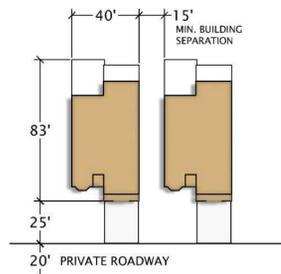


PROPERTY DATA:

PROPOSED SENIOR RESIDENTIAL COMMUNITY: ± 56.0 AC
 (MINUS POTENTIAL +/- 2-ACRE AFFORDABLE HOUSING TRACT)
 PROPOSED TOWN OPEN SPACE: ± 31.3 AC



TYPICAL HOME LAYOUT
 SCALE: 1"=50'



TYPICAL HOME ELEVATION
 NOT TO SCALE

LEGEND:

- WETLAND
- 100-YEAR FLOODPLAIN
- 30' WETLAND SETBACK
- 100' RIVERFRONT BUFFER
- 50' WETLAND SETBACK
- 200' RIVERFRONT BUFFER
- 100' WETLAND SETBACK
- STREAM

SOURCES:

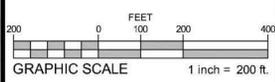
1. THIS PLAN IS THE EXCLUSIVE PROPERTY OF ESE CONSULTANTS INC., AND TOLL BROTHERS INC. ALL RIGHTS AND REMEDIES ARE HEREBY RESERVED. THIS PLAN MAY NOT BE REPRODUCED OR DISTRIBUTED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF ESE CONSULTANTS INC., AND TOLL BROTHERS INC.
2. TOPOGRAPHIC MAP TAKEN FROM USGS QUADRANGLE: LOWELL.
3. PARCELS FROM DEED PLOTS, SUBJECT TO FIELD SURVEY VERIFICATION.
4. PRELIMINARY WETLANDS FLAGGED BY ESE CONSULTANTS, SUBJECT TO FURTHER MAPPING AND DELINEATION.
5. LAWRENCE BROOK WATERCOURSE, MERRIMACK RIVER, AND GOLF COURSE PONDS TRACED FROM AERIAL PHOTO IMAGERY.
6. AERIAL PHOTOGRAPH FROM MASS GIS, 2013-14 IMAGERY.
7. ALL BASE SITE INFORMATION IS APPROXIMATE AND SUBJECT TO FIELD VERIFICATION.



Lower 31.3 Acres, including riverfront parcels, remain open space and will be donated to the Town at no cost.



SKETCH 18: SENIOR RESIDENTIAL COMMUNITY
 100 HOMES + TOWN OPEN SPACE
TYNGSBORO COUNTRY CLUB
 TOWN OF TYNGSBOROUGH, MIDDLESEX COUNTY, MA



PLAN SUMMARY:

- SENIOR RESIDENTIAL COMMUNITY:
 - ± 56 Ac. Community
 - 100 Homes
 - Clubhouse/Amenity
 - ± 4,130 LF Roads + 500 LF E.V.A.
 - Potential subtraction of ±2 AC for town affordable housing tract
- TOWN OPEN SPACE:
 - ± 27.6 Ac. South Golf Course area
 - ± 3.7 Ac. Riverfront area
 - ± 31.3 Ac. Total Town Open Space

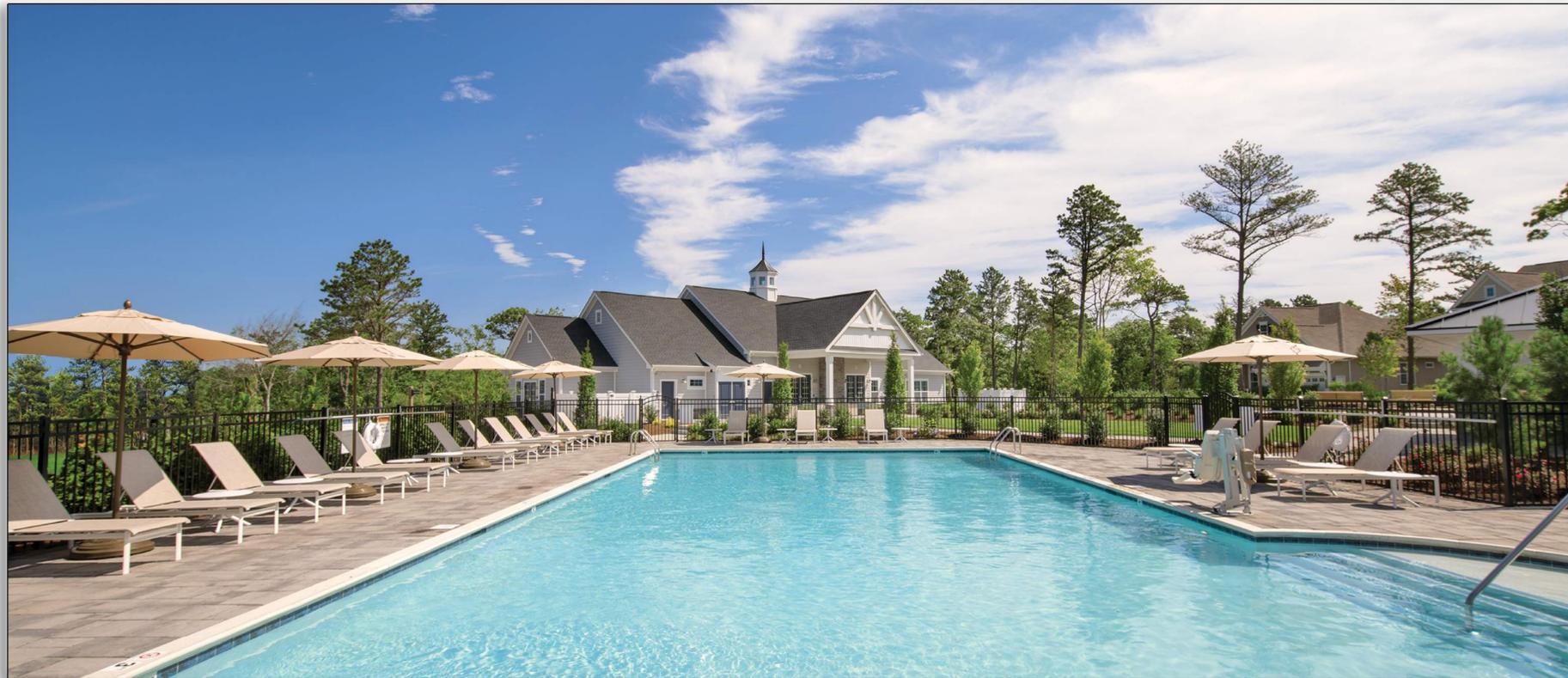
SITE DATA:

ADDRESS: PAWTUCKET BLVD. & SHERBURNE AVE.
 TYNGSBOROUGH, MA 01879
 PARCEL(S): MULTIPLE PARCELS AS NOTED ON PLAN
 SITE AREA: +/- 87.3 ACRES
 CURRENT ZONING: R-1 RESIDENTIAL
 PROPOSED USE: SENIOR RESIDENTIAL COMMUNITY & TOWN OPEN SPACE

OFFICE DATA:

PROJECT NUMBER: 4408
 DATE: DECEMBER 9, 2019
 SCALE: 1"=200'
 DRAWN BY: HRM

CLUBHOUSE REAR VIEW
POOL DECK
(PHOTO OF SIMILAR DESIGN)



CLUBHOUSE FRONT VIEW
(ARTIST'S RENDERING)

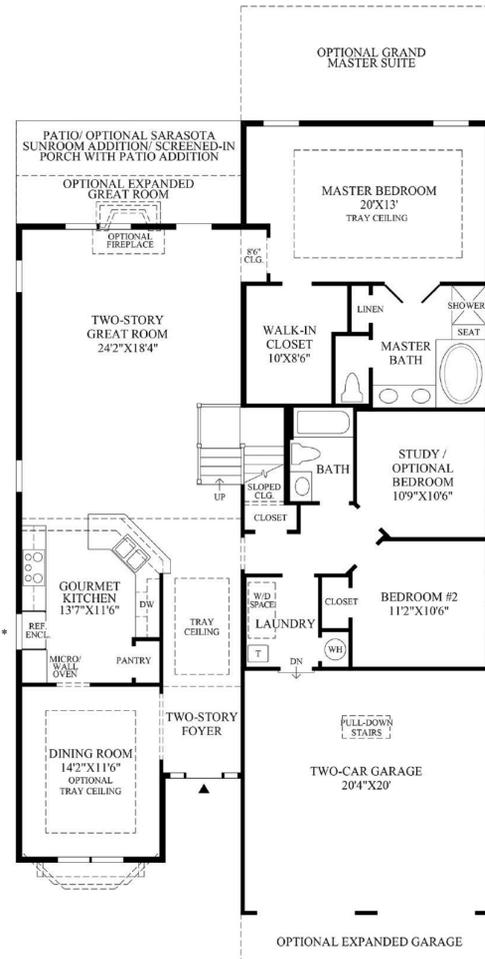
PROPOSED CLUBHOUSE & POOL
SENIOR RESIDENTIAL COMMUNITY
TYNGSBORO COUNTRY CLUB
TOWN OF TYNGSBOROUGH, MIDDLESEX COUNTY, MA
JANUARY 27, 2020



SECOND FLOOR LOFT



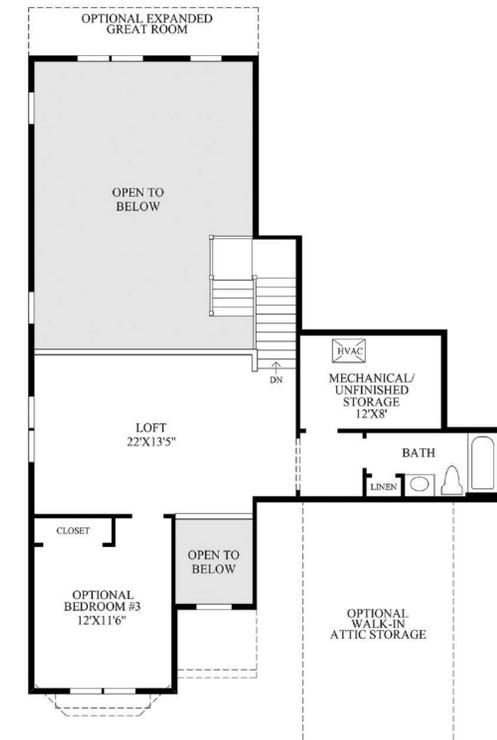
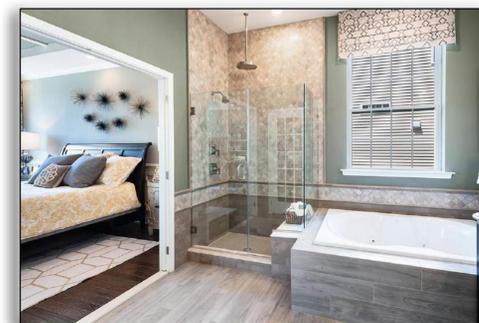
FIRST FLOOR GREAT ROOM



TYPICAL FIRST FLOOR PLAN



FIRST FLOOR MASTER BEDROOM & BATH



TYPICAL SECOND FLOOR PLAN

PROPOSED SINGLE HOMES
 SENIOR RESIDENTIAL COMMUNITY
 TYNGSBORO COUNTRY CLUB
 TOWN OF TYNGSBOROUGH, MIDDLESEX COUNTY, MA
 JANUARY 27, 2020

MEMORANDUM

TO: Matt Hanson, Town Administrator, Town of Tyngsborough, MA
FROM: Hannah Mazzaccaro, AICP
CC: David Bauer & Shawn Nuckolls, Toll Brothers, Inc.
DATE: January 23, 2020
RE: Tyngsboro Country Club Development Proposal FISCAL IMPACT ANALYSIS

ESE Consultants was retained by Toll Brothers to analyze the tax revenue implications of a proposed Active Adult Community on the Town of Tyngsborough. Toll Brothers is proposing a 100-unit age-restricted development on the Tyngsboro Country Club, comprised of detached single condominium homes surrounded by open space land, served by private roads and a private clubhouse and pool, as depicted on the site plan prepared by ESE Consultants titled “Sketch 18: Senior Residential Community,” dated December 9, 2019.

The subject property is a total of ± 88.7 acres, of which ± 56.7 acres are proposed for development and the remaining ± 32 acres will be donated to the town as open space and a potential site for affordable housing units. Access to the property is from Sherburne Avenue, just west of the existing house at 56 Sherburne Avenue. The site is currently zoned R-1 Low Density Residential; Toll Brothers plans to apply for a re-zoning of the property to allow a Senior Residential Community.

As an alternative, if a senior community is not approved for this site, Toll Brothers will develop a conventional subdivision of thirty-seven (37) ± 65,000 square foot lots on the full ± 88.7-acre site.

ESE Consultants used the “Per-Capita Multiplier Method” of fiscal impact analysis to project the annual cost that the town will incur to provide services on a per-person basis to residents of the new homes (using the 2019 town budget) and projected the tax revenue each home will pay, to determine the net fiscal impact of the homes on the town budget. ESE projected the fiscal impacts of both the Senior Residential Community scenario (100 age-restricted homes) and the conventional subdivision scenario (37 single-family home lots).

This analysis determined that the proposed Active Adult Overlay will provide a large surplus of annual tax revenue to the town. The proposed development will be age-restricted to adults 55 and older, therefore the new homes will not add any education costs. Education costs are the biggest budget item funded by Tyngsborough taxpayers. ESE’s projection shows that each new senior home in Tyngsborough will provide almost \$7,350 in surplus property tax revenue, paying more into the tax base than they will consume in local services. This estimate is consistent with the results seen in towns with existing age-restricted residential communities

The alternative scenario of a “by right” conventional subdivision, conforming to existing R-1 zoning, creates a net tax deficit for Tyngsborough, with the new homes consuming more in services – primarily educational services – than they will pay in property taxes. Based on a per capita analysis, the 37 new homes will house 128 residents, 30 of whom will be school-aged children attending local public schools. Due to the high cost of education, ESE projects that each new home will create a fiscal deficit of approximately \$9,220 per home, per year.

Option A: Senior Residential Community Development Summary:

- (100) age-restricted single homes in Tyngsborough, average delivered price \$590,000
- Private community amenities including a clubhouse and pool
- ± 30 acres of private condominium open space in the community
- ± 32 acres of public open space donated to the town
- Net fiscal SURPLUS of ± 7,350 per home, per year

Taxing Entity	Annual Property Tax Revenue	Annual Cost of Services	Annual NET SURPLUS From New Homes
Town of Tyngsborough (Including Schools)	\$ 910,813 <i>(Average \$9,108 / Home)</i>	(\$ 176,130) <i>(Average \$1,761 / Home)</i>	\$ 734,683 <i>(Average \$7,347 / Home)</i>

Option B: Conventional Subdivision Development Summary:

- (37) 65,000 SF minimum lots in Tyngsborough
- All ± 88.7 acres allotted to individual property owners
- Public street layouts proposed to serve residential lots
- Net fiscal DEFICIT of ± 9,220 per home, per year

Taxing Entity	Annual Property Tax Revenue	Annual Cost of Services	Annual NET DEFICIT From New Homes
Town of Tyngsborough (Including Schools)	\$ 268,304 <i>(Average \$8,134 / Home)</i>	(\$ 572,558) <i>(Average \$15,475 / Home)</i>	(\$ 304,254) <i>(Average \$9,220 / Home)</i>

See attached spreadsheets for detailed calculations and source data.

Tyngsboro C.C. - Town of Tyngsborough, MA
Option A: Senior Residential Community

The following calculations model the impact of the proposed development on the FY 2019/2020 Budget, as though the homes were already built, using 2020 tax rate and 2019 budget numbers.

A. Estimated Number of New Residents

Unit Type	Quantity New Homes	Average Number of Residents Per Unit*		New Residents
Age-Restricted Single Homes	100	1.9	=	190
Total Homes	100	Total New Residents	=	190

**Source: Average residents per age-restricted home from "Who Lives in New Jersey Housing," published by Rutgers University Center for Urban Policy Research in 2006, "Part Two, Section F: Specialized Housing Residential Multipliers - Age-restricted Housing." This publication is widely used for community impact analysis demographic projections in the Northeastern U.S., and uses actual census data from age-restricted communities constructed between 1980 and 2000. This analysis uses the multiplier for single-family detached age-restricted homes (1.57) and rounds up to 1.9, based on household statistics from Toll Brothers' Regency at Methuen community.*

B. Estimated Number of New Public School Children

Unit Type	Quantity New Homes	Average Number School Age Residents Per Unit*		New School Age Residents
Age Restricted Homes, Limited to Residents 55+	100	0	=	0
Total Homes	100	Total New Pupils	=	0

**Proposed community to be age-restricted to residents 55 and over, with no residents permitted under age 18, per the Federal Housing for Older Persons Act (HOPA).*

C. Estimated Taxable Value of New Homes

	Number of New Homes	Average Market Value Per Home*		Total Market Value
Age-Restricted Single Homes	100	\$ 590,000	=	\$ 59,000,000
TOTAL MARKET VALUE:				\$ 59,000,000
x EQUALIZATION RATIO**:				0.95
TOTAL ASSESSED TAXABLE VALUE OF PROPOSED HOMES:				\$ 56,050,000

**Average delivered market-rate home prices provided by Toll Brothers, based on own-company sales in the region for similar home models, and based on local area comparable sales for new homes (all builders), using data from MLS reports and proprietary market research data.*

***According to the Massachusetts Department of Revenue, Division of Local Services, residential and commercial parcels in Tyngsborough are assessed at 95% of their market value. Qualified Open Space parcels are assessed at 0% of their market value. Personal Property (tangible goods) is assessed at 100% of market value.*

D. Estimated Tax Revenue Generated by New Homes in Tyngsborough

Receiving Entity	Tax Rate per \$1000 of Assessed Value (2020 Rate)		Total 2019 Tax Revenues
Town of Tyngsborough & Tyngsborough Public Schools	\$ 16.25	=	\$ 910,813
TOTAL ANNUAL PROPERTY TAX REVENUE:			= \$ 910,813
AVERAGE Property Tax Per New Home:			= \$ 9,108

E. Estimated Annual Cost of Services for New Residents

	Average Cost Per Resident or Pupil*	Number of New Residents or Pupils		Total Annual Cost
Town of Tyngsborough: Per Capita Tax-Supported Cost of Municipal Services	\$ 927	190	=	\$ 176,130
Tyngsborough and Regional Schools	\$ 14,930	0	=	\$ -
TOTAL ANNUAL COST OF PUBLIC SERVICES*:				= \$ 176,130
AVERAGE Service Cost Per New Home:				= \$ 1,761

Per capita cost of municipal services is calculated by dividing total Town of Tyngsborough General Fund Budget amount by number of residents, adjusted to subtract education costs and funds contributed by non-residential taxes and other local revenue sources. The most recent source available for this data is the FY 20 Expense Report and Revenue Report, which lists budgeted amounts for FY 2019. Tyngsborough's Total FY 2019 General Fund Budget was \$40,925,045. Subtract \$23,319,696 for total education costs; subtract \$4,369,595 for local receipts revenues (not taxes); the resulting amount to be raised by taxes for municipal services is approximately \$13,235,754. This amount divided by 12,418 residents (2019 US Census population estimate), equals \$1,066 cost per capita for municipal services. Approximately 13% of the annual tax levy is paid by commercial and industrial property taxes and personal property taxes. The resulting per capita share of municipal service costs paid by residential real property taxes, for residents of the Town of Tyngsborough, is approximately \$1,066*.87= **\$927 per capita, per year.*

*** Per Pupil Cost for Tyngsborough School District reported by Massachusetts Department of Elementary & Secondary Education for Fiscal Year 2018. Tyngsborough pays into the regional school district budget as well.*

F. Projected Net Annual Fiscal Impact on Town of Tyngsborough

	Annual Property Tax Revenue	Annual Public Cost		Annual Net SURPLUS
Town of Tyngsborough (Including Schools)	\$ 910,813	\$ (176,130)	=	\$ 734,683
AVERAGE Net Surplus Per New Home:				= \$ 7,347

Tyngsboro C.C. - Town of Tyngsborough, MA**Option B: Conventional R-1 Subdivision - 37 - 65,000 SF Lots**

The following calculations model the impact of the proposed development on the FY 2019/2020 Budget, as though the homes were already built, using 2020 tax rate and 2019 budget numbers.

A. Estimated Number of New Residents

Unit Type	Quantity New Homes	Average Number of Residents Per Unit*		New Residents
4-Bdrm. Single Family Market Rate Homes	33	3.538	=	117
3-Bdrm. Single Family Affordable Homes	4	2.856	=	11
Total Homes	37	Total New Residents	=	128

*Source: Average residents per home from "Who Moves Into Massachusetts Housing?" published by EConsult Solutions in 2017 (data from 2015). The publication analyzes actual census data from households that moved between 2008 and 2015. This analysis uses the multiplier for single-family detached homes with 3 bedrooms (2.856) and 4 bedrooms (3.538).

B. Estimated Number of New Public School Children

Unit Type	Quantity New Homes	Average Number School Age Residents Per Unit*		New School Age Residents
4-Bdrm. Single Family Market Rate Homes	33	0.858	=	28
3-Bdrm. Single Family Affordable Homes	4	0.522	=	2
Total Homes	37	Total New Pupils	=	30

*Source: Average residents per home from "Who Moves Into Massachusetts Housing?" published by EConsult Solutions in 2017 (data from 2015). This analysis uses the multiplier for School-Age Children in single-family detached homes with 3 bedrooms (.522) and 4 bedrooms (3.538).

C. Estimated Taxable Value of New Homes

	Number of New Homes	Average Market Value Per Home*		Total Market Value
4-Bdrm. Single Family Market Rate Homes	33	\$ 500,000	=	\$ 16,500,000
3-Bdrm. Single Family Affordable Homes	4	\$ 220,000	=	\$ 880,000
		TOTAL MARKET VALUE:		\$ 17,380,000
		x EQUALIZATION RATIO**:		0.95
		TOTAL ASSESSED TAXABLE VALUE OF PROPOSED HOMES:		\$ 16,511,000

*Average new market rate home price based on comparable sales for new 4-bedroom Toll Brothers homes. Average affordable home price is affordable to a household making less than the median household income in Tyngsborough.

**According to the Massachusetts Department of Revenue, Division of Local Services, residential and commercial parcels in Tyngsborough are assessed at 95% of their market value. Qualified Open Space parcels are assessed at 0% of their market value. Personal Property (tangible goods) is assessed at 100% of market value.

D. Estimated Tax Revenue Generated by New Homes in Tyngsborough

Receiving Entity	Assessed Value (2019 Rate)		Total 2019 Tax Revenues
Town of Tyngsborough & Tyngsborough Public Schools	\$ 16.25	=	\$ 268,304
	TOTAL ANNUAL PROPERTY TAX REVENUE:		= \$ 268,304
	AVERAGE Property Tax Per New Home:		= \$ 8,134

E. Estimated Annual Cost of Services for New Residents

	Average Cost Per Resident or Pupil*	Number of New Residents or Pupils		Total Annual Cost
Capita Tax-Supported Cost of Municipal Services	\$ 927	128	=	\$ 118,656
Tyngsborough and Regional Schools	\$ 14,930	30	=	\$ 453,902
TOTAL ANNUAL COST OF PUBLIC SERVICES*:				= \$ 572,558
AVERAGE Service Cost Per New Home:				= \$ 15,475

Per capita cost of municipal services is calculated by dividing total Town of Tyngsborough General Fund Budget amount by number of residents, adjusted to subtract education costs and funds contributed by non-residential taxes and other local revenue sources. The most recent source available for this data is the FY 20 Expense Report and Revenue Report, which lists budgeted amounts for FY 2019. Tyngsborough's Total FY 2019 General Fund Budget was \$40,925,045. Subtract \$23,319,696 for total education costs; subtract \$4,369,595 for local receipts revenues (not taxes); the resulting amount to be raised by taxes for municipal services is approximately \$13,235,754. This amount divided by 12,418 residents (2019 US Census population estimate), equals \$1,066 cost per capita for municipal services. Approximately 13% of the annual tax levy is paid by commercial and industrial property taxes and personal property taxes. The resulting per capita share of municipal service costs paid by residential real property taxes, for residents of the Town of Tyngsborough, is approximately \$1,066*.87= **\$927 per capita, per year.*

*** Per Pupil Cost for Tyngsborough School District reported by Massachusetts Department of Elementary & Secondary Education for Fiscal Year 2018. Tyngsborough pays into the regional school district budget as well.*

F. Projected Net Annual Fiscal Impact on Town of Tyngsborough

	Annual Property Tax Revenue	Annual Public Cost		Annual Net DEFICIT
Town of Tyngsborough (Including Schools)	\$ 268,304	\$ (572,558)	=	\$ (304,254)
AVERAGE Net Deficit Per New Home:				= \$ (9,220)

Tyngsboro C.C. - Town of Tyngsborough, MA

2020 Tax Revenue - Parcels Proposed for Development:

ADDRESS	MAP-LOT	ACRES (Assessor)	OWNER	2020 ASSESSED VALUE
Parcel North of Sherburne Ave:				
46 Sherburne Ave.	26-2	56.7	Tyngsboro Ltd. Partnership	\$ 460,000
Parcels South of Sherburne Ave:				\$ -
45 Sherburne Ave.	20-74	9.45	Tyngsboro Ltd. Partnership	\$ 187,100
80 Pawtucket Blvd.	27-73	18.81	Tyngsboro Ltd. Partnership	\$ 702,700
Riverfront Parcels:				
0 Pawtucket Blvd.	27-74	2.6	Tyngsboro Ltd. Partnership	\$ 9,910
55 Pawtucket Blvd.	21-41	1.1	Tyngsboro Ltd. Partnership	\$ 15,100
TOTAL AREA:		88.66 Acres		
FY 2020 TOTAL ASSESSED VALUE:				\$ 1,374,810
FY 2020 Tax Rate Per \$1000:				\$ 16.25
Existing Tax Revenue - Parcels Proposed for Development & Open Space:				\$ 22,341



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Boston, MA 02109
p 617-556-0020 | f 617-556-0025

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FOUNDER

Joseph W. McMahon, P.E.

January 22, 2020

Scott P. Miccile, P.E.
Sr. Land Development Manager
Toll Brothers, Inc., New England Division
134 Flanders Road, Suite 275
Westborough, MA 01581

RE: Preliminary Traffic Assessment
Proposed Senior Residential Community
Tyngsboro, MA

Dear Mr. Miccile,

McMahon Associates has prepared a preliminary traffic assessment for the proposed redevelopment of the existing Tyngsboro Country Club located along Sherburne Avenue in Tyngsboro, Massachusetts (Figure 1). The assessment is based on a Concept Sketch prepared by ESE Consultants dated December 9, 2019. The site currently houses a nine-hole golf course with associated amenities and the proposed project would convert the existing use into a senior residential community with 100 detached residences and associated amenities. The following memorandum outlines the adjacent roadway conditions, summarizes existing roadway volumes, compares trip generation between existing and proposed land uses, and includes a sight distance summary at the proposed site access location.

Existing Transportation Infrastructure

Sherburne Avenue generally extends in a northwest-southeast direction, north of Pawtucket Boulevard (Route 113). The roadway is classified as an urban minor arterial and is under Town of Tyngsboro jurisdiction. Sherburne Avenue is a two-lane, two-way roadway with 11-foot travel lanes and one-foot wide shoulders, mainly providing access to residential land uses. The posted speed limit on Sherburne Avenue is 30 miles per hour.

Automated Traffic Recorder Counts

To assess daily traffic volumes along Sherburne Avenue, an ATR count was conducted on Sherburne Avenue west of Cardinal Lane, for a 48-hour day period from Tuesday April 24, 2018 to Wednesday April 25, 2018.

Table 1: Automated Traffic Recorder Data

Street	Direction	ADT	AM Peak	PM Peak	85th Percentile Speed	Heavy Vehicle %
Sherburne Avenue	Eastbound	3,270	160	410	38 mph	4.8%
	<u>Westbound</u>	<u>2,430</u>	<u>180</u>	<u>200</u>	<u>38 mph</u>	<u>4.4%</u>
	Overall	5,700	340	610	38 mph	4.6%

Along Sherburne Avenue, the overall average daily traffic (ADT) volume recorded was approximately 5,700 vehicles, with approximately 3,270 vehicles travelling eastbound, and approximately 2,430 vehicles travelling westbound. The weekday morning peak hour along Sherburne Avenue occurs between 7:00 AM and 8:00 AM with a total peak hour volume of approximately 340 vehicles. The weekday afternoon peak hour along Sherburne Avenue occurs between 4:45 PM and 5:45 PM with a total peak hour volume of approximately 610 vehicles.

As discussed, the posted speed limit in the vicinity of the project site is 30 miles per hour on Sherburne Avenue. The 85th percentile speed was shown to be 38 miles per hour in both the eastbound and westbound direction of travel on Sherburne Avenue. Approximately 4.6% of traffic on Sherburne Avenue can be attributed to heavy vehicles, such as buses, single unit trucks, and tractor trailers.

Site-Generated Traffic

In order to estimate the number of vehicle trips associated with the proposed senior residential community, the Institute of Transportation Engineers’ (ITE) publication, *Trip Generation Manual, 10th Edition*, was referenced. ITE is a national research organization of transportation professionals, and *Trip Generation Manual, 10th Edition* provides traffic generation information for various land uses compiled from studies conducted by members nationwide. Vehicle trip estimates for the existing golf course and for the proposed senior residential community were based on data for Land Use Code 430 (Golf Course) and 251 (Senior Adult Housing - Detached), respectively. The ITE data establishes vehicle trip rates based on actual traffic counts conducted at similar existing land uses.

Table 2 presents a comparison of the estimated project site trips generated during the weekday morning and afternoon peak hours, and for a typical weekday.

Table 2: Proposed Project Trips

Description	Size	Weekday AM			Weekday PM			Weekday Daily		
		In	Out	Total	In	Out	Total	In	Out	Total
Proposed Project Trips ⁽¹⁾	100 units	13	27	40	29	19	48	281	281	562
<u>- Existing Project Site Trips⁽²⁾</u>	<u>9 holes</u>	<u>13</u>	<u>3</u>	<u>16</u>	<u>14</u>	<u>12</u>	<u>26</u>	<u>106</u>	<u>106</u>	<u>212</u>
Total "New" Project Trips		0	24	24	15	7	22	175	175	350

(1) ITE Land Use Code 251 (Senior Adult Housing - Detached), based on 100 dwelling units.

(2) ITE Land Use Code 430 (Golf Course), based on 9 holes.

As shown in Table 2, the proposed project is estimated to generate approximately 350 additional vehicle trips (175 entering and 175 exiting vehicles) compared to the estimated trips of the existing Tyngsboro County Club during a typical weekday. During the weekday morning peak hour, the proposed project is estimated to generate approximately 24 additional vehicle trips (0 entering vehicles and 24 exiting vehicles). During the weekday afternoon peak hour, the proposed project is estimated to result in approximately 22 additional vehicle trips (15 entering vehicles and 7 exiting vehicles).

The number of total project trips would result in one entering or exiting vehicle every one to two minutes during the weekday morning and weekday afternoon peak hours.

Sight Distance

Access to the project site is proposed to be maintained by one full-access driveway for visitors and residents and one emergency vehicle access driveway, each located on Sherburne Avenue. McMahon Associates completed a review of the available sight distance at the proposed full-access site driveway location. Based on ATR data summarized above, the 85th percentile vehicle speed along Sherburne Avenue is 38 miles per hour in both directions, which was utilized for this review.

The American Association of State Highway and Transportation Officials (AASHTO) publication, *A Policy on Geometric Design, 2018 Edition*, defines acceptable sight distances at intersections. The minimum sight distance is based on the stopping sight distance (SSD) for vehicles traveling along the main road. The sight distance that allows vehicles to enter the main street traffic flow without requiring the mainline traffic to slow to less than 70% of their speed and is referred to as intersection sight distance (ISD). According to AASHTO, "If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient time to anticipate and avoid collisions."

Sight distances at the proposed full-access driveway are currently limited by horizontal and vertical curvatures in the roadway. Due to existing physical characteristics of the Sherburne Avenue, sight distance measurements were limited to being taken from five feet back from the travel lane. Based on these conditions, the measured sight distance looking left (east) and looking right (west) is approximately 400 feet and 375 feet, respectively. For vehicle speeds of 38 miles per hour, the required stopping sight distance 280 feet, which is exceeded for a driver's sight line at 5 feet back from the roadway. Based on the anticipated conditions under the proposed project, the minimum sight distance requirements are expected to be met for 85th percentile vehicle speeds along Sherburne Avenue from further back from the roadway, providing safe access to and from the project site.

Conclusion

Based on the review of the information presented in this assessment, the following summary is provided regarding the existing conditions and the potential traffic impacts of the proposed redevelopment of the Tyngsboro Country Club into a senior residential community.

- Sherburne Avenue has an ADT of approximately 5,700 total vehicles per day (340 total during weekday morning peak hour and 610 total during weekday afternoon peak hour) with an 85th percentile speed of 38 miles per hour and approximately 4.6% heavy vehicles.
- The proposed senior residential community is estimated to result in approximately 24 additional vehicle trips during the weekday morning peak hour and approximately 22 additional vehicle trips during the weekday afternoon peak hour, over the existing golf course use.
- Sight distance for the proposed full-access site driveway looking both directions is expected to satisfy AASHTO minimum sight distance for the existing 85th percentile speed.

Please do not hesitate to contact me should you require any further information.

Sincerely,



Erin Fredette, P.E.
Project Manager



Figure 1
Site Location Map
Senior Residential Community
Tyngsboro, Massachusetts