

EXHIBIT D

Report of Walter Kulash, P.E. (“Kulash Report”)

Concept Plan for an Improved Sandbridge Road

JUNE 23, 2022

Concept Plan for an Improved Sandbridge Road

(as an alternative approach to the
Nimmo Parkway VII-B proposal in Virginia Beach, VA)

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1.0 | INTRODUCTION AND PROJECT SUMMARY

This report puts forward a concept plan for an alternative to the proposed Nimmo Parkway Phase VII-B that involves upgrading the existing Sandbridge Road corridor. This concept plan is offered to show that upgrading the existing corridor is a reasonable, feasible, and cost-effective alternative to the Nimmo VII-B proposal. The concept plan demonstrates that a road construction alternative that is based on improving the existing Sandbridge Road corridor in lieu of expanding the Nimmo Parkway along the proposed Nimmo VII-B route warrants detailed study and close consideration as federal, state, and local decision-makers use the National Environmental Policy Act process to evaluate and compare options for addressing the flooding, safety, and reliability issues along existing Sandbridge Road.

It is important to note that the concept plan discussed in this report is one of any number of designs for ways the existing Sandbridge Road corridor could be improved to address the reliability concerns with the existing road and meet the “purpose and need” described in the Draft Environmental Assessment (“Draft EA”) for the City of Virginia Beach’s Nimmo Parkway Phase VII-B proposal. Given the importance of Sandbridge Road as the only public, vehicular access in and out of the Sandbridge community, this concept plan was designed to safely maintain traffic flow in both directions simultaneously on the corridor throughout the entirety of construction. (See more detail in Section 4 of this report.) In addition, this concept plan places a high priority on maintaining access to the properties located along Sandbridge Road to minimize inconvenience to those property owners during construction. (See more detail in Section 5 of this report.) A different balance of priorities could be struck that would, for example, require one-way traffic flow along stretches of the road during construction to eliminate the need for temporary roads. In short, the Improved Sandbridge Road concept plan discussed in this report demonstrates the feasibility of one reasonable and effective way the existing road corridor could be upgraded, but it is inherently flexible.

Similarly, this concept plan focuses on the segment of existing Sandbridge Road located between Hell’s Point Creek and the proposed western terminus of the Nimmo Parkway Phase VII-A project that is scheduled to begin construction this year. This segment, along with the segment of the Sandbridge Road corridor that is being upgraded with the Nimmo Parkway VII-A project, comprise the portion of the existing corridor that is most vulnerable to flooding. Without improvement, this segment is projected to be almost entirely inundated by 2060 as rising seas increase water levels in the Back Bay system.¹ In my opinion, it should therefore be the highest-priority segment of existing Sandbridge Road for upgrading. However, the same general approach to improving Sandbridge Road offered in this report could certainly be extended farther to the west along the Sandbridge Road corridor and remain a reasonable, feasible, and cost-effective alternative to the Nimmo VII-B proposal.

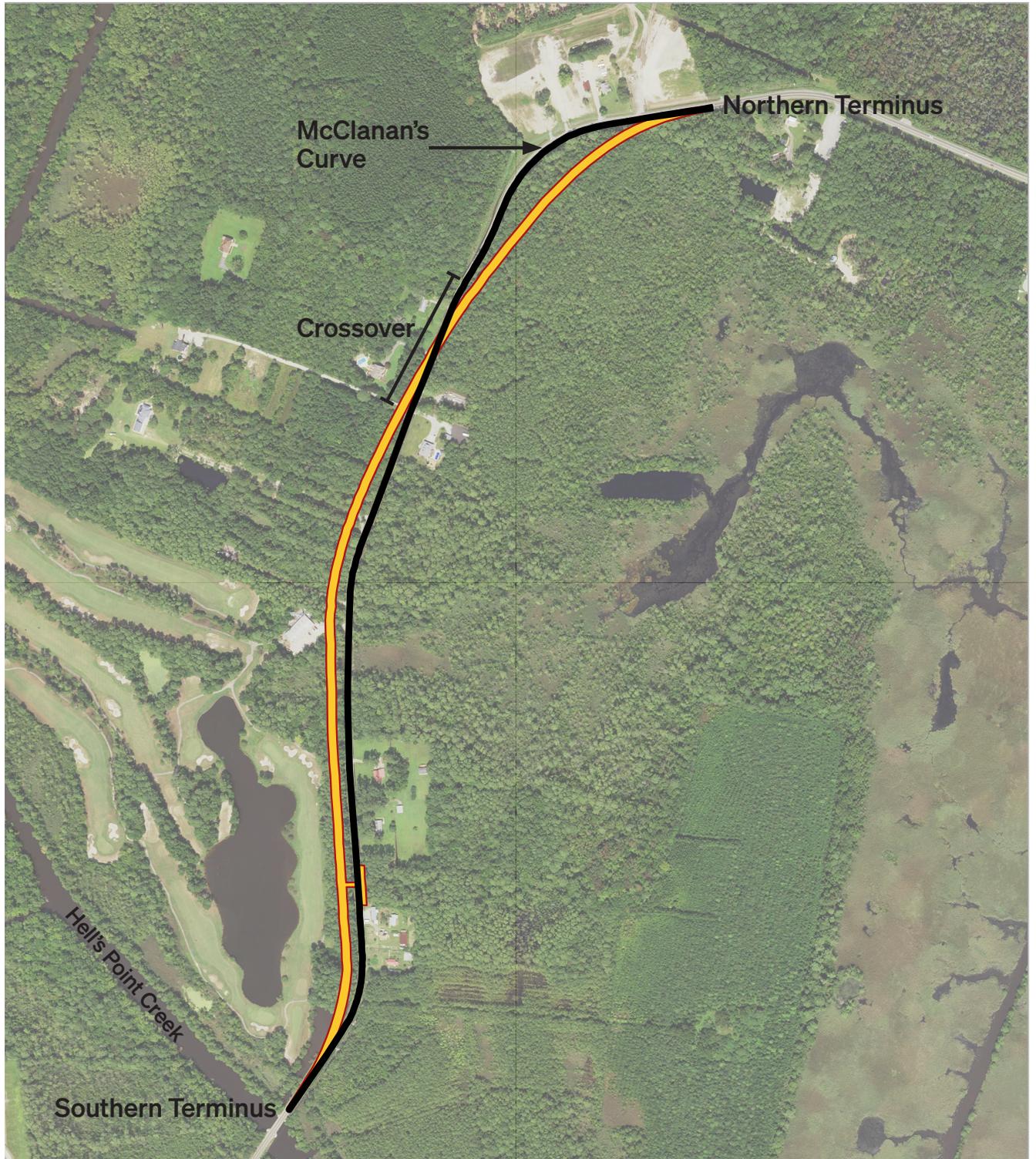
The Improved Sandbridge Road concept plan consists of constructing an upgraded, 0.97-mile, two-lane road immediately adjacent to existing Sandbridge Road. The upgraded road, labeled herein as “Improved Sandbridge Road,” would be built to an elevation that allows the road to remain passable during the projected 100-year flood, plus three additional feet to account for future sea-level rise.

To address safety and other reliability issues along existing Sandbridge Road, the Improved Sandbridge Road alternative incorporates paved shoulders, paved bicycle lanes, unpaved shoulders, and street lighting.

As shown in Figure 1, the southern terminus of Improved Sandbridge Road would be located at a point just north of where the existing road crosses Hell’s Point Creek. From there, the new road would be located just to the west of the existing Sandbridge Road alignment for a little over half its length, and then it would curve eastward and cross the alignment of existing Sandbridge Road. The new road would then continue

¹ See *Coastal Virginia Sea Level Rise and Minor to Moderate Flooding Year 2060*, Old Dominion U., <https://odu-gis.maps.arcgis.com/home/webmap/viewer.html?webmap=36e758f7e2b544a980962faef1faeb4> (search “Sandbridge Beach, Virginia Beach, VA, USA;” then select “Content,” select “Coastal Virginia ... Year 2060,” and de-select “Coastal Virginia ... Year 2080”).

Figure 1: Improved Sandbridge Road



Map created by: Miller Cochran (mcochran@selcnc.org)
Last updated: 12/17/2021
Sources: US Census Bureau, ESRI, Virginia Beach

0 225' 450'

- Existing Sandbridge Road
- Proposed Improved Sandbridge Road

on the east side of the existing Sandbridge Road alignment until ultimately joining (“tying into”) the western terminus proposed for the Nimmo Parkway Phase VII-A project. (See more detail in Section 2 of this report.)

Much of the approximately 1-mile-long segment of existing Sandbridge Road that would be replaced by Improved Sandbridge Road in this concept plan would be used to help maintain traffic flow during the construction of Improved Sandbridge Road. After completion of the new road, most of the corresponding segment of existing Sandbridge Road would be removed.

Improved Sandbridge Road would:

- Address flooding on existing Sandbridge Road:
 - With the completion of Nimmo Parkway Phase VII-A and Improved Sandbridge Road, the portion of the existing Sandbridge Road corridor that is most vulnerable to flooding and sea-level rise would be rebuilt at an elevated height. The height of Improved Sandbridge Road would accommodate the 100-year storm, plus 3 additional feet to account for the amount of sea-level rise the City is forecasting for 2065-2085 and has determined is suitable to use when designing critical infrastructure such as emergency evacuation routes.² This approach to elevation matches the approach that the City is using, and that the U.S. Army Corps of Engineers has approved, for the Nimmo Parkway Phase VII-A project.³
- Improve traffic safety in the Sandbridge Road corridor and provide reliable access and connectivity to the Sandbridge community by providing:
 - A consistent lane-width of 12 feet (in contrast to the 10-foot-wide travel lanes along this segment of existing Sandbridge Road);
 - Street lighting along the road in consistent intervals (in contrast to the inconsistent street lighting intervals along the existing road);
 - 8-foot paved shoulders and 5-foot unpaved shoulders on both sides of the roadway (in contrast to the lack of shoulders on existing Sandbridge Road);
 - 4-foot, paved bicycle lanes (within the 8-foot paved shoulders) that provide safer conditions for cyclists; and
 - A larger—and therefore safer—radius along the “McClanan’s Curve” section of the corridor.
 - Be a cost-effective alternative to Nimmo Parkway Phase VII-B. (See Section 7 and Table A-1 of this report.)

2.0 | ALIGNMENT OF IMPROVED SANDBRIDGE ROAD

As noted in the Introduction and as shown in Figure 1, the Improved Sandbridge Road concept plan begins approximately 140 feet northeast of the center of the Hell’s Point Creek bridge on existing Sandbridge Road. This beginning point where Improved Sandbridge Road would tie into existing Sandbridge Road is referred to herein as the project’s “southern terminus.” From there, the alignment of Improved Sandbridge Road shifts slightly westward over a distance of around 700 feet, becoming parallel and immediately adjacent to the western ditch line of the existing Sandbridge Road. Improved Sandbridge Road continues in this alignment (just to the west of existing Sandbridge Road) for approximately 2,300 feet.

From that point, Improved Sandbridge Road would then begin to curve eastward. Over a distance of approximately 900 feet, Improved Sandbridge Road would then gradually cross over the alignment of existing

² See City of Va. Beach, *Sea Level Wise: Adaptation Strategy* 26 (Mar. 31, 2020), [https://www.vbgov.com/government/departments/public-works/comp-sea-level-rise/Documents/20200330%20FullDocument%20\(2\).pdf](https://www.vbgov.com/government/departments/public-works/comp-sea-level-rise/Documents/20200330%20FullDocument%20(2).pdf).

³ As noted in the Corps of Engineers’ environmental assessment of the Nimmo Parkway Phase VII-A project, “the City...determined that the proposed roadway should be designed to accommodate 3 feet of sea level rise and the existing 100-[year] storm elevation of 4.0 foot [sic], which raises the road up to a minimum of 7.0 feet . . .” Department of Army, Memorandum for Record § 4.1 at 10 (Dec. 2016). See also *Capital Project Detail Sheet: 2.078.000: Sandbridge Road-Nimmo Phase VII-A*, City of Va. Beach, <https://cipstatus.vbgov.com/ProjectDetail.aspx?id=1602>, (last visited June 21, 2022) (“The Project will also raise the roadway elevation to be passible [sic] during the 100 year flood and the account for 3 additional feet of sea level rise.”).

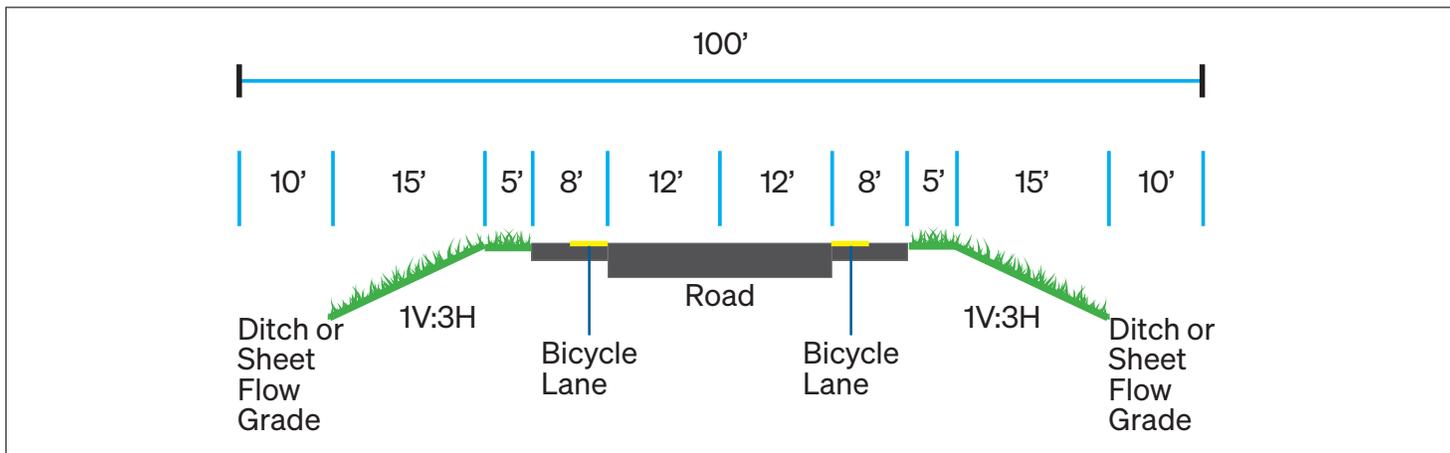
Sandbridge Road until it is running to the east of the existing road. This 900-foot-long segment of the project where Improved Sandbridge Road would cross the alignment of existing Sandbridge Road is referred to herein as the “crossover.” As noted above, the curve resulting from Improved Sandbridge Road’s more easterly route in this location would have a larger—and therefore safer—radius than what currently exists at “McClan’s Curve” on existing Sandbridge Road.

At the end of the crossover, the new road would then continue on the eastern/southern side of existing Sandbridge Road for roughly 1,000 feet. Then, over the final 250 feet of the project, it would gradually overlay the existing Sandbridge Road alignment and would ultimately tie into the proposed western terminus of the Nimmo Parkway Phase VII-A project.

3.0 | TYPICAL SECTION OF IMPROVED SANDBRIDGE ROAD

The typical section of the Improved Sandbridge Road alternative is shown in Figure 2. From the center-line outward, both sides of the new roadway would include a 12-foot traffic lane, an 8-foot paved inner shoulder that is marked for a one-way bicycle lane, and a 5-foot unpaved shoulder. Both sides of the project would also include a 15-foot side slope at a “1V:3H” (one vertical foot to three horizontal) grade down to adjacent ground; the side slopes are necessary to meet safety standards for protecting errant vehicles that might inadvertently veer off the road. Finally, the outermost section of both sides would consist of a 10-foot-wide strip that could serve for stormwater management.⁴ The total width of the right-of-way required for the Improved Sandbridge Road alternative is 100 feet.

Figure 2: Improved Sandbridge Road — Typical Section



4.0 | CONSTRUCTION STAGING AND MAINTENANCE OF TRAFFIC

As noted above, Sandbridge Road is the only public, vehicular access in and out of the Sandbridge community.⁵ As a result, Improved Sandbridge Road would need to be constructed in a manner that ensures there would always be an open route for vehicle traffic along the Sandbridge Road corridor, and ideally the traffic flow would be maintained in both directions simultaneously throughout construction. This can be done by staging construction and by using temporary detour roads. As described below and as illustrated in Figures 3 and 4, construction of the Improved Sandbridge Road alternative could proceed in four stages and use three temporary roads to maintain traffic flow in both directions simultaneously throughout the process.

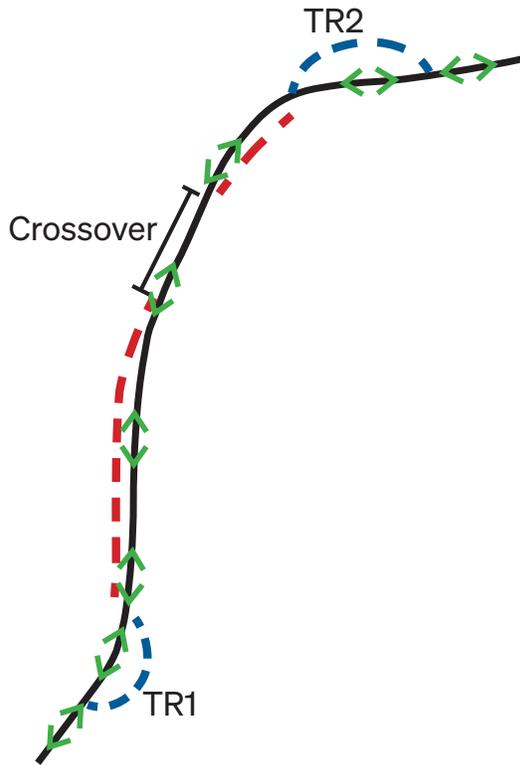
⁴A promising approach to stormwater management for the Improved Sandbridge Road conceptual plan discussed herein is the “Conserved Open Space” method as specified in the Virginia Department of Environmental Quality’s Stormwater Design Specification No. 2, *Sheet Flow to A Vegetated Filter Strip or Conserved Open Space* (Version 1.9, March 1, 2011). This method calls for the simple sheet flow of stormwater from a road embankment to a suitably vegetated area that will be protected from future development, disturbance, or clearing.

⁵When flooding or other emergencies result in Sandbridge Road being impassable, the U.S. Navy and Virginia Beach Public Safety Department may open the back gate of the Naval Air Station Oceana-Dam Neck Annex, allowing vehicles heading to or from Sandbridge to use Dam Neck Road. However, this detour can only be opened to the public during these rare circumstances.

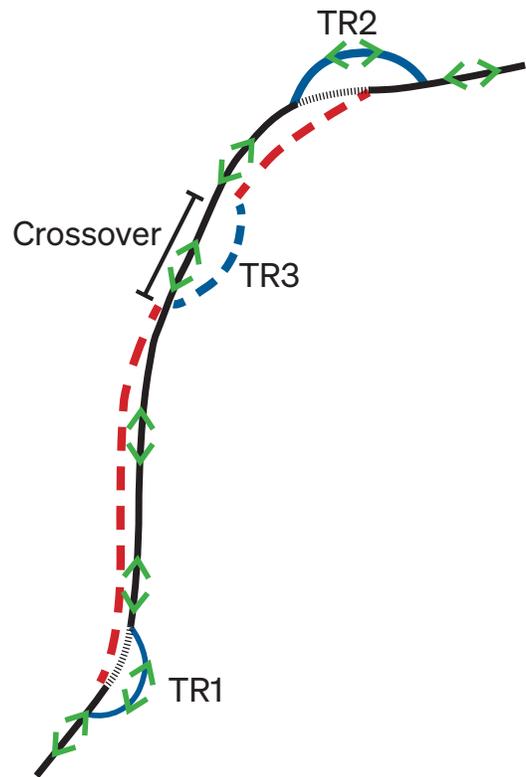
Figure 3: Construction Staging and Maintenance of Traffic

NOT TO SCALE

Stage 1



Stage 2



Sandbridge Road

-  Existing
-  Removed

Temporary roads

-  Under construction
-  Complete
-  Removed

Improved Sandbridge Road

-  Under construction
-  Complete

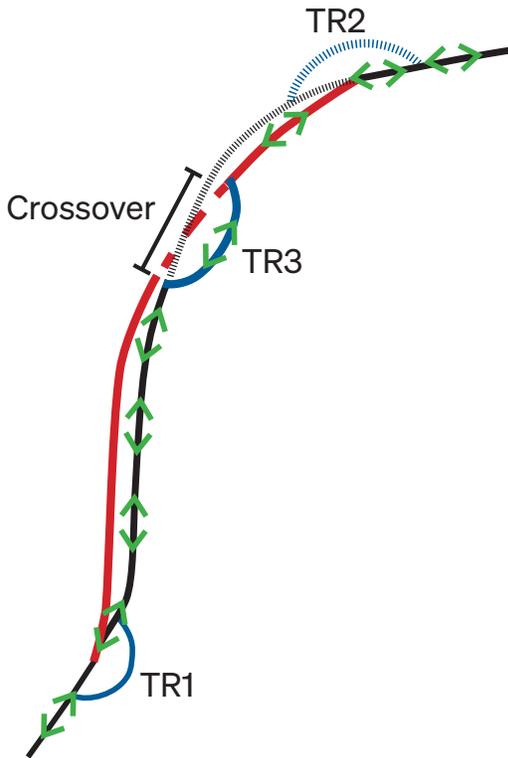
Traffic flow

-  Carrying "through" traffic

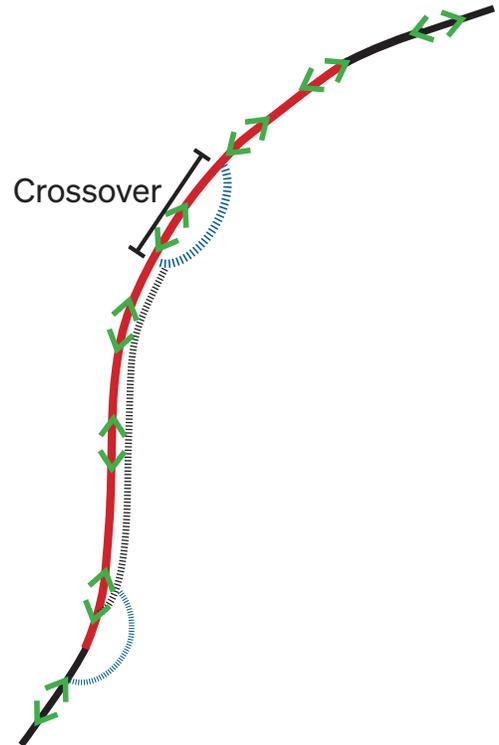
Figure 4: Construction Staging and Maintenance of Traffic

NOT TO SCALE

Stage 3



Stage 4



Sandbridge Road

-  Existing
-  Removed

Temporary roads

-  Under construction
-  Complete
-  Removed

Improved Sandbridge Road

-  Under construction
-  Complete

Traffic flow

-  Carrying "through" traffic

PROPOSED STAGE 1:

In Stage 1 of the conceptual construction plan, temporary roads 1 and 2 (“TR 1” and “TR 2”) would be constructed at the south and north ends, respectively, of the project. (See Figure 3.) TR 1 and TR 2, respectively, would be used in subsequent construction stages to carry traffic around the areas where Improved Sandbridge Road ultimately would tie into existing Sandbridge Road at the southern end, and to Nimmo Parkway Phase VII-A at the northern end.⁶ Both ends of TR 1 would connect to existing Sandbridge Road. One end of TR 2 would connect to existing Sandbridge Road, and the other end of TR 2 would connect to Nimmo Parkway Phase VII-A.

During Stage 1, construction would begin on most of Improved Sandbridge Road, but not on the two tie-in areas discussed above, or on the crossover near the mid-point of the proposed route. Throughout Stage 1, all traffic would continue to use existing Sandbridge Road throughout the full length of the project area.⁷ (See Figure 3.)

PROPOSED STAGE 2:

As stated above, TR 1 and TR 2, constructed during Stage 1, would now be used to carry traffic so as to allow construction of the permanent tie-ins at both ends of Improved Sandbridge Road. Construction would continue on all of Improved Sandbridge Road with the exception of the crossover.

The third temporary road (“TR 3”) would also be constructed during Stage 2. As shown in Figure 3, the southern end of TR 3 would connect to existing Sandbridge Road just south of the crossover, and the northern end of TR 3 would connect to Improved Sandbridge Road just north of the crossover. TR 3 would be used during Stage 3 to carry traffic around the crossover while that portion of the project is under construction.⁸

During Stage 2, all traffic would use a combination of existing Sandbridge Road, TR 1 and TR 2, to traverse or travel within the project corridor.

PROPOSED STAGE 3:

In Stage 3, TR 3 would be open to traffic, and construction of the final segment of Improved Sandbridge Road—the segment traversing the crossover—would occur. All of Improved Sandbridge Road would be complete with the exception of the portion in the crossover. (See Figure 4.)

The route for all through traffic would consist of existing Sandbridge Road south of where it connects with TR 3, then TR 3 itself, and then the completed segment of Improved Sandbridge Road located north of the crossover.

As discussed in more detail in Section 5 below, the completed segment of Improved Sandbridge Road located south of the crossover would also be open during Stage 3. However, its usage during Stage 3 would be limited to the adjacent properties on the west side of existing Sandbridge Road whose access to the existing road would be blocked during this stage of construction.

PROPOSED STAGE 4—COMPLETION:

By the beginning of Stage 4, the segment of Improved Sandbridge Road traversing the crossover would be complete, and all traffic would be able to use the completed Improved Sandbridge Road along the entire length of the project corridor, as shown in Figure 4. During Stage 4, TR 3 and the remaining portions of

⁶TR 1 and TR 2 would be approximately 750 and 570 feet long, respectively.

⁷As described in Section 5 below, the driveways of certain properties would temporarily be blocked by construction of Improved Sandbridge Road during Stages 1 and 2, as well as during Stage 3, and thus alternate access would need to be provided. Permanent driveway access to Improved Sandbridge Road for such parcels would be built at the end of Stages 2 and 3, respectively.

⁸TR 3 would be approximately 950 feet long.

existing Sandbridge Road (other than a segment providing access to some properties on the east side of Sandbridge Road) (see Section 5.2) would be removed.

5.0 | MAINTENANCE OF PROPERTY ACCESS

Parcels with existing driveways that connect to Sandbridge Road would, of course, need to continue to be accessible during and after construction of Improved Sandbridge Road. This section details how access could be maintained for the parcels whose existing access would be interrupted at some point during the construction of Improved Sandbridge Road. Figures 5 and 6 illustrate the use of two temporary accessways that would be used to provide access for certain parcels during one or more phases of construction, as discussed in more detail below.

5.1 | PROPERTIES ON WEST SIDE OF SANDBRIDGE ROAD

There are eight properties bordering the western edge of existing Sandbridge Road whose driveway access would be temporarily interrupted at some point during construction. Going from south to north, the addresses of these eight properties are 840, 820, 804, 776, 772, 768, 756, and 752 Sandbridge Road.⁹

PROPERTIES LOCATED AT 840, 820, 804, AND 776 SANDBRIDGE ROAD

The driveways to four properties—840, 820, 804, and 776 Sandbridge Road—would be interrupted during Stages 1 and 2 while construction proceeds on the adjacent segment of Improved Sandbridge Road. To provide access to these properties, a temporary accessway could be built immediately adjacent and to the west of, and parallel to, the Improved Sandbridge Road construction, as shown in Figure 5. The temporary accessway would begin at the driveway to 840 Sandbridge Road and extend north to the driveway at 776 Sandbridge Road, a distance of approximately 1,000 feet. In between these endpoints, the temporary accessway would intersect with and provide access to the driveways for 820 and 804 Sandbridge Road. The temporary accessway would provide all four of the above properties with access to the adjoining segment of existing Sandbridge Road via the driveway to 776 Sandbridge Road; this segment of Sandbridge Road would remain open to all traffic during Stages 1 and 2 of construction.

At the beginning of Stage 3, the situation described above would essentially be reversed: the segment of Improved Sandbridge Road located adjacent to 840, 820, and 804 Sandbridge Road would be complete, and construction would proceed within the crossover where the driveway to 776 Sandbridge Road currently connects to existing Sandbridge Road. As a result, the portion of the temporary accessway between 804 and 776 Sandbridge Road would need to remain in place to provide access to 776 Sandbridge Road during this phase of construction. However, as shown in Figure 6, the driveways to 840, 820, and 804 Sandbridge Road would at this point all be permanently connected to Improved Sandbridge Road, and the portion of the temporary accessway extending between 840, 820, and 804 Sandbridge Road therefore could be removed. Vehicles traveling from 776 Sandbridge Road would continue to use the remaining portion of the temporary accessway to reach the driveway to 804 Sandbridge Road, which would connect them to the open segment of Improved Sandbridge Road south of the crossover.

As noted above in Section 4 of this report, during Stage 3, the segment of Improved Sandbridge Road south of the crossover would only be open for purposes of accessing 840, 820, 804, and 776 Sandbridge Road.¹⁰ That segment of Improved Sandbridge Road would connect to existing Sandbridge Road near the southern terminus of the project corridor. To travel further south at that point, vehicles traveling from 840, 820, 804, and 776 Sandbridge Road could use existing Sandbridge Road. To travel north on existing Sandbridge Road, they could turn left onto TR 1 to access the existing road to head north.

⁹There are two other properties—704 and 700 Sandbridge Road—with driveways that connect to existing Sandbridge Road on its western side within the project corridor. The driveway access to these two properties would not be interrupted during construction. The two driveways would simply need to be connected to the adjoining segment of Improved Sandbridge Road once that segment is complete and opened to traffic (at the end of Stage 2).

¹⁰All other traffic south of the crossover would be using existing Sandbridge Road.

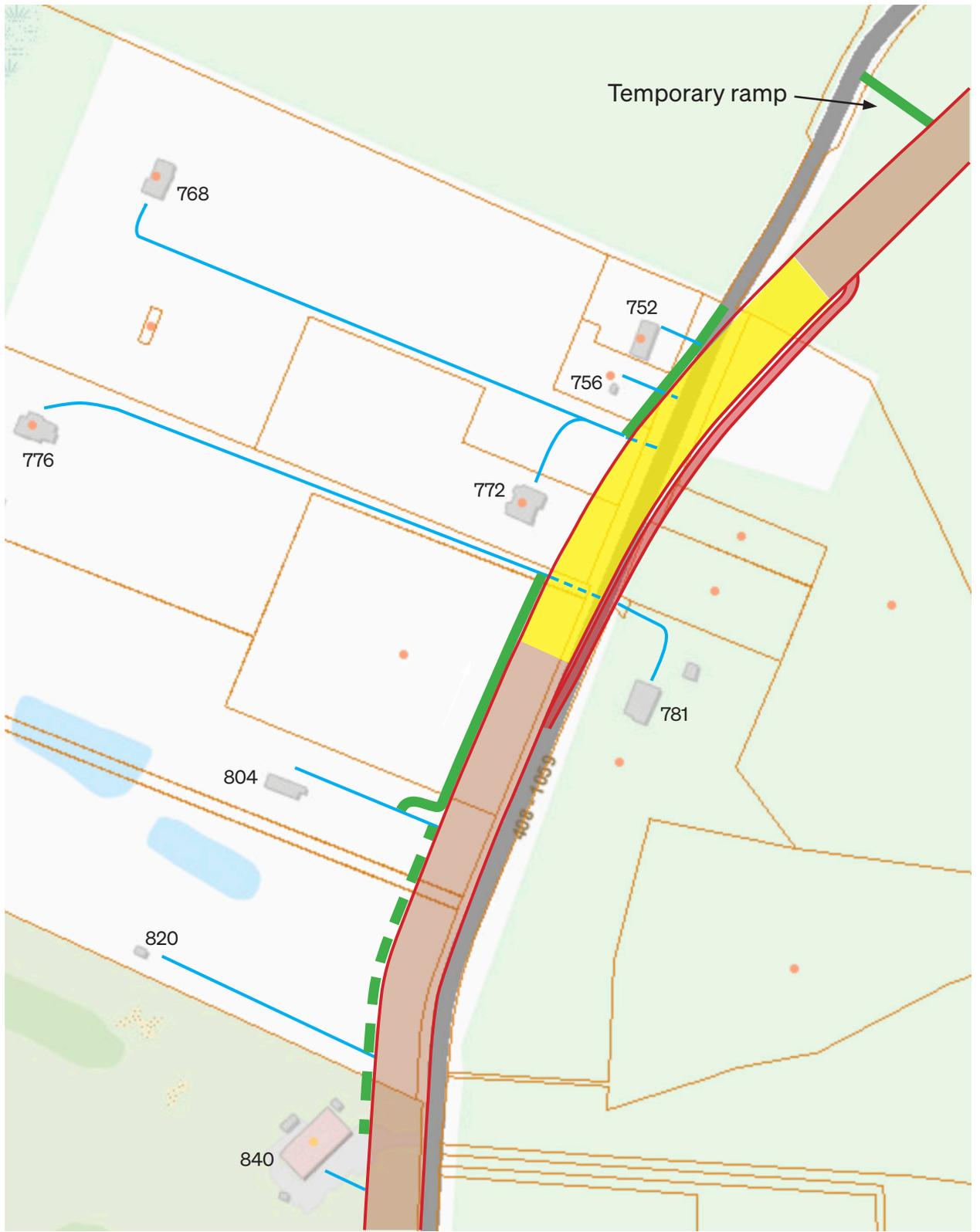
Figure 5: Temporary Accessways, Stages 1 and 2



Improved Sandbridge Road right-of-way

- | | | | | | |
|---|----------------------|---|---------------------|---|--------------------------|
|  | Under construction |  | Temporary accessway |  | Existing Sandbridge Road |
|  | Planned construction | | |  | Driveway |
| | | | |  | Removed driveway |

Figure 6: Temporary Accessways, Stage 3



Improved Sandbridge Road right-of-way

0 100' 200' 300'

- | | | | | | |
|---|-----------------------|---|-----------------------------|---|--------------------------|
|  | Under construction |  | Temporary accessway |  | Existing Sandbridge Road |
|  | Construction complete |  | Removed temporary accessway |  | Driveway |
| | |  | Temporary Road 3 (TR 3) |  | Removed driveway |

During Stage 4, Improved Sandbridge Road would be complete and carrying all traffic. The driveway to 776 Sandbridge Road would be permanently connected to Improved Sandbridge Road, and the remaining portion of the temporary accessway would be removed.

PROPERTIES LOCATED AT 772, 768, 756, AND 752

Sandbridge Road: These four properties currently connect to existing Sandbridge Road in the crossover, and that section of the road would remain open to all traffic throughout Stages 1 and 2 of construction. As a result, the existing driveways that provide access to these four parcels would continue to connect to existing Sandbridge Road. (See Figure 5; note that parcels 772 and 768 share a driveway.)

During Stage 3, construction would take place in the crossover, and these four parcels would therefore need temporary access to Improved Sandbridge Road. Thus, as shown in Figure 6, a temporary accessway could be built immediately to the west of, and parallel to, where Improved Sandbridge Road is under construction. It would extend north from the existing shared driveway for 772 and 768 Sandbridge Road, and then connect with the existing driveways to 756 and 752 Sandbridge Road. Just north of 752 Sandbridge Road, the temporary accessway would tie into an approximately 450-foot-long segment of existing Sandbridge Road that would be kept in place during Stage 3 but would only be open to these four properties. That segment would connect to a temporary ramp that would be constructed to connect to Improved Sandbridge Road north of the crossover; that section of Improved Sandbridge Road would be complete and open to all traffic during Stage 3.

At the end of Stage 3, the existing driveways serving the four properties would be permanently connected to Improved Sandbridge Road. The temporary accessway, the 450-foot portion of existing Sandbridge Road, and the ramp connection between existing and Improved Sandbridge Road would all be removed.

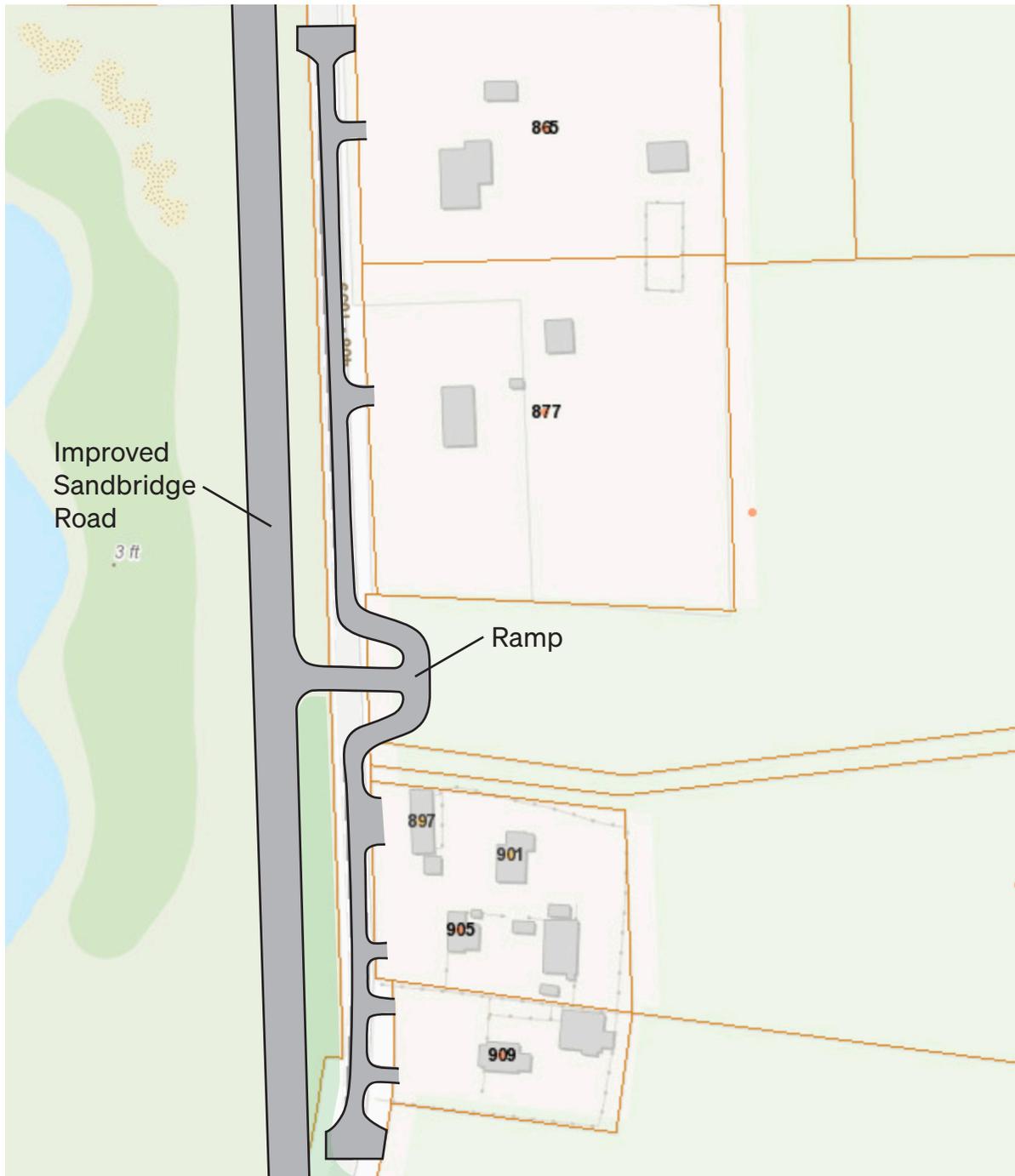
5.2 | PROPERTIES ON EAST SIDE OF SANDBRIDGE ROAD

There are five properties within the project corridor that have existing driveways that connect to existing Sandbridge Road on its eastern side. Going from south to north, the addresses of these five properties are 909, 905/901/897, 877, 865, and 781 Sandbridge Road. (Note that 905, 901, and 897 Sandbridge Road comprise a single parcel, according to city records.¹¹)

- **Properties Located at 909, 905/901/897, 877, and 865 Sandbridge Road:** During Stages 1, 2, and 3 of construction of Improved Sandbridge Road, each of these properties would continue to have access to the adjoining segment of existing Sandbridge Road, which would remain open to through traffic throughout. This segment, following the completion of Improved Sandbridge Road, would thereafter provide a permanent accessway to Improved Sandbridge Road for these properties, and would no longer serve through traffic. A ramp would be constructed to connect the accessway to Improved Sandbridge Road. (See Figure 7.)
- **Property Located at 781 Sandbridge Road:** This property would continue to have access to the adjoining segment of existing Sandbridge Road while it remains open during Stages 1 and 2 of construction. (See Figure 5.) During Stage 3, the adjoining segment of existing Sandbridge Road would be closed in this area, and TR 3 would provide access to 781 Sandbridge Road to travel north and south. (See Figure 6.) During Stage 4, TR 3 would be removed, and the elevation of the existing driveway on this property would be adjusted to connect to the completed Improved Sandbridge Road.

¹¹ Based on the “VBgov City Map” application available on the city’s website at <https://gisapps.vbgov.com/map/>, the street addresses of 905, 901, and 897 Sandbridge Road are all encompassed within a single parcel (search for GPIN 24234740790000).

Figure 7: Access Ramp for 909, 905/901/897, 877, and 865 Sandbridge Road



0 50' 100' 150' 200'

6.0 | RIGHT-OF-WAY IMPACTS OF THE IMPROVED SANDBRIDGE ROAD

Based on the general design conceived for this conceptual plan, Improved Sandbridge Road would likely require permanent right-of-way from 16 of the 35 parcels adjoining it. Of these 16 parcels, two are part of Hell’s Point Golf Club, five are part of the Back Bay National Wildlife Refuge (“Back Bay NWR” or “Refuge”), four contain residences, and the remaining six parcels appear to be undeveloped.

As shown on Table 1, the total amount of right-of-way estimated to be needed from all of these parcels is approximately 8.7 acres. The removal of existing Sandbridge Road following completion of the project would generate approximately 3.4 acres of “surplus” right-of-way, resulting in a net of approximately 5.3 acres of land that would be needed for the Improved Sandbridge Road project. Notably, if the areas of this “surplus” right-of-way that are adjacent to the Back Bay NWR acreage were to be transferred to the Refuge following completion, the project would yield a net increase in Back Bay NWR land, as shown in Table 1.

Table 1 below aggregates the right-of-way impacts by category of land use adjoining Sandbridge Road.

Table 1: Summary of Right-of-Way Impacts, Improved Sandbridge Road

Land Use, Parcel Adjoining Existing and/or Improved Sandbridge Road	Needed for Improved Sandbridge Road (Acres)	Surplus Land Due to Closing of Existing Sandbridge Road (Acres)	Net Needed (Surplus) (Acres)
Residence (developed/occupied)	0.42	0.91	(0.49)
Hell’s Point Golf Club	3.59		3.59
Undeveloped	2.82	0.34	2.48
Back Bay NWR	1.89	2.18	(0.29)
Total	8.72	3.43	5.29

7.0 | PLANNING-LEVEL COST ESTIMATE

Table A-1 in the Appendix contains a planning-level cost estimate for Improved Sandbridge Road of approximately \$12.2 million. This estimate was developed using “Planning-Level Cost Estimate” templates provided by the Virginia Department of Transportation, other state transportation departments, and the Federal Highway Administration, with unit costs based on published default values and comparable projects. Planning-level cost estimates are appropriate for concept plans (such as the one presented in this report) before preliminary engineering is undertaken. As shown in Table A-1, the cost estimate for Improved Sandbridge Road includes a significant (20%) construction contingency line item to account for project expenses this report may not have anticipated.

Notably, the estimated project cost of approximately \$12.2 million for the 0.97-mile Improved Sandbridge Road project is significantly less on a per-mile basis than the \$43 million estimate for Nimmo Parkway Phase VII-B included in the Draft EA.

8.0 | CONCLUSION

As demonstrated in this concept plan, the existing Sandbridge Road corridor can reasonably be upgraded to meet the purpose and need described in the Draft EA for the Nimmo Parkway Phase VII-B proposal. Unlike the Nimmo Parkway proposal, an upgraded Sandbridge Road corridor would also provide a safe and reliable route for the residents and businesses located along Sandbridge Road.

The cost-effective alternative discussed in this report would significantly reduce the threat of flooding and address other safety and reliability issues along the most flood-vulnerable portion of the Sandbridge Road corridor. Despite raising the road's elevation to a minimum of 7.0 feet, the footprint of Improved Sandbridge Road would only require approximately 5.3 net acres and would be highly unlikely to displace any homes or businesses. Further, this concept plan demonstrates that the existing corridor can be upgraded in a manner that maintains traffic flow in both directions simultaneously, and maintains access to adjacent properties, throughout the entirety of construction.

Although I chose to focus on the section of the corridor that I feel is the most urgent to address, the same engineering strategies reflected in this concept plan could be extended farther to the west along the Sandbridge Road corridor and remain a reasonable, feasible, and cost-effective alternative to the Nimmo VII-B proposal. I strongly recommend that decision-makers thoroughly study and evaluate different alternatives for upgrading the existing Sandbridge Road corridor, and compare those alternatives to the proposed Nimmo Parkway Phase VII-B project, so that they can make an informed decision about how best to address the reliability issues on existing Sandbridge Road.



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APPENDIX

Table A-1: Planning-Level Cost Estimate

Category	Quantity	Unit Cost	Cost (\$)
RIGHT OF WAY			
Right of Way acquisition	8.72 ac	60,000 – 100,000/ac	877,760
Right of Way contingency		50 %	438,880
Out-of-Plan utilities	(none)		
TOTAL RIGHT OF WAY			1,316,640
CONSTRUCTION			
Mobilization	Unit	227,000	227,000
Sediment barriers	10,700 lf	3.35/lf	35,845
Maintenance of traffic			
Temporary easements	3.53 ac	33,800/ac	119,055
Temporary road construction	6,037 sy	40.20/sy	242,701
Temporary accessway construction	3,254 sy	20.10/sy	65,405
Flagging, signing	0.97 mi	108,094/mi	104,851
Earthwork/Geotech			
Clearing and grubbing	16.6 ac	18,000/ac	298,800
Unclassified excavation	71,133 cy	11/cy	782,463
Embankment	125,906 cy	15/cy	1,888,590
Remove Pavement, existing SR	10,890 sy	15/sy	163,350
Road			
Two-lane, 24-f roadway	0.97 mi	90.00/sy	1,229,760
Paved Shoulder, 8 ft each side	0.97 m	40.20/sy	366,195
Guard Rail	432 lf	25/lf	10,800
Guard rail ends	2	3,000 ea	6,000
Driveways	10	11,750ea	117,500
Multi-property ramp	1	84,769	84,769
Seeding and planting	34,144 sy	1.12/sy	38,241
Hydrology			
Drainage	0.97 mi	300,000/mi	291,000
30 inch culverts	600 lf	100/lf	66,000
30 inch headwalls	12	5,973	71,676
In-plan utilities			
Roadway lighting	0.97 mile	127,690	123,859
Relocate power line	0.48 mile	125,000	60,000
Traffic			
Traffic control devices	0.97 mile	34,534	34,879
Site restoration			
Remove temporary roads	9,291 sy	15/sy	139,365
Landscape temporary road ROW	3.43 ac	4,700/ac	16,121
Environmental/wetland mitigation			550,000
TOTAL CONSTRUCTION			7,134,225
CONSTRUCTION CONTINGENCY		20 %	1,426,845
ENGINEERING		20 %	1,426,845
CONSTRUCTION INSPECTION		12 %	856,107
TOTAL PROJECT			12,160,662

WALTER M. KULASH, P.E.

Traffic Engineer

EDUCATION

Graduate Studies, Civil Engineering (Transportation Planning) Northwestern University, Evanston, Illinois (1970)

Master of Business Administration, University of North Carolina, Chapel Hill, North Carolina (1965)

Bachelor of Science, Industrial Engineering, North Carolina State University, Raleigh, North Carolina (1964)

EXPERIENCE

Public-interest traffic engineering consultant, 2007 – present

Principal, Senior Transportation Planner, Glatting Jackson Kercher Anglin, Inc., Orlando, Florida (1987 - 2007)

Senior Transportation Planner, Post, Buckley, Schuh & Jernigan, Inc., Orlando, Florida (1984 - 1987)

Senior Associate, Alan Voorhees & Associates, McLean, Virginia (1971 to 1984)

REGISTRATION

Professional Engineer, Virginia #064353, Florida, #45920, North Carolina #044814, Texas (inactive), Alabama (inactive) and Tennessee (inactive)

MAJOR AREAS OF EXPERTISE

Over 40 years of experience in traffic engineering. Since the 1990's, focused on bringing balance to transportation planning, focusing not only on vehicular traffic capacity but also multi-mode travel.

Roadway Planning: Applied traffic forecast modeling and capacity analysis for concept plan for Shelby Farms Parkway in Memphis; "86/64" plan for replacing riverfront freeway in Louisville; Riverfront Parkway conversion from freeway in Chattanooga; Route 202 greenway/parkway in Bucks County, PA.; Martin Luther King Parkway through the University Circle area in Cleveland; Route 19 riverfront conversion from freeway in Trenton; Fort Washington Way (I-71) in Cincinnati; I-20/59 in downtown Birmingham; Alaskan Way freeway conversion in Seattle; I-540 extension in Raleigh.

Highway Alternatives Analysis: Conversion of Columbus Boulevard to waterfront centerpiece, Philadelphia; downsizing of Cumberland Avenue, Knoxville; prototype designs for strip reclamation, Savannah GA, La Crosse, WI and Kansas City; reclamation of Route 51, Pittsburgh; transition to urban boulevard on Brambleton Avenue, Norfolk; "town and country" concept on Maybank Highway, Charleston SC; removing ramps and restoring urban street features on Mercury Boulevard in Hampton, VA; lane reduction and transition to urban avenue on South Orange Avenue, Orlando; transition to urban boulevard on Johnny Dodd Boulevard, Mount Pleasant, SC.

Traffic Capacity Analysis: Responsible charge for application of Highway Capacity Manual procedures and proprietary applications software (HCS and Synchro) for projects throughout the US, including traffic impact analysis for private developments, comparison of road improvement alternatives, review of proposed road designs and environmental impact analysis.

Environmental Document Review: Reviewed traffic and transportation elements of environmental documents for major highway projects in Tennessee, California, Georgia, Pennsylvania, Texas, North Carolina and South Carolina. Focus of reviews included need for project, alternatives analysis, traffic capacity analysis, traffic modeling and safety analysis.

Policy Advice on "Smart Growth" traffic planning: PennDOT, New Jersey DOT, Delaware Valley RPC.

Testimony: Accepted as expert for court testimony in Pennsylvania, New York, Georgia and Ohio. Numerous appearances at hearings for record.

PUBLICATIONS

Residential Streets, Third Edition, 2001, Urban Land Institute, (Principal Author).

Time Saver Standards for Urban Design, 2003, McGraw Hill Companies, Traffic Calming, Section 7.2.

Can't Get There from Here – Or Can We, Forum for Applied Research and Public Policy, Summer, 2001

Massachusetts Highway Design Manual (Intersection, Traffic Calming Chapters), 2005.