

**Balls Hill Road and Old Dominion Drive Roadway Spot Improvement
Evaluation Matrix**

SCENARIO	AM Level of Service & Overall Intersection Delay ⁽¹⁾	PM Level of Service & Overall Intersection Delay ⁽¹⁾	AM/PM 95 th % Queue ⁽³⁾	Estimated # of Property Impacts*	Estimated # of Property Takes	Stormwater Management Facilities ⁽⁴⁾	Preliminary Estimated Right-of Way Needed**		Cost Estimate ⁽⁵⁾⁽⁶⁾ Year 2017	Pros	Cons
						S.F./Acres/ LF of 60" U.G. Pipe	S.F.	Acres			
No-Build - 2040	F 221.1	F 210.5	WB - 3,909 ft.	0	0	N/A	0	0	Less than \$20,000	<ul style="list-style-type: none"> Keeps historic look No Construction Potential retiming effort by VDOT No Right-of-Way acquisition or easements 	<ul style="list-style-type: none"> Increased congestion and aggravation for residents and through traffic Does not solve delay/queuing issue
Alternative A - T-Intersection	North Intersection B 14.5 South Intersection C 28.9	North Intersection C 21.4 South Intersection C 20.5	WBT/R - 328 ft. EBT - 394 ft.	20 (15 Partial Right-of-Way + 5 Easements)	1***	0	50,000	1.15	\$13,500,000	<ul style="list-style-type: none"> Solves delay/queuing issues Keeps historic look Small right-of-way footprint compared to Alternative B County gains approximately 1.5 miles of 5-foot bike lanes County gains approximately 3,000 linear feet of walkways 	<ul style="list-style-type: none"> Impacts an estimated 21 parcels Tight design radii (northern section of project) Requires stormwater management basin outside of right-of-way, complicated by Mehr Farms Introduces unconventional intersection geometry at Balls Hill Road and Dulaney Drive intersection
Alternative B - Roundabout⁽²⁾	C 31.6	C 23.0	EB - 784 ft.	9 (9 Partial Right-of-Way)	4	0	79,000	1.81	\$12,100,000	<ul style="list-style-type: none"> Improves LOS to C / C in 2040 AM / PM Reduces queuing Maintains VDOT design standard (horizontal curvature) Can be landscaped to keep historic look, be an area amenity Traffic calming effect Lowest Cost Community gains approximately 2,000 linear feet of walkways Improves alignment at Balls Hill Road and Old Dominion Drive intersection 	<ul style="list-style-type: none"> Impacts estimated 13 parcels Driver roundabout learning curve May require significant grading issues due to topography, particularly for approach realignments Impacts to three new homes currently being constructed by the Mehr Farms development
Alternative C - Addition of Dedicated Left-turn Lanes⁽⁵⁾	D 46.5	E 55.8	WB - 2,969 ft.	21 (20 Partial Right-of-Way + 1 Easement)	1***	0	48,000	1.10	\$12,700,000	<ul style="list-style-type: none"> Improves LOS to D/E in 2040 AM/PM No major road link realignments (widens along existing alignment) Smaller right-of-way footprint compared to Alternative B Lower cost relative to Alternative A County gains approximately 1 mile of 5' bike lanes County gains approximately 3,000 linear feet of walkways 	<ul style="list-style-type: none"> Impacts estimated 22 parcels Does not eliminate inefficient left-turn (quasi u-turn) for the Old Dominion Dr. approaches May have significant impact to church frontage Requires stormwater management basin outside of right-of-way, complicated by Mehr Farms Roadway access for the Mehr Farms development is problematic
Alternative A.1 T-Intersection Improved⁽⁷⁾	North Intersection B 14.5 South Intersection C 28.9	North Intersection C 21.4 South Intersection C 20.5	WBT/R - 328 ft. EBT - 394 ft.	19 (14 Partial Right-of-Way + 5 Easements)	2***	500 LF	61,000	1.40	\$15,000,000	<ul style="list-style-type: none"> Solves delay/queuing issues Small right-of-way footprint compared to Alternative B Community gains approximately 1.5 miles of 5-foot bike lanes Community gains approximately 2,750 linear feet of walkways Improves alignment at southern Balls Hill Road and Old Dominion Drive intersection relative to Alternative A Space provided for Stormwater management facilitates Incorporates improved access for Mehr farms 	<ul style="list-style-type: none"> Impacts estimated 21 parcels Tight design radius (northern section of project)

Notes:

(1) LOS E or better is considered acceptable.

(2) For roundabouts, v/c <= 0.85 is considered acceptable (per FHWA guidance).

(3) Only the longest queue from either AM or PM of the intersection approaches is reported. Reported queues may be the sum of the nodes for the subject approach.

(4) For Alternatives A and C, Stormwater Management (SWM) quantities shown as zero because location has yet to be determined; however, a placeholder SWM cost estimate is still included in both Alternative A and C costs above. For Alternative B, the SWM area is assumed to fit within the gore areas immediately north and south of the roundabout, within existing right-of-way. These estimates are preliminary and are subject to change when SWM facilities are advanced further in the design phase.

(5) Cost estimates do not include the re-configuration of Greyson Woods Lane at Old Dominion Drive or the new development of Mehr Farms. Alternative A.1 includes impacts to Greyson Woods Lane and the development at Mehr Farms.

(6) The right-of-way element of the cost estimate does not include unanticipated damages to the property as well as to any improvements that have not been constructed.

(7) No additional traffic analysis was conducted.

* "Property Impacts" defined as parcels from which right-of-way and/or easements are anticipated to be needed.

** Does not include estimated easements or areas for Stormwater Management Facilities which lie outside of right-of-way footprint.

*** Indicates no total property takes from Mehr Farms development.