Montgomery County
Department of Transportation

East Randolph Road Noise Study

From Burkhart Street to Old Columbia Pike

Please Hold Questions

We will answer all questions at the end of the presentation.

WHO ARE WE?

Department of Transportation

Division of Transportation Engineering

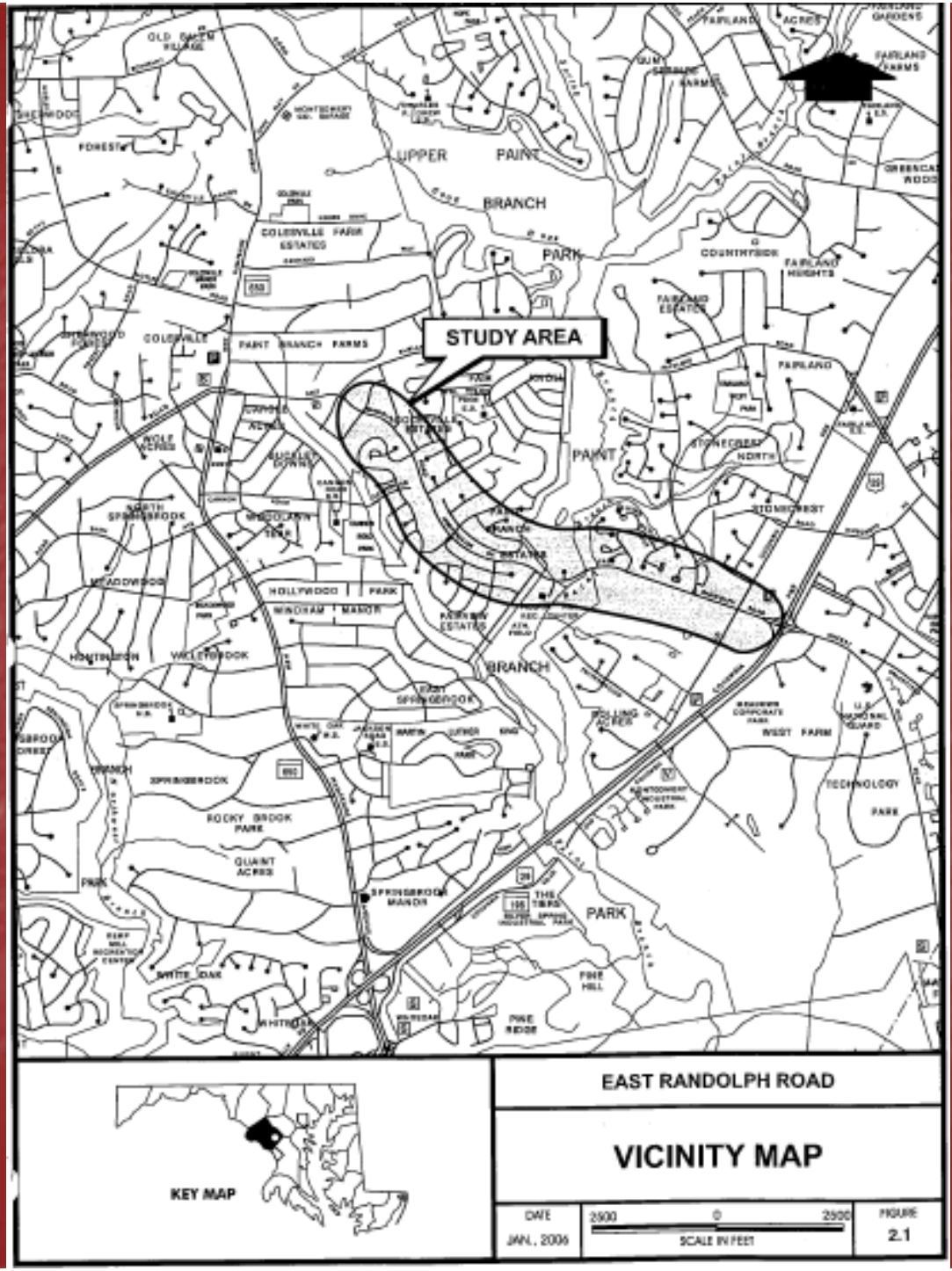
Bruce Johnston (Chief)

Michael Mitchell (Program Manager)

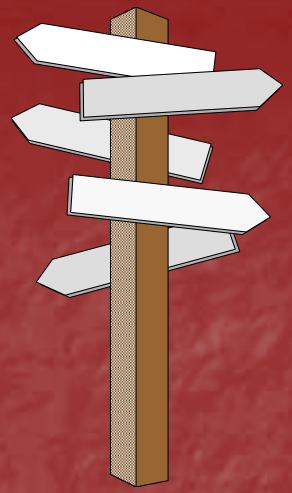
PURPOSE OF THIS MEETING ?

- Present the results of the noise study.
- Answer Community's questions.
- Receive feedback from the public on the findings of the study.

Vicinity Map



Project Need:



- This project is a study to assess noise levels generated by road traffic only.
- The study determines the need, qualification and feasibility of noise mitigation measures.

Noise Fundamentals

- Two short videos on fundamentals of quantifying and measuring highway noise and designing barriers.

Noise Fundamentals 1

Noise Fundamentals 2

Noise Fundamentals

- Concerned with traffic noise (trucks, cars, buses, and motorcycles). Noise is generated by the stack, engine, and tires and increases with speed and volumes.
- Background noise (rustling leaves, children playing, insects, etc.)
- Unit of noise measurement is DECIBEL, a logarithmic scale based on energy.
- A doubling of sound energy, as would be a doubling of traffic volume, would be 3 dBA change.
- Human Hearing ability affects how noise is heard.
  - **3 dBA change generally barely perceptible**
  - **5 dBA change readily noticeable**
  - **10 dBA change 'sounds' twice as loud to most people**

Terms (More Fundamentals)

- Impacted: A receptor experiencing a peak-noise hour equivalent sound level of 67 dBA or higher due to vehicular traffic noise.
- Affected (By Construction): Properties on which the implementation of the noise mitigation measures created temporary or permanent property impacts.
- Benefited: Receptors (or homeowners) which are noise impacted and experience barrier insertion loss of at least 3 dBA.
- Insertion Loss: The decrease in the sound level measured at a receptor location when a noise barrier is placed in the noise propagation path between the receptor and a roadway
- Level of Service (LOS-D): A qualitative measure of traffic flow conditions (primarily traffic volume and average speed), differentiated into six levels and given letter designations (‘A’ through ‘F’) where ‘A’ represents the best operating conditions (low volume/high speed) and ‘F’ the worst. The greatest noise generation from a roadway generally occurs at LOS-D, characterized by high traffic density with stable, high speeds.

Study Criteria

- The Noise Study was done as per the County's Highway Noise Abatement Policy

  The County's noise study criteria is very similar to noise study criteria used by the Federal government and other state governments

- Noise Measurements are taken at outdoor ground level (i.e. rear useable yard) 25 feet from the house, five feet above ground (approx. human ear level).

  Typically the noise inside the dwelling is 15 to 20 dBA below that outside the dwelling

Methodology
How The Study Was Conducted

- Logical Implementation Segments (LIS)

  LIS is a Logical assessment area that has similar noise characteristics. An LIS is generally selected such that protection would be provided by an individual noise barrier wall.

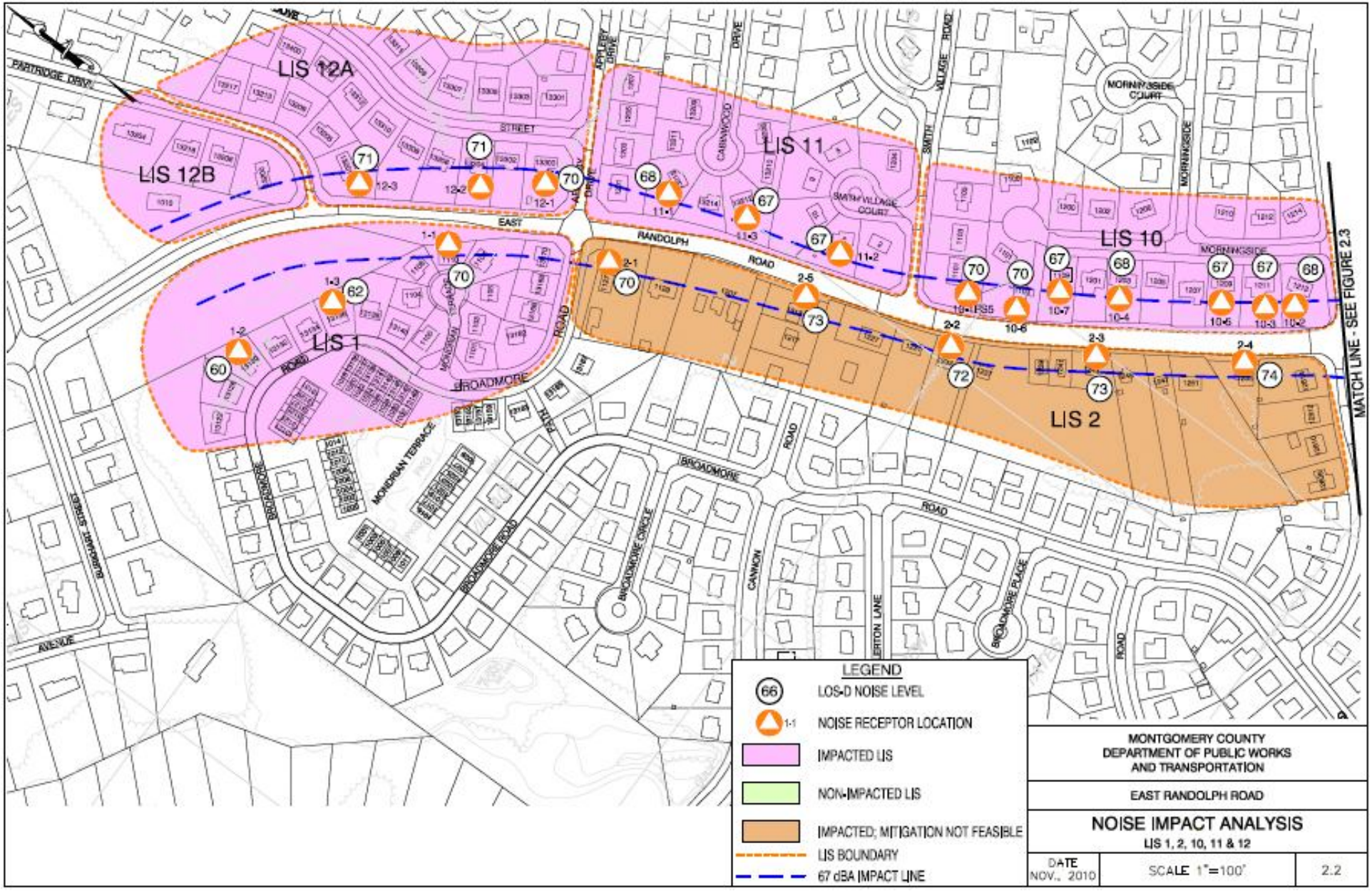
- Receptor Locations

  Receptor locations selected to accurately show noise levels within each LIS.

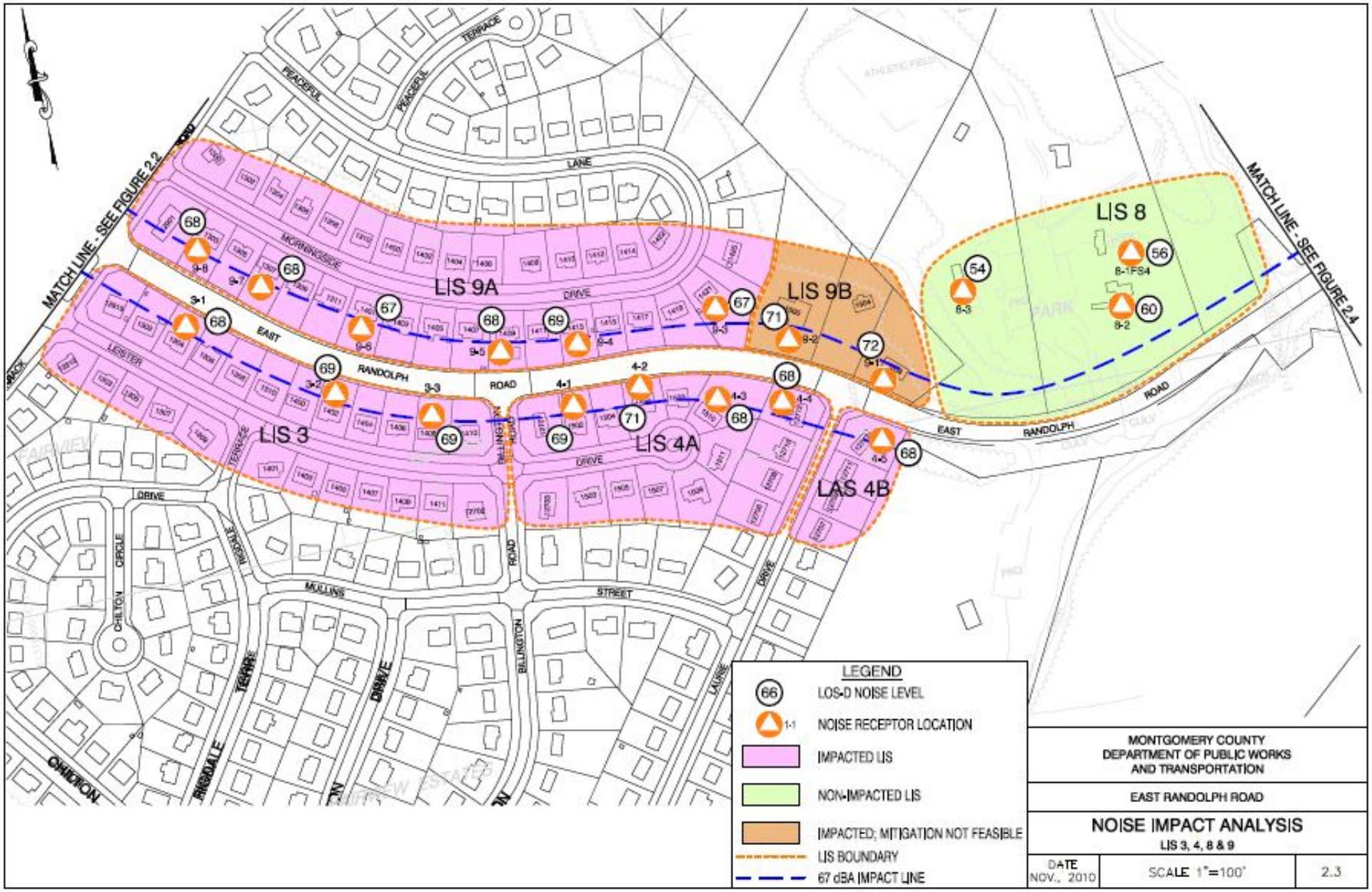
- Scope of Study (Noise Measurements & Modeling)

  Investigate current noise levels as well as noise levels projected to occur within the next 20 years (at Level of Service 'D')

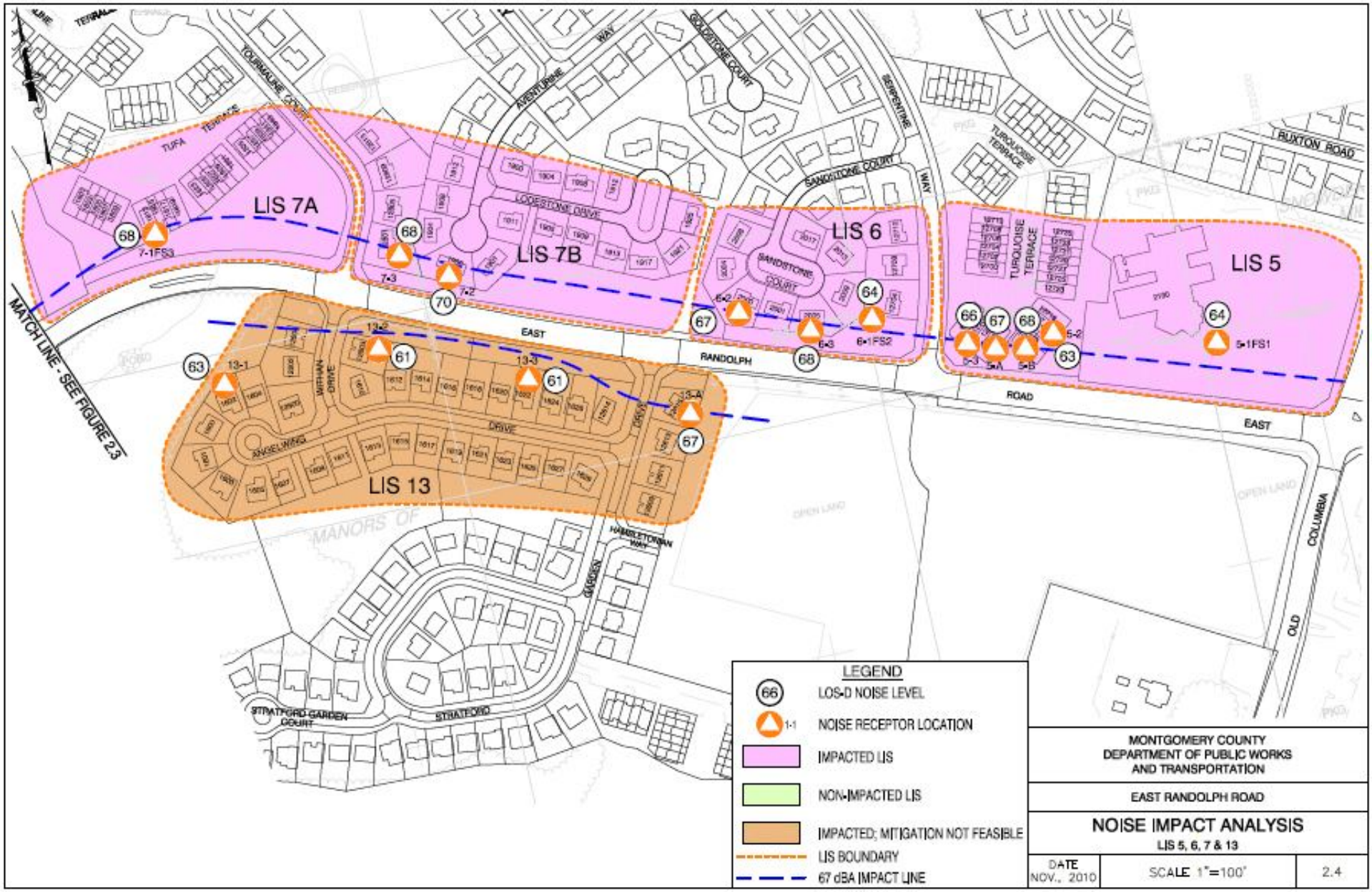
LIS Map


LIS 12A
LIS 12B
LIS 11
LIS 10
LIS 1
LIS 2
RANDOLPH ROAD
EAST
BROADMORE
MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
EAST RANDOLPH ROAD
NOISE IMPACT ANALYSIS
LIS 1, 2, 10, 11 & 12
DATE NOV., 2010
SCALE 1"=100'
2.2
LEGEND
66 LOS-D NOISE LEVEL
1-1 NOISE RECEPTOR LOCATION
IMPACTED LIS
NON-IMPACTED LIS
IMPACTED; MITIGATION NOT FEASIBLE
LIS BOUNDARY
67 dBA IMPACT LINE
MATCH LINE - SEE FIGURE 2-3

LIS Map continued



LIS Map continued



LIS Descriptions

LIS	Description	No. of Residences	No. of Receptor Sites
1	Single-family and Townhouse residences on south side of E. Randolph Road between Burkhart St and Broadmore Road	71	3
2	Single-family residences on south side of E. Randolph Rd between Broadmore Road and Tamarack Road	20	5
3	Single-family residences on south side of E. Randolph Rd between Tamarack Road and Billington Road	24	3
4A	Single-family residences on south side of E. Randolph Rd between Billington Road and Laurie Drive	16	4
4B	Single-family residences on south side of E. Randolph Rd east of Laurie Drive	4	1
5	Townhouse residences and a church on north side of E. Randolph Rd between Old Columbia Pk & Serperntine Way	23	3
6	Single-family residences on north side of E. Randolph Rd between Serpentine Way and Sandstone Court	11	3
7A	Single-family and Townhouse residences on north side of E. Randolph Road along Toufa Terrace and Tourmaline Court	19	1

LIS Descriptions continued

LIS	Description	No. of Residences	No. of Receptor Sites
7B	Single-family and Townhouse residences on north side of E. Randolph Road along Tourmaline Court, Aventurine Way, and Lodestone Drive	20	2
8	A park on north side of E. Randolph Road between Morningside Drive and Toufa Terrace	1*	3
9A	Single-family residences on north side of E. Randolph Rd along Morningside Drive to the east of Tamarack Road	36	8
10	Single-family residences on north side of E. Randolph Rd between Tamarack Road and Smith Village Road	20	7
11	Single-family residences on north side of E. Randolph Rd between Smith Village Road and Appleby Drive	17	3
12A	Single-family residences on north side of E. Randolph Rd between Appleby Drive and Partridge Drive	21	3
12B	Single-family residences on north side of E. Randolph Rd between Partridge Drive and Burkhart Street	5	0
13	Single-family residences on south side of E. Randolph Road along Withan Dr, Angelwing Dr, and Stratford Garden Dr	36	3

Scope of Noise Study

1. Review study area and select LIS and receptor sites.

2. Take short term (20 minute) and long term (24 hour) noise measurements.

   * Traffic counts taken with short term measurements. Noise measurements and traffic counts used to calibrate computer model used for acoustical analysis

   * 24-hour noise measurements used to determine sound variations over a day and to determine noisiest hours

3. Set up and calibrate computer model used to determine noise levels in the future design year. Transportation Noise Model (TNM) of Federal Highway Administration used to model noise levels. Input includes traffic types, volumes and speeds; locations and types of roadways and receivers; intervening objects that would affect the noise levels such as buildings, trees, ground, and grass.

Scope of Noise Study continued

5. Run calibrated model based on projected traffic levels expected to occur within 20 years (use LOS-D traffic volume if expected to occur within 20 years). Where noise levels exceed 67 dBA analyze barriers.

6. Input proposed barrier locations, lengths and heights into TNM computer program.

7. Vary barrier heights as required until desired noise reduction is obtained.

8. Estimate cost and perform cost/benefit analysis

9. Prepare report

Highest Measured and Predicted Noise Levels

LIS	Highest Leq Receptor #	Location	Noise Level	
			Field Ambient	Predicted LOS-D
1	1-1	1110 Mondrain Terr	64	70
		13170 Broadmore Rd	NA	71
2	2-4	1255 East Randolph Rd	72	74
3	3-2	1402 Leister Drive	61	69
		1410 Leister Drive	NA	70
4A	4-2	1506 Lesiter Drive	64	71
4B	4-5	12713 Laurie Drive	62	68
5	5-1	2130 East Randolph Rd	60	64
		12711 Turquoise Terr	NA	68
6	6-3	2005 Sandstone Court	64	68

Highest Measured and Predicted Noise Levels Continued

LIS	Highest Leq Receptor #	Location	Noise Level	
			Field Ambient	Predicted LOS-D
7B	7-2	1900 Aventurine Way	65	70
8	8-2	Valley Mill Park	60	60
9A	9-1	1413 Morningside Drive	63	69
9B	9-1	1508 East Randolph Rd	66	72
10	10-6	1103 Morningside Drive	67	70
11	11-2	6 Smith Village Court	59	67
		13214 Cabinwood Drive	NA	69
12A	12-2	13304 Dove Street	63	71
12B		13200 Partridge Drive	NA	69
13	13-1	1602 Angelwing Drive	60	63
		12604 Withan Drive	NA	69

Noise Mitigation Criteria

Feasibility Criteria

- The barrier can be built to provide an insertion loss of at least 7 dBA for the most seriously traffic-noise impacted receptors.
- The barrier can be built without either unduly restricting pedestrian or vehicular access, or without interfering with safe sight distances for motorists.
- Any right-of-way required for the construction and maintenance of the barrier must either be dedicated to the County at no cost or the County is granted permanent easement.

Noise Mitigation Criteria continued

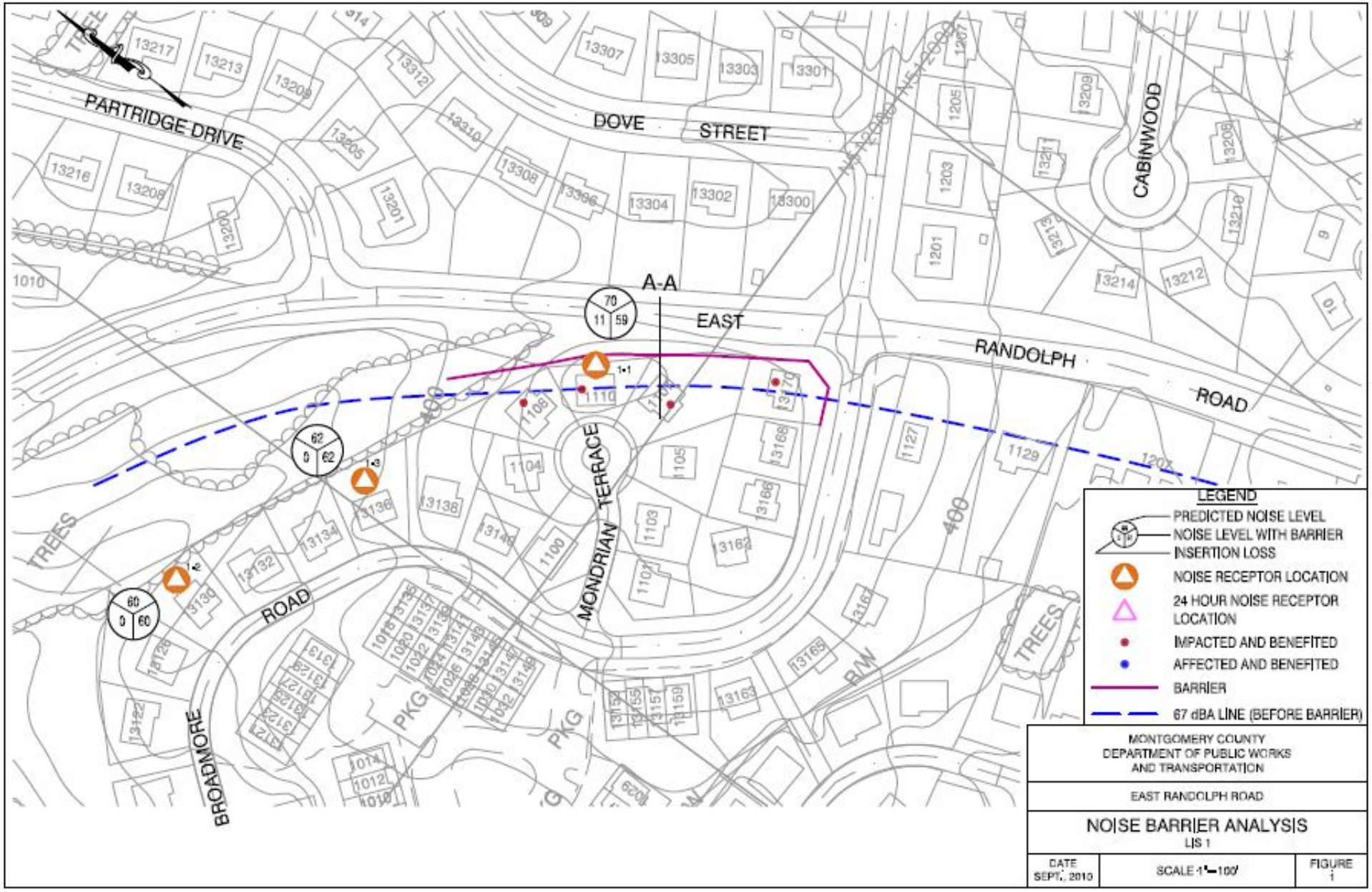
Reasonableness Criteria

- The measured or projected sound level must equal or exceed 67 dBA.
- The barrier will not result in undue negative impacts on the environment or historical resources.
- The County costs to install the barrier will not exceed $100,000* per benefited receptor (where benefited receptors are considered to be the owners of those dwellings which are impacted or affected by construction and will enjoy a barrier loss of at least 3 dBA).
- * If homes are built AFTER the approved Master Plan for the subject area, the home owner is required to pay 10% of cost of barrier up to the first $100,000.
- The barrier designs and payment responsibility, if any, are approved by the benefited property owners.

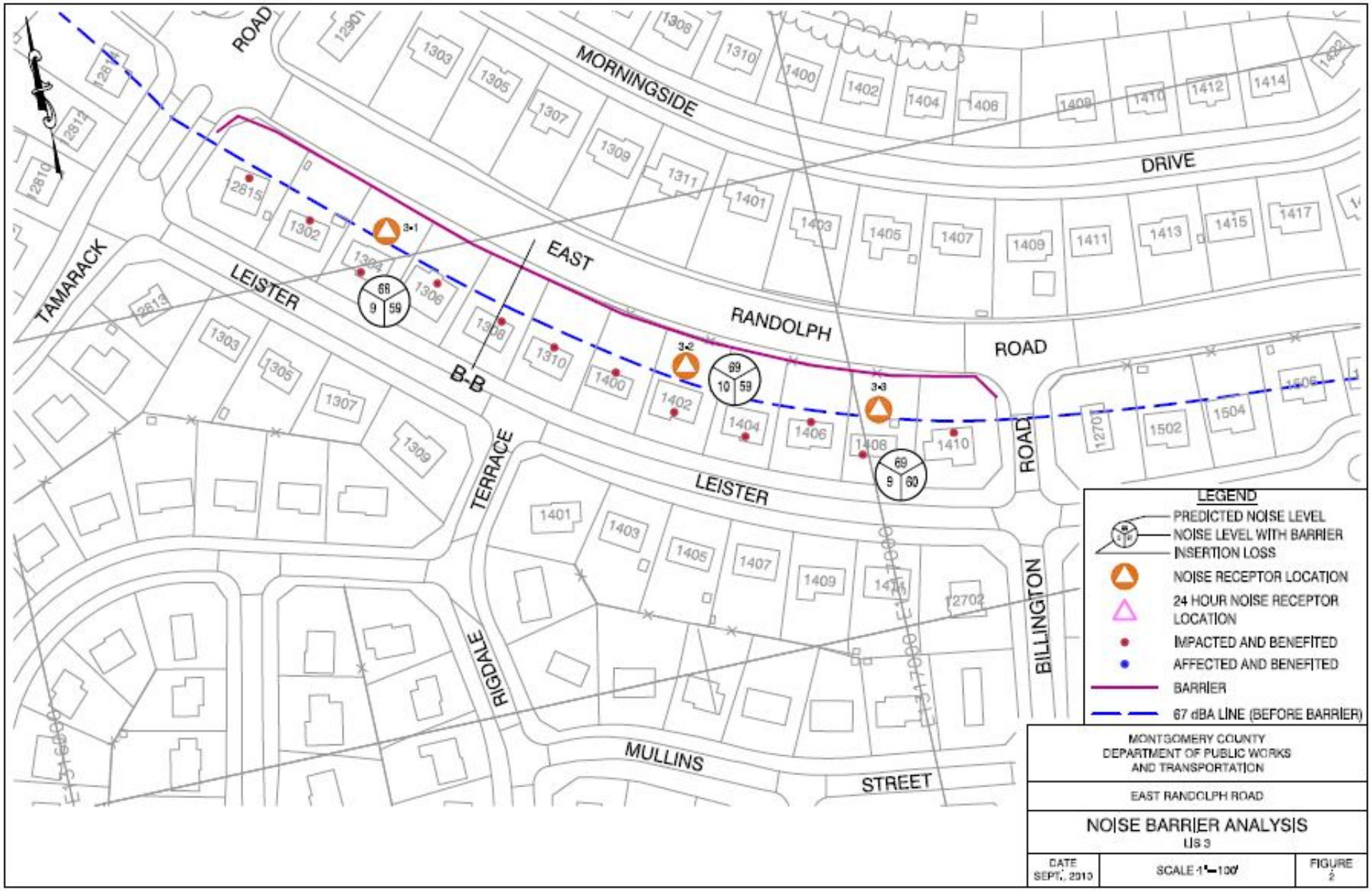
Summary of Results

- All LISs within the study area meet the criteria for noise mitigation except LIS 2, LIS 9B, and LIS 13

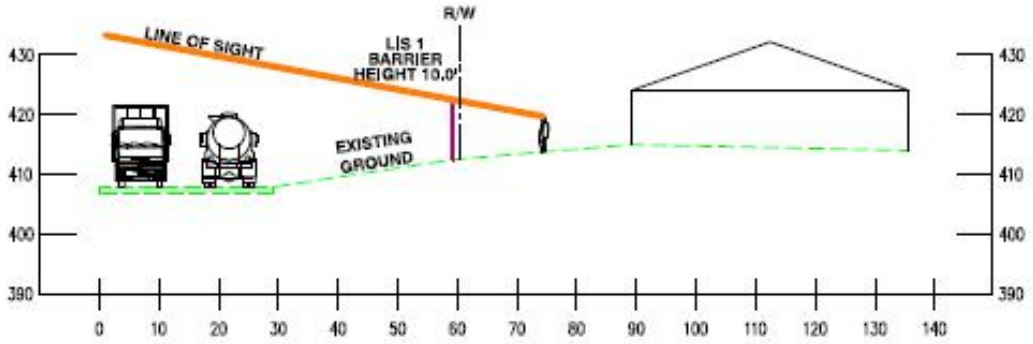
LIS 1 with proposed barrier



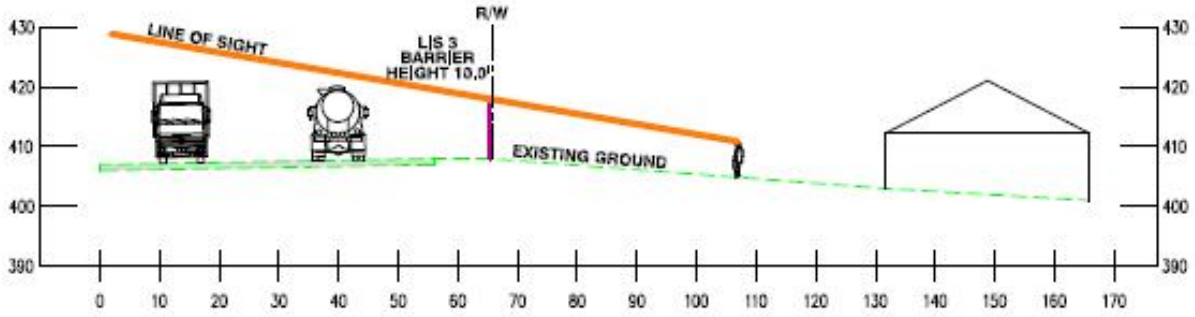
LIS 3 with proposed barrier



LIS 1 & 3 proposed typical sections



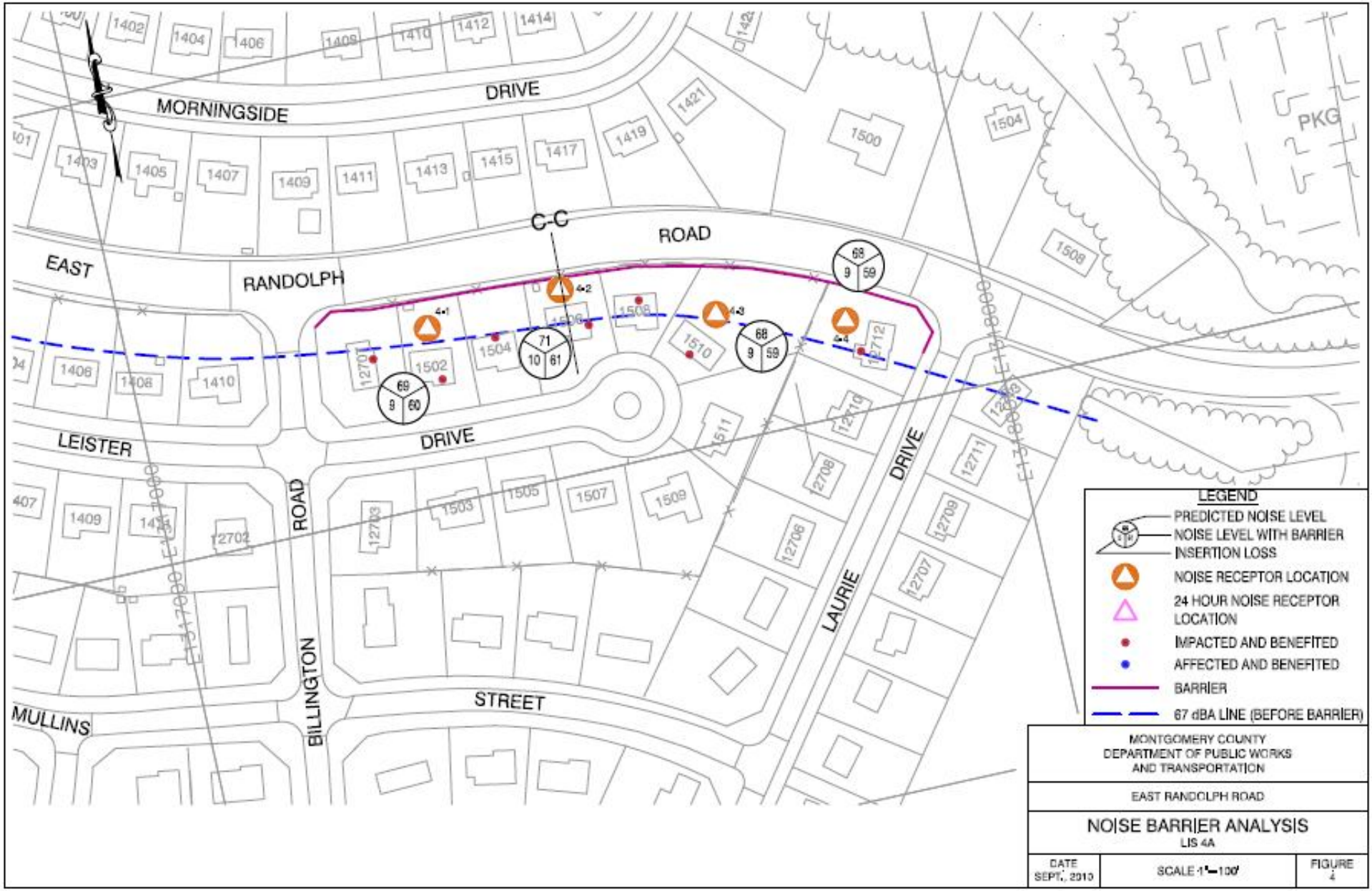
SECTION A-A



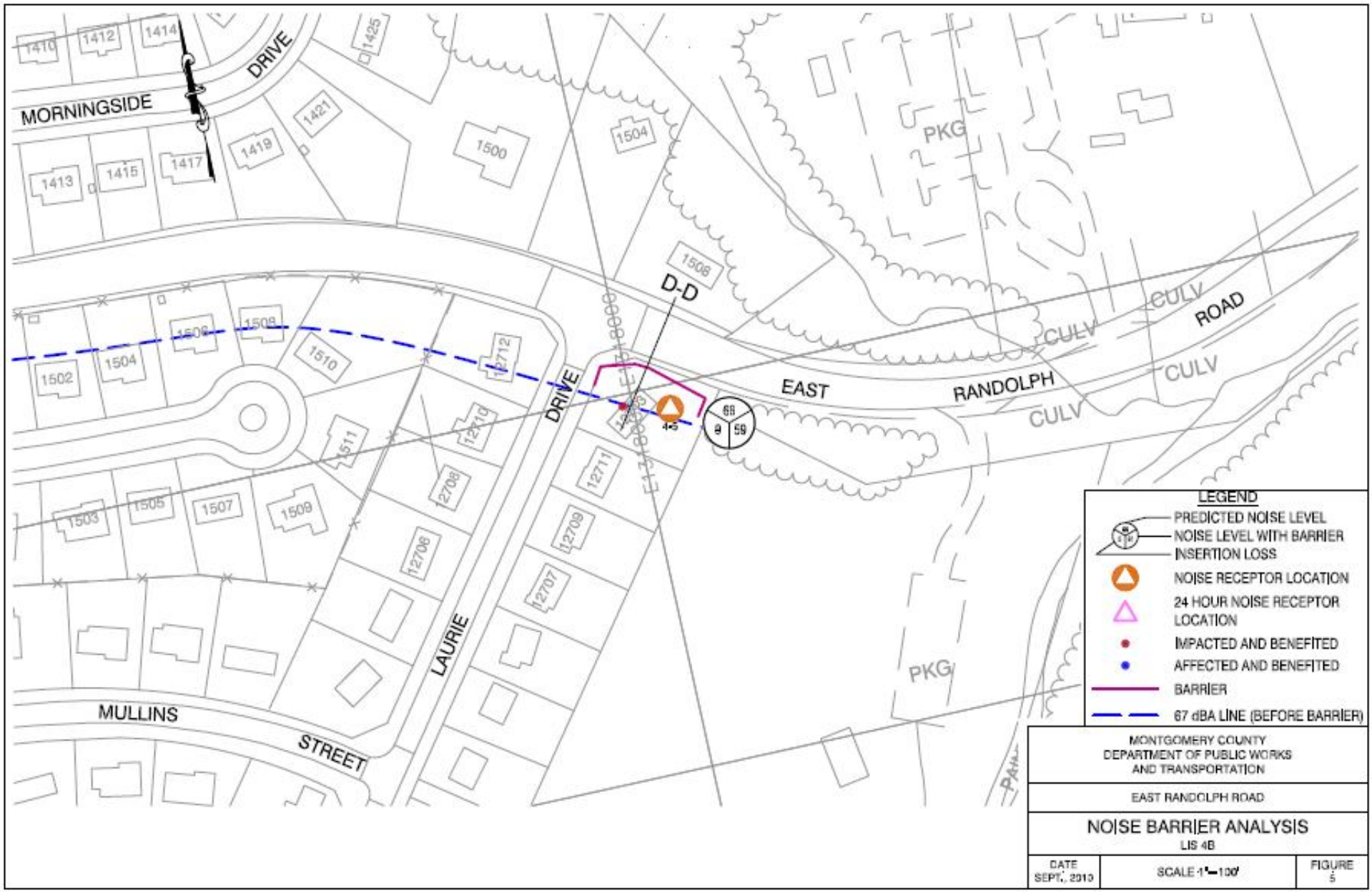
SECTION B-B

MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION		
EAST RANDOLPH ROAD		
NOISE ABATEMENT BARRIER LIS 1 & 3		
DATE SEPT., 2010	10 0 10 20	FIGURE 3

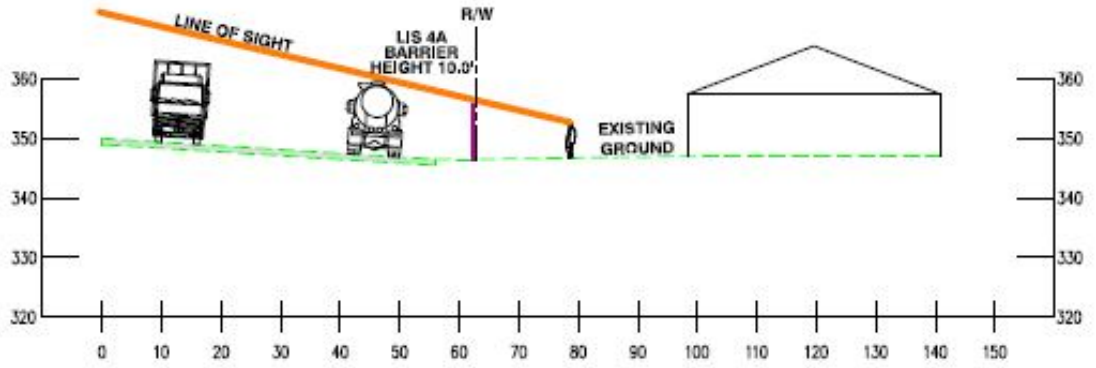
LIS 4A with proposed barrier



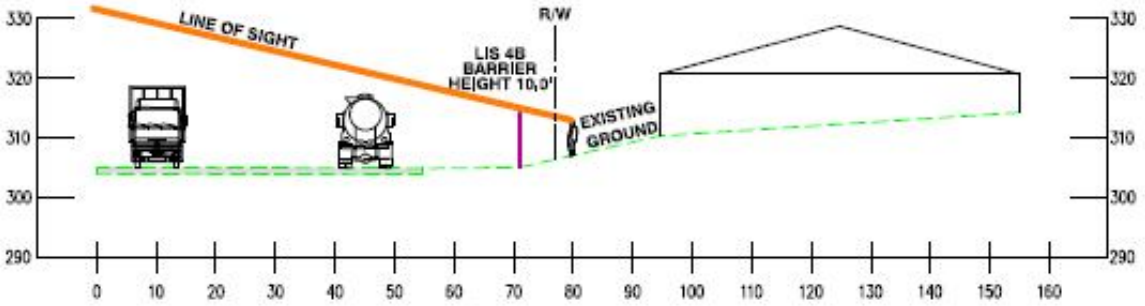
LIS 4B with proposed barrier



LIS 4A & 4B proposed typical sections



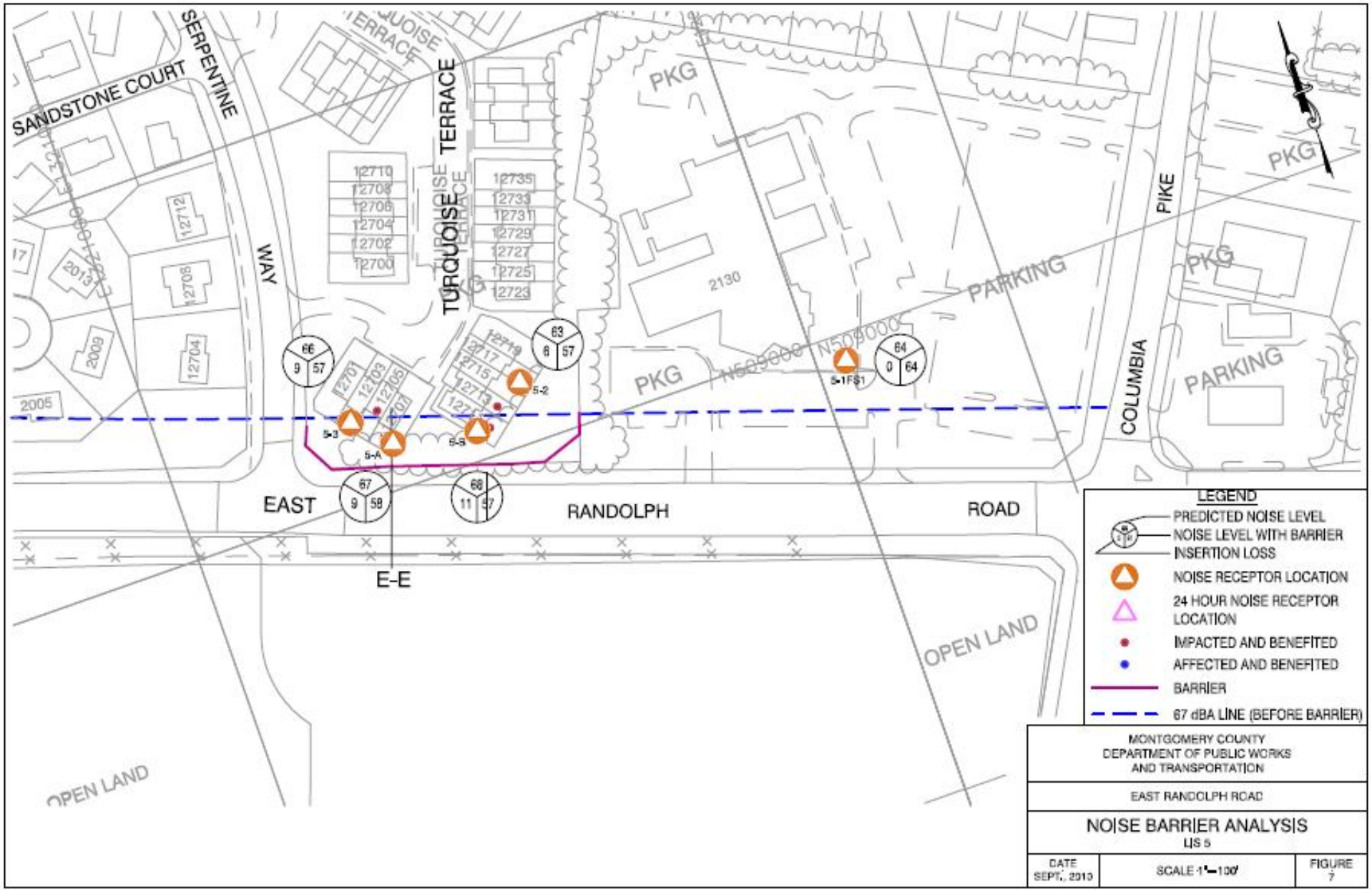
SECTION C-C



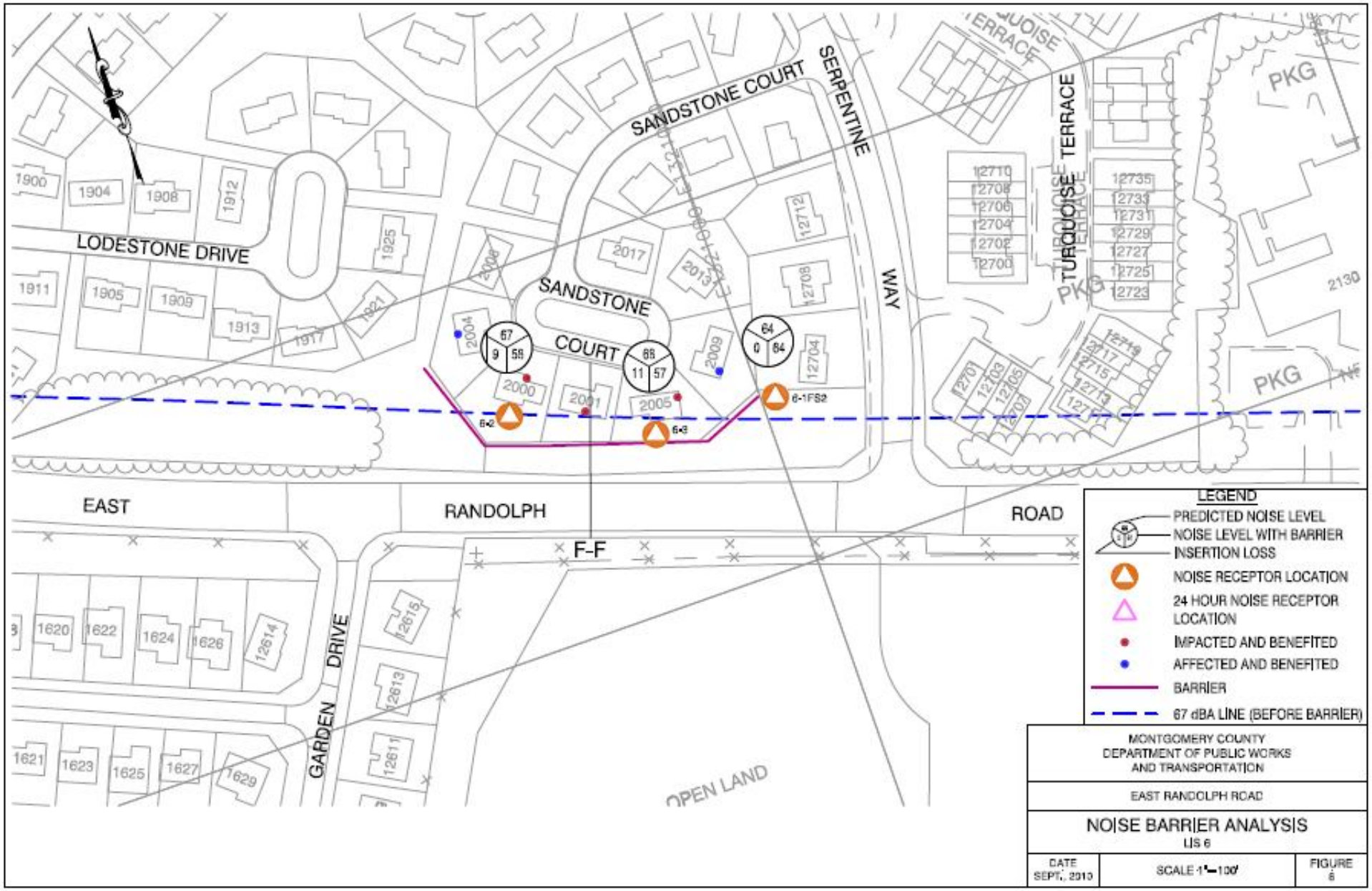
SECTION D-D

MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION		
EAST RANDOLPH ROAD		
NOISE ABATEMENT BARRIER LIS 4		
DATE SEPT., 2010	10 0 10 20	FIGURE 6

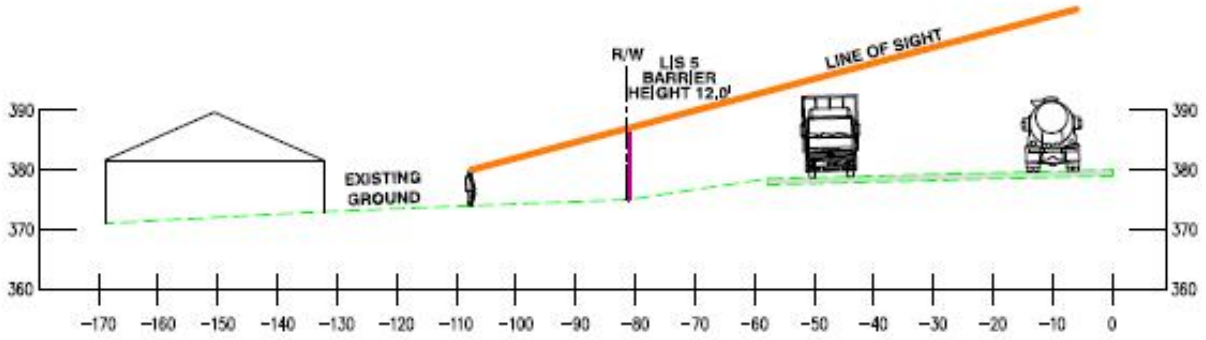
LIS 5 with proposed barrier



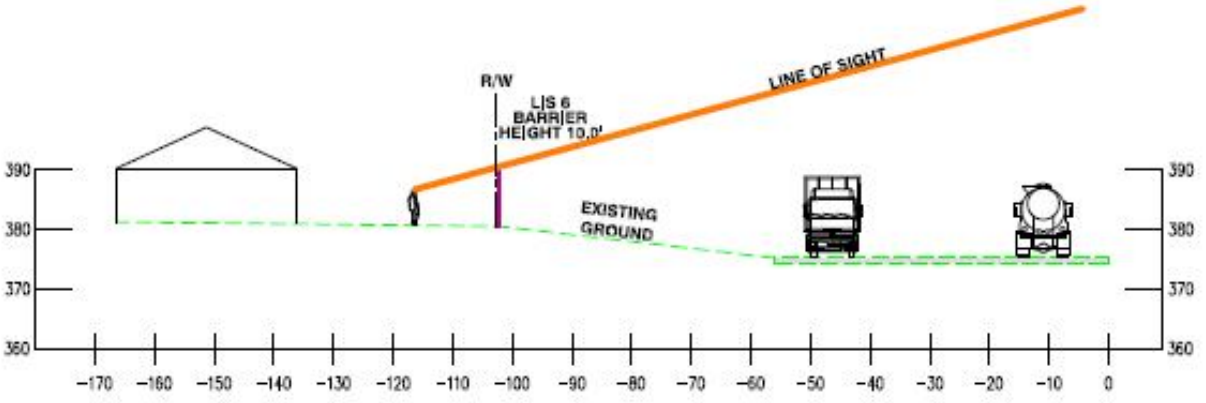
LIS 6 with proposed barrier



LIS 5 & 6 proposed typical sections



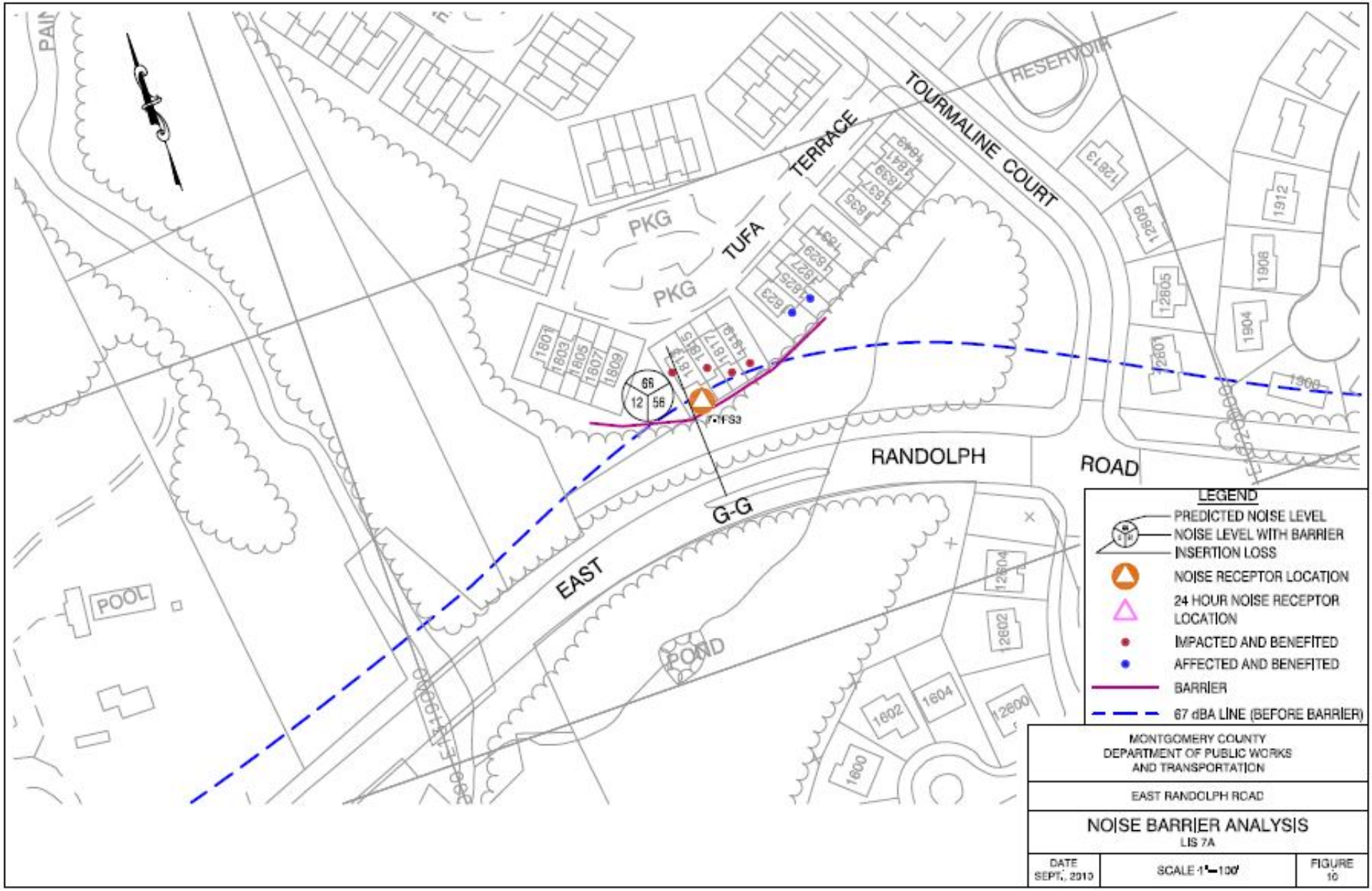
SECTION E-E



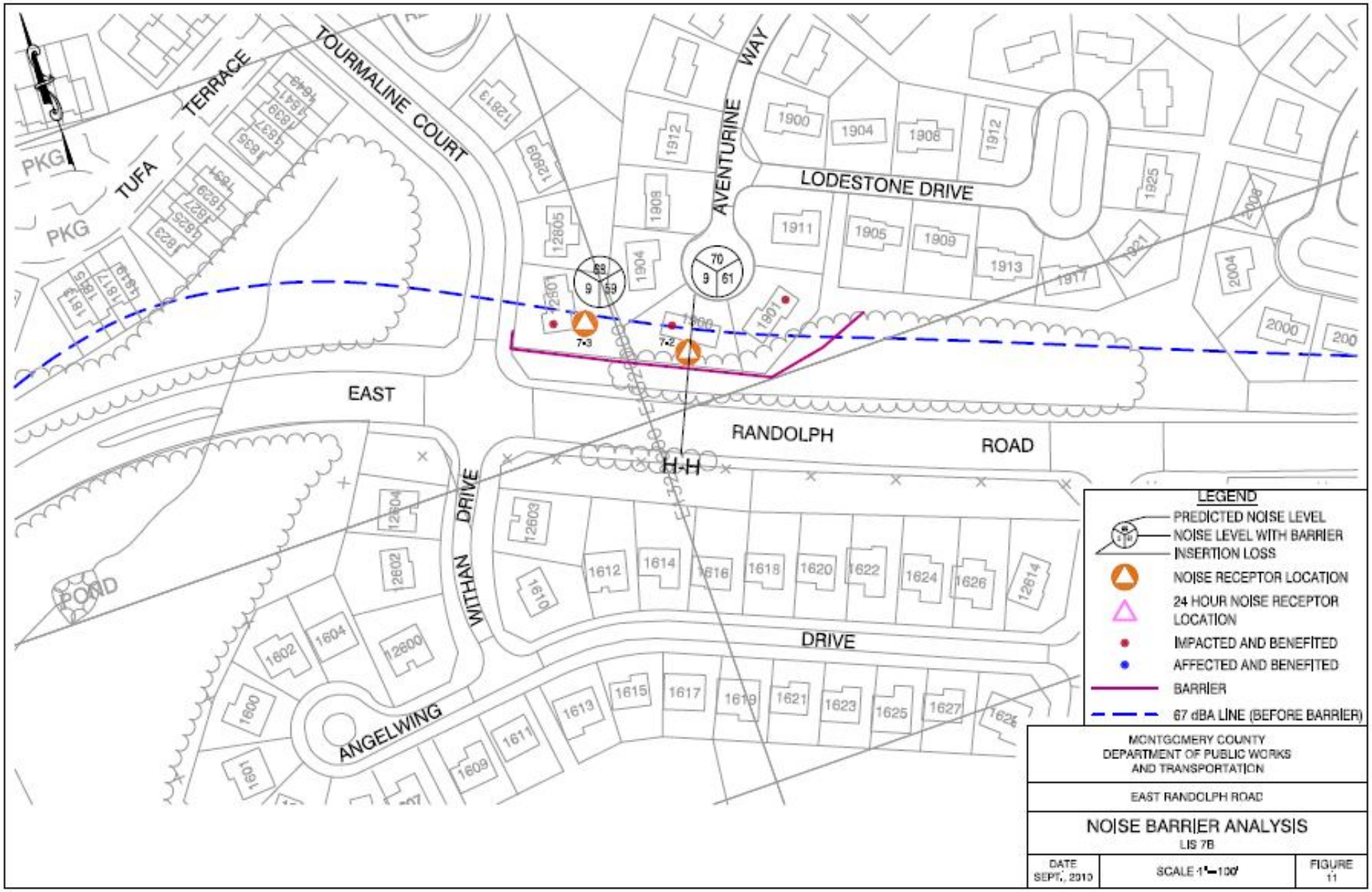
SECTION F-F

MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION		
EAST RANDOLPH ROAD		
NOISE ABATEMENT BARRIER LIS 5 & 6		
DATE SEPT., 2010	10 0 10 20	FIGURE 9

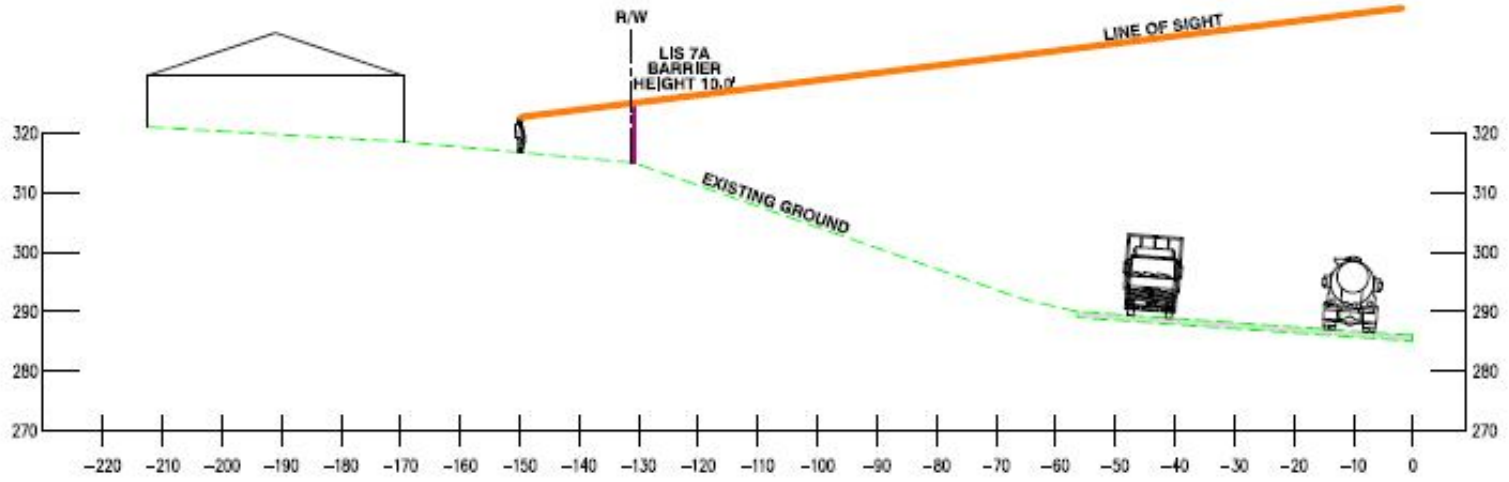
LIS 7A with proposed barrier



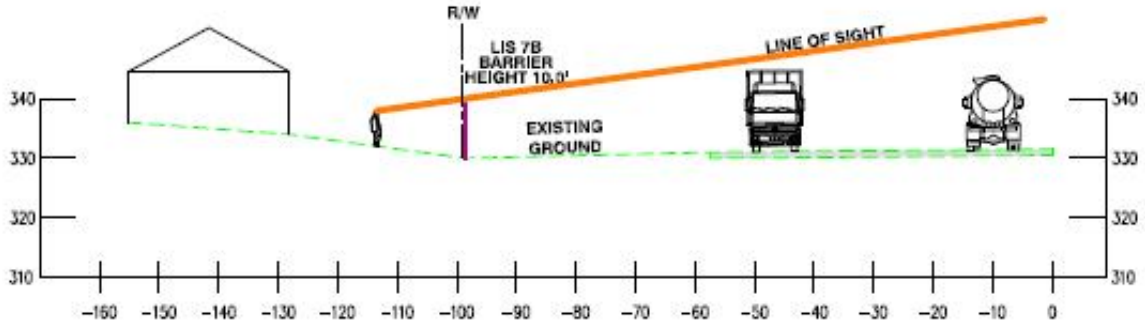
LIS 7B with proposed barrier



LIS 7 proposed typical sections



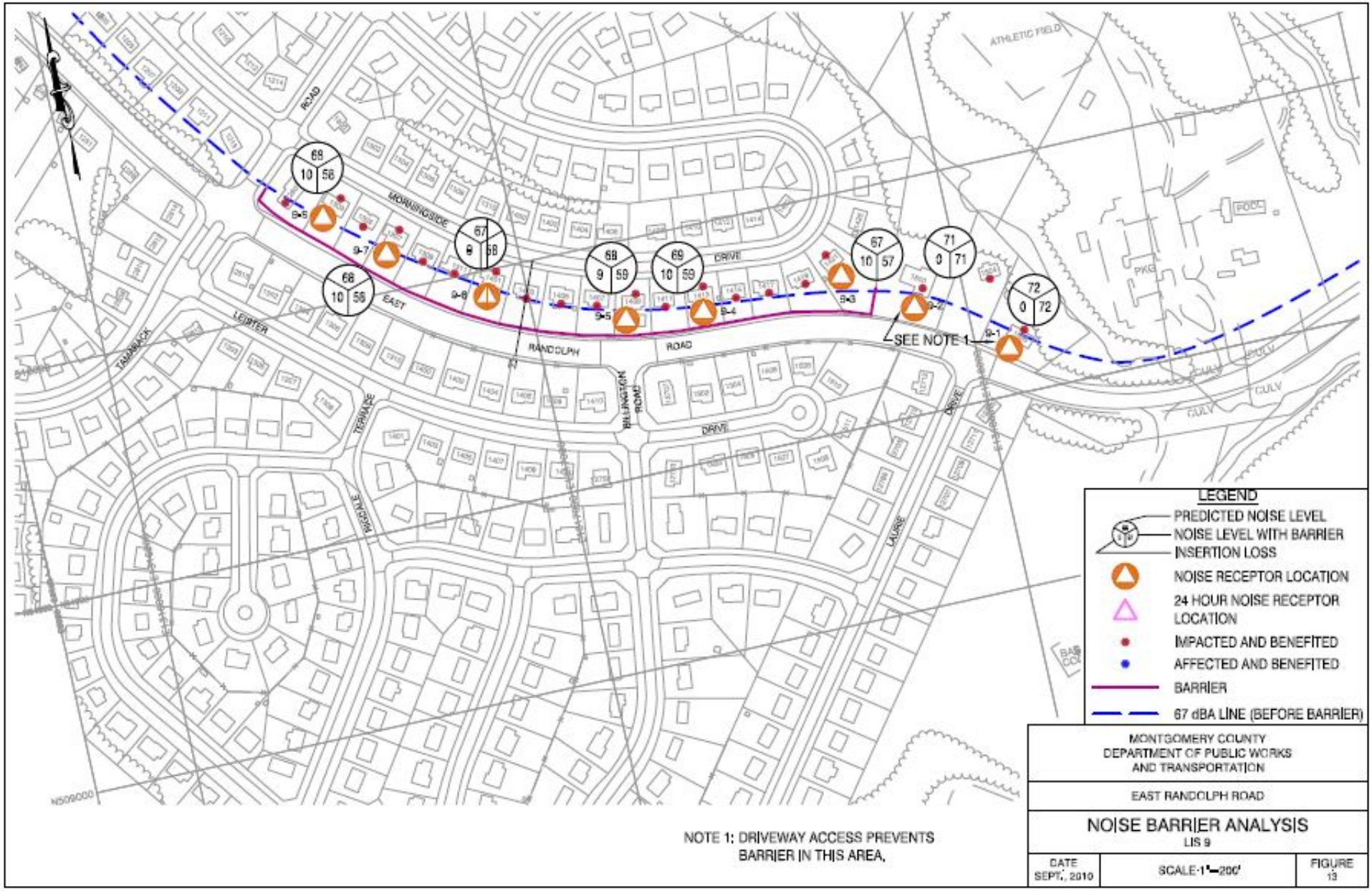
SECTION G-G



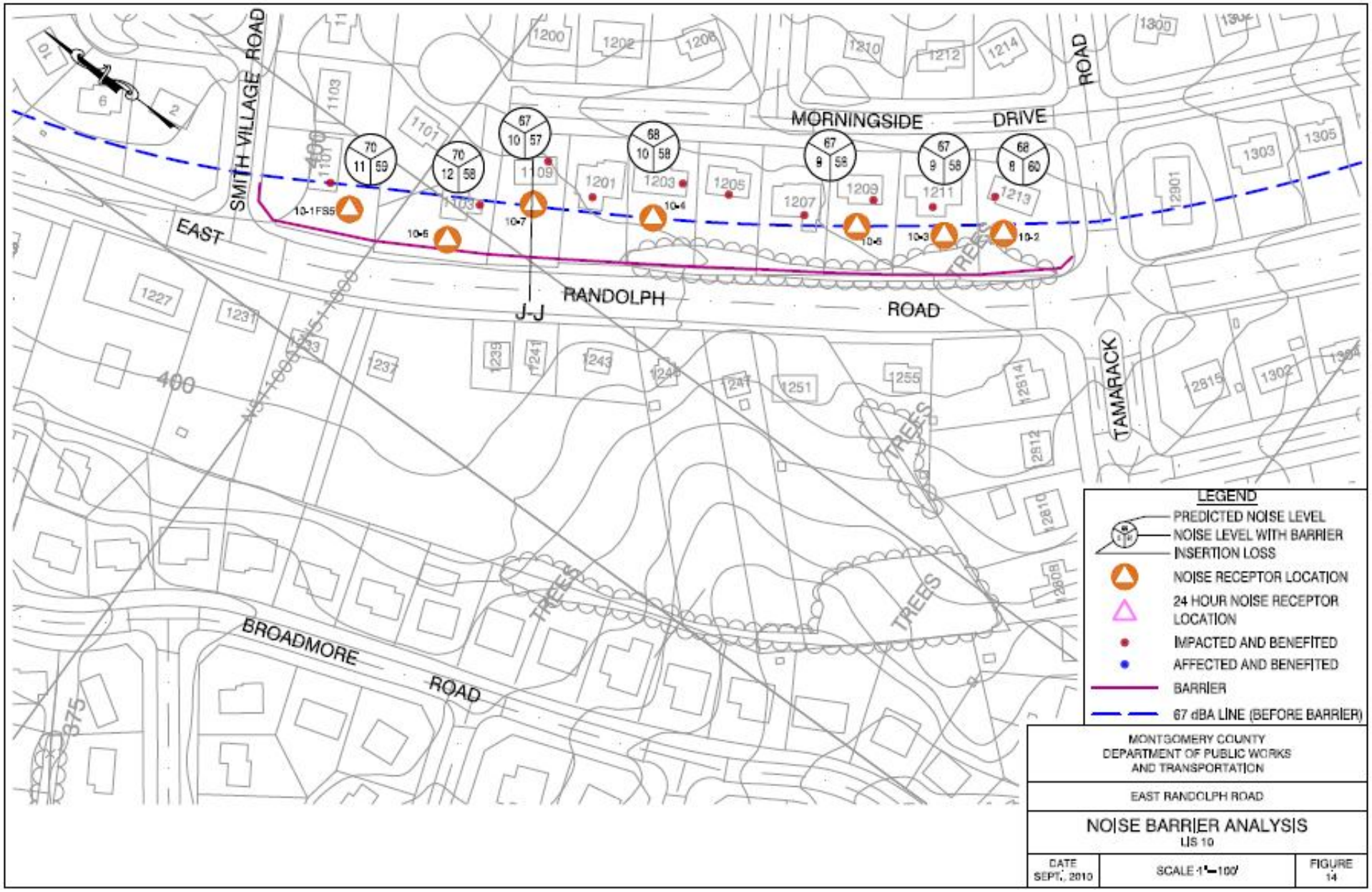
SECTION H-H

MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION		
EAST RANDOLPH ROAD		
NOISE ABATEMENT BARRIER LIS 7		
DATE SEPT., 2010	10 0 10 20	FIGURE 12

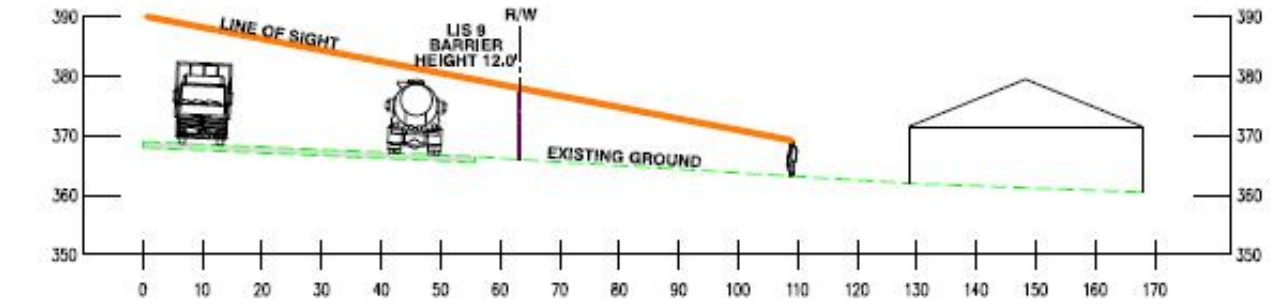
LIS 9A with proposed barrier



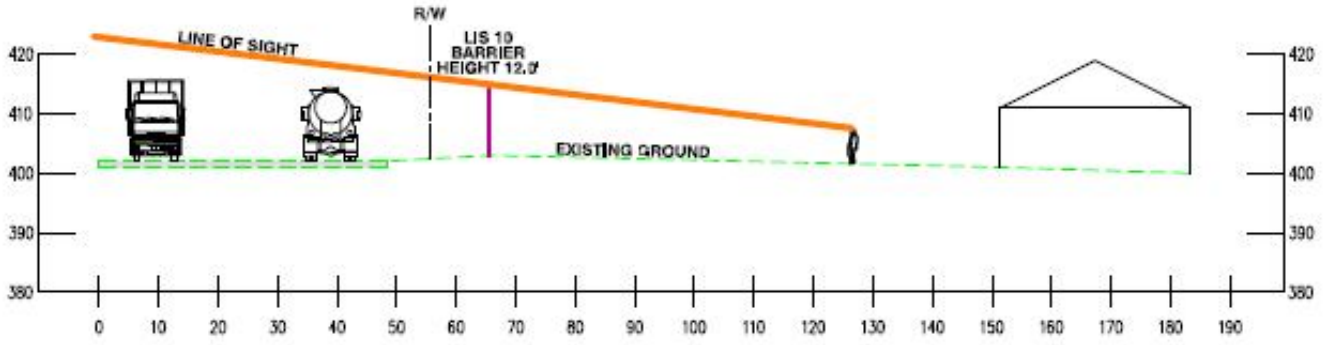
LIS 10 with proposed barrier



LIS 9A & 10 proposed typical sections



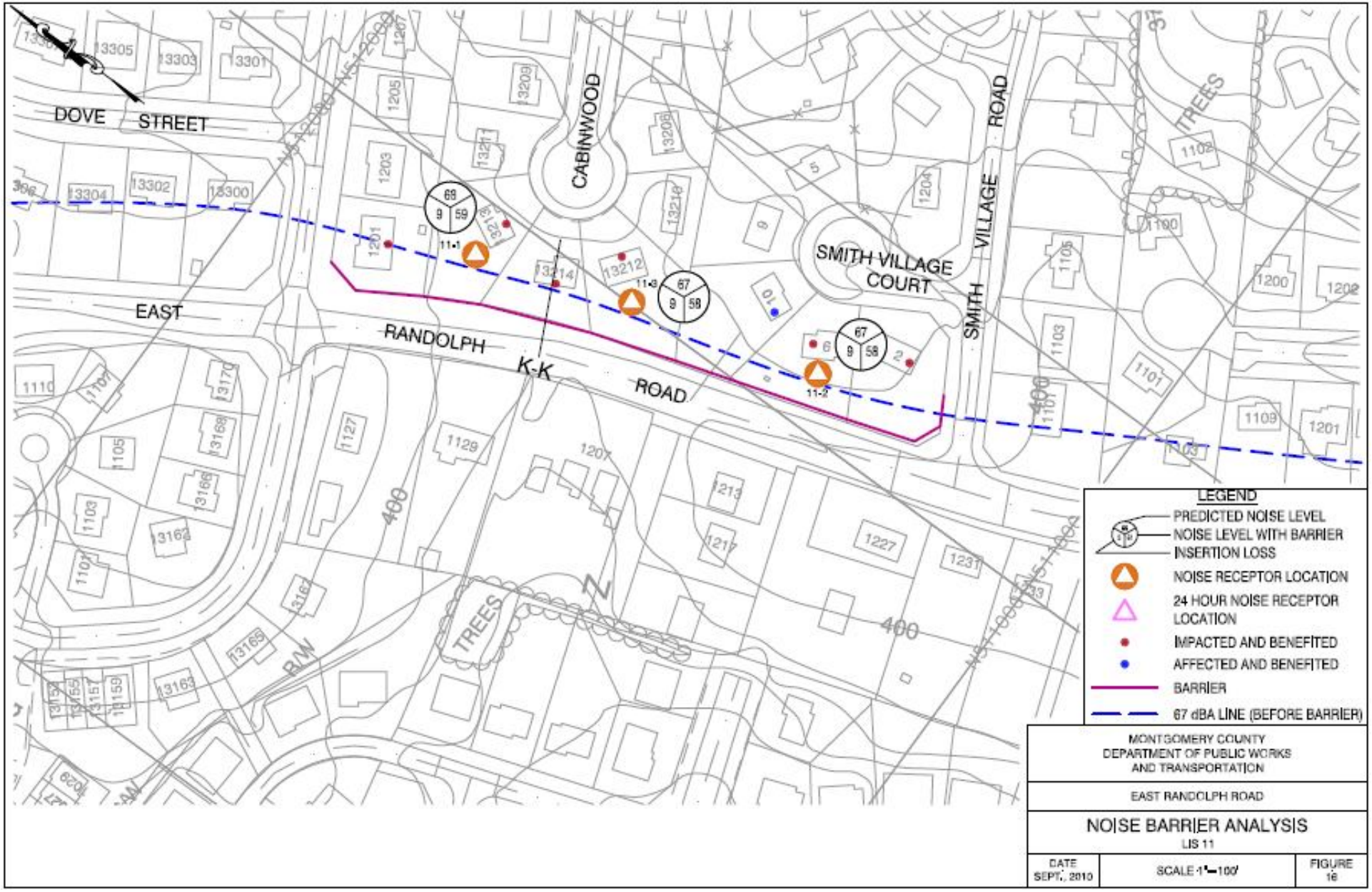
SECTION H-H



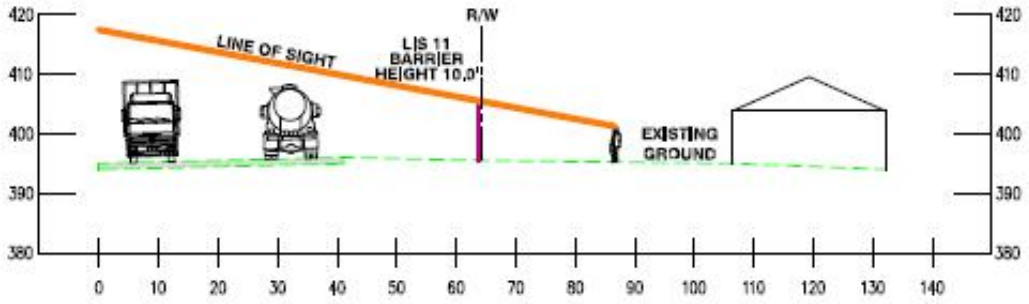
SECTION J-J

MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION		
EAST RANDOLPH ROAD		
NOISE ABATEMENT BARRIER LIS 9 & 10		
DATE SEPT., 2010	10 0 10 20	FIGURE 15

LIS 11 with proposed barrier



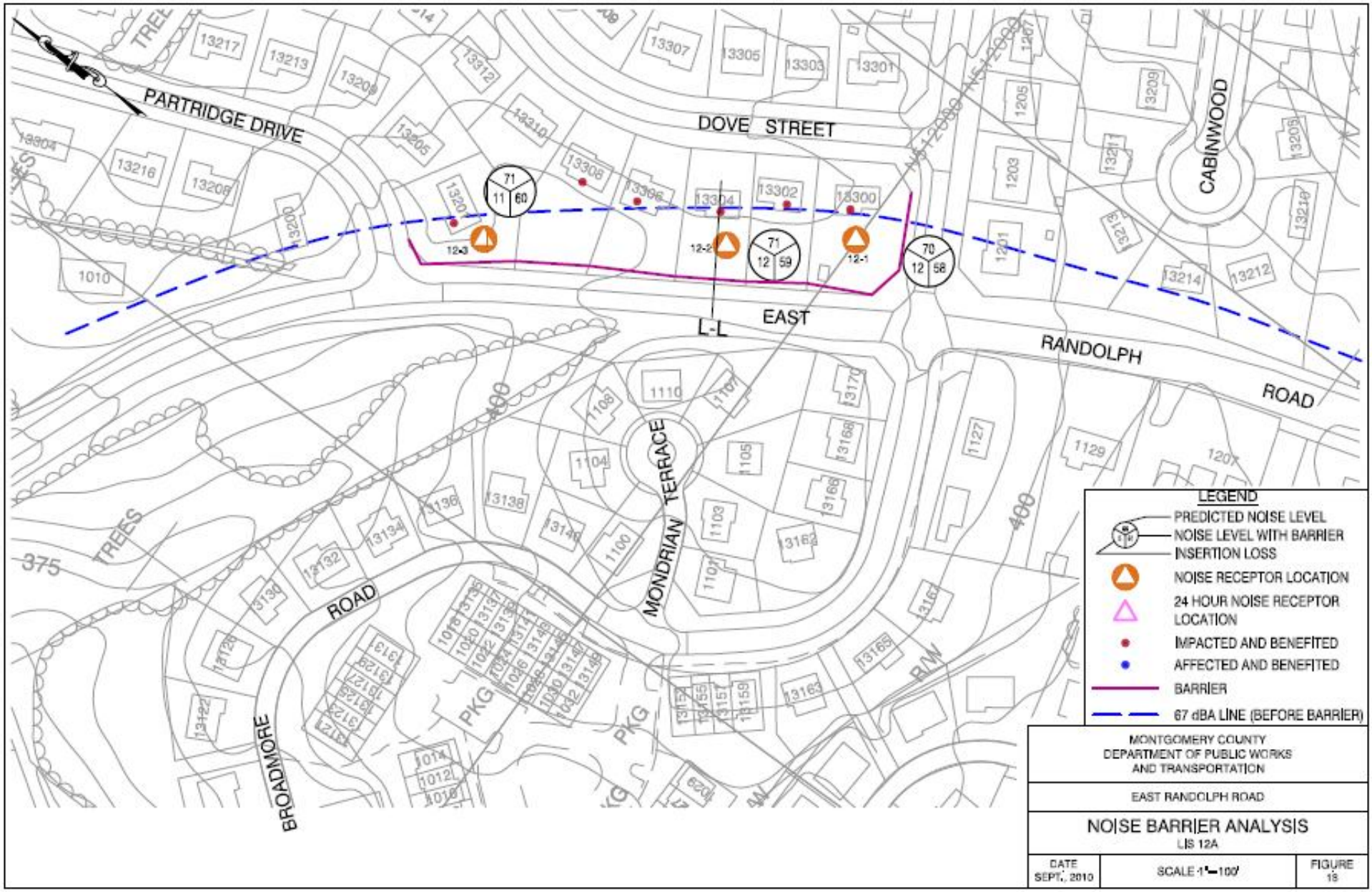
LIS 11 proposed typical section



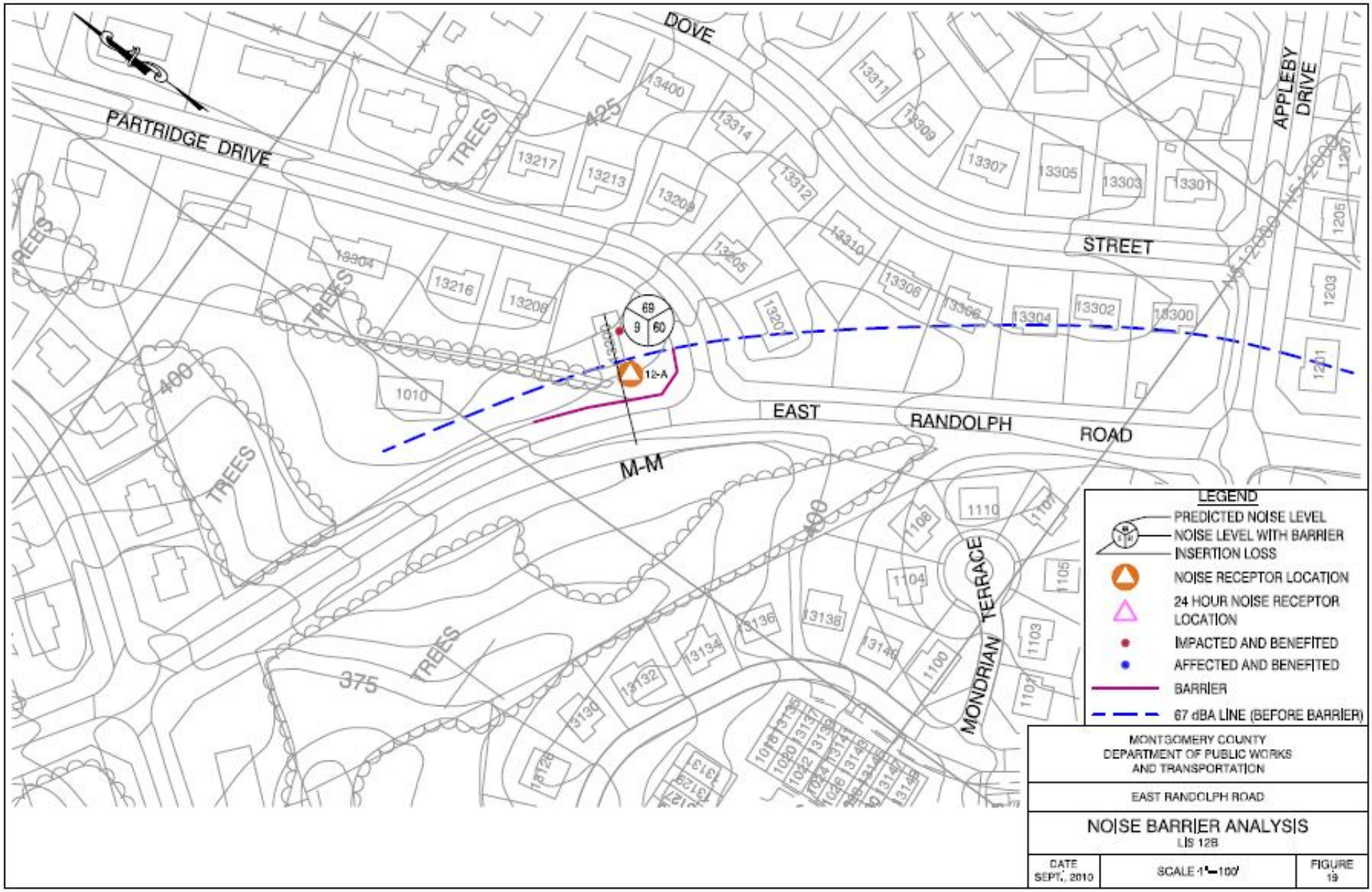
SECTION K-K

MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION		
EAST RANDOLPH ROAD		
NOISE ABATEMENT BARRIER LIS 11		
DATE SEPT., 2010	10 0 10 20	FIGURE 17

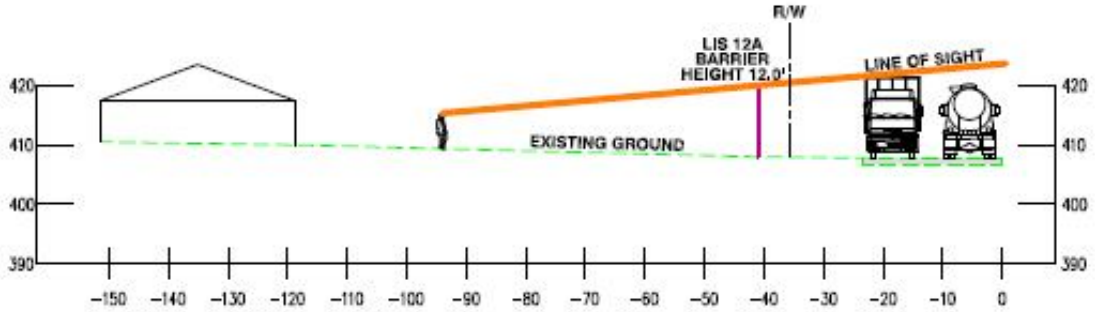
LIS 12A with proposed barrier



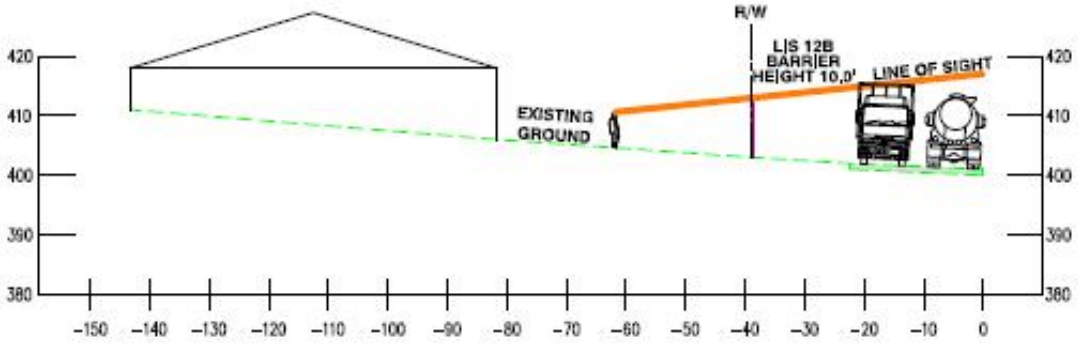
LIS 12B with proposed barrier



LIS 12 proposed typical sections



SECTION L-L



SECTION M-M

MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION		
EAST RANDOLPH ROAD		
NOISE ABATEMENT BARRIER LIS 12		
DATE SEPT., 2010	10 0 10 20	FIGURE 20

Summary of Estimated Costs

LIS	Avg Peak Hour Noise ($L_{Aeq\ 1hrpk}$) dBA	Est. Total Cost*	Number of Benefited Homes	Avg Cost per Benf. Home	Date Built [Master Plan]	Total Per Resident Co-Pay
1	70	$484,690	4	$121,173	'85-'89 ['55]	$31,173
2	N/A					
3	70	$947,245	12	$78,937	'64-'65 ['55]	$7,894
4A	70	$744,990	7	$106,427	'65-'66 ['55]	$16,427
4B	68	$169,575	1	$169,575	'65 ['55]	$79,575
5	67	$447,830	4	$111,958	'81-'82 ['55]	$21,958
6	68	$433,675	5	$86,735	'65-'68 ['55]	$8,674
7A	68	$301,815	6	$50,303	‘80 ['55]	$5,030

* Average Cost based on $95/s.f. for full implementation cost

Summary of Estimated Costs continued

LIS	Avg Peak Hour Noise ($L_{Aeq\ 1hrpk}$) dBA	Est. Total Cost*	Number of Benefited Homes	Avg Cost per Benf. Home	Date Built [Master Plan]	Total Per Resident Co-Pay
7B	67	$438,235	3	$146,078	'81-'83 ['55]	$56,078
8	N/A					
9A	69	$1,841,100	17	$108,300	'65 ['55]	$18,300
9B	N/A					
10	69	$1,136,770	10	$113,677	’63-09 ['55]	$23,677
11	68	$757,625	7	$108,232	‘68-'86 ['55]	$18,232
12A	70	$796,195	6	$132,699	'80 ['55]	$42,699
12B	68	$203,015	1	$203,015	’67-‘80 ['55]	$113,015
13	N/A					

* Average Cost based on $95/s.f. for full implementation cost

Rankings & Funding Priority

The "Score"

S = NIP + TLOSD + HCD + HPD + NBH + CBH + EOB

- MC-DOT provides County Council with rankings of eligible communities biennially
- Council selects which LISs will be funded for mitigation

Rankings

Ranking of Feasible and Reasonable Noise Wall Candidates

Current Rank	Score	Road	Segment (LIS: Logical Implementation Segments)	Est S.F.	Estimated Total Cost
1	72.0	Middlebrook Road-E of I270	**LIS 1:** Twinflower Circle	24,610	$2,337,950
2	45.0	Shady Grove Road-North	**LIS 8A:** East side, Tupelo Drive to "Mid County Hwy"	1,335	$126,825
3	35.0	E. Randolph Road	**LIS 3:** south side, Tamarack Rd to Billington Rd	9,971	$947,245
4	32.0	Shady Grove Road-North	**LIS 7A:** east side, Briardale Rd to ICC right-of-way	4,366	$414,770
5	31.5	E. Randolph Road	**LIS 12A:** north side, Appleby Dr to Partridge Dr	8,381	$796,195
6	29.5	E. Randolph Road	**LIS 4A:** south side, Billington Rd to Laurie Dr	7,842	$744,990
7	28.0	E. Randolph Road	**LIS 1:** south side, Burkhart St to Broadmore Rd	5,102	$484,690
8	27.5	E. Randolph Road	**LIS 7A:** south side of Tufa Terrace	3,177	$301,815
9	27.0	Shady Grove Road-North	**LIS 9:** east side, Mill Run Drive to Muncaster Mill Rd	7,040	$668,800
10	26.5	E. Randolph Road	**LIS 9:** north side, east of Tamarack Road	19,380	$1,841,100
11	23.5	E. Randolph Road	**LIS 10:** north side, Tamarack Rd to Smith Village Rd	11,966	$1,136,770
11	23.5	Middlebrook Road	**LIS 5:** north side, near Ridgecrest Drive	1,564	$148,580
13	23.0	Midcounty Highway	**LIS D:** south side, For. Oak MS to Saybr. Oaks Blvd	26,421	$2,509,995
14	20.5	Middlebrook Road	**LIS 2:** south side, Ridgecrest Dr to Waring Sta. Rd	4,735	$449,825
15	17.5	E. Randolph Road	**LIS 11:** north side, Smith Village Rd to Appleby Dr	7,975	$757,625
16	17.0	Shady Grove Road-North	**LIS 5:** West side, Mill Run Drive to Munaster Mill Rd	9,452	$897,940
16	17.0	E. Randolph Road	**LIS 6:** north side, Serpentine Way to Sandstone Ct	4,565	$433,675
18	16.5	Shady Grove Road-North	**LIS 8B:** East side, "Mid County Hwy" to Mill Run Drive	3,329	$316,255
19	16.0	E. Randolph Road	**LIS 12B:** north side, Partridge Dr to Burkhart St	2,137	$203,015
19	16.0	E. Randolph Road	**LIS 4B:** south side, East Side of Laurie Dr	1,785	$169,575
21	15.5	Middlebrook Road	**LIS 3:** south side, Waring Sta. Rd to I-270 on-ramp	4,675	$444,125
22	15.0	E. Randolph Road	**LIS 7B:** north side, Tourmaline Ct & Aventurine Way	4,613	$438,235
23	14.0	Shady Grove Road-North	**LIS 7B:** East side, ICC right-of-way to Tupelo Drive	1,538	$146,110
24	12.0	Shady Grove Road-North	**LIS 4:** West side, Mid County Hwy to Mill Run Drive	7,796	$740,620
25	11.5	Middlebrook Road	**LIS 4:** south side, at I-270 on-ramp	3,107	$295,165
26	11.0	E. Randolph Road	**LIS 5:** north side, Old Columbia Pike to Serpentine Way	4,714	$447,830
27	10.5	Middlebrook Road	**LIS 1A:** west of Ridgecrest Drive	2,351	$223,345
28	6.5	Shady Grove Road-South	**LIS E:** east side, Sweetwood Ave to Shinning Willow Dr	6,456	$613,320
29	5.5	Midcounty Highway	**LIS H-2:** south side, Miller Fall Rd to Wash. Grove La	4,321	$410,495
29	5.5	Shady Grove Road-South	**LIS B:** west side at Procera Drive	5,580	$530,100

Your Choices

1. Mitigation (Noise Barrier): agree to the co-pay amount and provide fee simple property or easement to build barrier, where necessary. 60% of the each LIS community has to agree. 100% of property owners from whom property is needed have to agree.

   If an LIS community rejects a barrier, it has to wait at least six 6 years before requesting reconsideration for barriers.

2. Non-Mitigating measures (fences or vegetative landscaping): will not reduce the noise impact but will provide visual obstruction of the road and give the *perception* that traffic noise is less objectionable.

   If an LIS community requests non-mitigating measures, it has to wait 12 years before requesting consideration for mitigation (barriers).

Next Steps:

- Get Community Input
- Conduct Survey (Voting)
- Present the results to the County Council along with results for other locations around the County
- County Council will decide which locations will be funded for Final Design and Construction

QUESTIONS?