the transportation system's operational efficiency to improve visitor mobility, safety, and accessibility | Sustainability of transportation system, to minimize congestion and pollution | Improvement of the visitor experience, in particular the understanding and appreciation of fish and wildlife resources | Financial sustainability | Fostering and sustaining partnerships | Consequences   |
|--------------------------------|------|---|--|---|---|--|--------------------------|---------------------------------------|--|
| Parking and Parking Management | PM 1 | Provide designated area in existing beach parking lots for small motorized vehicles, including motorcycles, scooters and electric carts. Include storage lockers (could be used for bicyclists also).   | 4  | 3   | 2   | 2  | 3                        | 5                                     | Encourages smaller vehicle use. Very low cost. Encourages partnership w/rental vendors and other Town intities.  |
|                                | PM 2 | Add parking lot information to CNWR map and other online and print materials.   | 3  | 3   | 3   | 3  | 2                        | 5                                     | Modest solution with modest benefits. Negigible costs.   |
| Bicycles and Pedestrians       | BP 1 | Construct trail between the NPS bridge and the Chamber of Commerce traffic circle.  | 5  | 5   | 4   | 3  | 5                        | 3                                     | Strong inducement of new riders and walkers, with high related benefits. Good for partnering with many entities in Town. Some added O/M cost for CNWR trail work.  |
|                                | BP 2 | Develop improved bicycle maps (Town and CNWR), signage (e.g., "Share the road"), and educational outreach materials in partnership with the Town of Chincoteague and bicycle rental companies, to be distributed by lodging and other businesses in Chincoteague.                             | 3  | 4   | 3   | 3  | 5                        | 4                                     | Modest inducement of new riders, and modest environmental benefit. Good for partnering with many entities in Town. Low repeating cost to keep map up to date.  |
| Transit                        | TR 1 | Shorten the existing green Pony Express Route to route that goes from Community Center to HS (via Hallie Wealton Drive), then along Main Street to Bunting, then up Ridge Road to Maddox, and to Oyster Museum and back via Deep Hole Road to the Community Center. Red route stays the same. | 2  | 3   | 4   | 3  | 4                        | 2                                     | Potential long run benefit is high, especially for getting visitors to non-beach sites in CNWR. Depending on implementation and alteration of existing service routes, O/M cost increase could be minimal. |
|                                | TR 2 | Extend the route above as a pilot for May and September (weekends and holidays only, 9am-5pm or so) to sites within the Refuge: Wildlife Loop/Lighthouse, FWS VC, NPS VS/Beach. No new vehicles required.   | 3  | 3   | 3   | 4  | 3                        | 4                                     | Modest effect on increasing bike/ped use and fostering partnerships with vendors.  |
|                                | TR 3 | Implement a commercial special use permit for beach equipment concessions at beach (umbrellas, chairs, etc.) to provide gear for visitors who access beach by bicycle or walking.   | 3  | 3   | 3   | 3  | 5                        | 3                                     | Easy to do. New partnership. Better opportunities for bikes/peds.  |
| <b>Score</b>                   |      |   | 2.6  | 3.6   | 2.8   | 3.1  | 2.8                      | 4.0                                   |  |

APPENDIX F

Table F-11. Alternative 3 Assessment.

| Transportation Solutions   |       | Protection and conservation of natural, historic, and cultural resources   | Optimization of the transportation system's operational efficiency to improve visitor mobility, safety, and accessibility | Sustainability of transportation system, to minimize congestion and pollution | Improvement of the visitor experience, in particular the understanding and appreciation of fish and wildlife resources | Financial sustainability | Fostering and sustaining partnerships | Consequences |   |
|----------------------------|-------|--|---|---|--|--------------------------|---------------------------------------|--------------|---|
| Engineering/Infrastructure | EI 6  | Construct shelters on the beach for emergencies/storms for visitors accessing the beach via transit and bike/ped.  | 2   | 4   | 2  | 2                        | 3                                     | 2            | Important safety feature no matter which alternative is chosen.   |
|                            | EI 7  | Reconfigure Assateague Channel Bridge for three vehicle lanes, for transit vehicles and emergency vehicle access, and build new ~12-foot wide bridge to provide bicycle/pedestrian access into CNWR; includes widening Beach Road between bridge and fee booths at current or re-located site. | 1   | 5   | 3  | 3                        | 3                                     | 2            | Expensive project with substantive access and safety benefits, ONLY if congestion related to beach parking lots persists.         |
|                            | EI 8  | Construct shoulders and additional emergency pull-off areas (as recommended in VHB Route 13 Corridor Study) on the Route 175 Causeway.   | 1   | 4   | 3  | 2                        | 3                                     | 2            | Substantive safety and access benefits no matter which alternative is chosen.   |
| Traffic Management         | TM 10 | Relocate fee booths east, further from the bridge, to provide additional storage capacity for queuing vehicles and to accommodate an express lane.   | 1   | 4   | 3  | 3                        | 2                                     | 2            | Some safety and access benefit, but ONLY if in conjunction with widening of beach Road.   |
|                            | TM 11 | Provide real-time information on beach parking availability through variable message signs at the Chamber of Commerce traffic circle and the small rotary before Beach Road bridge, using data obtained from vehicle detectors   | 3   | 4   | 3  | 3                        | 3                                     | 3            | Substantive access and safety benefits in all alternatives; traffic management relates mostly to beach parking lot overflow days. |
|                            | TM 12 | Provide detailed information for visitors at hotels, campgrounds and the Chamber of Commerce on peak visitation times, options for beach access, and real-time information on beach parking/traffic conditions (likely via website).   | 2   | 4   | 3  | 3                        | 3                                     | 4            | Sensible, cheap, and effective in all cases.  |
|                            | TM 13 | Install cameras to monitor traffic on the Route 175 causeway for improved incident management.   | 2   | 4   | 3  | 2                        | 5                                     | 3            | Safety benefits for Town and County, with much of the O/M burden borne by VDOT and TrafficLand                                    |
|                            | TM 14 | Implement special event and peak weekend traffic routing using variable message signs and/or traffic signal timing in response to real-time traffic conditions.  | 3   | 3   | 3  | 3                        | 3                                     | 4            | Ancillary benefit from TM 11, for small number of days each year.   |

Table F-11 (continued). Alternative 3 Assessment.

| Transportation Solutions       |      | Protection and conservation of natural, historic, and cultural resources  | Optimization of the transportation system's operational efficiency to improve visitor mobility, safety, and accessibility | Sustainability of transportation system, to minimize congestion and pollution | Improvement of the visitor experience, in particular the understanding and appreciation of fish and wildlife resources | Financial sustainability | Fostering and sustaining partnerships | Consequences |   |
|--------------------------------|------|---|---|---|--|--------------------------|---------------------------------------|--------------|---|
| Parking and Parking Management | PM 3 | Construct new parking lot for beach north of current lots, of similar or reduced capacity, accessible by existing service road (requires environmental assessment). Site should be in a more protected area (limited severe weather impacts) with consideration for emergency access and shelter. | 2   | 2   | 2  | 2                        | 5                                     | 2            | Similar to status quo parking management. High environmental impact to be addressed in CCP. O/M costs may decline.  |
|                                | PM 4 | Provide drop-off area for gear and people at beach parking lots. Driver would then return to satellite parking lot and bicycle or take a shuttle back to the beach (also consider in design for new lot).   | 2   | 2   | 2  | 3                        | 5                                     | 2            | Small bore project with minor traffic and parking management benefits   |
|                                | PM 5 | Reduce parking capacity at beach front lots.  | 4   | 1   | 1  | 1                        | 5                                     | 1            | This is the parking management premise for Alternative 3.   |
|                                | PM 6 | Close Assateague Island to personal vehicles during peak hours during peak season (July and August weekends, 10 am to 2 pm).  | 4   | 3   | 3  | 2                        | 5                                     | 1            | Makes sense with reduced parking capacity condition and would be most effective with good real-time parking data and a flexible approach.   |
|                                | PM 7 | Designate existing community and public parking lots for peak seasonal beach parking, to be serviced by shuttle. Parking lots could include the parking lots at the Chincoteague Center and Town Hall, the High School, and the Elementary School.  | 4   | 4   | 4  | 3                        | 4                                     | 5            | Most effective short term solution: quickly increases capacity without any new infrastructure and does so with coordination and partnership with co-applicants and other stakeholders |
|                                | PM 8 | Implement ITS system to track real-time beach parking lot occupancy and feed into variable message signs.   | 4   | 4   | 4  | 3                        | 3                                     | 4            | Essential to the success of many other PM and TM solutions.   |

Table F-11 (continued). Alternative 3 Assessment.

| Transportation Solutions |      |   | Protection and conservation of natural, historic, and cultural resources | Optimization of the transportation system's operational efficiency to improve visitor mobility, safety, and accessibility | Sustainability of transportation system, to minimize congestion and pollution | Improvement of the visitor experience, in particular the understanding and appreciation of fish and wildlife resources | Financial sustainability | Fostering and sustaining partnerships | Consequences  |
|--------------------------|------|---|--|---|---|--|--------------------------|---------------------------------------|---|
| Bicycles and Pedestrians | BP 3 | Construct trail between the end of the Black Duck Trail and the beach to provide safe bicycle and walking paths in CNWR.  | 4  | 4   | 3   | 4  | 4                        | 3                                     | Bicycling solutions enhance CNWR use year round, especially access to trails and interpretative sites   |
|                          | BP 4 | Sidewalk improvements and/or construction along both sides of Maddox Blvd. to fill in gaps from Beach Road  | 2  | 4   | 3   | 3  | 4                        | 2                                     | The effect of BP 4 and 5 would be most beneficial for businesses and residences along Maddox, providing safe, attractive pedestrian access. They would also encourage more bike/ped access into CNWR. |
|                          | BP 5 | Install crosswalks, pedestrian pushbuttons, and signals for pedestrians and bicycles to safely cross at signalized intersections on Maddox and Main Streets, Chicken City Road, Deep Hole Road. Consider No Right Turn on Red restrictions and leading pedestrian signal timing (giving pedestrians a head start for crossing). Add high visibility crosswalks and signage at the Chamber of Commerce traffic circle. | 2  | 4   | 3   | 4  | 4                        | 2                                     |   |
| Transit                  | TR 4 | Create permanent daytime service into CNWR from May through September, weekends and holidays only. This route will serve any new satellite parking areas. No new vehicles required.   | 4  | 5   | 5   | 4  | 2                        | 5                                     | Pragmatic extension of existing trolley service for busiest days of the year; pairs with PM 7 as an inexpensive and sensible expansion of parking capacity  |
|                          | TR 5 | Modify existing Pony Express vehicles to add bicycle racks, and accommodation for other gear  | 3  | 3   | 3   | 3  | 4                        | 3                                     | Simple and cheap way to encourage more bicycle use, especially from campgrounds at south end of Chincoteague  |
| Score                    |      |   | 2.3  | 3.1   | 2.5   | 2.4  | 3.2                      | 2.4                                   |   |

APPENDIX F

Table F-12. Alternative 4 Assessment.

| Transportation Solutions       |      |   | Protection and conservation of natural, historic, and cultural resources | Optimization of the transportation system's operational efficiency to improve visitor mobility, safety, and accessibility | Sustainability of transportation system, to minimize congestion and pollution | Improvement of the visitor experience, in particular the understanding and appreciation of fish and wildlife resources | Financial sustainability | Fostering and sustaining partnerships | Consequences  |
|--------------------------------|------|---|--|---|---|--|--------------------------|---------------------------------------|---|
| Engineering/ Infrastructure    | EI 9 | Widen Route 175 causeway to provide shoulders for bicycle lanes and emergency vehicle access in both directions.  | 1  | 5   | 4   | 2  | 3                        | 3                                     | Big safety benefit. Encourages touring bikers to visit area.  |
| Parking and Parking Management | PM 8 | Construct new parking structure off-site, probably in the Town of Chincoteague, with shuttle service to the beach.  | 4  | 3   | 4   | 2  | 2                        | 4                                     | Critical element, along with satellite parking (PM ), to remove beach lots and restore habitat. Also requires strong partnerships.                                      |
| Bicycles and Pedestrians       | BP 6 | Provide bike lanes along both sides of Maddox Blvd. to fill in gaps from Main Street to the Chamber of Commerce traffic circle (eliminate on-street parking).             | 2  | 4   | 4   | 3  | 4                        | 4                                     | Completes bike connection between downtown area and CNWR and among all Maddox Blvd. businesses. Big boost for bike use and business partnerships.                       |
| Transit                        | TR 6 | Include the parking garage in Green route.  | 3  | 3   | 4   | 3  | 5                        | 4                                     | Formalizes TR 4 and is essential to success of garage and other parking management issues. Adds opportunity for interpretation of CNWR resources, onboard the vehicles. |
|                                | 7    | Purchase new vehicles (2) for service to CNWR and ASIS sites. Should consider alternative fuel vehicle equipped with bicycle racks that can accommodate gear more easily. | 4  | 3   | 4   | 3  | 3                        | 4                                     | New vehicles would not affect transit service particulars, but are excellent "green" assets in terms of pollution prevention, carbon footprint, and public education    |
| <b>Score</b>                   |      |   | <b>2.8</b>   | <b>3.6</b>  | <b>4</b>  | <b>2.6</b>   | <b>3.4</b>               | <b>3.8</b>                            |   |