II. ALTERNATIVES CONSIDERED

SR 1, Little Heaven Grade Separated Intersection Project
Environmental Assessment / Section 4(f) Evaluation

U.S. Department of Transportation
Federal Highway Administration

Delaware Department of Transportation

II. ALTERNATIVES CONSIDERED

This section describes the history of the project, alternatives development and the public involvement. A detailed description and figures for each alternative are provided along with a summary of the environmental impacts and an evaluation of how well each alternative meets the purpose and need.

A. Project History and Public Involvement

The Little Heaven Grade Separated Intersection Project was identified as part of DelDOT's SR 1 CCPP. The program began as DelDOT policy in 1992 and was made into law in 1996 with the intent to preserve the capacity of existing transportation facilities rather than build new facilities on new alignments. In 1998, ten locations were identified along the SR 1/SR 113 corridor that will require improvements to the roadway in order to preserve the capacity of the facility. The Little Heaven / SR 1 area was one of these project locations identified and presented in Public Workshops in 1998. More information about the CCPP can be obtained by visiting: http://www.deldot.gov/information/pubs_forms/brochures/pdf/ccpp_fyi.pdf.

The Little Heaven Grade Separated Intersection Project began in August 25, 2003. DelDOT originally developed Alternatives A (**Figure II-2**) and B (**Figure II-3**). These alternatives were shown at a Public Workshop on February 23, 2004 and included a bridge structure north of Mulberrie Point Road. Concerns arose among residents about the separation of the community and a lack of interconnectivity between the eastern and western sides of Little Heaven. The Bower's Beach, Frederica and Magnolia Fire Companies also had concerns about emergency access to the Little Heaven area. In addition, the location of the bridge crossing in the vicinity of Mulberrie Point Road was close to several wetlands and would result in several wetland impacts. Based on the need to reduce wetland impacts and to respond to the concerns raised by the residents and local fire companies, Alternatives C (**Figure II-4**), D (**Figure II-5**), E (**Figure II-6**) and F (**Figure II-7**) were developed and presented to the public at a workshop held on July 20, 2004.

Alternatives C, D, and E involved moving the bridge structure to the Bower's Beach Road intersection. The existing intersection at Bower's Beach Road will remain, but SR 1 will pass over the intersection on a bridge structure. There are variations on local access, notably in the vicinity of the Tara subdivision, which is located off of northbound SR 1 at the intersection of Mulberrie Point Road. Alternative F (**Figure II-7**) located the bridge structure and the Bower's Beach Road intersection further south than the other alternatives to reduce the visual impact of the bridge to the historic Jehu Reed House.

Alternatives C, D, E and F all include the extension of the project southward to Barratt's Chapel Road. A new tie-in between Barratt's Chapel Road and the western service road is provided, resulting in the closure of the median crossover located at Barratt's Chapel Road. This avoids an unsafe situation of having several conflicting movements happening in the same area.

The selection of Alternative C as the Preferred Alternative was based on the balance of the concerns of all parties involved and based on how well it met the Purpose and Need of the project better than other alternatives. It also took into account input from residents, local fire companies, and state and federal natural and cultural resource agencies. The Preferred

Alternative was presented to the public at the July 20, 2004 and October 26, 2004 workshops. Later that year the project was placed on-hold due to budgetary constraints. The project would not resume again until 2007.

During the period the project was on hold several new development proposals were approved resulting in the project team having to make refinements to the design of Preferred Alternative C to accommodate new traffic movements and provide service road connectivity for proposed developments. At the July 16, 2008 public workshop, the project team presented refinements developed for Preferred Alternative C.

Throughout the history of the development of this project, DelDOT has coordinated closely with federal and state environmental and regulatory agencies and the Federal Highway Administration. The public workshops provided a forum for interaction with the local residents and business owners and emergency service providers and their input was crucial to selection of the Preferred Alternative C with refinements.

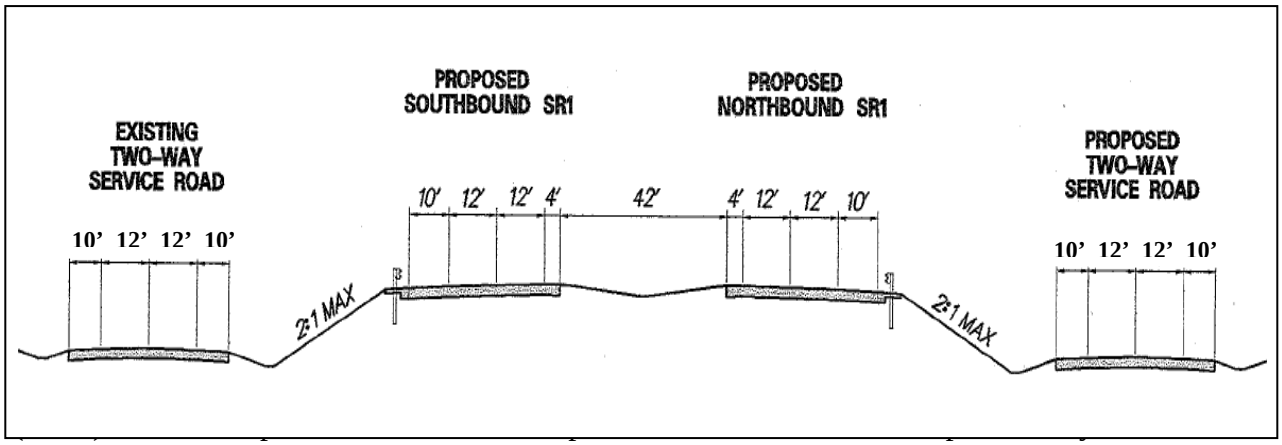
B. Description of Alternatives

Six build alternatives were developed, Alternatives A through F. A No-Build Alternative was also considered which assumed no substantial improvements other than normal maintenance would be made to the transportation network within the project area. Public Workshops were held throughout the project development process to allow the public to review and comment on the alternatives. The public workshops were held on July 17, 1996, October 21, 1998, January 6, 2004, July 20, 2004, October 26, 2004 and July 16, 2008.

1. Typical Cross Section for the Build Alternatives

Each build alternative proposes to reconstruct SR 1 to a four lane divided, access controlled freeway consisting of 2, 12 foot travel lanes in each direction with 10 foot outside shoulders and 4 foot inside shoulders. A 42 foot open grass median would separate the northbound and southbound lanes. Two-way service roads on the northbound and southbound (existing) of SR 1 would provide access to properties and public streets. The typical cross section for the two-way service roads consists of 2, 12 foot lanes (one in each direction) and 10 foot shoulders on both sides of the roadway as shown in **Figure II-1**.

Figure II-1: Typical Section for Proposed Build Alternatives



A design speed of 60 MPH was applied to SR 1. In the proposed designs, a grade separation elevates 23 feet above existing SR 1 to allow for the required clearance of 16 feet - 6 inches after

construction of the bridge. The maximum grade for any road or ramp that has been adopted for use on the SR 1 CCP Program is five percent. Acceleration and deceleration lanes on SR 1 and Clapham Road were included in the preliminary alternatives. The various lane design capacities for each alternative were based on design speed and projected traffic volumes on both SR 1 and Clapham Road. Sidewalks would be maintained along the existing service road where they currently exist. Sidewalks would be provided at existing locations. New sidewalks would be constructed by developers as new developments come into the area.

2. Description of Build Alternatives

a. Alternative A

Alternative A provides a two-lane overpass of Mulberrie Point Road approximately 860 feet north of the existing Mulberrie Point Road intersection, as shown on **Figure II-2**. Two-lane, North-South service roads would be provided parallel to SR 1 and extend to approximately 2,650 feet south of the SR 1/Bower's Beach Road intersection. The existing southbound SR 1 alignment would become the new alignment for the west service road. The existing SR 1 northbound alignment would become the alignment for SR 1 southbound. The new northbound SR 1 and the east service road would be shifted to the east on new alignments.

The west overpass approach would tie into Clapham Road to the west at a new 4-way intersection with Jury Drive, located approximately 1,000 feet north of the existing intersection of Clapham Road and Mulberrie Point Road. An extension of Mulberrie Point Road that would .begin approximately 1,640 feet east of the existing SR 1/Mulberrie Point Road intersection would provide the main overpass approach to the east. A 3-way T-intersection would be provided where the new extension to Mulberrie Point Road and the east service road intersects. A new 4-way, stop-controlled intersection would be located to connect existing Mulberrie Point Road to the new east service road at a location approximately 470 feet east of the existing SR 1/Mulberrie Point Road intersection. The existing 4-way intersection of SR 1 and Mulberrie Point Road would become right-in/right out ramps providing access from and to SR 1 and Mulberrie Point Road.

Alternative A requires right-of-way acquisition of 73.99 acres of residential and agricultural property and 11.93 acres of commercial property. There are 22 residential relocations and 10 business relocations necessary for the construction of this alternative.

b. Alternative B

Alternative B is similar to Alternative A in that it provides the overpass, service roads and, shifts SR 1 to the same locations as Alternative A. The key difference between Alternative A and B is that Alternative B connects the east service road as the main approach and thus eliminates the extension of Mulberrie Point Road and subsequently the 3-way T-intersection where the extension of Mulberrie Point Road and the service road intersected in Alternative A. This modification results in the new 4-way, stop-controlled intersection of the east service road and Mulberrie Point Road connecting approximately 370 feet east of the existing SR 1/Mulberrie Point Road intersection compared to Alternative A, where this new intersection would be located 470 feet east of the east of the existing SR 1/Mulberrie Point Road intersection.

Alternative B requires right-of-way acquisition of 68.02 acres of residential and agricultural property and 11.84 acres of commercial property. There are 17 residential relocations and 10 business relocations necessary for the construction of this alternative.

c. Alternative C (Preferred Alternative)

Alternative C (see **Figure II-4)** would shift SR 1 to the east of the existing SR 1 roadway corridor, would provide two-way north-south parallel service roads on each side of SR 1 would construct/reconstruct several intersections to tie into the proposed improvements and would provide a grade separated crossing of SR 1 over Bower's Beach Road. The Bower's Beach Road crossing would connect to the new two-way, north-south service roads that would be constructed parallel to SR 1 which would in turn provide connection between the local roadways and would provide access to and from SR 1 via ramps. The west service road would connect Clapham Road in the north to Barratt's Chapel Road in the south. The east service road would connect Mulberrie Point Road to the north to Skeeter Neck Road to the south. It would improve the local road network while helping to preserve the capacity of SR 1. It is the only alternative that provides access to all of the local roads along the service road.

Locating the grade separated crossing of SR 1 to Bower's Beach Road instead of north of Mulberrie Point Road would avoid direct impacts to several communities and would minimize wetland impacts. The intersection improvements would align the intersections of South Skeeter Neck Road and Barratt's Chapel at a single intersection and would provide ramps connecting Clapham Road to and from southbound SR 1 and would provide access to and from southbound SR 1 and Clapham Road. The existing SR 1 intersection with Barratt's Chapel Road would be closed in favor of using this new intersection.

This alternative requires right-of-way acquisition of 64.53 acres of residential and agricultural property and 12.40 acres of commercial property. There are 5 residential relocations and 7 business relocations necessary for the construction of this alternative.

Alternative C as shown in **Figure II-4** displays several refinements that took place after its selection as the Preferred Alternative, primarily a new connection to the west service road and Barratt's Chapel Road opposite South Skeeter Neck Road. This new connection was needed based on planned and projected development and increased traffic along Barratt's Chapel Road. The original Barratt's Chapel Road connection that was applied to Alternative C was the same as the one displayed in Alternatives D, E and F. Their descriptions are provided in the next section.

d. Alternative D

Alternative D (**See Figure II-5**) is similar to Alternative C, except the ramp from Mulberrie Point Road to the service road connecting to SR 1 is eliminated. The service roads that tie into SR 1 terminate south of the intersection of SR 1 at Skeeter Neck Road. Intersection improvements are included for Skeeter Neck Road, Bower's Beach Road and Barratt's Chapel Road. A series of North-South service roads would be added on either side of SR 1. Service roads and realignment of SR 1 to the east would be required to minimize right-of-way impacts. As with Alternative C, the project limits extend to Barratt's Chapel Road.

This alternative requires right-of-way acquisition of 53.24 acres of residential and agricultural property and 9.24 acres of commercial property. There are 14 residential relocations and 8 business relocations necessary for the construction of this alternative.

e. Alternative E

Alternative E (**See Figure II-6**) is nearly identical to Alternative C, except the ramp from Mulberrie Point Road to the service road connecting to SR 1 is eliminated. All service roads and SR 1 alignments are the same as Alternative C. Intersection improvements are incorporated for Skeeter Neck Road, Bower's Beach Road and Barratt's Chapel Road.

This alternative requires right-of-way acquisition of 54.16 acres of residential and agricultural property and 10.46 acres of commercial property. There are 14 residential relocations and 8 business relocations necessary for the construction of this alternative.

f. Alternative F

Alternative F (**See Figure II-7**) was developed in response to comments from the State Historic Preservation Office (SHPO). The SHPO raised concerns over visual impacts to the Jehu Reed House, which is located on southbound SR 1 at the Bower's Beach Road intersection. The bridge structure and the Bower's Beach Road intersection were moved further to the south to reduce the visual impact of the bridge to this historic resource.

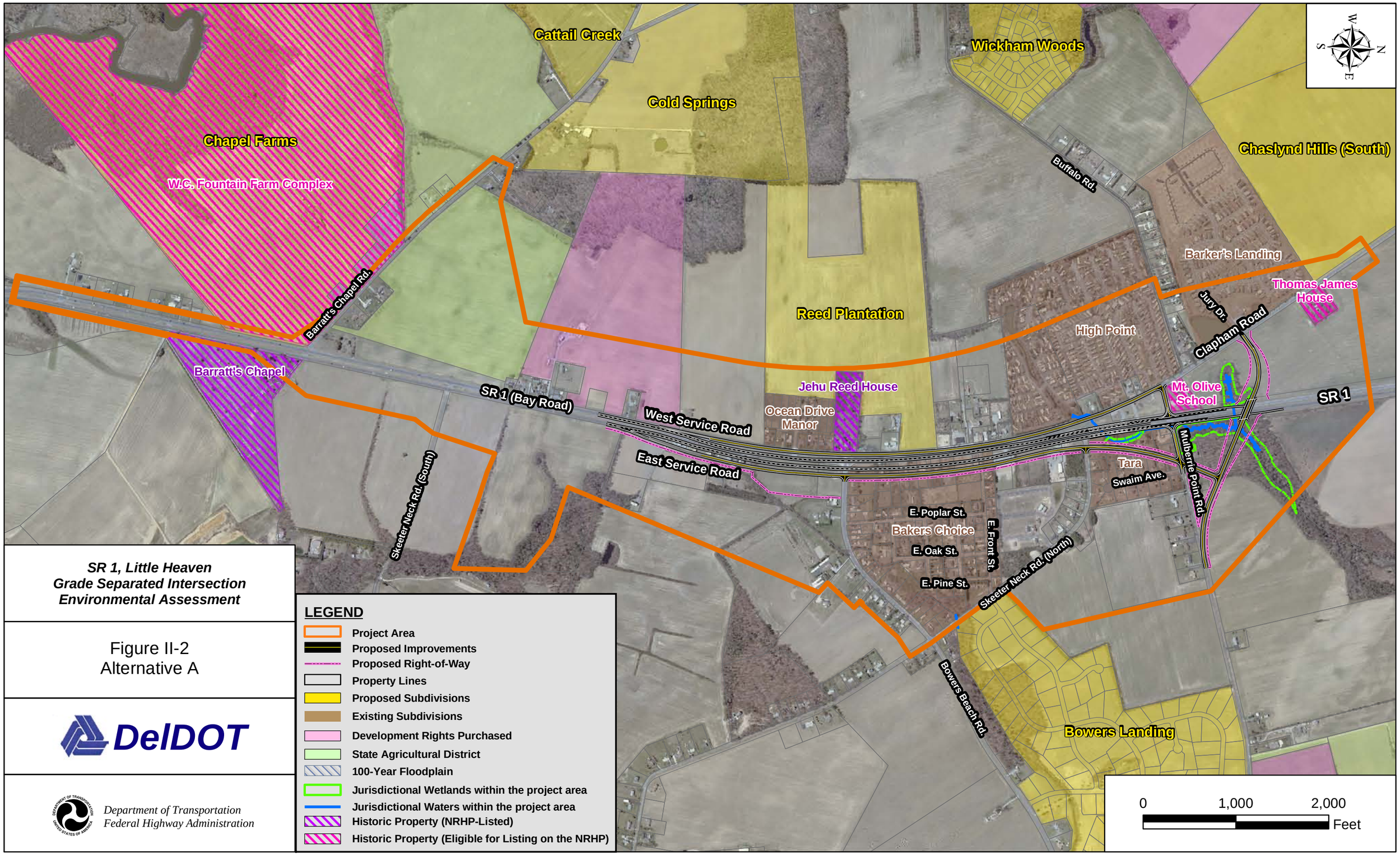
Alternative F is nearly identical to Alternative D, with the only difference being that Bower's Beach Road and the SR 1 bridge over it have been shifted further south to avoid a visual impact to the Nation-Register-listed Jehu Reed House. All service roads and SR 1 alignments are the same as Alternative D. Intersection improvements are included for Skeeter Neck Road, Bower's Beach Road and Barratt's Chapel Road.

This alternative requires right-of-way acquisition of 55.20 acres of residential and agricultural property and 9.52 acres of commercial property. There are 14 residential relocations and 8 business relocations necessary for the construction of this alternative.

C. Multi-modal Opportunities

A local Delaware Transit Corporation (DART) bus route stops in Little Heaven, serving the surrounding community. Currently the bus stops at Barker's Landing, High Point, and Medd's Market, but the service is under consideration for expansion with additional stops being considered in the area of the Jehu Reed House and near Chapel Farms. The extension of Clapham Road along the west service road would assist future service connections.

The implementation of a grade separated crossing would allow pedestrians and bicyclists to access either side of SR 1 safely. Sidewalks and wide shoulders along the service roads would accommodate pedestrians and bicyclists. This is consistent with the bicycle network being planned for this area of Kent County. New sidewalks would be provided along eastbound Bower's Beach Road and the along the southbound side of the west service road from Bower's Beach Road to Buffalo Road along the southbound side. Crosswalks would be provided connecting sidewalks at roadway crossings.



SR 1, Little Heaven
Grade Separated Intersection
Environmental Assessment

Figure II-2
Alternative A

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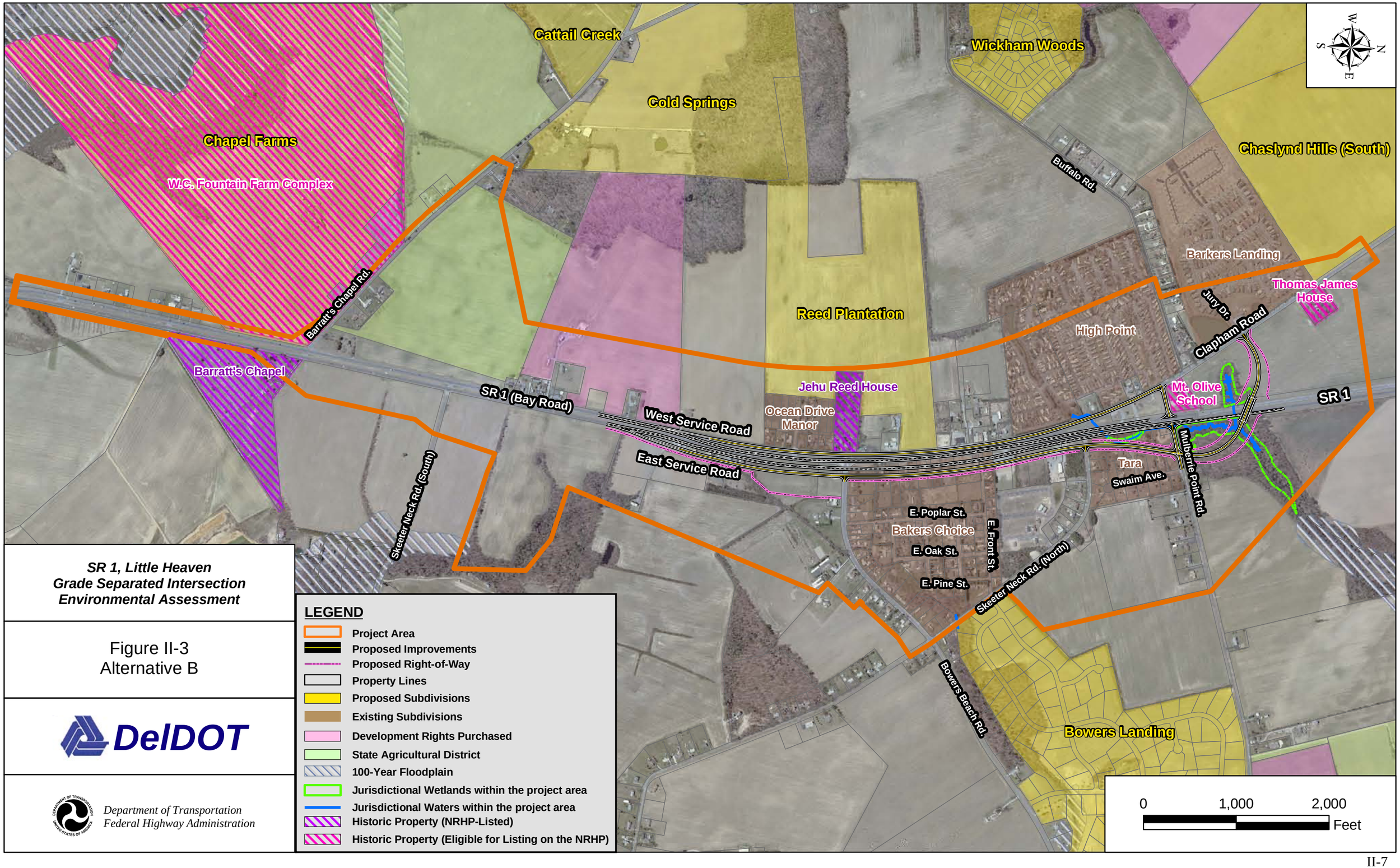
LEGEND

- Project Area
- Proposed Improvements
- Proposed Right-of-Way
- Property Lines
- Proposed Subdivisions
- Existing Subdivisions
- Development Rights Purchased
- State Agricultural District
- 100-Year Floodplain
- Jurisdictional Wetlands within the project area
- Jurisdictional Waters within the project area
- Historic Property (NRHP-Listed)
- Historic Property (Eligible for Listing on the NRHP)



SR 1, Little Heaven
Grade Separated Intersection
Environmental Assessment

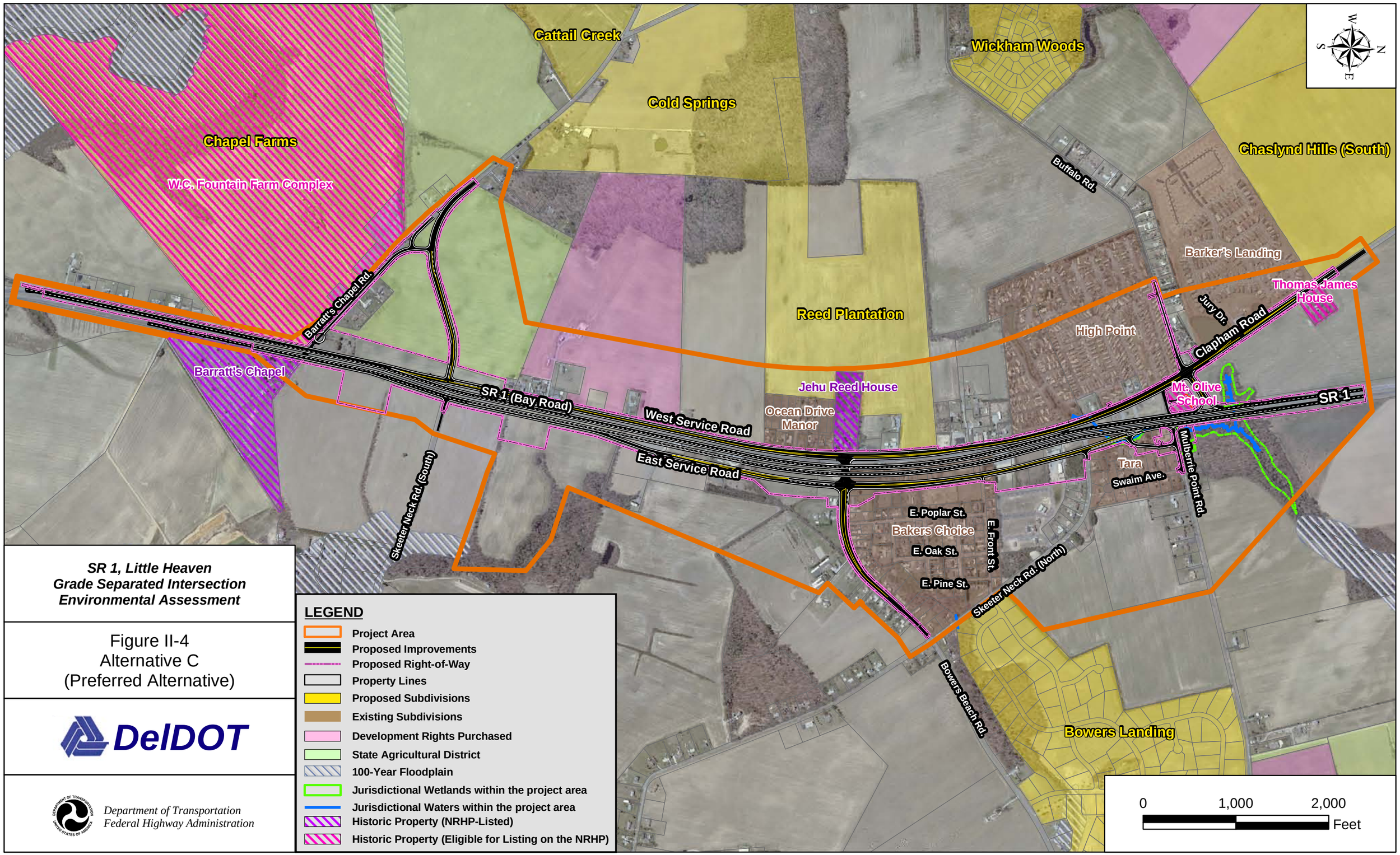
Figure II-3
Alternative B

DelDOT

Department of Transportation
Federal Highway Administration

LEGEND

- Project Area
- Proposed Improvements
- Proposed Right-of-Way
- Property Lines
- Proposed Subdivisions
- Existing Subdivisions
- Development Rights Purchased
- State Agricultural District
- 100-Year Floodplain
- Jurisdictional Wetlands within the project area
- Jurisdictional Waters within the project area
- Historic Property (NRHP-Listed)
- Historic Property (Eligible for Listing on the NRHP)



SR 1, Little Heaven
Grade Separated Intersection
Environmental Assessment

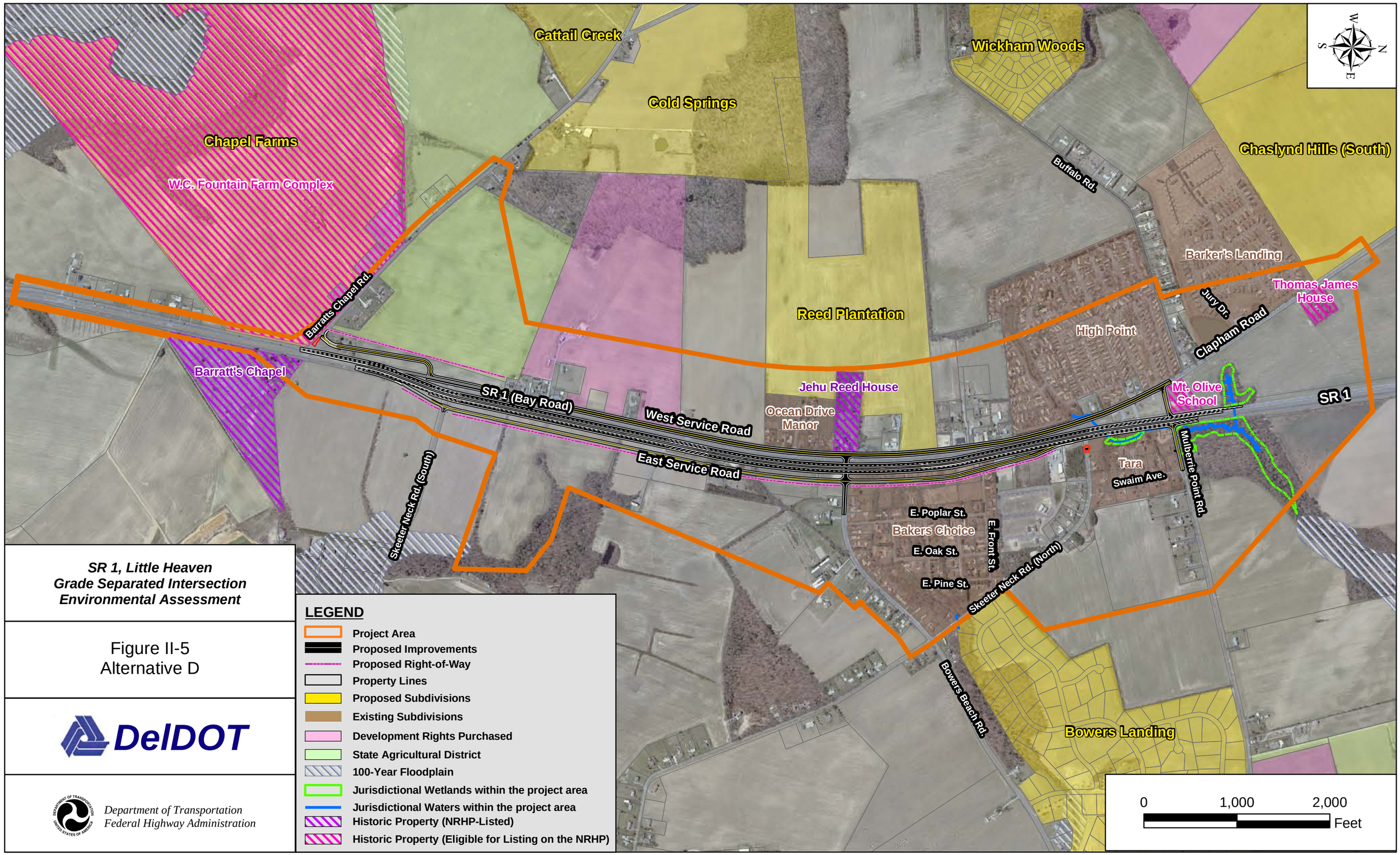
Figure II-4
Alternative C
(Preferred Alternative)

DelDOT

Department of Transportation
Federal Highway Administration

LEGEND

- Project Area
- Proposed Improvements
- Proposed Right-of-Way
- Property Lines
- Proposed Subdivisions
- Existing Subdivisions
- Development Rights Purchased
- State Agricultural District
- 100-Year Floodplain
- Jurisdictional Wetlands within the project area
- Jurisdictional Waters within the project area
- Historic Property (NRHP-Listed)
- Historic Property (Eligible for Listing on the NRHP)



SR 1, Little Heaven
Grade Separated Intersection
Environmental Assessment

Figure II-5
Alternative D

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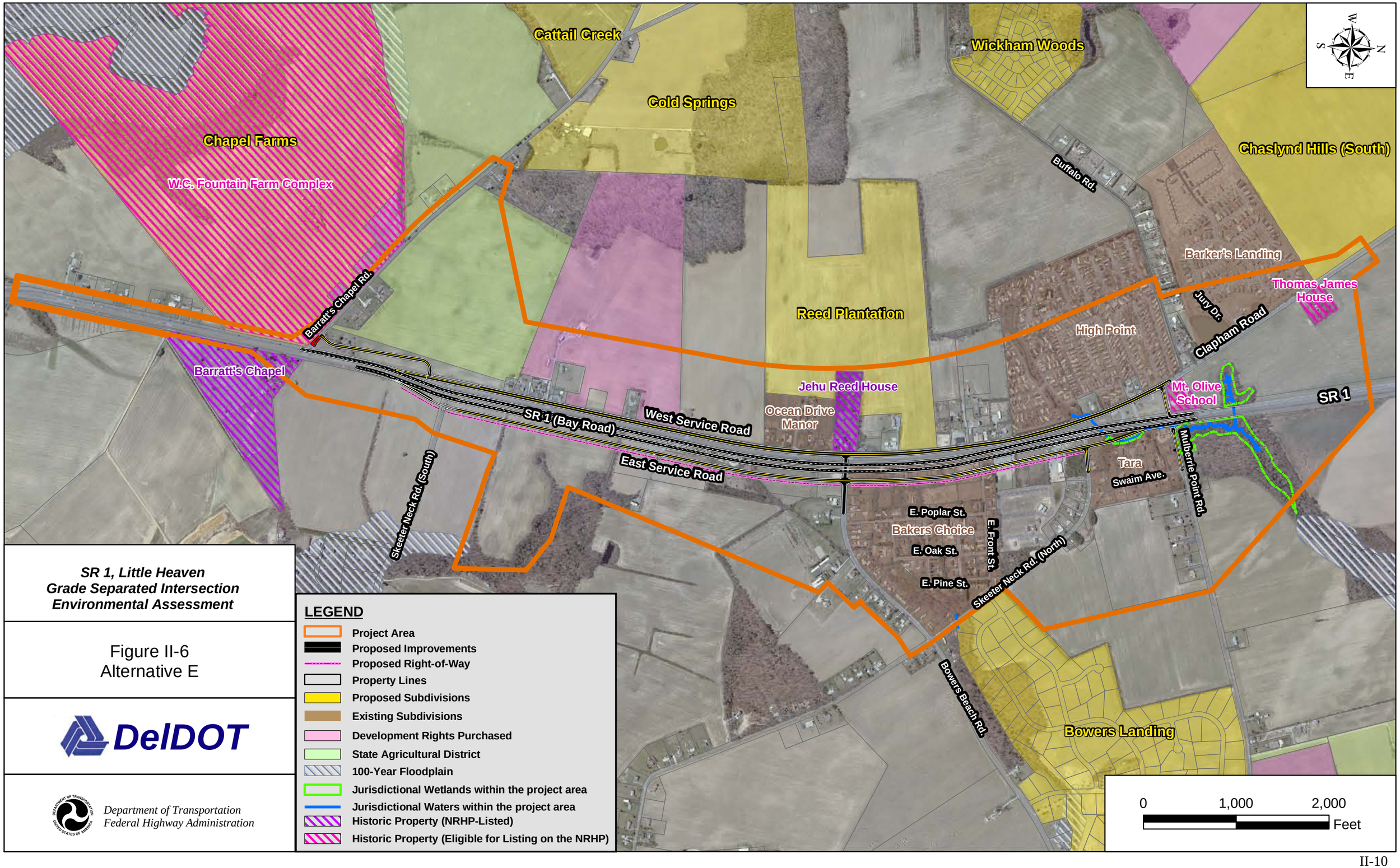
LEGEND

- Project Area
- Proposed Improvements
- Proposed Right-of-Way
- Property Lines
- Proposed Subdivisions
- Existing Subdivisions
- Development Rights Purchased
- State Agricultural District
- 100-Year Floodplain
- Jurisdictional Wetlands within the project area
- Jurisdictional Waters within the project area
- Historic Property (NRHP-Listed)
- Historic Property (Eligible for Listing on the NRHP)



SR 1, Little Heaven
Grade Separated Intersection
Environmental Assessment

Figure II-6
Alternative E

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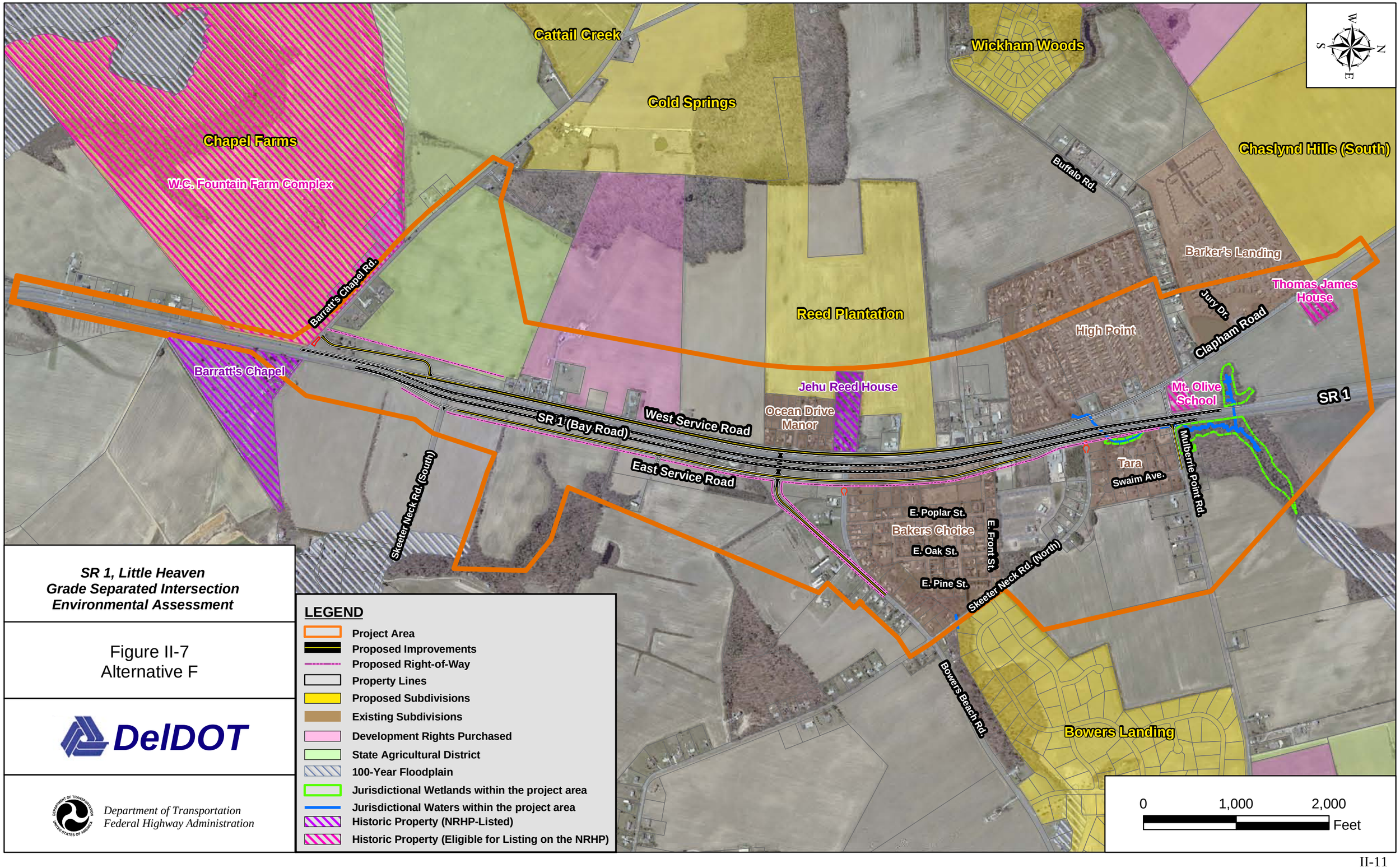
LEGEND

- Project Area
- Proposed Improvements
- Proposed Right-of-Way
- Property Lines
- Proposed Subdivisions
- Existing Subdivisions
- Development Rights Purchased
- State Agricultural District
- 100-Year Floodplain
- Jurisdictional Wetlands within the project area
- Jurisdictional Waters within the project area
- Historic Property (NRHP-Listed)
- Historic Property (Eligible for Listing on the NRHP)



SR 1, Little Heaven
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Environmental Assessment

Figure II-7
Alternative F

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LEGEND

- Project Area
- Proposed Improvements
- Proposed Right-of-Way
- Property Lines
- Proposed Subdivisions
- Existing Subdivisions
- Development Rights Purchased
- State Agricultural District
- 100-Year Floodplain
- Jurisdictional Wetlands within the project area
- Jurisdictional Waters within the project area
- Historic Property (NRHP-Listed)
- Historic Property (Eligible for Listing on the NRHP)

D. Selection of the Preferred Alternative

An evaluation of all alternatives was conducted to determine how well they met the purpose and need (**Table II-1**) and an evaluation of the impacts to the socio-economic, cultural and natural environment (see **Table II-2** for a summary of impacts for all alternatives). A detailed discussion of environmental resources and their impacts is provided in the following chapter.

Table II-1: Alternatives Analysis

Accessibility and Mobility Elements	Retained Alternatives			
	C*	D	E	F
SR 1 Northbound				
-Off-ramp to East Service Road from SR 1 (south of Skeeter Neck Road)	✓	✓	✓	✓
-Grade separated crossing of SR 1 over Bower's Beach Road	✓	✓	✓	✓
-Right-in/right-out low speed ramps at Mulberrie Point Road	--	✓	--	✓
SR 1 Southbound				
-Right-in/right-out low speed ramps at Mulberrie Point Road	✓	✓	✓	✓
-On-ramp to West service Road/Barratt's Chapel Road	✓	✓	✓	✓
-Off-ramp to West service Road/Barratt's Chapel Road	✓	✓	✓	✓
East Service Road				
-Access to/from South Skeeter Neck Road	✓	✓	✓	✓
-Access to/from Bower's Beach Road	✓	✓	✓	✓
-Access to/from East Front Street	✓	✓	✓	✓
-Access to/from North Skeeter Neck Road	✓	--	✓	--
-Access to/from Mulberrie Point Road	✓	--	--	--
-Provides access to all local streets and East Service Road	✓	--	--	--
-Eliminates weave along northbound SR 1 between East Service Road and Mulberrie Point Road.	✓	--	✓	--
Clapham Road/West Service Road				
-Access to/from Buffalo Road	✓	✓	✓	✓
-Access to/from Barratt's Chapel Road	✓	✓	✓	✓
-Provides safer radius on ramps entering and exiting SR 1 southbound from Clapham Road/West Service Road	✓	--	--	--
-Consolidates offset intersection at Buffalo Road and Mulberrie Point Road into a 4-way intersection.	✓	--	--	--
-Realigns/relocates Barratt's Chapel Road to provide for future grade separated crossing to accommodate future traffic.	✓	--	--	--

*Alternative C is the Preferred Alternative
✓-Indicates that the alternative provides this element in the proposed design.

Table II-2: Summary of Impacts for All Alternatives

FEATURE	UNIT	Alternatives						
		NO-BUILD	A	B	C**	D	E	F
Total Right-of-Way Acquisition	Acres	0	85.92	79.86	76.93	62.48	64.63	64.10
Commercial/Business	Acres	0	11.93	11.84	12.40	9.24	10.46	9.52
Residential/Agricultural	Acres	0	73.99	68.02	64.53	53.24	54.16	55.20
Total of Properties Affected*	Number	0	56	52	72	35	38	42
Residential Relocations	Number	0	22	17	5	14	14	14
Business Relocations	Number	0	10	10	7	8	8	8
Active Agriculture Land	Acres	0	16.51	16.51	21.21	22.23	22.23	22.23
Prime Farmland Soils	Acres	0	0	0	0	0	0	0
Forest Cover	Acres	0	10.72	7.27	2.86	0.07	1.29	0.35
Public Parks/Recreational Areas	Number	0	0	0	0	0	0	0
Adverse Effects on National Register of Historic Places Listed or Eligible Properties	Number	0	2	2	2	2	2	2
Archeological Sites Impacted	Number	0	0	0	0	0	0	0
Noise (NSAs impacted @ 67 dBa level)	Number	2	2	2	2	2	2	2
Meets National Ambient Air Quality Standards	Yes/No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Potential Hazardous Materials Sites	Number	0	8	8	8	8	8	8
Jurisdictional Wetlands	Number	0	3	3	3	2	2	2
	Acres	0	3.91	3.87	0.989	0.22	0.49	0.22
Streams Crossed***	Number	0	2	2	2	1	1	1
Jurisdictional Waters****	Linear Feet	0	739	759	834	344	624	344
Floodplain Encroachment	Acres	0	0	0	0	0	0	0
Additional Impervious Area	Acres	0	21.16	19.58	27.78	36.28	38.46	36.14
Total Length	Miles	0	2.09	2.09	2.73	1.81	1.81	1.81
Estimated Construction Cost	$ million	0	$31.8	$31.7	$38.6	$37.1	$38.1	$39.6
Estimated Right-of-Way Cost	$ million	0	$13.6	$12.5	$13.8	$10.3	$10.7	$10.8
Total Cost***	**$ million**	**0**	**$45.4**	**$44.2**	**$52.4**	**$47.4**	**$48.8**	**$50.4**

* Affected properties are any lots or tax parcels where encroachment of the project alternative may occur.
** Alternative C is the Preferred Alternative
*** Excluding Wetlands
**** All waterways have not been verified as Jurisdictional by USACE
***** Total cost includes Right-of-Way and Construction Cost. (D*oes not* include Project Development or Engineering Fees.)

Least Impacts  Most Impacts

1. Alternatives Not Selected as the Preferred Alternative

Alternatives A and B were dismissed from further consideration earlier in the process because they did not satisfy the purpose and need. The grade separated intersection location had extensive impacts to wetlands and had major right-of-way impacts to the local communities and it did not provide sufficient safety because it did not address access and service roads south of Bower's Beach Road.

Alternative D does not accommodate current and future traffic along SR 1 or the local roadway connections. It does not provide sufficient local road access to the East Service Road because it excludes access to and from North Skeeter Neck Road forcing traffic to use East Front Street or Bower's Beach Road and increasing traffic on these roadways. It also does not provide access to the East Service Road for Mulberrie Point Road and forces that traffic to use northbound SR 1 therefore does not separate local and through traffic sufficiently. Alternative D does not meet the need for traffic safety or future traffic because a proposed weave section on northbound SR 1 (between traffic entering onto SR 1 from the East Service Road and traffic entering/exiting SR 1 from Mulberrie Point Road, may contribute to future accidents as traffic volumes increase.

Alternative E does not accommodate current and future traffic along SR 1 or the local roadway connections. It does not provide sufficient local road access to the East Service Road because it excludes access to and from Mulberrie Point Road, nor does it provide access to Mulberrie Point Road to/from SR 1. Under Alternative E the weave section along SR 1 northbound is eliminated which improves safety; however, it effectively isolates residents along Mulberrie Point Road from the transportation system by providing a 3.5-mile circuitous route to access SR 1.

Alternative F is the same as Alternative D with the exception that SR 1 at Bower's Beach Road grade separated intersection is relocated along a new extension of Bower's Beach Road and the existing intersection of Bower's Beach Road is removed and converted to a cul-de-sac. This alternative was developed to reduce the potential for a visual effect on the National Register-listed Jehu Reed House. This alternative does not satisfy the purpose and need for the same reasons described for Alternative D. The relocation of the intersection also increases the cost of implementing this alternative by $3 million compared to Alternative D and this relocation provides no additional traffic or safety benefit.

2. Alternative C – The Preferred Alternative

An evaluation of all alternatives determined that Alternative C is the only alternative that provides safe access to and from the service roads and SR 1 while providing local service road access to the entire existing local roadway network. Alternative C was advanced into the detailed design phase as the Preferred Alternative because Alternative C is the only alternative that meets all aspects of the purpose and need. Alternative C was selected as the Preferred Alternative because it provides interconnection of the roadways, separates local and through traffic, maintains access for emergency response vehicles and is the best alternative for addressing safety concerns and maintaining community cohesiveness. Additionally, Alternative C was the preferred design of the local communities in the project area. Several refinements have been made to Alternative C throughout the design phase to avoid, minimize and/or mitigate impacts to the existing socio-economic, cultural and natural environmental resources within the project area.