

## MEMORANDUM

**TO:** Mr. Stephen V. Coravos  
133 Phineas Street, LLC  
2100 Lakeview Avenue  
Dracut, MA 01826

**FROM:** Mr. F. Giles Ham, P.E.  
Vanasse & Associates, Inc.  
35 New England Business Center Drive  
Suite 140  
Andover, MA 01810-1066  
(978) 474-8800  
[www.rdfa.com](http://www.rdfa.com)

**DATE:** June 9, 2022

**RE:** 9404

**SUBJECT:** Transportation Assessment  
Proposed Residential Development  
Dracut, Massachusetts

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Assessment to evaluate the anticipated traffic impacts and proposed access configuration associated with the construction of a proposed residential development to be located at 133 Phineas Street in Dracut, Massachusetts (hereafter referred to as the “Project”). This assessment evaluates the following specific areas as they relate to the Project: i) projected traffic characteristics of the Project; ii) vehicle travel speeds and sight distances along Phineas Street at the Project site; and iii) access and safety considerations with respect to the design of the Project site driveway.

**Based on this analysis, it has been concluded that Project-related traffic-volume increases are considered nominal when dispersed over the day or during the peak hours and would not result in a material impact (increase) on motorist delays or vehicle queuing. Further, given the relatively low volume of traffic that is expected to be generated by the Project and the adequate lines of sight to and from the Project site driveways, it can be concluded that access to the Project site can be accommodated in a safe manner.**

The following details our assessment of the Project.

## PROJECT DESCRIPTION

The Project will entail the construction of 20 age-restricted residential units accommodated in 10 buildings. Access to the proposed development will be provided via a single driveway onto Phineas Street opposite Goodhue Avenue.

## TRAFFIC-VOLUME PROJECTIONS

In order to develop the traffic characteristics of the Project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)<sup>1</sup> were used. The ITE provides trip-generation information for various types of land uses developed as a result of scientific studies that have been conducted over the past 50-plus years, the most recent update of which was published in 2021. Based on a review of the ITE database and the known elements of the Project, ITE Land Use Code (LUC) 252, *Senior Adult Housing* was

<sup>1</sup>*Trip Generation*, 11<sup>th</sup> Edition; Institute of Transportation Engineers; Washington, DC; 2021.

used to develop the traffic characteristics of the Project. Table 1 summarizes the anticipated traffic characteristics of the Project using the above methodology.

**Table 1**  
**TRIP-GENERATION SUMMARY**

Time Period/Direction	20 Age-Restricted Units <sup>a</sup>
<i>Average Weekday Daily:</i>	
Entering	42
<u>Exiting</u>	<u>42</u>
Total	84
<i>Weekday Morning Peak Hour:</i>	
Entering	2
<u>Exiting</u>	<u>3</u>
Total	5
<i>Weekday Evening Peak Hour:</i>	
Entering	3
<u>Exiting</u>	<u>2</u>
Total	5

<sup>a</sup>Based on ITE LUC 252, *Senior Adult Housing*.

As can be seen in Table 1, the Project is expected to generate approximately 84 vehicle trips on an average weekday (two-way, 24-hour volume, or 42 entering and 42 exiting), with 5 vehicle trips expected during the weekday morning peak hour (2 entering and 3 exiting) and 5 vehicle trips expected during the weekday evening peak hour (3 entering and 2 exiting).

## **SPEED MEASUREMENTS**

Vehicle travel speed measurements were performed on Phineas Street in the vicinity of the Project site. Table 2 summarizes the vehicle travel speed measurements.

**Table 2**  
**VEHICLE TRAVEL SPEED MEASUREMENTS**

	Phineas Street	
	Northbound	Southbound
Mean Travel Speed (mph)	32	31
85 <sup>th</sup> Percentile Speed (mph)	35	34
Posted Speed Limit (mph)	30	30

mph = miles per hour.

As can be seen in Table 2, the mean (average) vehicle travel speed along Phineas Street in the vicinity of the Project site was found to be approximately 32 miles per hour (mph) in the northbound direction and 31 mph in the southbound direction. The measured 85<sup>th</sup> percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below, was found to be approximately 35 mph in the northbound direction and 34 mph in the southbound direction, which is above the posted speed limit in the area of the Project site (25 mph). The 85<sup>th</sup> percentile speed is used as the basis of engineering design and in the evaluation of sight distances and is often used in establishing posted speed limits.

### **SIGHT DISTANCE EVALUATION**

Sight distance measurements were performed at the existing site driveway intersection with Phineas Street in accordance with Massachusetts Department of Transportation (MassDOT) and American Association of State Highway and Transportation Officials (AASHTO)<sup>2</sup> standards. In brief, stopping sight distance (SSD) is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. In accordance with AASHTO and MassDOT standards, at a minimum, sufficient stopping sight distances must be provided at an intersection. Table 3 presents the measured sight distances at the site driveway.

**Table 3**  
**SIGHT DISTANCE MEASUREMENTS**

Stopping Sight Distance Measurement	Required Minimum (Feet) <sup>a</sup>		Existing Measured (Feet)
	30 mph	35 mph	
<i>Phineas Street at the Site Driveway</i>			
Looking to the north from Site driveway	200	250	500
Looking to the south from Site driveway	200	250	500

<sup>a</sup>Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*, Sixth Edition; American Association of State Highway and Transportation Officials (AASHTO); 2011.

As can be seen in Table 3, the available lines of sight at the subject intersection were found to exceed the recommended minimum sight distance requirements to function in a safe manner based on a 35 mph approach speed along Phineas Street, which is 5 mph above the posted speed limit (30 mph). It should be noted that the existing bush adjacent to the utility pole just north of the Project driveway needs to be removed. Based upon the above, there is adequate stopping sight distances at the driveway for safe operations.

<sup>2</sup>*A Policy on Geometric Design of Highway and Streets*, 6<sup>th</sup> Edition; American Association of State Highway and Transportation Officials (AASHTO); 2011.

## **SUMMARY**

VAI has completed a Transportation Assessment of the proposed 20-unit 55 and over residential development to be located at 133 Phineas Street in Dracut, Massachusetts. This assessment evaluates the following specific areas as they relate to the Project: i) projected traffic characteristics of the Project; ii) vehicle travel speeds and sight distances along Phineas Street at the Project site; and iii) access and safety considerations with respect to the design of the Project site driveway.

An evaluation of the proposed access to the Project site was completed with respect to both traffic increases and safety. With respect to traffic increases, the Project is expected to generate approximately 5 vehicle trips during the peak-traffic-volume hours, or approximately 1 vehicle every 12 minutes during the peak hours. Such increases would not be readily apparent on the roadway network over existing conditions and would not result in a material impact (increase) on motorist delays or vehicle queuing.

## **RECOMMENDATIONS**

A transportation improvement program has been developed that is designed to provide safe and efficient access to the Project and minimize the Project impact. The following improvements have been recommended as a part of this evaluation.

### **Project Access**

The following recommendations are offered with respect to the design and operation of the Project site driveway:

- The Phineas Street site driveway should be placed under STOP-sign control with a marked STOP-line provided. The curb radius shall be 30 feet. The site driveway detail is depicted on sheet 8 (attached) of the definitive site plan.
- All signs and pavement markings to be installed within the Project site shall conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).<sup>3</sup>
- Signs or landscaping along the Project driveway and at its intersections with Phineas Street should be designed and maintained so as not to restrict lines of sight.

### **Pedestrian Accommodations**

- Marked crosswalks and wheelchair ramps should be provided at pedestrian crossings at the Project site driveway.
- A 4-foot wide bituminous sidewalk enters the site and is connected to the Phineas Street sidewalk.

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<sup>3</sup>*Manual on Uniform Traffic Control Devices* (MUTCD); Federal Highway Administration; Washington, D.C.; 2009.

## **CONCLUSION**

Based on this analysis, it has been concluded that Project-related traffic-volume increases are considered nominal when dispersed over the day or during the peak hours and would not result in a material impact (increase) on motorist delays or vehicle queuing. Further, given the relatively low volume of traffic that is expected to be generated by the Project and that adequate lines of sight exist to and from the Project site driveway, it can be concluded that access to the Project site can be accommodated in a safe manner with the implementation of the above recommendations.

## **APPENDIX**

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**TRIP GENERATION  
VEHICLE SPEED DATA  
SITE PLAN  
SHEET 8 – DEFINITIVE SITE PLAN**

## TRIP GENERATION

**Table 1**  
**TRIP GENERATION SUMMARY**

Time Period/ Directional Distribution	Proposed Senior Housing (20-units) <sup>a</sup>
<i>Weekday Daily:</i>	
Entering	42
<u>Exiting</u>	<u>42</u>
Total	84
<i>Weekday Morning Peak Hour:</i>	
Entering	2
<u>Exiting</u>	<u>3</u>
Total	5
<i>Weekday Evening Peak Hour:</i>	
Entering	3
<u>Exiting</u>	<u>2</u>
Total	5

<sup>a</sup>Based on ITE LUC 252, *Senior Adult Housing - Multifamily* (252) – 11<sup>th</sup> Edition

# Land Use: 252

## Senior Adult Housing—Multifamily

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### Description

Senior adult housing—multifamily sites are independent living developments that are called various names including retirement communities, age-restricted housing, and active adult communities. The development has a specific age restriction for its residents, typically a minimum of 55 years of age for at least one resident of the household.

Residents in these communities are typically considered active and requiring little to no medical supervision. The percentage of retired residents varies by development. The development may include amenities such as a golf course, swimming pool, 24-hour security, transportation, and common recreational facilities. They generally lack centralized dining and on-site health facilities.

The dwelling units share both floors and walls with other units in the residential building. Senior adult housing—single-family (Land Use 251), congregate care facility (Land Use 253), assisted living (Land Use 254), and continuing care retirement community (Land Use 255) are related land uses.

### Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 1990s, and the 2000s in Alberta (CAN), California, Maryland, New Hampshire, New Jersey, Ontario (CAN), and Pennsylvania.

### Source Numbers

237, 272, 576, 703, 734, 970, 1060

# Senior Adult Housing - Multifamily (252)

Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 6

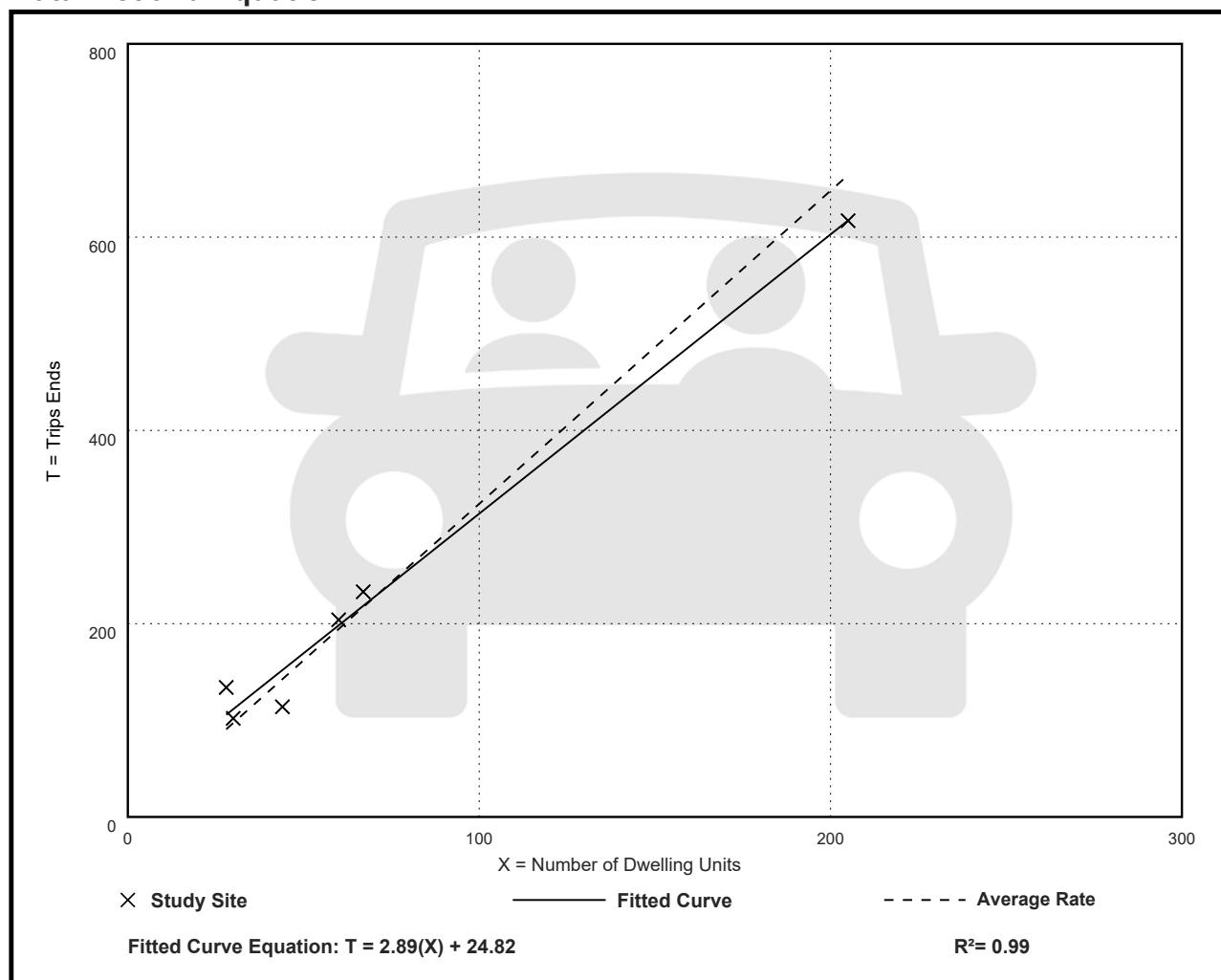
Avg. Num. of Dwelling Units: 72

Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
3.24	2.59 - 4.79	0.53

## Data Plot and Equation



# Senior Adult Housing - Multifamily (252)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 9

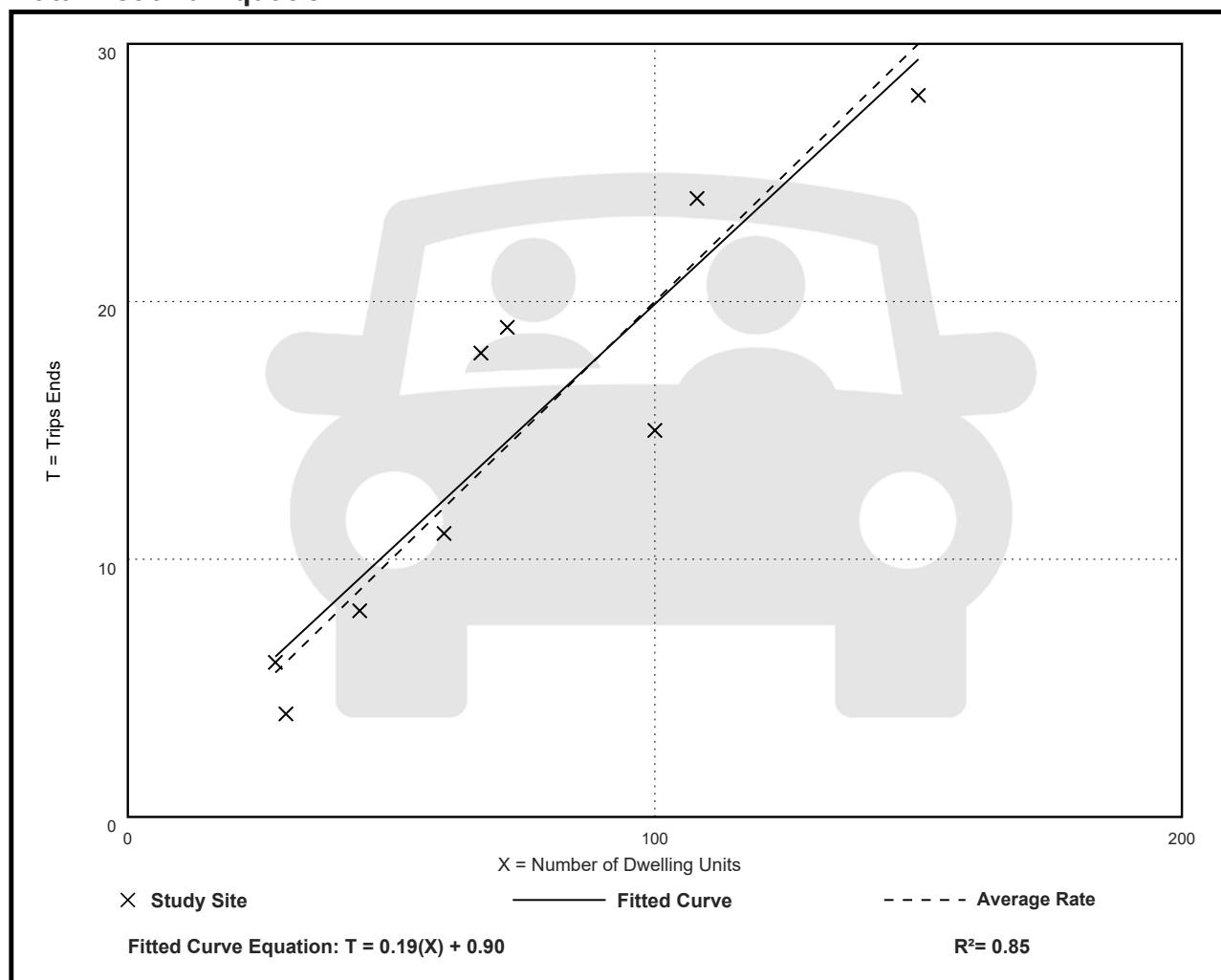
Avg. Num. of Dwelling Units: 73

Directional Distribution: 34% entering, 66% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.20	0.13 - 0.27	0.04

## Data Plot and Equation



# Senior Adult Housing - Multifamily (252)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 9

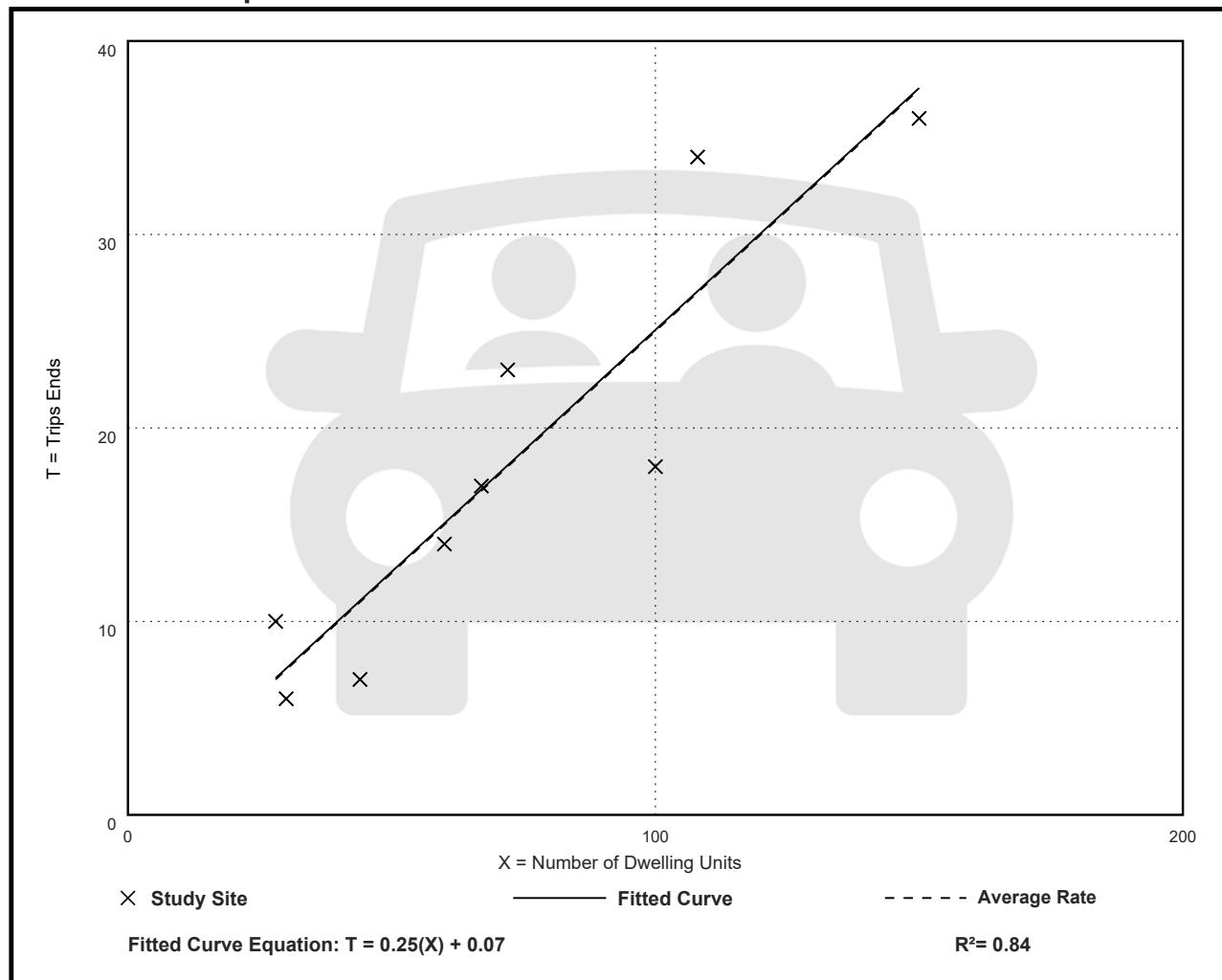
Avg. Num. of Dwelling Units: 73

Directional Distribution: 56% entering, 44% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.25	0.16 - 0.36	0.06

## Data Plot and Equation



VEHICLE SPEED DATA





**Vanasse & Associates, Inc.**  
Transportation Engineers & Planners

Job  
Location  
Calculated By:  
Checked By:

Dracut, MA  
At Site Drive  
S.R.F.

Job # 9404  
Date 6/6/2022

Street: **Phineas Street**  
Direction: **Southbound**

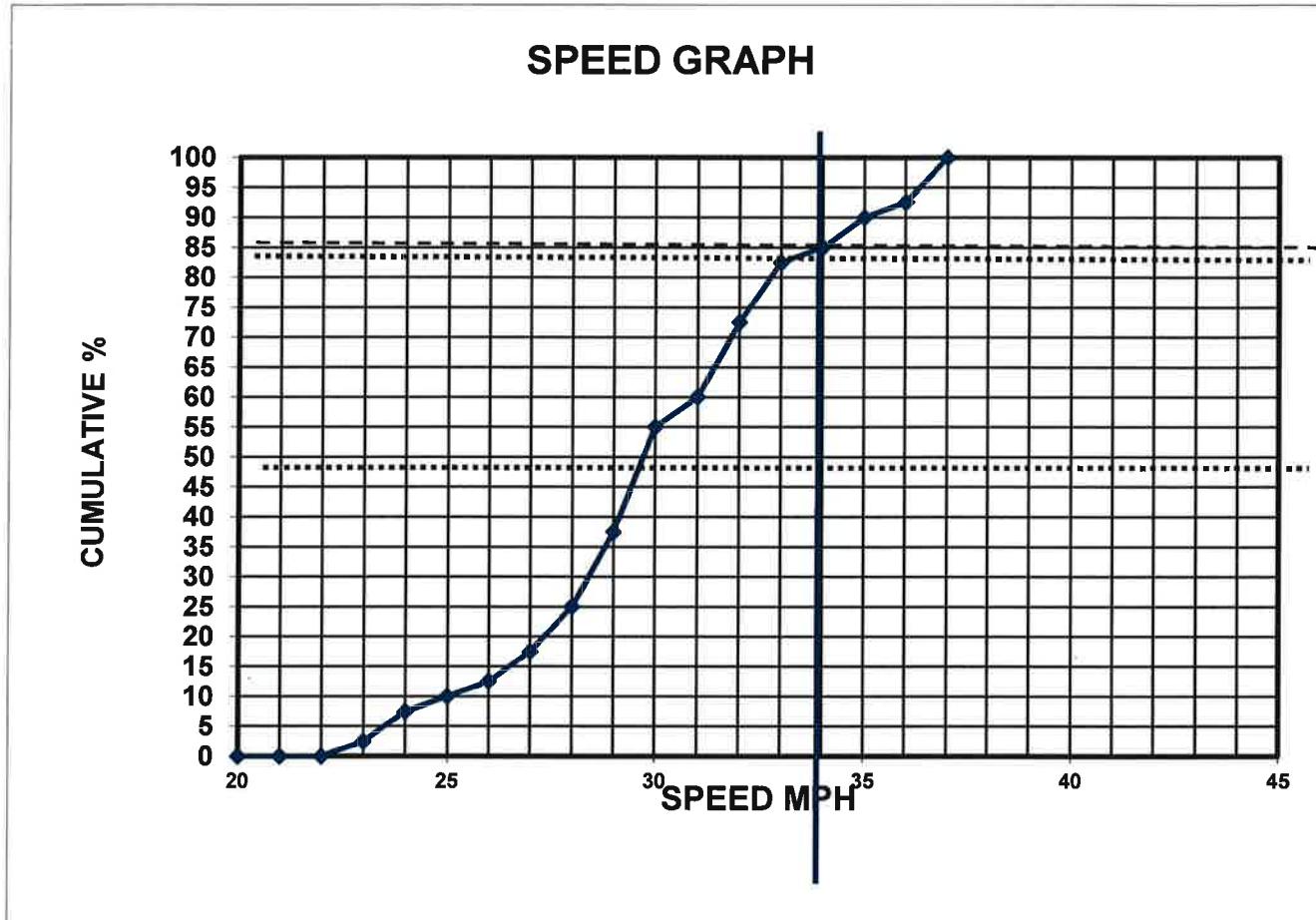
Speed Limit: **30**  
Time of Day  
Observations **40**

Speed	# of Observation	CUM. # Of OBS	% OF TOTAL OBS	CUM %
55				
54				
53				
52				
51				
50				
49				
48				
47				
46				
45				
44				
43				
42				
41				
40				
39				
38				
37	3	3	7.5	100
36	1	4	2.5	92.5
35	2	6	5	90
34	1	7	2.5	85
33	4	11	10	82.5
32	5	16	12.5	72.5
31	2	18	5	60
30	7	25	17.5	55
29	5	30	12.5	37.5
28	3	33	7.5	25
27	2	35	5	17.5
26	1	36	2.5	12.5
25	1	37	2.5	10
24	2	39	5	7.5
23	1	40	2.5	2.5
22				
21				
20				

Average: 30.5  
Comments: 85% = 34.0 m.p.h.

**Street:** Phineas Street  
**Direction:** Southbound

**Job #** 9404  
**Date** 6/6/2022





**VANASSE & ASSOCIATES, INC.**  
Transportation Engineers & Planners

Job  
Location  
Calculated By:  
Checked By:

**Dracut, MA**  
**At Site Drive**  
**S.R.F.**

Job # **7404**  
Date **6/6/2022**

Street: **Phineas Street**  
Direction: **Northbound**

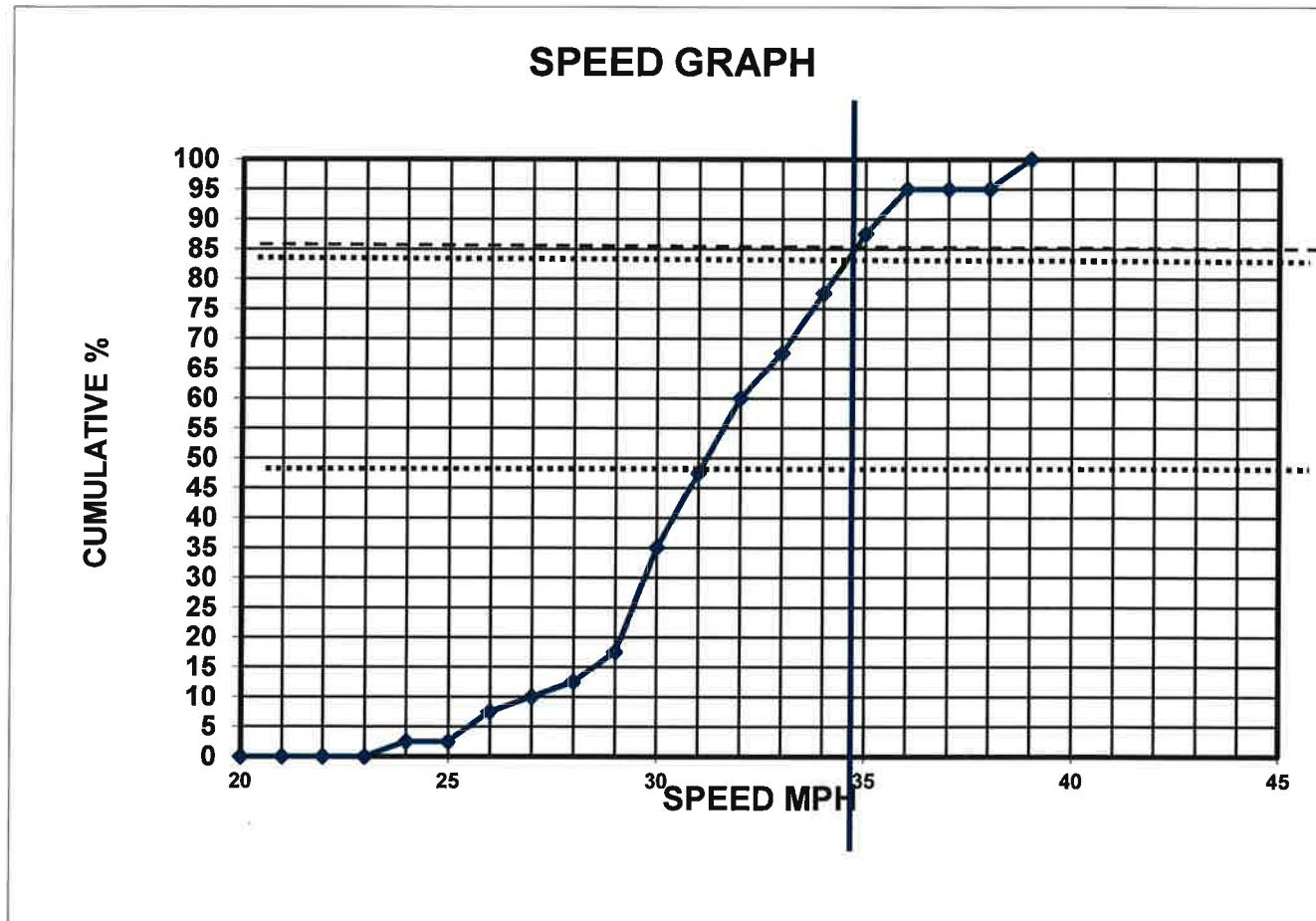
Speed Limit: **30**  
Time of Day  
Observations **1:00 p.m.**  
**40**

Speed	# of Observation	CUM. # Of OBS	% OF TOTAL OBS	CUM %
55				
54				
53				
52				
51				
50				
49				
48				
47				
46				
45				
44				
43				
42				
41				
40				
39	2	2	5	100
38	0	2	0	95
37	0	2	0	95
36	3	5	7.5	95
35	4	9	10	87.5
34	4	13	10	77.5
33	3	16	7.5	67.5
32	5	21	12.5	60
31	5	26	12.5	47.5
30	7	33	17.5	35
29	2	35	5	17.5
28	1	36	2.5	12.5
27	1	37	2.5	10
26	2	39	5	7.5
25	0	39	0	2.5
24	1	40	2.5	2.5
23				
22				
21				
20				

Average: **31.875**  
Comments: **85% = 34.8 m.p.h.**

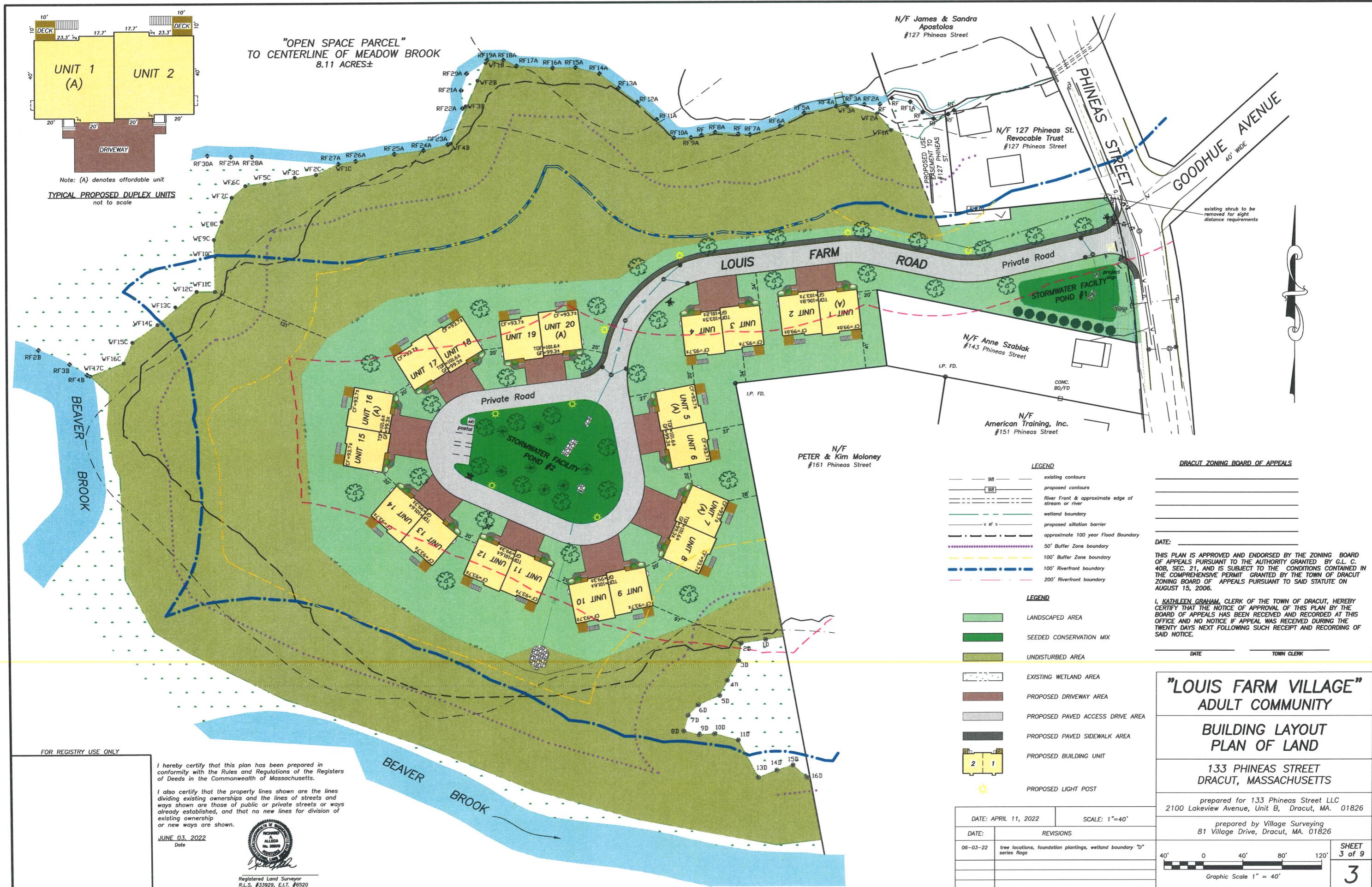
**Street:** Phineas Street  
**Direction:** Northbound

**Job #** 7404  
**Date** 6/6/2022



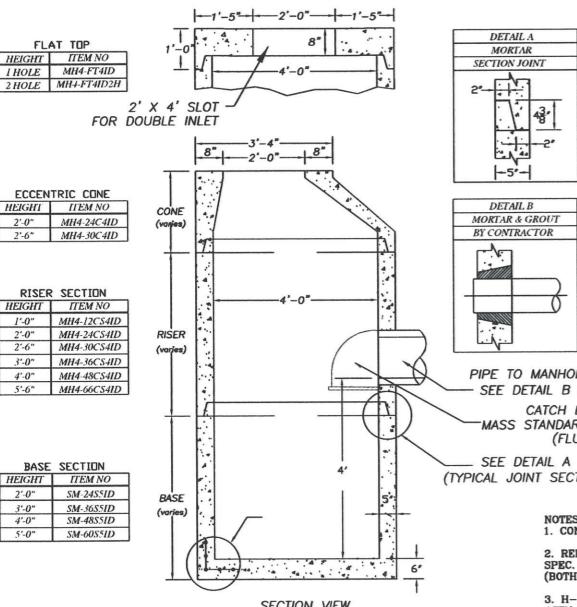
SITE PLAN





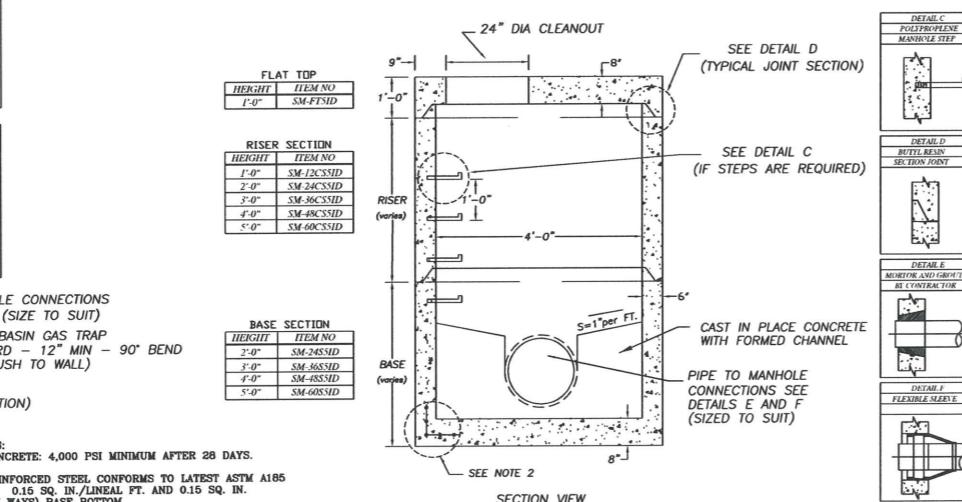
SHEET 8 – DEFINITIVE SITE PLAN





### 48" CATCH BASIN

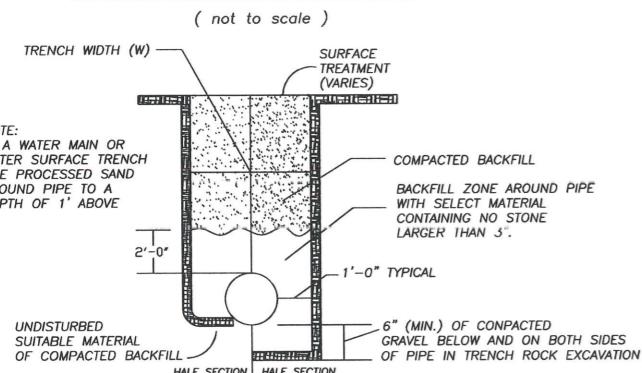
(not to scale)  
SHEA CONCRETE PRODUCTS, INC.



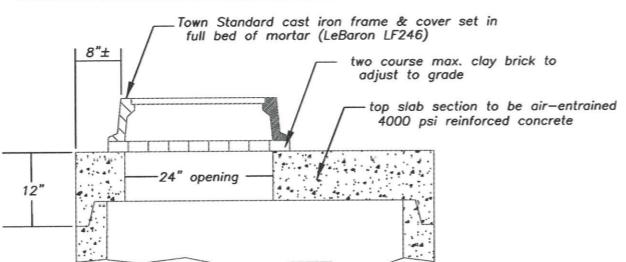
### 48" DRAIN MANHOLE

(not to scale)  
SHEA CONCRETE PRODUCTS, INC.

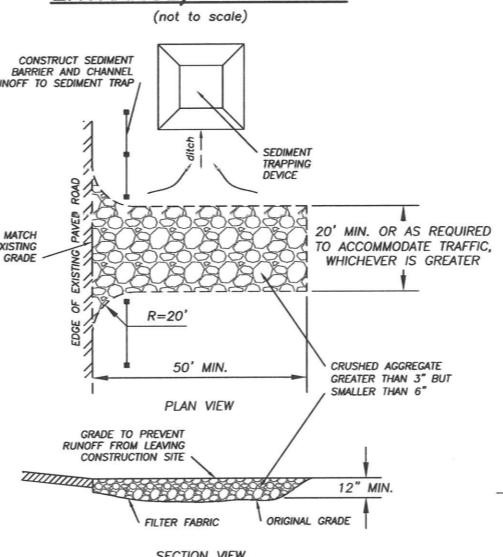
### TYPICAL PIPE TRENCH DETAIL



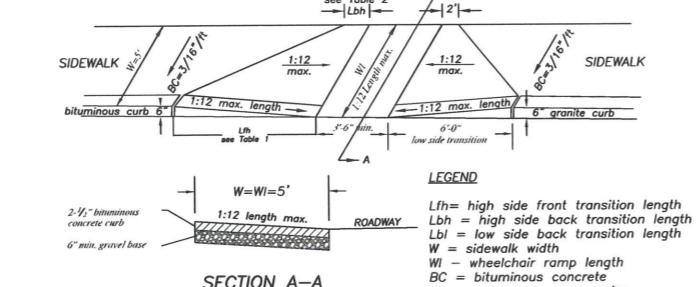
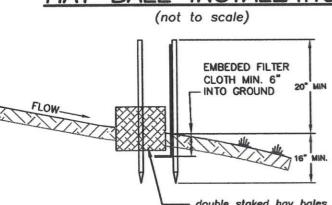
### TYPICAL BASIN FRAME & COVER DETAIL



### STABILIZED CONSTRUCTION ENTRANCE/EXIT DETAIL



### TYPICAL SILT FENCE & HAY BALE INSTALLATION



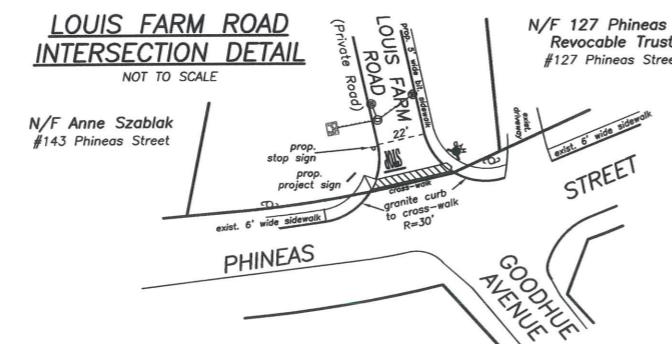
### DRAUT ZONING BOARD OF APPEALS

I hereby certify that this plan has been prepared in conformity with the Rules and Regulations of the Registers of Deeds in the Commonwealth of Massachusetts.

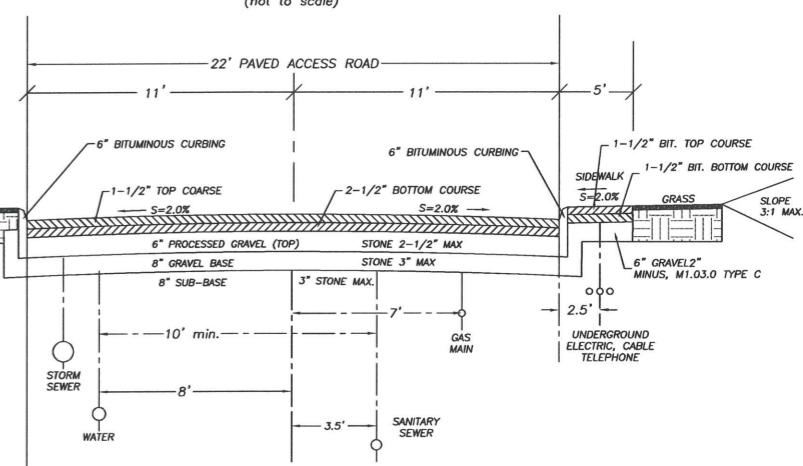
I also certify that the property lines shown are those of public or private streets or ways already established, and that no new lines for division of existing ownership or new ways are shown.

JUN 03, 2022

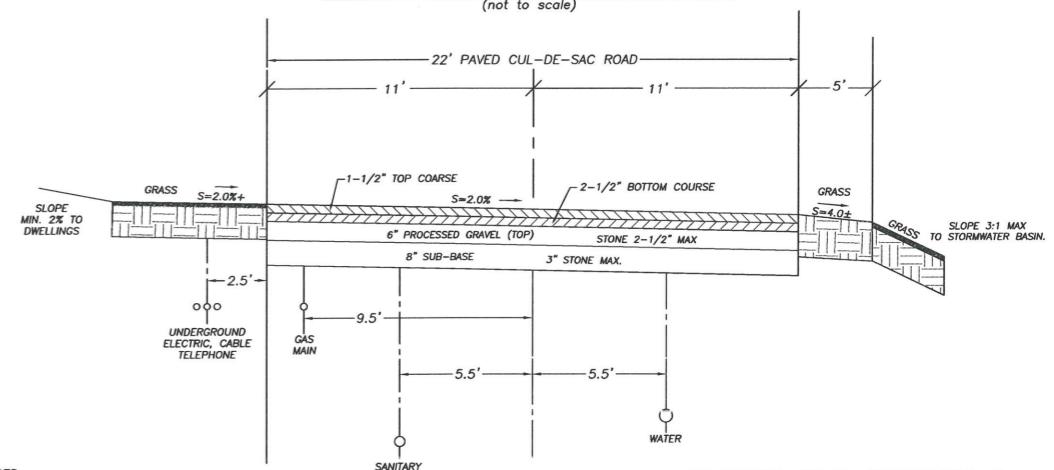
MARK O'HARA  
P.E. #45201



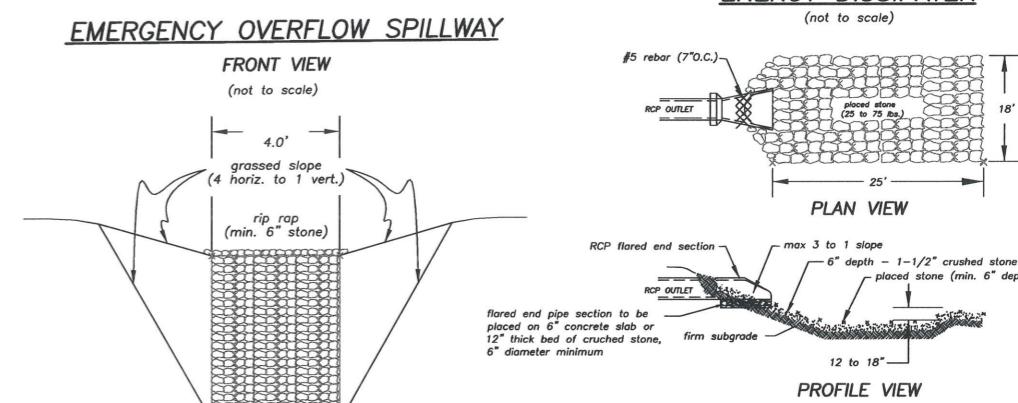
### TYPICAL ROADWAY SECTION



### TYPICAL CUL-DE-SAC SECTION



### FLARED END SECTION & ENERGY DISSIPATER



### "LOUIS FARM VILLAGE" ADULT COMMUNITY

### DRAINAGE AND ROAD SECTION DETAILS

133 PHINEAS STREET  
DRACUT, MASSACHUSETTS

DATE: APRIL 11, 2022	SCALE: AS SHOWN
DATE:	REVISIONS
06-03-22	Louis Farm Road & Phineas Street Detail

prepared for 133 Phineas Street LLC  
2100 Lakeview Avenue, Unit B, Dracut, MA.

prepared by Village Surveying  
81 Village Drive, Dracut, MA. 01826