Executive Summary

Volkert, Inc. conducted a conceptual study for the Virginia Department of Transportation (VDOT) covering Route 28 (Catlett Road) through Fauquier County. The south end of the project is at US-29/James Madison Highway. The study area is approximately 14 miles long, extending in a northeasterly direction to the Prince William County line, which is located approximately 700 feet northeast of the intersection of Route 28 and Old Nokesville Road.

Route 28 through Fauquier County is currently a two-lane, mostly rural facility traversing gently rolling terrain. While the horizontal and vertical geometrics of Route 28 appear consistent with VDOT's GS-2 standard for rural minor arterials, the shoulders and clear zone are not. As is the case for similar facilities throughout much of Virginia, Route 28 provides access to several historic sites.

Traffic data for Route 28 and cross streets was obtained from VDOT's website. In the year 2010, the Annual Average Daily Traffic (AADT) on Route 28 ranged from 8700 vehicles between US-29/James Madison Highway and US-17/Marsh Road to 14000 vehicles approaching the Prince William County line.

Two alternates have been developed for Route 28: *Alternative 1* entails improvements to the existing two-lane roadway with the provision of full shoulders and ditches per VDOT's GS-2 standard, while *Alternative 2* is a four-lane divided section. Both alternates included reduced, urban sections through the communities of Calverton and Catlett.

The right-of-way footprint for both alternates is set approximately 10 feet outside the "normal" ditch bottom. Construction/slope easements may be required at certain locations. In addition, right of way and/or easements may be required in order to accommodate stormwater management facilities.

The construction cost estimates developed for this study are for planning and programming purposes only. Roadway construction costs are based on unit prices from bid tabulations for recent construction projects for similar facilities in the same general area. Earthwork quantities were estimated based on a similar project developed by Volkert in Culpeper County. For major drainage structures, cost estimates are based on extending existing structures as needed in order to accommodate the widened roadway cross section. Pavement design is based on similar facilities carrying similar traffic loads. For Alternative 1, some traffic signals remain useable, while for Alternative 2, all existing signals need to be completely replaced. The existing bridge over Licking Run needs to be replaced, while the existing bridge over Cedar Run was constructed in 2005 and should be retained.

The total estimated cost (in 2017 dollars) for Alternative 1, including preliminary engineering, right of way and construction is $51 million. For Alternative 2, the total estimated cost is $120 million. Each alternative was broken down into 10 segments each in order to facilitate phased construction as funding becomes available.

Right-of-way acquisition and utility relocations would be required by both alternates. Alternative 1 would affect approximately 220 parcels and require approximately 96 acres of right of way, while Alternative 2 would affect roughly 180 parcels and require about 29 acres of right of way. Fiber optic lines, power lines and telephone lines would be relocated in either case. Approximately 25% more utility relocations would be required for Alternative 2 compared to Alternative 1.

Route 28 Catlett Road Improvement Study

Fauquier County

Prepared by

Volkert, Inc.

for

Virginia Department of Transportation

April 3, 2012

1. Introduction

This conceptual study covers Route 28 (Catlett Road) through Fauquier County. The south end of the project is at US-29/James Madison Highway. The study area is approximately 14 miles long, extending in a northeasterly direction to the Prince William County line, which is located approximately 700 feet northeast of the intersection of Route 28 and Old Nokesville Road.

2. Background Information

Route 28 through Fauquier County is currently a two-lane facility traversing gently rolling terrain. Right and/or left-turn lanes are provided at various intersections. Minimal shoulders are provided throughout most of the corridor. While the horizontal and vertical geometrics of Route 28 appear consistent with VDOT's GS-2 standard for rural minor arterials, the shoulders and clear zone are not.

Route 28 is a mostly rural route through Fauquier County. Two notable exceptions are the communities of Calverton (in the vicinity of Station 564+00/1464+00) and Catlett (in the vicinity of Station 685+00/1585+00). Other adjacent communities include Bealeton (in the vicinity of Station 222+00/1122+00) and Midland (in the vicinity of Station 364+00/1264+00). Route 28 serves both local traffic (much of which is associated with the agricultural land use patterns along the route) as well as commuter traffic to and from Washington, DC and the northern Virginia suburbs.

Traffic data for Route 28 and cross streets was obtained from VDOT's website. In the year 2010, the Annual Average Daily Traffic (AADT) on Route 28 ranged from 8700 vehicles between US-29/James Madison Highway and US-17/Marsh Road to 14000 vehicles approaching the Prince William County line. Data for the main cross streets is summarized in Table 1 on the next page. Note that all of the cross streets are designated "rural" on VDOT's Functional Classification Map for Fauquier County.

As is the case for similar facilities throughout much of Virginia, Route 28 provides access to various historic sites. These include four historical markers, namely CL 3 (John Marshall's birthplace) near Station 401+00/1301+00, B 36 (Stuart and Mosby) near Station 649+00/1549+00, B 35 (Mosby's raid at Catlett's Station) near Station 688+00/1588+00 and Z 170 (Fauquier County) near Station 820+50/1720+00.

Table 1—Route 28 Cross-Street Traffic

Route	Location	Functional Classification	2010 AADT
US-29/James Madison Highway	Station 100+00/1000+00	Other Principal Arterial	28000 S of Rte. 28
US-29/James Madison Highway	Station 100+00/1000+00	Other Principal Arterial	22000 N of Rte. 28
Route 657/Kings Hill Road	Station 100+00/1000+00	Local	220
US-17/Marsh Road	Station 222+00/1122+00	Other Principal Arterial	20000
Route 649/Germantown Road	Station 386+00/1286+00	Major Collector	1800 S of Rte. 28
Route 649/Germantown Road	Station 386+00/1286+00	Minor Collector	370 N of Rte. 28
Route 643/Meetze Road	Station 460+00/1360+00	Major Collector	2500
Route 616/Casanova Road	Station 558+00/1458+00	Major Collector	920
Route 616/Bristersburg Road	Station 564+00/1464+00	Local	830
Route 603/Bastable Mill Road	Station 564+00/1464+00	Minor Collector	720
Route 806/Elk Run Road	Station 685+00/1585+00	Major Collector	2700
Route 667/Old Dumfries Road	Station 685+00/1585+00	Major Collector	1100

3. General Guidelines for Designers

This is a conceptual study and therefore several key topics are important to bring to the attention of the future designer. Two alternates have been developed for Route 28: *Alternative 1* entails improvements to the existing two-lane roadway with the provision of full shoulders and ditches per VDOT's GS-2 standard, while *Alternative 2* is a four-lane divided section. Both alternates included reduced, urban sections through Calverton and Catlett. Any improvements on any cross streets should follow the appropriate GS standard for the functional classification and projected traffic.

The right-of-way footprint for both alternates is set approximately 10 feet outside the "normal" ditch bottom. This will be sufficient throughout much of the corridor, as the terrain is relatively flat, without many significant cut or fill sections. Nonetheless, construction/slope easements may be required at certain locations. In addition, assessment of stormwater management requirements is outside the scope of this study, so it may be that right of way and/or easements will be required in order to accommodate stormwater management.

For Alternative 1 (improved two-lane section), roundabouts are recommended for the intersections with Route 643/Meetze Road, Route 616/Casanova Road/Bristersburg Road/Route 603/Bastable Mill Road and Route 806/Elk Run Road/Route 667/Old Dumfries Road. According to Exhibit 1-9 in the National Cooperative Highway Research Program's *Report 672* entitled *Roundabouts: An Informational Guide* (Second Edition), a single-lane roundabout can accommodate approximately 25000 vehicles per day. Assuming a 50% growth in traffic over the next 20 years, roundabouts on Route 28 should prove adequate at the three suggested locations.

For Alternative 2 (four-lane divided), a relatively small number of median crossovers are shown, the intent being to maximize safety and follow VDOT's access management principles to the extent practicable. During final design, it is likely that additional crossovers would be added.

4. Construction Cost Estimate

The construction cost estimates developed for this study are for planning and programming purposes only. During the development of final construction plans, detailed construction cost estimates will be required. The roadway construction costs are based on unit prices from bid tabulations for recent construction projects for similar facilities in the same general area.

In the absence of a digital terrain model, earthwork quantities were estimated based on a similar project developed by Volkert in Culpeper County. For the rural sections, the average excavation is assumed to be approximately five feet over the width of widening.

Major drainage structures were noted in the field and are shown on the plan sheets provided as part of this study. No deficiencies were noted by VDOT. Thus cost estimates are based on extending existing major structures as needed in order to accommodate the widened roadway cross section.

The pavement design is based on similar facilities carrying similar traffic loads. Where existing Route 28 is to be widened, the estimates include a three-inch overlay of the existing pavement.

For Alternative 1, one existing signal would be removed and replaced with a roundabout (at Route 667/Old Dumfries Road/Route 806/Elk Run Road). One signal would require modifications due to widening on the cross street (Independence Avenue, Station 245+00). The other signals on Alternative 1 should remain useable. For Alternative 2, all existing traffic signals would need to be completely replaced.

Bridge/structural work is expected to be relatively moderate for this project. No retaining walls are anticipated. The existing bridge over Licking Run (Station 410+00/1310+00) does not have adequate shoulders, so the cost estimate assumes replacement. The existing bridge over Cedar Run (Station 654+00/1554+00) was constructed in 2005 and has adequate shoulders. No work is anticipated on this bridge for Alternative 1. A similar, adjacent structure is assumed for Alternative 2.

Construction cost estimates for both alternates are provided in Tables 2 and 3 on the next two pages. Note that costs have been escalated for an Advertisement Year of 2017. Note also that Preliminary Engineering (PE) and Right of Way (RW) costs were provided by VDOT.

Table 2-- Alternative 1 Cost Summary (2017 Dollars)

Section	Description	Station Limits	Typical Section	PE	RW	Construction	Section Total
A	US-29 to US-17	100+00 to 215+00	2-lane rural	$616,400	$1,747,800	$4,993,500	$7,357,700
B	US-17 to W of Rte. 610	215+00 to 347+50	2-lane rural	$682,500	$1,648,000	$6,103,500	$8,434,000
C	W of Rte. 610 to Rte. 649	347+50 to 386+00	2-lane rural	$375,000	$536,800	$1,988,000	$2,899,800
D	Rte. 649 to Rte. 643	386+00 to 458+50	2-lane rural	$533,000	$1,237,000	$4,123,250	$5,893,250
E	Rte. 643 Improvements	458+50 to 480+00	2-lane rural	$268,300	$436,300	$1,745,300	$2,449,900
F	E of Rte. 643 to Rte. 616	480+00 to 557+00	2-lane rural	$462,480	$802,100	$3,208,300	$4,472,880
G	Rte. 616 Improvements	557+00 to 570+50	3-lane urban	$272,100	$835,900	$1,671,700	$2,779,700
H	Rte. 616 to Rte. 806	570+50 to 673+00	2-lane rural	$569,500	$1,103,100	$4,412,500	$6,085,100
I	Rte. 806 Improvements	673+00 to 725+50	3-lane urban	$444,600	$1,560,900	$3,121,700	$5,127,200
J	E of Rte. 806 to PW County Line	725+50 to 821+00	2-lane rural	$540,140	$1,070,100	$3,963,200	$5,573,440
	Grand Total	**100+00 to 821+00**		**$4,764,020**	**$10,978,000**	**$35,330,950**	**$51,072,970**

Table 3-- Alternative 2 Cost Summary (2017 Dollars)

Section	Description	Station Limits	Typical Section	PE	RW	Construction	Section Total
A	US-29 to US-17	1000+00 to 1115+00	4-lane divided	$1,034,300	$4,422,700	$12,636,200	$18,093,200
B	US-17 to W of Rte. 610	1115+00 to 1248+50	4-lane divided	$1,171,900	$4,060,600	$15,039,400	$20,271,900
C	W of Rte. 610 to Rte. 649	1248+50 to 1286+00	4-lane divided	$513,100	$1,021,100	$3,781,900	$5,316,100
D	Rte. 649 to Rte. 643	1286+00 to 1351+50	4-lane divided	$966,500	$3,337,000	$11,123,200	$15,426,700
E	Rte. 643 Improvements	1351+50 to 1380+00	4-lane divided	$473,500	$855,600	$3,422,600	$4,751,700
F	E of Rte. 643 to Rte. 616	1380+00 to 1457+50	4-lane divided	$779,100	$1,975,800	$7,903,200	$10,658,100
G	Rte. 616 Improvements	1457+50 to 1470+50	5-lane urban	$472,900	$1,730,200	$3,460,500	$5,663,600
H	Rte. 616 to Rte. 806	1470+50 to 1571+00	4-lane divided	$1,055,900	$3,260,000	$13,040,000	$17,355,900
I	Rte. 806 Improvements	1571+00 to 1622+50	5-lane urban	$668,100	$2,901,500	$5,803,000	$9,372,600
J	E of Rte. 806 to PW County Line	1622+50 to 1721+00	4-lane divided	$879,700	$1,966,000	$9,829,700	$12,675,400
	Grand Total	**1000+00 to 1721+00**		**$8,015,000**	**$25,530,500**	**$86,039,700**	**$119,585,200**

As shown in Tables 2 and 3, right-of-way acquisition and utility relocations would be required by both alternates. Estimated right-of-way acquisition areas are tabulated following the plan sheets for each alternate. Major utility relocation items for both alternates are shown in Tables 4 and 5 below.

Table 4-- Alternative 1 Utility Relocations

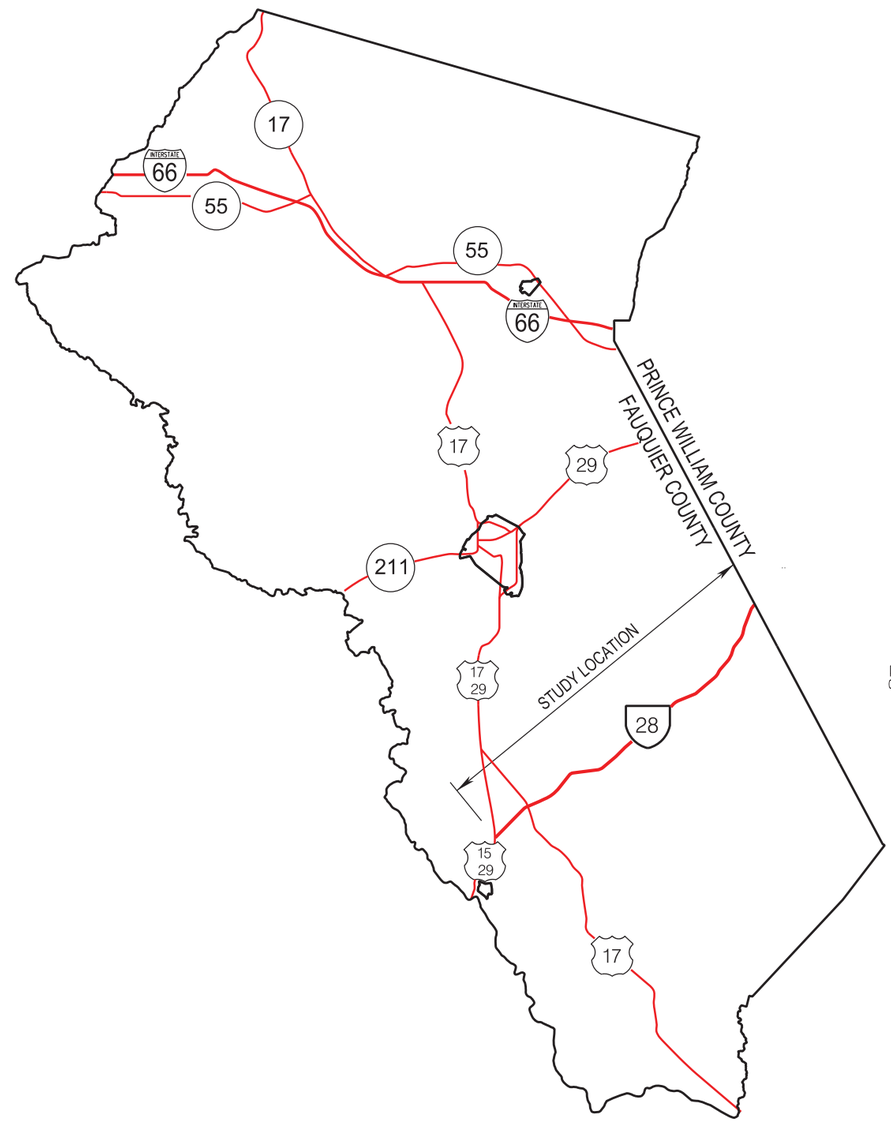
Item	Unit	Section										Total
		A	B	C	D	E	F	G	H	I	J	
Fiber Optic Marker	EA	4	-	-	3	2	4	2	19	3	12	49
Fire Hydrant	EA	-	-	-	-	-	-	-	-	1	-	1
Light Pole	EA	-	-	-	-	-	-	1	-	1	-	2
Power Pole	EA	35	53	-	19	11	71	13	64	16	-	282
Telephone Junction Box	EA	20	8	-	4	3	9	2	3	6	7	62

Table 5-- Alternative 2 Utility Relocations

Item	Unit	Section										Total
		A	B	C	D	E	F	G	H	I	J	
Fiber Optic Marker	EA	4	-	1	3	2	4	2	19	5	13	53
Fire Hydrant	EA	-	1	-	-	-	-	-	-	3	-	4
Light Pole	EA	-	1	-	-	-	2	1	-	1	-	5
Power Pole	EA	51	63	1	28	17	79	14	66	24	10	353
Telephone Junction Box	EA	25	16	-	9	5	9	2	4	13	7	90

ROUTE 28 CATLETT ROAD IMPROVEMENT STUDY

VDOT Project No.
PE12-967-103 UPC # 99579
Route 28 Pre-Scoping Services
Fauquier County, VIRGINIA



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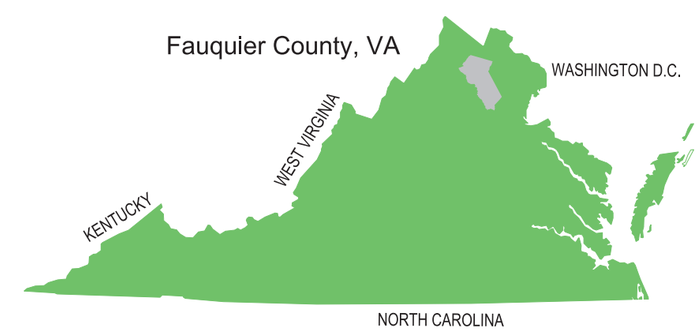

MARCH 2012
STUDY AREA

Prepared by:

VOLKERT

Alexandria, VA.

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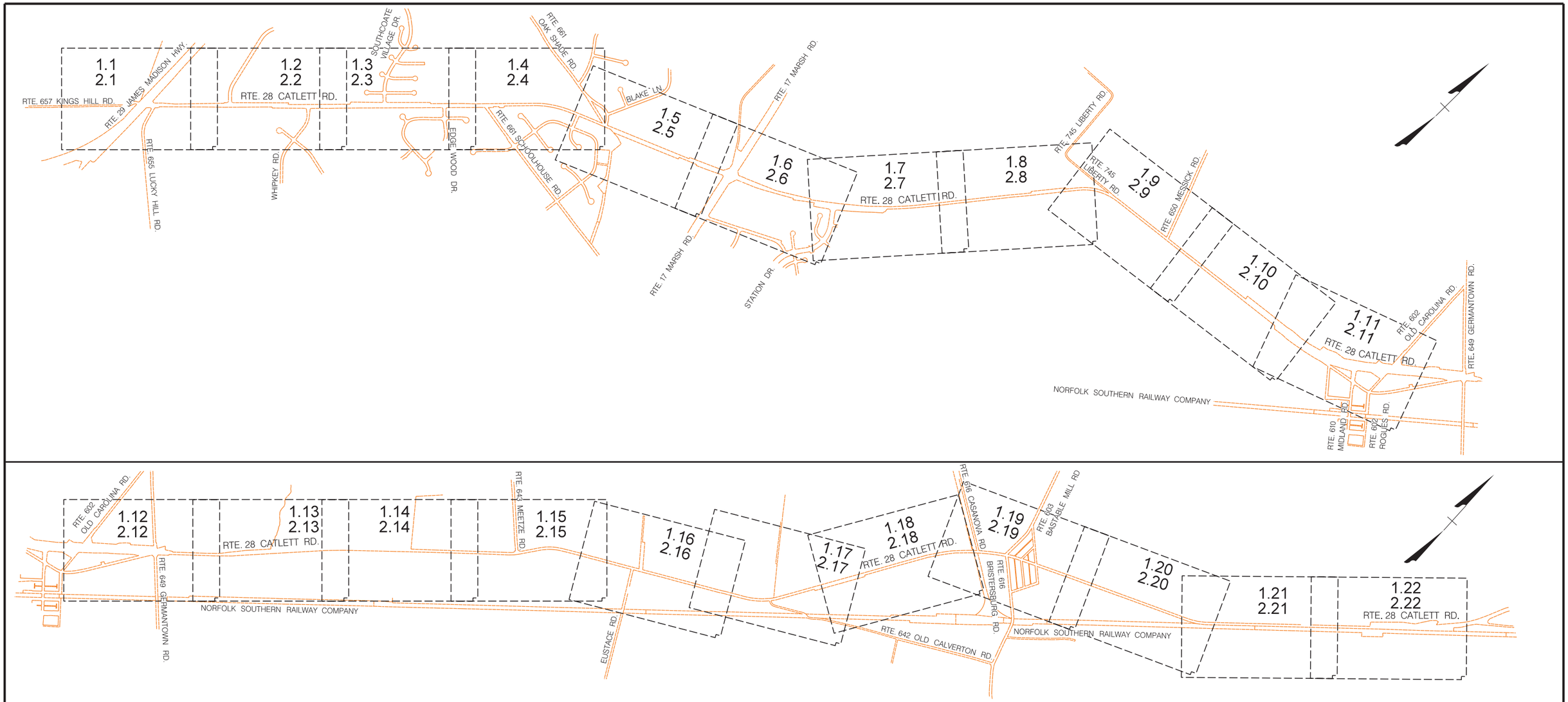

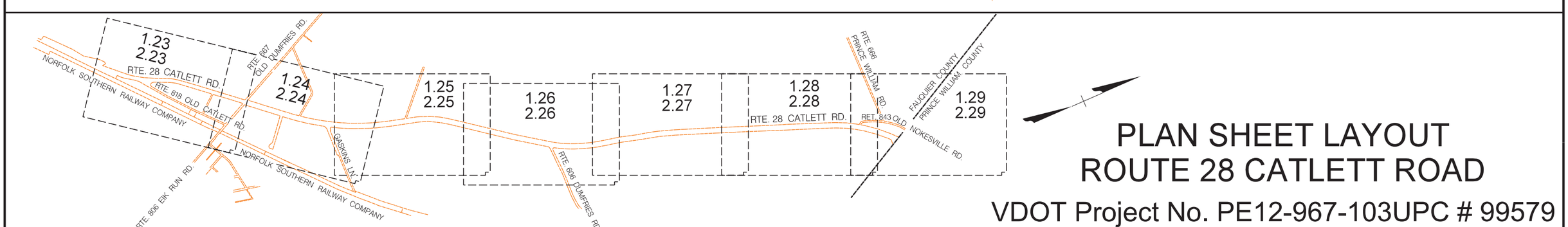

PLAN SHEET LAYOUT
ROUTE 28 CATLETT ROAD

VDOT Project No. PE12-967-103UPC # 99579

VOLKERT

PLAN SHEET INDEX:

2 LANE SHEET NO. 1.1 THRU 1.29

4 LANE SHEET NO. 2.1 THRU 2.29

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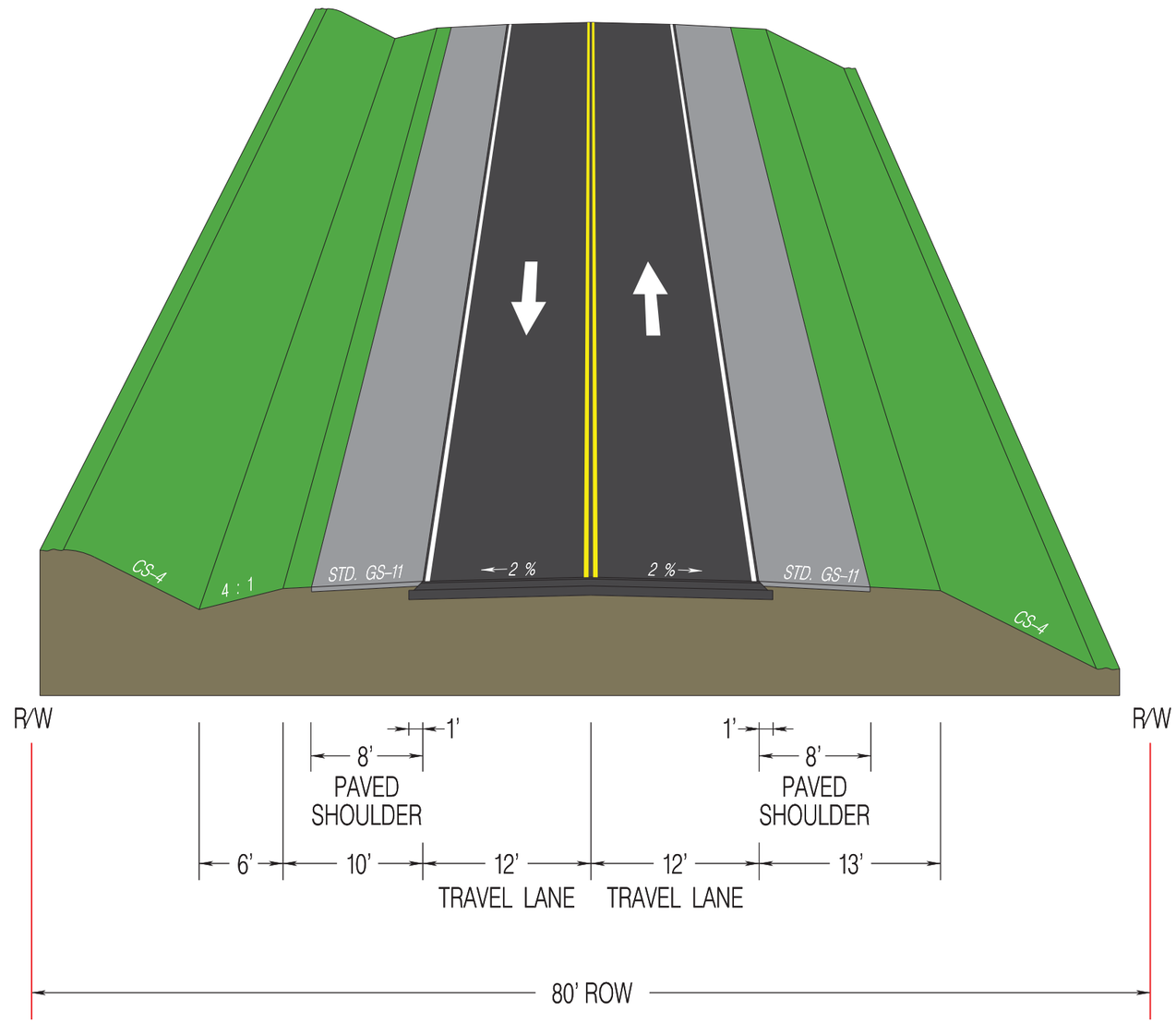

TYPICAL SECTION

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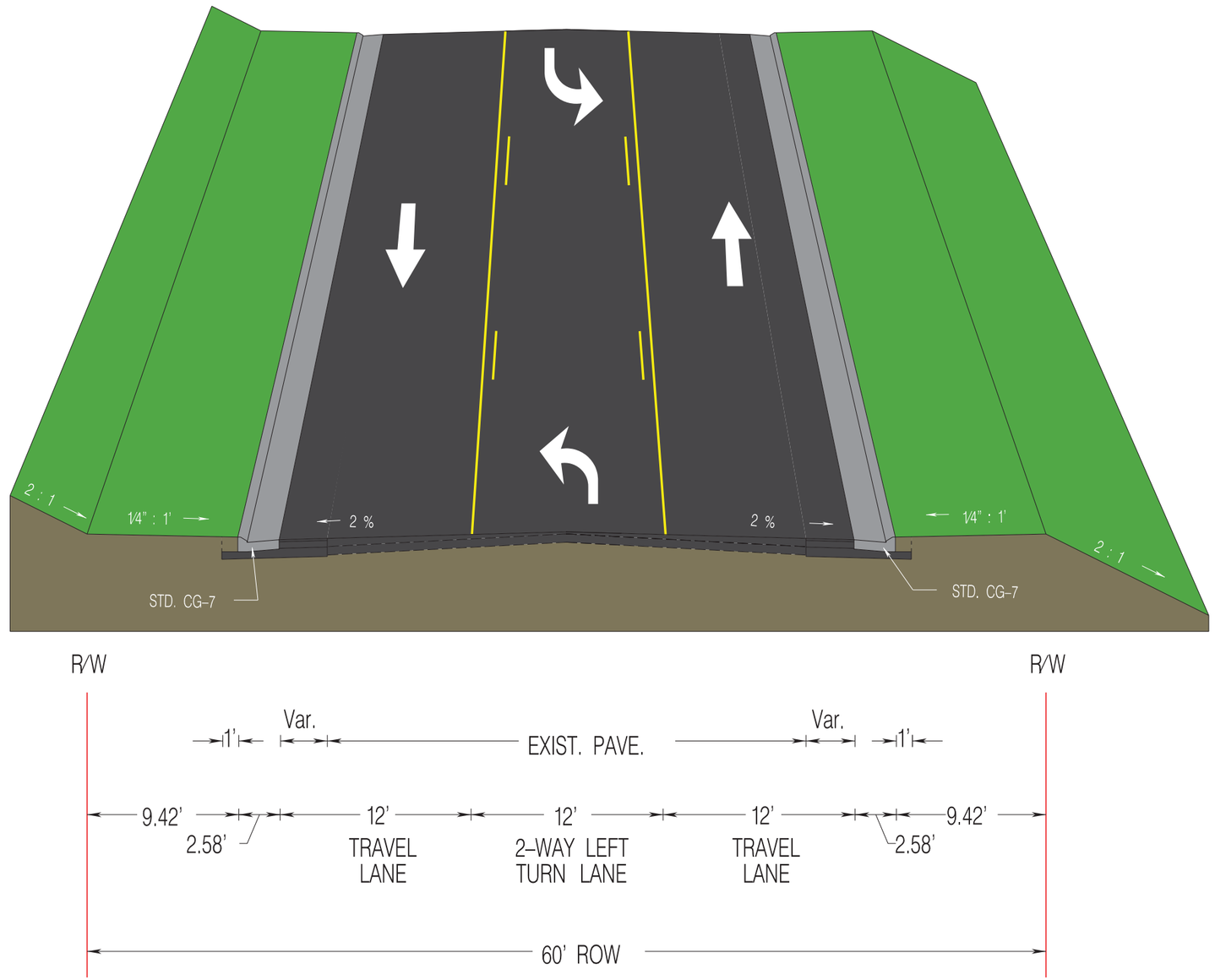

TYPICAL SECTION

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3-Lane Urban Section

VOLKERT

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JAMES MADISON HWY
15
29
28
CATLETT RD
657 KINGS HILL RD
655 LUCKY HILL RD
100
105
110
001
002
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004
005
006
007
008
009
010
ML SHEET 1.2
LEGEND
Road Improvements
Bridge
Grass Median
Proposed R/W
Existing R/W
Existing 8' Paved Shoulder
VOLKERT
PLAN
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2 Lanes w/ Shoulder and Intersection Improvements
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BLUE RIDGE CHRISTIAN HOME
CRAIG RUN
(2) 60" C.M. PIPE
(2) 60" C.M. PIPE
28
CATLETT RD
ML SHEET 1.1
ML SHEET 1.3
WHISKEY RD
CRAIG RUN
001
007
008
009
010
011
012
013
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LEGEND
Road Improvements
Bridge
Grass Median
Proposed R/W
Existing R/W
Existing 8' Paved Shoulder
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LEGEND

- Road Improvements
- Bridge
- Grass Median
- Proposed R/W
- Existing R/W
- Existing 8' Paved Shoulder

SOUTHCOATE VILLAGE DR

28 CATLETT RD

1121 MAPLEWOOD DR

1120 EDGEWOOD DR

PERSIMMON CT

BRIANWOOD CT

ML SHEET 1.2

ML SHEET 1.4

140 145 150 155 160 165

012 021 022 023 024 025 026 027 028 029 030 031 032 033 034 035 036 037 038 039 040 041 042

(2) 60" C.M. PIPE

PLAN

CONCEPT ALTERNATIVE 1

2 Lanes w/ Shoulder and Intersection Improvements

VOLKERT

VDOT

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LEGEND

- Road Improvements
- Bridge
- Grass Median
- Proposed R/W
- Existing R/W
- Existing 8' Paved Shoulder

ML SHEET 13

ML SHEET 15

CATLETT RD

28

661 OAK SHADE RD

1242 HUNTLAND DR

1240 BLAKE LN

BRIANWOOD CT

SCHOOLHOUSE RD

FORBES PLACE WEST

FORBES PLACE EAST

1031

CEDAR LN

LANCIA CT

1032

1030 CREST LN

WALNUT GROVE CHILD CARE

1123 WILLOWBROOK DR

NATURAL GAS PIPELINE ESMT

54" C.M. PIPE

24" C.M. PIPE

0.0000 Acre

PLAN

CONCEPT ALTERNATIVE 1

2 Lanes w/ Shoulder and Intersection Improvements

VOLKERT

VDOT

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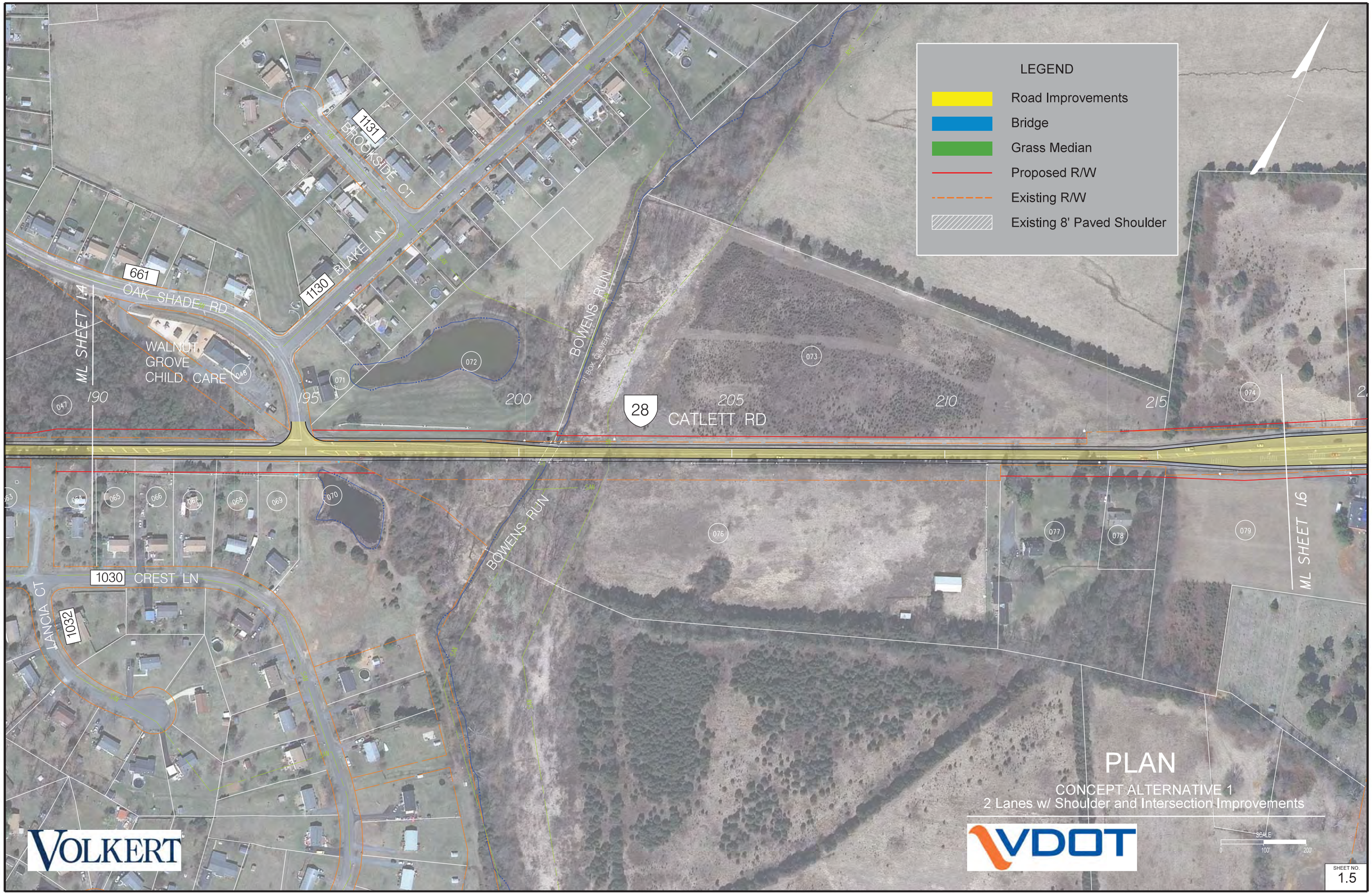
LEGEND
Road Improvements
Bridge
Grass Median
Proposed R/W
Existing R/W
Existing 8' Paved Shoulder
1131
BROOKSIDE CT
1130
BLAKE LN
661
OAK SHADE RD
WALNUT GROVE CHILD CARE
ML SHEET 1.4
BOWENS RUN
21' BOX CULVERT
28
CATLETT RD
190
195
200
205
210
215
1030
CREST LN
LANCIA CT
1032
ML SHEET 1.6
PLAN
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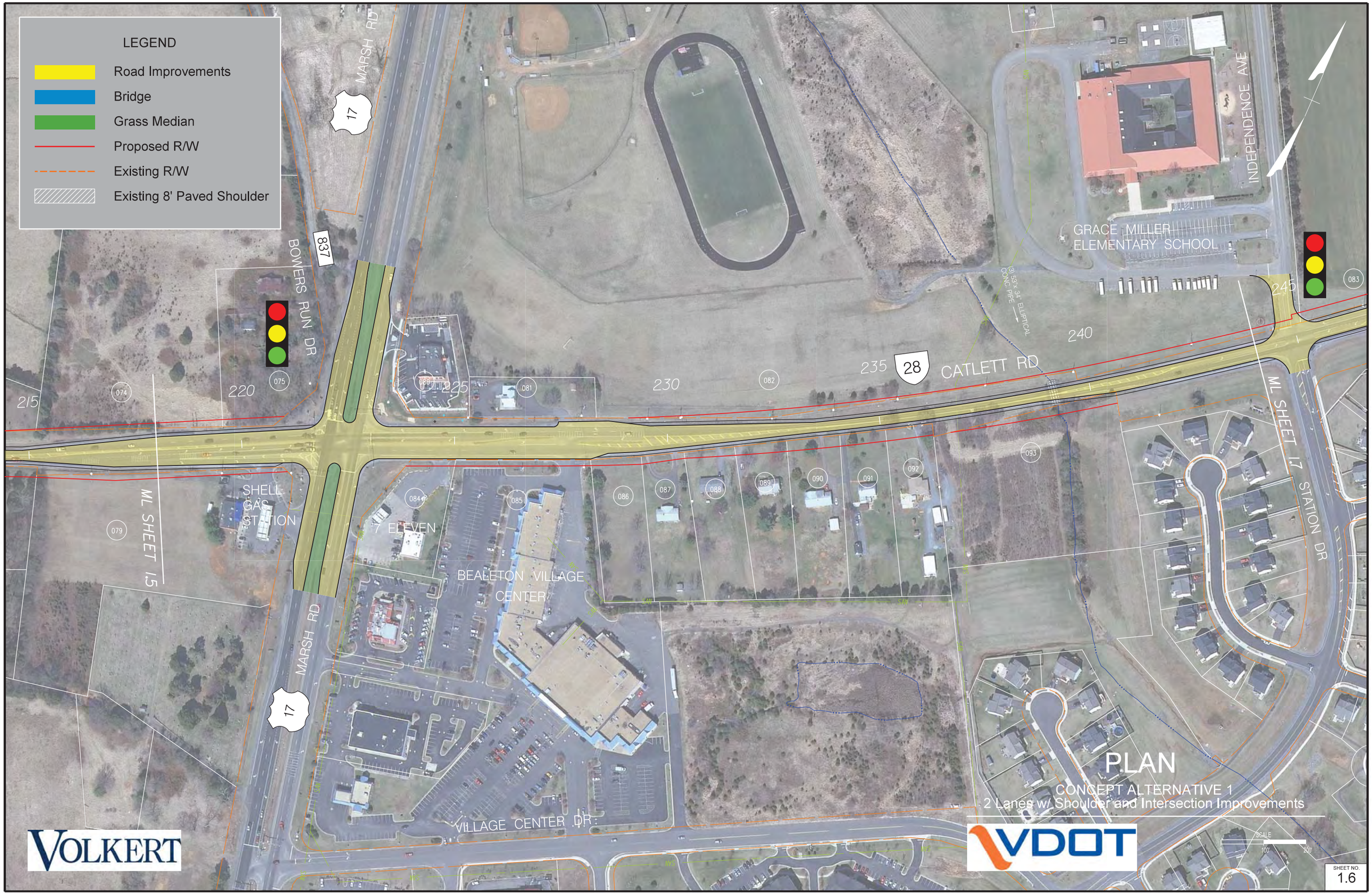

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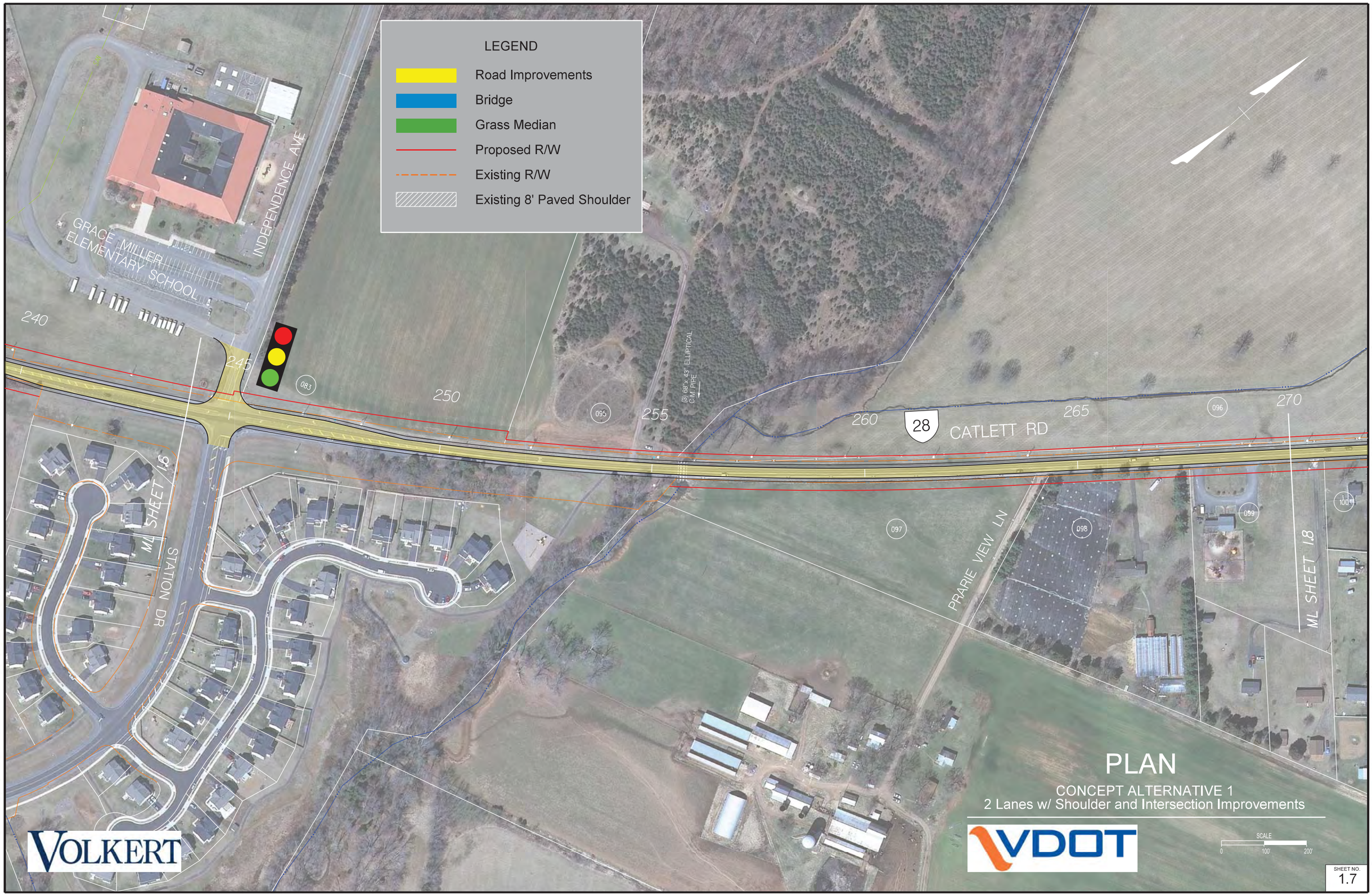

VOLKERT

VDOT

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LEGEND
Road Improvements
Bridge
Grass Median
Proposed R/W
Existing R/W
Existing 8' Paved Shoulder
GREAT MARSH PL
GLOBAL AUTOMOTIVE
GLOBAL WAY
745 LIBERTY RD
28 CATLETT RD
24" C.M. PIPE
270
275
280
285
290
295
096
099
100
101
102
103
104
105
106
107
108
109
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111
112
ML SHEET 1.7
ML SHEET 1.9
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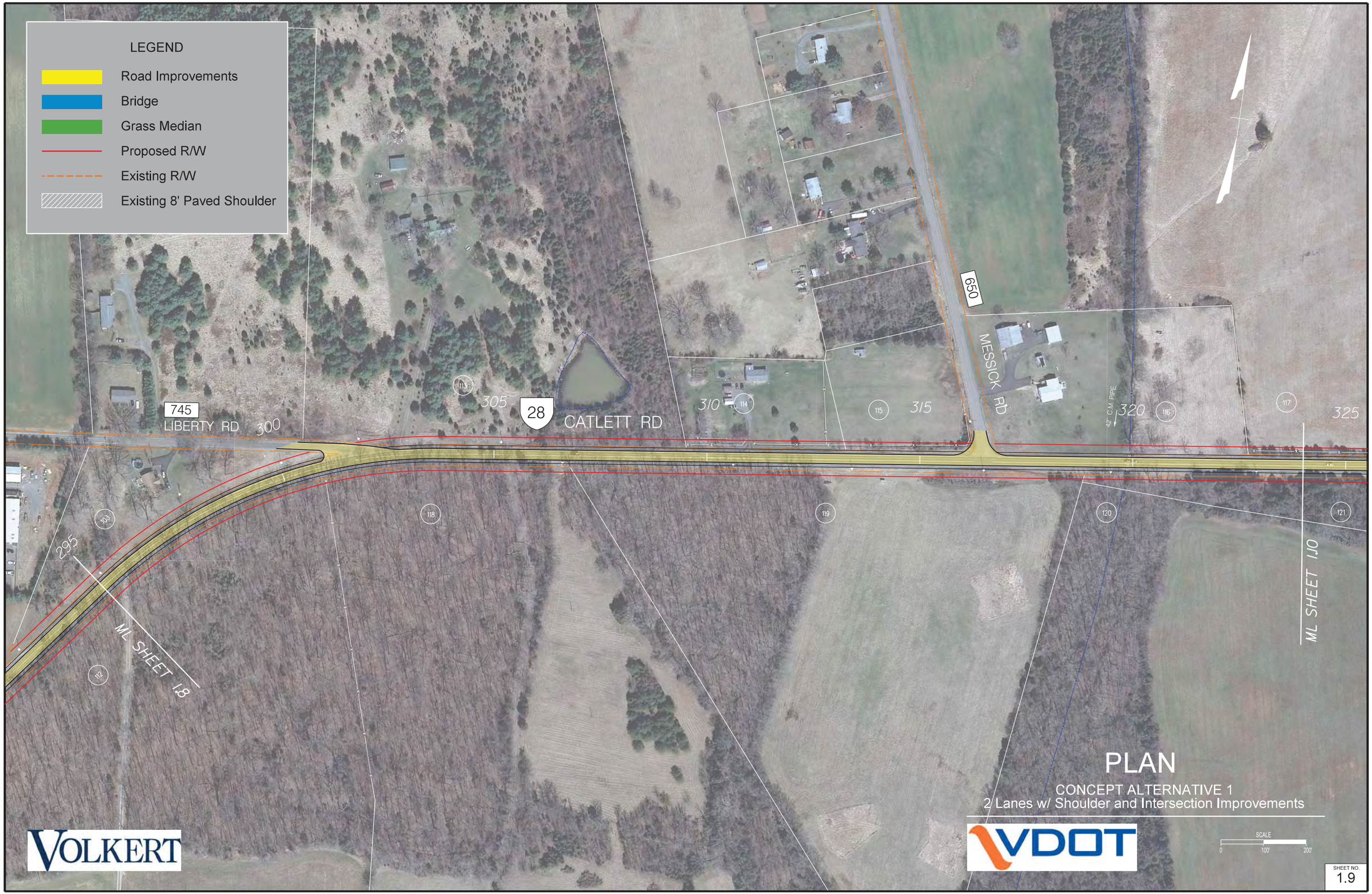
LEGEND
Road Improvements
Bridge
Grass Median
Proposed R/W
Existing R/W
Existing 8' Paved Shoulder
745
LIBERTY RD
300
305
28
CATLETT RD
310
315
650
MESSICK RD
320
325
42" C.M. PIPE
295
ML SHEET 1.8
ML SHEET 1.10
PLAN
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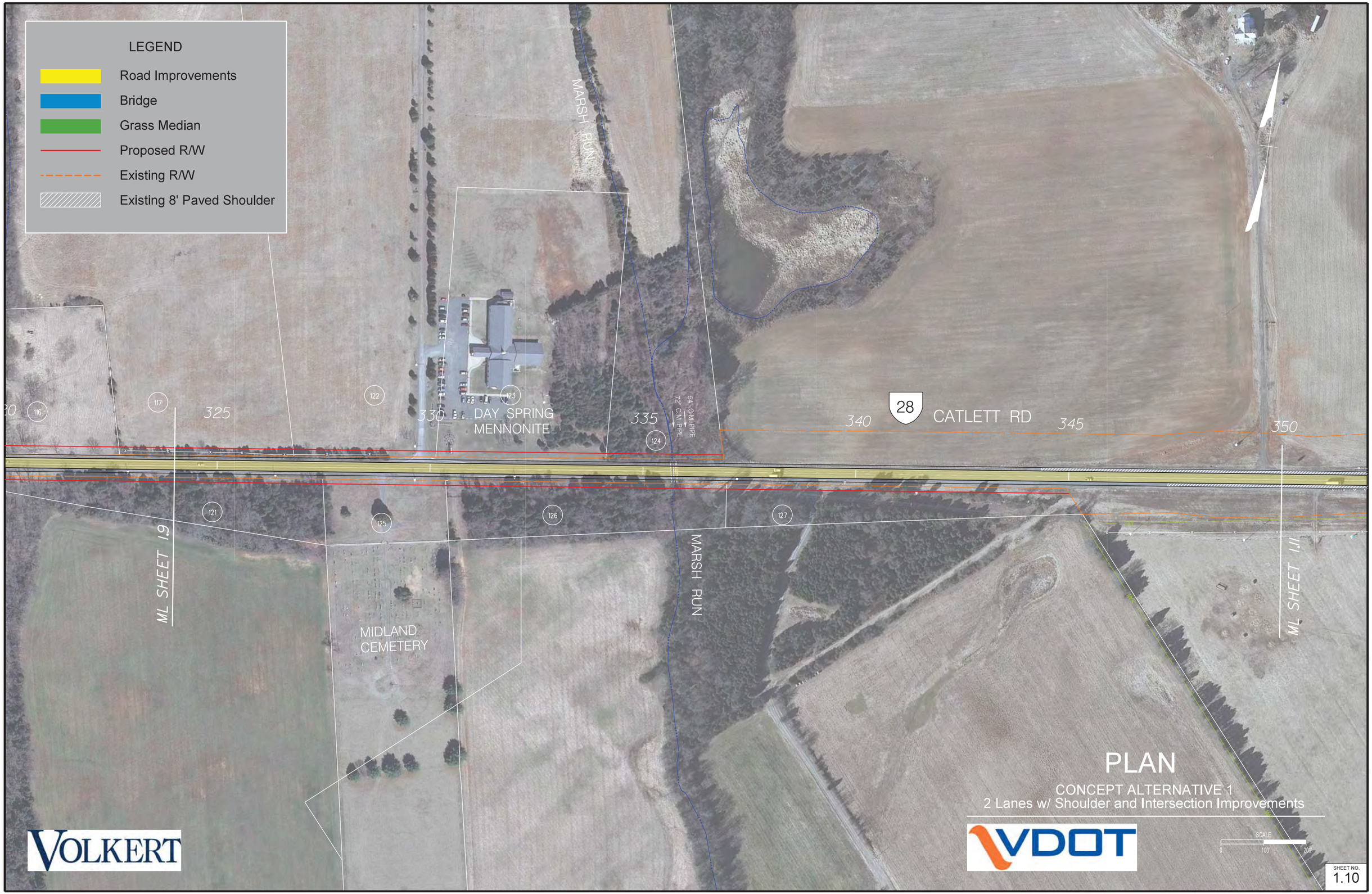
LEGEND
Road Improvements
Bridge
Grass Median
Proposed R/W
Existing R/W
Existing 8' Paved Shoulder
MARSH RUN
DAY SPRING MENNONITE
54" C.M. PIPE
72" C.M. PIPE
28
CATLETT RD
325
330
335
340
345
350
116
117
121
122
123
124
125
126
127
ML SHEET 1.9
ML SHEET 1.11
MIDLAND CEMETERY
MARSH RUN
PLAN
CONCEPT ALTERNATIVE 1
2 Lanes w/ Shoulder and Intersection Improvements
VOLKERT
VDOT
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200'
SHEET NO.
1.10

10/11/12 AM

LEGEND
Road Improvements
Bridge
Grass Median
Proposed R/W
Existing R/W
Existing 8' Paved Shoulder
OLD CAROLINA RD
602
375
370
365
360
355
350
345
28
CATLETT RD
ML SHEET 1.10
ML SHEET 1.12
133
132
131
130
129
128
128a
COMMUTER PARKING
GOOD FELLOWS BIKE REPAIRS
610
MIDLAND RD
602
ROGUES RD
PLAN
CONCEPT ALTERNATIVE 1
2 Lanes w/ Shoulder and Intersection Improvements
VOLKERT
VDOT
SCALE
0
100'
200'
SHEET NO.
1.11

10/21/20 AM

PLAN

CONCEPT ALTERNATIVE 1
2 Lanes w/ Shoulder and Intersection Improvements

10:41:28 AM

PLAN

CONCEPT ALTERNATIVE 1

2 Lanes w/ Shoulder and Intersection Improvements

SHEET NO.
1.13

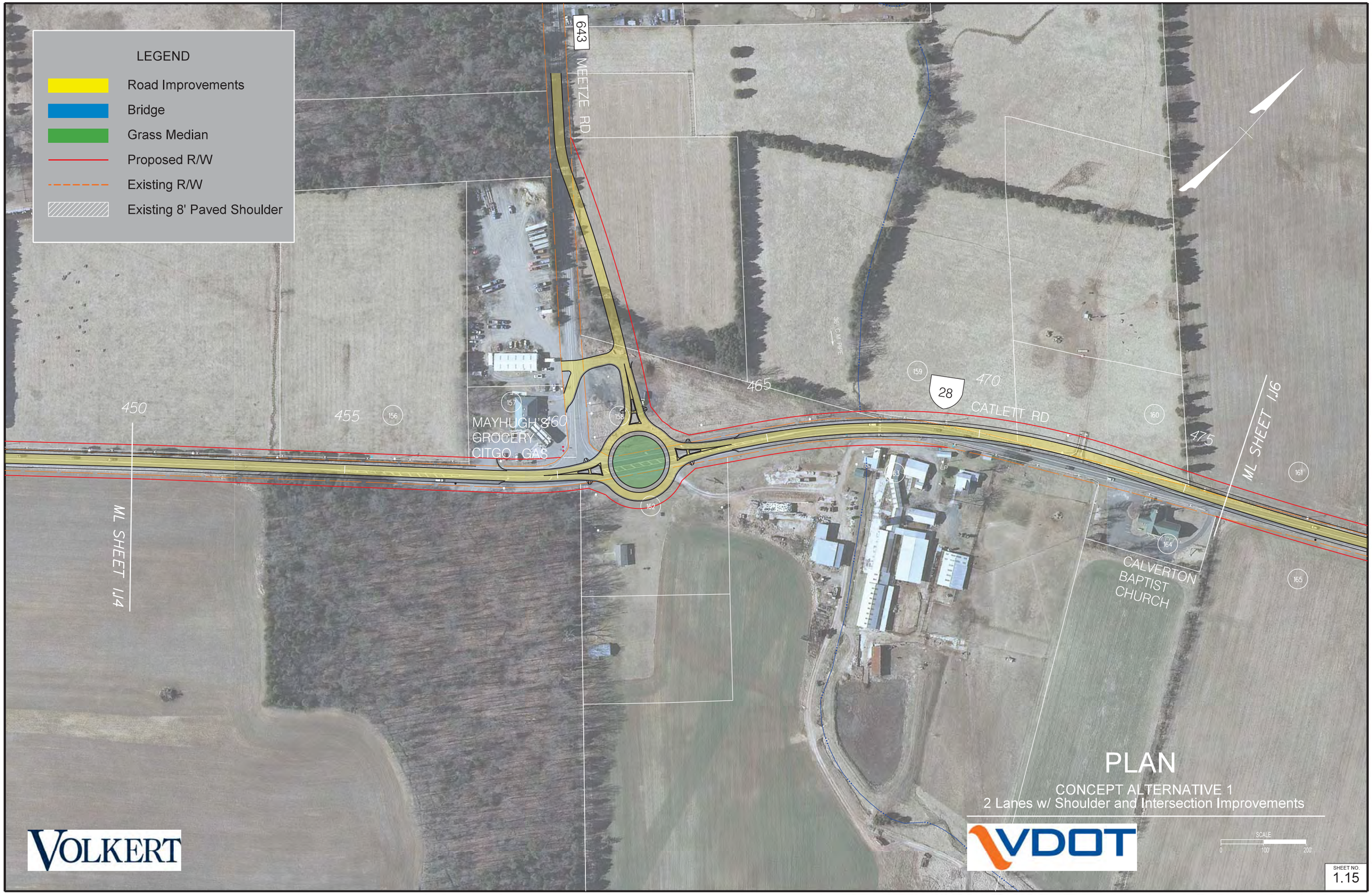
10:41:36 AM

PLAN

CONCEPT ALTERNATIVE 1
2 Lanes w/ Shoulder and Intersection Improvements

SHEET NO.
1.14

10:01:44 AM



PLAN

CONCEPT ALTERNATIVE 1
2 Lanes w/ Shoulder and Intersection Improvements

10:41:52 AM

LEGEND
Road Improvements
Bridge
Grass Median
Proposed R/W
Existing R/W
Existing 8' Paved Shoulder
ML SHEET 1.15
ML SHEET 1.17
SOUTHEASTERN ALTERNATIVE SCHOOL
CATLETT RD
28
CALVERTON BAPTIST CHURCH
EUSTACE RD
NORFOLK SOUTHERN RAILWAY COMPANY
475
480
485
490
495
500
505
161
164
165
166
167
168
169
170
171
172
175
176
177
178
179
180
PLAN
CONCEPT ALTERNATIVE 1
2 Lanes w/ Shoulder and Intersection Improvements
SCALE
0
100'
200'
SHEET NO.
1.16

10/4/2020 AM

LEGEND
Road Improvements
Bridge
Grass Median
Proposed R/W
Existing R/W
Existing 8' Paved Shoulder
530
525
520
515
510
505
500
CHEMETRICS INC.
ML SHEET 1.18
ML SHEET 1.16
28
CATLETT RD
642
OLD CALVERTON RD
42" C.M. PIPE
36" C.M. PIPE
NORFOLK SOUTHERN RAILWAY COMPANY
169
170
171
172
173
174
179
180
181
182
183
184
185
186
PLAN
CONCEPT ALTERNATIVE 1
2 Lanes w/ Shoulder and Intersection Improvements
SCALE
0
100'
200'
SHEET NO.
1.17

10:42:08 AM

PLAN

CONCEPT ALTERNATIVE 1

2 Lanes w/ Shoulder and Intersection Improvements

10:22:46 AM

LEGEND
Road Improvements
Bridge
Grass Median
Proposed R/W
Existing R/W
Existing 8' Paved Shoulder
616
CASANOVA RD
603
BASTABLE MILL RD
MITCH HARRISON SADDLES
28
CATLETT RD
560
565
570
575
580
555
SOUTHERN STATES
CALVERTON MARKET
HICKERSON BROTHERS ELECTRIC SERVICE
ML SHEET 1.18
ML SHEET 1.20
616
BRISTERSBURG RD
PLAN
CONCEPT ALTERNATIVE 1
2 Lanes w/ Shoulder and Intersection Improvements
VOLKERT
VDOT
SCALE
0
100'
200'
SHEET NO.
1.19

10/22/24 AM

LEGEND
Road Improvements
Bridge
Grass Median
Proposed R/W
Existing R/W
Existing 8' Paved Shoulder
CONCRETE PRODUCTS COMPANY
580
585
590
595
600
605
28
CATLETT RD
199
209
212
213
214
ML SHEET 1.19
ML SHEET 1.21
NORFOLK SOUTHERN RAILWAY COMPANY
NATURAL GAS PIPELINE ESMT
PLAN
CONCEPT ALTERNATIVE 1
2 Lanes w/ Shoulder and Intersection Improvements
VOLKERT
VDOT
SCALE
0
100'
200'
SHEET NO.
1.20

10:42:32 AM

PLAN

CONCEPT ALTERNATIVE 1
2 Lanes w/ Shoulder and Intersection Improvements

SHEET NO.
1.21

10/12/40 AM