SANBORN HEAD

Tamworth Transfer Station Study

TAMWORTH TRANSFER STATION

Tamworth, New Hampshire

Prepared for Town of Tamworth

File No. 5511.00

March 30, 2023

TABLE OF CONTENTS

TABLE OF CONTENTS (cont.)

1.0 INTRODUCTION

As part of the Recycling Center Improvement Project for the Town of Tamworth (Town), Sanborn, Head & Associates, Inc. (Sanborn Head) prepared this transfer station study to support the proposed development of a new transfer station and recycling facility in Tamworth, New Hampshire.

The objectives of this study were to evaluate 1) the traffic flow at the transfer station and 2) monthly solid waste and recyclable data and utilize it to project future traffic flow and solid waste and recyclable materials generation rates, loose storage volumes, and baled storage volumes for development and sizing of the new transfer station and recycling facility. This report summarizes the processes used to perform this study and the results.

1.1 Traffic Observations

On Saturday, January 21, 2023, two (2) representatives of Sanborn Head observed traffic patterns associated with solid waste disposal and recycling activities at the existing transfer station. Sanborn Head's observations included:

- Arrival Times;
- Number of vehicles queued during arrival;
- Drop-off duration;
- Number of vehicles queued following departure;
- Locations visited (i.e., aluminum can roll-off, cardboard drop-off, compactor, etc.); and
- General observations of people and vehicle movement at the solid waste compactor area, the recycling drop-off area, and construction and demolition (C&D) drop-off area.

Appendix A contains the traffic observations field data sheets and graphs showing the traffic trends at the site from the January 21, 2023. Table 1.1 provides a summary of the information within the field data sheets with charts visualizing the data provided.

Observations were made from off-loading areas near the compactor and along the recycling containers. See Figure 1 for a site plan of the transfer station with traffic flow arrows and waste locations. Observations were noted on individual vehicles from the time they entered the queue, while in queue, and through off-loading to gain insight as to how the facility is used by various people. While observations were being made on selected vehicles, general observations were also noted regarding the number of vehicles in queue, vehicles parked remotely (not entering the queue), vehicles circling around the facility to avoid the queue line, and activities at other areas.

Table 1.1
Raw Data Summary of Vehicles Tracked on January 21, 2023

Arrival Time Interval	Number of MSW Drop-Offs	Number of Recycling Drop-Offs
8:00 to 8:15	4	0
8:15 to 8:30	3	2
8:30 to 8:45	4	1
8.45 to 9:00	5	3
9:00 to 9:15	9	3
9:15 to 9:30	9	2
9:30 to 9:45	5	0
9:45 to 10:00	5	2
10:00 to 10:15	8	3
10:15 to 10:30	7	2
10:30 to 10:45	11	5
10:45 to 11:00	13	5
11:00 to 11:15	8	3
11:15 to 11:30	13	4
11:30 to 11:45	5	3
11:45 to 12:00	7	3
12:00 to 12:15	6	1
12:15 to 12:30	10	6
12:30 to 12:45	16	6
12:45 to 13:00	8	4
13:00 to 13:15	6	3
13:15 to 13:30	4	1
13:30 to 13:45	6	4
13:45 to 14:00	5	3
14:00 to 14:15	4	0
14:15 to 14:30	2	1
14:30 to 14:45	4	1
14:45 to 15:00	6	2
15:00 to 15:15	2	0
15:15 to 15:30	5	1
15:30 to 15:45	3	1
15:45 to 16:00	0	0
TOTAL VEHICLES	203	75
AVERAGE VEHICLES PER HOUR	25	9
AVERAGE VEHICLES PER 15 MINUTES	6	2
PEAK 1 HOUR INTERVAL	10:30 to 11:30	12:15 to 13:15
	45 Vehicles	6 Vehicles
PEAK 15 MINUTE INTERVAL	12:30 to 12:45	12:15 to 12:30
	16 Vehicles	6 Vehicles

NOTE: Compiled data from notes recorded by Aaron Wilker and Zach Sagendorf on January 21, 2023

Legend
Peak Recycling 1-Hour Interval
Peak Recycling 15-Min Interval
Peak MSW 1-Hour Interval
Peak MSW 15-Min Interval

Table 1.2
Data Summary of Vehicles Tracked[1,2]

Metric	Value
Number of Vehicles at municipal solid waste (MSW) Drop-off	203
Number of Vehicles at Recycling Drop-off	76
Number of Vehicles at C&D Drop-off	16
Peak 1-hour interval for MSW Drop-off	10:30 to 11:30 [45]
Peak 1-hour interval for Recycling Drop-off	12:15 to 13:15 [19]

1. Observations performed on January 21, 2023.
2. Values were calculated based on the information shown in Table 1.1 – Traffic Observations, see Appendix B.

The most significant information that can be taken from Table 1.2 is that peak operation hours occur within the late morning to early afternoon. Based on the traffic count data for January 21, 2023, presented in Table 1.1, and discussions with the attendants, the study day was much less than a typical busy Saturday. The low numbers were more than likely caused by a lower off-season population and inclement weather from the previous day. We anticipate increased values for each metric in Table 1.2 on a typical busy Saturday or Sunday in the summer season when the Town has an increased population.

Other general observations include:

- Users generally waited to park directly adjacent to the compacter building to begin off-loading;
- Users generally dropped off at recycling before joining the queue to drop off MSW;
- Some users would drop off at MSW before looping around and dropping off at recycling;
- Some users would park at the MSW compactor building and walk across the site to drop off recycling;
- Before leaving the site, some users would drive to the C&D area and park to drop-off C&D, talk with the attendant, or observe the C&D materials; and
- The vehicle queue line for MSW was observed to never have more than 3 cars queued. We understand that queue lines have been observed by Town staff extending to the entrance of the transfer station at Route 25 on busier days.

Safety observations include:

- Front-end-loader travelling near lanes with resident's vehicles waiting in the queue;
- One lane moving while the other lane is not moving. Residents crossing from standing lane to moving lane are at risk of being struck by moving vehicles;
- Vehicles changing lanes to gain position or to exit more quickly place residents and staff at risk;
- The steep approach to the transfer station drop-off areas could result in slips, trips, and falls during wet or icy conditions or allow vehicles to roll back into another vehicle or resident; and

- Vehicles exiting the recycling drop-off as a vehicle heading directly to MSW drop-off are at risk of colliding before heading into the loop for the MSW drop-off queue.

1.2 Traffic Data Summary

The Town provided Sanborn Head with traffic count data from July 15, July 18, and July 26, 2020, that included hourly counts of traffic using the recycling area or going straight to the MSW area. Table 1.3 provides a summary of the 2020 and 2023 traffic count data by hour and by 15-minute interval when available. From this data the traffic flow in terms of total vehicle counts, average hour, peak hour, and peak 15-minute interval was calculated. The 2023 traffic count data was not used in the overall calculations because the total vehicle counts were significantly below the other three data sets and was not deemed consistent with July 2020 data. Below is a summary of key traffic data from the July 2020 traffic study.

- Total Vehicles – 1,175[1]
- Average Hour – 49 vehicles
- Average 15 Minute – 12 vehicles
- Peak Hour – 77 vehicles

Using this data, a Peaking Factor was calculated by dividing the Peak 15-minute traffic count by the Average 15-minute value (Average Hour Traffic Count divided by four (60 minutes/15 minutes)). The Peaking Factor ranged from 129.84% to 160.42% with an average of 140.12%. The average Peaking Factor is used in the future projection calculations to develop the required amount of off-loading positions and estimating average amount of time required at the facility.

Based on current conditions at the facility, the queue is assumed to start at the entrance to the facility from Route 25. The end of queue is located at the recycling area, providing approximately 730 feet for a single queueing lane. Assuming a vehicle occupancy area of 20 feet would provide a queue of approximately 37 vehicles in the queue.

1.3 Traffic Projections

Traffic projections were estimated using a combination of the traffic count data provided by the Town, data recorded by Sanborn Head, and population estimates provided in the Town's Master Plan, dated November 2008. Table 1.4 summarizes these projections and provides a comparison between the preferred concept facility layout and the existing facility layout based on vehicle traffic and available off-loading positions. The traffic data from the January 21, 2023, observation date is provided as a point of reference only. This data was not used to calculate traffic projections as it was deemed to be a non-typical day in terms of facility usage. As noted previously, total data was calculated using traffic counts from July 2020, see Table 1.3 in Appendix B.

The total projected traffic was calculated using the average July 2020 traffic flow of 392 vehicles and population data for 2020 (2,824), 2021 (2,837), 2040 (3083[2]), and 2040 max seasonal (4,500). The traffic flow for 2040 was increased by 271 based on the population increase. The traffic flow for 2040 max seasonal was increased by 407 based on the population increase and an additional 50% due to seasonal increases in Town population. A 10% participation increase factor was then added to the

[1] July 2020 traffic count covered three days that included a Wednesday, a Saturday, and a Sunday.
[2] Estimated population based on New Hampshire Population Projections: 2020 – 2050, September 2022.

traffic flow for years 2021 (42 vehicles), 2040 (66 vehicles), and 2040 max seasonal (80 vehicles). The total projected traffic flow for years 2040 and 2040 seasonal max is 729 and 878 vehicles per day (on a weekend day).

The projected average hourly traffic flow was then calculated to be 91 and 110 vehicles per hour in 2040 and 2040 seasonal maximum respectively. The average 15-minute traffic flow was then calculated by dividing the average hourly traffic flow by four (60 minutes / 15 minutes), resulting in projected average 15-minute traffic flows of 23 and 27 vehicles in 2040 and 2040 max seasonal, respectively. Using the average 15-minute traffic flow and the average Peaking Factor (see above section) the projected 15-minute peak traffic flow was calculated to be 32 and 38 vehicles in 2040 and 2040 max seasonal, respectively. Based on the projected peak queue of 38 vehicles, head-on parking would be the recommended alignment to limit traffic queuing off the site onto Route 25, providing ample parking around the facility, and provide better controls for limiting traffic queuing that might occur when exiting the facility.

Table 1.3
Traffic Count Summary

Time Interval		1/21/2023[1] Saturday		7/15/2020[2] Wednesday	7/18/2020[2] Saturday	7/26/2020[2] Sunday	Average[3]
8:00	8:15	4	16	--	--	--	--
8:15	8:30	3					
8:30	8:45	4					
8:45	9:00	5					
9:00	9:15	9	28	51	77	57	62
9:15	9:30	9					
9:30	9:45	5					
9:45	10:00	5					
10:00	10:15	8	39	41	68	43	51
10:15	10:30	7					
10:30	10:45	11					
10:45	11:00	13					
11:00	11:15	8	33	43	64	68	58
11:15	11:30	13					
11:30	11:45	5					
11:45	12:00	7					
12:00	12:15	6	40	62	28	53	48
12:15	12:30	10					
12:30	12:45	16					
12:45	13:00	8					
13:00	13:15	6	21	40	42	68	50
13:15	13:30	4					
13:30	13:45	6					
13:45	14:00	5					
14:00	14:15	4	16	58	32	54	48
14:15	14:30	2					
14:30	14:45	4					
14:45	15:00	6					
15:00	15:15	2	10	37	39	43	40
15:15	15:30	5					
15:30	15:45	3					
15:45	16:00	0					
16:00	16:15	--	--	50	31	26	36
16:15	16:30	--					
16:30	16:45	--					
16:45	17:00	--					
Total Vehicles		203	203	382	381	412	392
Average Hour		26	26	48	48	52	49
Average 15 Minutes		7	7	12	12	13	12
Peak Hour		45	45	62	77	68	62
Peak 15 Minute		16					17
Peaking Factor[4]		**173.08%**		**129.17%**	**160.42%**	**130.77%**	**140.12%**

1. Traffic data obtained from observing traffic at the Town of Tamworth Transfer Station.
2. July 2020 traffic data obtained from traffic count study supplied by the Town of Tamworth.
3. Average of the July 2020 traffic data.
4. Peaking Factor is the calculated peaking factor for the 15 minute peak traffic flow above the average 15 minute (Average Hour divided by four).

Table 1.4
Vehicle Traffic Projections

	Units	Sanborn Head Observation Date January 21, 2023	July 2020 Average	2021	2040	2040 Seasonal Max
Population	people	2950	2812	2837	3083	4500
Total Number of Vehicles	veh/day	203	392	392	392	392
Population Increase Factor	veh/day			25	271	407
Participation Increase (10%) Factor	veh/day			42	66	80
Projected Total Number of Vehicles	veh/day	203	392	458	729	878
Projected Number of Vehicles (average hour)	veh/hour	26	49	57	91	110
Average 15 minutes	veh/15 minutes	7	12	14	23	27
Peak 15 minutes	veh/15 minutes	16				
Calculated Average Peaking Factor	Percentage		**140.12%**			
Calculated Peak 15 minutes	veh/15 minutes		**17**	**20**	**32**	**38**

2.0 SOLID WASTE & RECYCLING DATA REVIEW & PROJECTIONS

2.1 Review of Existing Data and Calculation of Per Capita Generation Rates

The Town provided Sanborn Head with monthly solid waste and recycling data disposed of from the facility between January 2020 through December 2022. The data provided by the Town segregated the material into the following categories:

- Municipal Solid Waste (MSW);
- C&D;
- Glass;
- Cardboard;
- Light Iron;
- Aluminum; and
- Tin.

Sanborn Head sorted the data supplied by the Town and focused specifically on MSW and household recyclables (consisting of glass, cardboard, light iron, aluminum, and tin). The C&D stream was also of interest for the purposes of projecting possible future C&D disposal demands that may be placed on the new facility. But this stream has less focus placed on it due to the primary requirements for MSW and household recyclables that will be managed by the new facility building. The ability to reasonably estimate future quantities of household recyclables has a direct impact on sizing the loose storage requirements for these materials within the proposed building's bunker bays, as well as anticipated bale storage space needs.

Table 2.1 summarizes Sanborn Head's sorting of the Town's past three years of MSW, C&D, and recycling data shipped offsite from the transfer station. Peak disposal months for each material type are highlighted in a blue shade. The table also totals MSW and household recyclables as a function of the total of these two streams. As shown in the table, the percentage of MSW and C&D to household recyclables has been steady over the past three years, with MSW and C&D representing approximately 90% of the waste stream and household recyclables representing approximately 10% of the waste stream. A 3-year average sub-table calculating average disposal rates for each month over the past 3 years and shows the average peak disposal months for each material.

Table 2.1 also provides population data for 2020 through 2022. The data is based upon population data provided by the New Hampshire Office of Strategic Initiatives. Population projection data is provided in the New Hampshire Population Projections: 2020 – 2050, September 2022 (Table 4 of the Projections tables) includes estimates for 2020, 2025, 2030, 2035, 2040, 2045, and 2050. This information was used to estimate population between 2021 and 2040 using straight line projections based on the Master Plan data. Estimated and reported population figures are shown at the top of each sub-table for each year of Table 2.1. The 3-year average sub-table provides the average of the population data for the previous 3 years. Using the average population data, average per-capita waste generation rates (pounds per person per day) were calculated for each material type for 2020 through 2022. Total per-capita generation rates for the aggregate of all materials (MSW, recyclables, and C&D) and combined MSW and household recyclables were also calculated and are shown in the bottom row of each year of Table 2.1.

Table 2.1
Tamworth Transfer Station Monthly Tonnage Data for MSW & Recyclables
Year 2020 through 2022

YEAR	Population	2812		RECYCLABLES						TOTAL	PERCENTAGES	
	MONTH	MSW	C&D	CARDBOARD	GLASS	LIGHT IRON	ALUMINUM	TIN	TOTALS	MSW + C&D	MSW + C&D	RECYCLABLES
2020	JANUARY	105.66	13.97	3.47	-	-	-	-	123.10	119.63	97%	3%
	FEBRUARY	86.11	12.94	3.15	6.2	7.11	-	-	115.51	99.05	86%	14%
	MARCH	91.92	22.41	3.21	-	6.97	-	-	124.51	114.33	92%	8%
	APRIL	124.43	26.51	0	-	13.75	-	-	164.69	150.94	92%	8%
	MAY	113.52	36.21	0	-	6.36	1.06	-	157.15	149.73	95%	5%
	JUNE	114.5	25.17	3.37	6.25	13.36	-	-	162.65	139.67	86%	14%
	JULY	114.97	29.64	5.82	6.34	9.21	1.02	-	166.99	144.61	87%	13%
	AUGUST	128.68	29.2	2.74	6.87	7.79	1.07	-	176.35	157.88	90%	10%
	SEPTEMBER	121.99	40.41	6.06	6.49	12.87	1.01	-	188.83	162.4	86%	14%
	OCTOBER	113.44	27.89	3.73	6.21	7.73	-	-	159.00	141.33	89%	11%
	NOVEMBER	114.78	35.95	2.8	-	13.19	-	-	166.72	150.73	90%	10%
	DECEMBER	103.35	23.43	3.47	6.17	-	-	-	136.42	126.78	93%	7%
TOTAL		1333.35	323.73	37.82	44.53	98.35	4.16	0	1841.94	1657.08	90%	10%
% OF TOTAL TONNAGE		72.4%	17.6%	2.1%	2.4%	5.3%	0.2%	0.0%	100.0%			
AVG. MONTHLY TONNAGE		111.11	26.98	3.15	6.36	9.84	1.04	0.00	153.50			
PEAK MONTH		128.68	40.41	6.06	6.87	13.75	1.07	0.00	188.83	162.4		
		AUGUST	SEPTEMBER	SEPTEMBER	AUGUST	JULY	JULY		SEPTEMBER	SEPTEMBER		
Per Capita (lb/person per day)		2.59	0.63	0.07	0.09	0.19	0.01	0.00	3.58	3.22		

YEAR	Population	2837		RECYCLABLES						TOTAL	PERCENTAGES	
	MONTH	MSW	C&D	CARDBOARD	GLASS	LIGHT IRON	ALUMINUM	TIN	TOTALS	MSW + C&D	MSW + C&D	RECYCLABLES
2021	JANUARY	101.12	12.12	2.72	6.76	-	-	-	122.72	113.24	92%	8%
	FEBRUARY	91.3	13.1	3.47	-	4.6	-	2.71	115.18	104.4	91%	9%
	MARCH	103.04	19.46	2.59	6.27	4.51	-	-	135.87	122.5	90%	10%
	APRIL	104.44	35.81	6.18	5.92	8.89	-	-	161.24	140.25	87%	13%
	MAY	100.65	19.32	3.19	-	4.11	1.36	-	128.63	119.97	93%	7%
	JUNE	116.11	31.94	5.51	6.74	8.64	-	-	168.94	148.05	88%	12%
	JULY	109.65	32.19	5.78	6.97	5.96	1.30	-	161.85	141.84	88%	12%
	AUGUST	133.5	33.98	5.66	-	5.04	1.37	-	179.55	167.48	93%	7%
	SEPTEMBER	108.22	32.21	5.35	7.61	8.32	1.30	2.23	165.24	140.43	85%	15%
	OCTOBER	108.75	35.82	5.87	7.01	5	-	-	162.45	144.57	89%	11%
	NOVEMBER	94.97	35.15	2.26	7.47	8.53	-	-	148.38	130.12	88%	12%
	DECEMBER	97.92	27.48	5.43	-	-	-	-	130.83	125.4	96%	4%
TOTAL		1269.67	328.58	54.01	54.75	63.60	5.33	4.94	1780.88	1598.25	90%	10%
% OF TOTAL TONNAGE		68.9%	17.8%	2.9%	3.0%	3.5%	0.3%	0.3%	100.0%			
AVG. MONTHLY TONNAGE		105.81	27.38	4.50	6.84	6.36	1.33	2.47	148.41			
PEAK MONTH		133.5	35.82	6.18	7.61	8.89	1.37	2.71	179.55	167.48		
		AUGUST	OCTOBER	APRIL	SEPTEMBER	APRIL	AUGUST	FEBRUARY	AUGUST	AUGUST		
Per Capita (lb/person per day)		2.45	0.63	0.10	0.11	0.12	0.01	0.01	3.44	3.09		

YEAR	Est. Population	2950		RECYCLABLES						TOTAL	PERCENTAGES	
	MONTH	MSW	C&D	CARDBOARD	GLASS	LIGHT IRON	ALUMINUM	TIN	TOTALS	MSW + C&D	MSW + C&D	RECYCLABLES
2022	JANUARY	97.79	12.64	2.59	7.22	4.79	-	-	125.03	110.43	88%	12%
	FEBRUARY	86.28	6.05	2.22	-	5.06	-	-	99.61	92.33	93%	7%
	MARCH	100.49	24.82	2.98	-	-	-	-	128.29	125.31	98%	2%
	APRIL	105.44	17.18	2.51	7.17	8.9	1.47	2.15	144.82	122.62	85%	15%
	MAY	93.59	42.86	5.36	7.41	7.56	-	-	156.78	136.45	87%	13%
	JUNE	105.13	34.2	6.15	6.95	7.26	-	-	159.69	139.33	87%	13%
	JULY	112.75	29.69	4.83	-	7.94	1.50	-	156.71	142.44	91%	9%
	AUGUST	125.24	24.91	2.85	7.33	8.04	-	-	168.37	150.15	89%	11%
	SEPTEMBER	98.53	35.76	5.68	7.12	4.38	-	-	151.47	134.29	89%	11%
	OCTOBER	107.2	29.33	2.47	7.07	4.05	1.39	-	151.51	136.53	90%	10%
	NOVEMBER	99.42	35.01	3.31	-	8.95	-	2.13	148.82	134.43	90%	10%
	DECEMBER	90.59	13.14	2.24	7.21	-	-	-	113.18	103.73	92%	8%
TOTAL		1222.45	305.59	43.19	57.48	66.93	4.36	4.28	1704.28	1528.04	90%	10%
% OF TOTAL TONNAGE		72%	17.9%	2.5%	3.4%	3.9%	0.3%	0.3%	100%			
AVG. MONTHLY TONNAGE		101.87	25.47	3.60	7.19	6.69	1.45	2.14	142.02			
PEAK MONTH		125.24	42.86	6.15	7.41	8.95	1.5	2.15	168.37	150.15		
		AUGUST	MAY	JUNE	SEPTEMBER	NOVEMBER	JULY	APRIL	AUGUST	AUGUST		
Per Capita (lb/person per day)		2.27	0.57	0.08	0.11	0.12	0.01	0.01	3.17	2.84		

Note: Maximum monthly tonnages and maximum monthly per capita generation rates are highlighted with blue shading.

Average MSW, C&D, & Household Recyclables Recorded from 2020 to 2022: 1775.70

YEAR	Est. Population	2861		RECYCLABLES						TOTAL	PERCENTAGES	
	MONTH	MSW	C&D	CARDBOARD	GLASS	LIGHT IRON	ALUMINUM[1]	TIN[1]	TOTALS	MSW + C&D	MSW + C&D	RECYCLABLES
3-YEAR AVERAGE	JANUARY	101.52	12.91	2.93	6.99	4.79	-	-	129.14	114.43	89%	11%
	FEBRUARY	87.90	10.70	2.95	6.20	5.59	-	-	113.33	98.59	87%	13%
	MARCH	98.48	22.23	2.93	6.27	5.74	-	-	135.65	120.71	89%	11%
	APRIL	111.44	26.50	2.90	6.55	10.52	-	-	157.89	137.94	87%	13%
	MAY	102.59	32.80	2.85	7.41	6.01	-	-	151.65	135.38	89%	11%
	JUNE	111.91	30.44	5.01	6.65	9.75	-	-	163.76	142.35	87%	13%
	JULY	112.46	30.51	5.48	6.66	7.70	-	-	162.80	142.96	88%	12%
	AUGUST	129.14	29.36	3.75	7.10	6.96	-	-	176.31	158.50	90%	10%
	SEPTEMBER	109.58	36.13	5.70	7.07	8.52	-	-	167.00	145.71	87%	13%
	OCTOBER	109.80	31.01	4.02	6.76	5.59	-	-	157.19	140.81	90%	10%
	NOVEMBER	103.06	35.37	2.79	7.47	10.22	-	-	158.91	138.43	87%	13%
	DECEMBER	97.29	21.35	3.71	6.69	-	-	-	129.04	118.64	92%	8%
TOTAL		1275.16	319.30	45.01	81.81	81.40	4.62	3.07	1810.37	1594.46	88%	12%
% OF TOTAL TONNAGE		74.8%	18.7%	2.6%	4.8%	4.8%	0.3%	0.2%	100.0%			
AVG. MONTHLY TONNAGE		106.26	26.61	3.75	6.82	7.40	-	-	150.22			
PEAK MONTH		129.14	36.13	5.70	7.47	10.52	1.50	2.71	176.31	158.50		
		AUGUST	SEPTEMBER	SEPTEMBER	NOVEMBER	APRIL	APRIL	FEBRUARY	AUGUST	AUGUST		
Per Capita (lb/person per day)		2.44	0.61	0.09	0.16	0.16	0.01	0.01	3.47	3.05		

1. Due to the inconsistent monthly data for aluminum and tin recycling, per month averages were not calculated. The peak month data for the 3-years of data is used instead.

The average per capita waste generation rates in Table 2.1, combined with future population projections for the Town, served as the basis for projected future MSW and recyclable generation quantities that will be brought to the proposed facility. These projections were then used to estimate MSW, and recyclable storage requirements appropriate for the facility.

2.2 Solid Waste and Recycling Projections

Solid waste and recycling projections were developed using the average per capita generation rates associated with each material type recorded during the past three years, as highlighted in Table 2.1. These average per capita generation rates for each material type were then applied to Tamworth's most recent published population for 2020 (2,812) to estimate current average tonnages that the Town may experience at the facility. The same average generation rates were also applied to the future population projection for Tamworth in 2040 (3,083), and 2040 max seasonal population (4,500). The 2040 max seasonal population was calculated based on the estimated increase to 3,680, with a 50% increase based on the summer population increase and potential additional population for including communities outside of Tamworth.

The solid waste and recycling projections for 2021, seasonal, and future population projections, using the previous three-year average per capita generation rates, are summarized in Table 2.2 below.

Table 2.2
Peak Municipal Solid Waste and Household Recycling Projections

2021 Base Population 2837			Household Recyclables					Trash & Household Recyclables Only		
									Percentages	
	MSW	C&D	Cardboard	Glass	Light Iron	Aluminum	Tin	TOTALS	C&D + MSW	Household Recyclables
Per Capita Gen Rates (lbs/person/day)	2.44	0.61	0.09	0.16	0.16	0.01	0.01	3.47	88%	12%
Tons	1264	317	45	81	81	5	3	1795	1581	214

2040 Base Population 3083			Household Recyclables					Trash & Household Recyclables Only		
									Percentages	
	MSW	C&D	Cardboard	Glass	Light Iron	Aluminum	Tin	TOTALS	C&D + MSW	Household Recyclables
Per Capita Gen Rates (lbs/person/day)	2.44	0.61	0.09	0.16	0.16	0.01	0.01	3.45	88%	12%
Tons	1374	344	48	88	88	5	3	1951	1718	233

2040 Max Seasonal Population 4,500	MSW	C&D	Household Recyclables: Cardboard	Glass	Light Iron	Aluminum	Tin	Trash & Household Recyclables Only: TOTALS	Percentages: C&D + MSW	Percentages: Household Recyclables
Per Capita Gen Rates (lbs/person/day)	2.44	0.61	0.09	0.16	0.16	0.01	0.01	3.45	88%	12%
Tons	2006	502	71	129	128	7	5	2847	2508	340

1. Per capita generation rates (highlighted in blue) taken from average rates recorded for each material type for 2020 through 2022 (see Table 2.1)
2. Population estimates for projected years provided within New Hampshire Population Projections: 2020 - 2050, September 2022. The population projection data provided in the projections was used to estimate the base population for 2021. (Straight line projection).

Based on the information provided in Table 2.2, the projected average tonnage for MSW and household recyclables that could be brought to the facility (existing or now) under current conditions is estimated at approximately 1,795 tons per year and 2,847 tons per year with the current maximum seasonal population. The average tonnage for MSW and household recyclables brought to the facility during the past three years is approximately 1,750 tons per year (see Table 2.1). This information shows that the peak demands estimated in Table 2.1 represent approximately a 4.6% increase to the average demands placed on the facility over the past three years.

The future projections provided in Table 2.2 represent the design basis quantities for the new transfer station and recycling facility. While the future MSW and recycling needs will serve as the basis for sizing the facility, the estimated three-year average tonnages will also be carried forward in the facility sizing calculations for the purposes of providing the Town with a comparison of how the proposed facility size and operation will vary if it were designed for current tonnages that have been averaged (2021) versus long-range projections (2040).

2.3 Estimating Individual Recycling Stream Tonnages

Having generated the MSW and household recycling projections, the next step in the waste stream analysis is to estimate the individual material components of the household recycling stream. For example, although Table 2.2 provide aggregated estimates for glass, cardboard, and metals, the amount of this total that consists of glass only, versus cardboard only, versus metals only must be estimated so that bunker bay storage is provided within the building for the source-separation of each material that the Town will be accepting and baling.

For the purposes of identifying storage volume requirements for source-separated recyclables at the new facility, the household recycling tonnages provided in Tables 2.2 and 2.3 were divided into the following individual streams:

Table 2.3

Components of Household Recycling Stream Used to Refine Material Storage Requirements at Proposed Facility

Household Recycling Stream	Individual Components of Recycling Stream
Glass	Glass
Metal	Steel & Tin
	Aluminum
Plastic	PET (#1)
	HDPE (#2)
	#3 - #7
Paper	Newspaper (ONP)
	Mixed Paper
	Cardboard (OCC)

Using national data available from the EPA, Sanborn Head estimated the percentage distribution of the individual components of each recycling stream (for metals, percentage of steel cans and percentage of aluminum cans; for plastic, percentage of PET, percentage of HDPE, and percentage of #3 - #7, and similar percentages for newspaper, mixed paper and cardboard of the paper stream). The percentages of the individual components of the glass, metal and plastic recycling streams were derived from solid waste data provided in the EPA document entitled *Advancing Sustainable Materials Management: 2018 Tables and Figures, December 2020.*

Sanborn Head compiled data provided within the EPA document pertaining to the materials referenced in Table 2.3. Table 2.4 presents the compilation of the data, showing household recyclables in the solid waste stream. Table 2.4 also provides the theoretical maximum recycling rate for glass, metal, paper, and plastic. The theoretical recycling rate is estimated at 29% of the waste stream and based on the actual EPA recycling rates also provided in Table 2.4, the national recovery rate is approximately 19%.

Utilizing the theoretical maximum recycling rates for each material type derived and presented in Table 2.4 the individual components of each recycling stream are further refined. These component recycling rates for household plastic, paper, and metal materials are calculated and presented in Table 2.5 (Plastic), Table 2.6 (Paper), and Table 2.7 (Metal).

Table 2.4

Percentages of Household Recyclables in the Solid Waste Stream Derived from EPA Data

TOTAL WASTE GENERATION (EPA, 2020), Million Tons

These figures are for all waste materials generated, of this some are not routinely recycled. For example, "plastics" includes durable and non-durable goods, as well as containers and packaging. Of this amount, about half is durable and non-durable goods - and these materials are not readily recyclable. Therefore, the portion of the total material generated that is readily recyclable (mostly containers and packaging) was identified and these materials are summarized in the table below.

Estimated Portion of Total Waste Stream that is a Household Recyclable Material

Total MSW (EPA Table 1)			Durable Goods (EPA Tables 6, 7 & 8) (Million Tons)	Non-Durable Goods (EPA Table 18) (Million Tons)			Containers & Packaging (EPA Table 22) (Million Tons)			Total Non-Durable and Containers & Packaging (Million Tons)	Theoretical % of Material that could be recycled	Theoretical % of Total Household Waste Stream that could be Recycled	Actual Recycled (EPA Tables 19 & 24)	
Material	Million Tons	%of Total		ONP	Books/Mags/Office Paper	Other	Steel	Aluminum	Other				Mill of Tons	Current Recycle Rate
Paper	67.39	23.4%	NA	5.05	7.64	NA	NA	NA	41.9	54.59	81%	18.9%	45.97	15.9%
Yard Waste	35.4	12.3%	NA	NA	NA	NA	NA	NA	NA	0				
Plastics	35.68	12.4%	13.69	NA	NA	1.03	NA	NA	14.53	15.56	44%	5.4%	1.98	0.7%
Rubber & Leather	9.16	3.2%	NA	NA	NA	NA	NA	NA	NA	0				
Textiles	17.03	5.9%	NA	NA	NA	NA	NA	NA	NA	0				
Metals	25.6	8.9%	21.25	NA	NA	NA	2.21	1.92	NA	4.13	16%	1.4%	2.3	0.8%
Wood	18.09	6.3%	NA	NA	NA	NA	NA	NA	NA	0				
Food Waste	63.13	21.9%	NA	NA	NA	NA	NA	NA	NA	0				
Glass	12.25	4.2%	2.46	NA	NA	NA	NA	NA	9.79	9.79	80%	3.4%	3.06	1.1%
Other	4.56	1.6%	NA	NA	NA	NA	NA	NA	0.34	0.34				
Total	288.29	100%										29.2%		18.5%

Note: EPA Tables referenced in Table 2.5 refer to data tables provided in the EPA document entitled *Advancing Sustainable Materials Management: 2018 Tables and Figures, December 2020* .

Table 2.5
Percent of Plastic in MSW Stream by Type and
Theoretical Maximum that can be Recovered

Plastic ID No.	Description	Generation (Mil Tons)	% of Total Plastic	Aggregate % Plastic that can be recovered	% of Total Waste Stream that can be Recovered
1	PET	3.86	26.6%	5.4%	1.4%
2	HDPE	3.79	26.1%	5.4%	1.4%
3	PVC	0.39	2.7%	5.4%	0.1%
4	LDPE	3.73	25.7%	5.4%	1.4%
5	Polypropylene	1.83	12.6%	5.4%	0.7%
6	Polystyrene	0.55	3.8%	5.4%	0.2%
7	Other	0.36	2.5%	5.4%	0.1%
Total		14.51	100.0%		5.4%

1. Generation tonnage (2018) obtained from Table 8 of EPA's *Advancing Sustainable Materials Management: 2018 Tables and Figures, December 2020.*
2. Aggregate % plastic that can be recovered is calculated in Table 2.4

Table 2.6
Percent of Paper in MSW Stream by Type and
Theoretical Maximum that can be Recovered

Type	Generation (Mil Tons)	% of Total Paper	Aggregate % Plastic that can be recovered	% of Total Waste Stream that can be Recovered
Newspaper (ONP)	5.05	7.5%	18.9%	1.4%
Books/Magazine/Tissue	20.44	30.4%	18.9%	5.7%
Cardboard (OCC)	33.26	49.4%	18.9%	9.4%
Gable tops	0.63	0.9%	18.9%	0.2%
Folding Cartons	5.37	8.0%	18.9%	1.5%
Bags & Sacks	1.09	1.6%	18.9%	0.3%
Other Paper	1.5	2.2%	18.9%	0.4%
Total	67.34	100.0%		18.9%

1. Generation tonnage (2018) obtained from Table 5 of EPA's *Advancing Sustainable Materials Management: 2018 Tables and Figures, December 2020.*
2. Aggregate % paper that can be recovered is calculated in Table 2.4

Table 2.7
Percent of Metal Containers in MSW Stream by Type and
Theoretical Maximum that can be Recovered

Type	Generation (Mil Tons)	% of Total Metal Container	Aggregate % Plastic that can be recovered	% of Total Waste Stream that can be Recovered
Steel Cans	2.21	53.5%	1.4%	0.8%
Aluminum Cans	1.92	46.5%	1.4%	0.7%
Total	4.13	100.0%		1.4%

1. Generation tonnage (2018) obtained from Table 7 of EPA's *Advancing Sustainable Materials Management: 2018 Tables and Figures, December 2020.*
2. Aggregate % metal that can be recovered is calculated in Table 2.4

With the individual recycling percentages estimated in Tables 2.5 through 2.7, these values can be used to estimate the tonnages of the household recyclable that would be brought to the Transfer Station under current (2021), future (2040), and max seasonal conditions. These tonnage distributions for MSW and household recycling streams are presented in Tables 2.8 through 2.10.

Table 2.8
Tonnage Estimates for Source Separation of Recyclables into Component Streams
2021 Average MSW and Recycling Tonnages

Year	Total Projected tons (MSW & Household Recyclables)	Recyclable Stream		% of Total Waste Stream Based on EPA Numbers	Roll-up EPA Theoretical Max Recovery	Using EPA %s to Calculate Individual Recycling Components (Tons)	Total Roll-up (Tons)
2021	1479	Glass	Glass	3.4%	3.4%	50.21	50
		Metal	Steel & Tin	0.8%	1.4%	11.33	21
			Aluminum	0.7%		9.85	
		Plastic	#1 (PET)	1.4%	5.4%	20.84	80
			#2 (HDPE)	1.4%		21.23	
			# 3 - 7	2.6%		37.73	
		Paper	Newspaper (ONP)	1.4%	18.9%	21.00	280
			Mixed Paper	8.2%		120.70	
			Cardboard (OCC)	9.4%		138.28	
Maximum Theoretical Recycling Rate & Tonnage (provides conservative basis for sizing recycling storage needs)				29.2%		431	29.2%
Net Trash Tonnage (70.8%)						1047	70.8%
Until 30% recycling rate can be achieved, assume trash tonnage is 90% of total stream (provides conservative basis for evaluating trash storage needs)						1331	90%

Table 2.9
Tonnage Estimates for Source Separation of Recyclables into Component Streams
2040 Average MSW and Recycling Tonnages

Year	Total Projected tons (MSW & Household Recyclables)	Recyclable Stream		% of Total Waste Stream Based on EPA Numbers	Roll-up EPA Theoretical Max Recovery	Using EPA %s to Calculate Individual Recycling Components (Tons)	Total Roll-up (Tons)
2040	1607	Glass	Glass	3.4%	3.4%	54.56	55
		Metal	Steel & Tin	0.8%	1.4%	12.32	23
			Aluminum	0.7%		10.70	
		Plastic	#1 (PET)	1.4%	5.4%	23.07	87
			#2 (HDPE)	1.4%		22.65	
			# 3 - 7	2.6%		41.00	
		Paper	Newspaper (ONP)	1.4%	18.9%	22.82	304
			Mixed Paper	8.2%		131.16	
			Cardboard (OCC)	9.4%		150.27	
Maximum Theoretical Recycling Rate & Tonnage (provides conservative basis for sizing recycling storage needs)				29.2%		469	29.2%
Net Trash Tonnage (70.8%)						1138	71%
Until 30% recycling rate can be achieved, assume trash tonnage is 90% of total stream (provides conservative basis for evaluating trash storage needs)						1446	90%

Table 2.10
Tonnage Estimates for Source Separation of Recyclables into Component Streams
Max Seasonal Peak MSW and Recycling Tonnages

Year	Total Projected tons (MSW & Household Recyclables)	Recyclable Stream		% of Total Waste Stream Based on EPA Numbers	Roll-up EPA Theoretical Max Recovery	Using EPA %s to Calculate Individual Recycling Components (Tons)	Total Roll-up (Tons)
2040 Max Seasonal	2345	Glass	Glass	3.4%	3.4%	79.64	80
		Metal	Steel & Tin	0.8%	1.4%	17.98	34
			Aluminum	0.7%		15.62	
		Plastic	#1 (PET)	1.4%	5.4%	33.06	127
			#2 (HDPE)	1.4%		33.67	
			# 3 - 7	2.6%		59.85	
		Paper	Newspaper (ONP)	1.4%	18.9%	33.30	444
			Mixed Paper	8.2%		191.45	
			Cardboard (OCC)	9.4%		219.34	
Maximum Theoretical Recycling Rate & Tonnage (provides conservative basis for sizing recycling storage needs)				29.2%		684	29.2%
Net Trash Tonnage (70.8%)						1661	71%
Until 29% recycling rate can be achieved, assume trash tonnage is 90% of total stream (provides conservative basis for evaluating trash storage needs)						2111	90%

1. Total projected tonnages were obtained from Table 2.2. Based on EPA Calculations, C&D was removed from waste stream for this calculation.
2. Waste stream percentages obtained from Tables 2.4 (glass), 2.5 (plastic), 2.6 (paper) and 2.7 (metal).

The information provided in Tables 2.8 through 2.10 summarizes the quantity of household recyclables that could be delivered to the facility under current and future conditions, where the recycling rates represent the estimated theoretical maximum recovery of these materials from the waste stream. As shown in Tables 2.8 through 2.10, the theoretical maximum estimated peak recycling rate is 29%, compared to the Town's current rate, which is approximately 10%. The peak recycling rate provides the specific design basis tonnages for the theoretical maximum quantities of glass, metal, paper, and plastic materials that will be processed through the new facility. It would follow that if the peak recycling rate estimated at 29% (29.2% from Tables 2.8 through 2.10), then the resulting trash rate would be 71%. However, for facility sizing purposes, it is more appropriate to assume that the trash disposal rate will initially be in the 90% range (consistent with the current rate) and reduce over time as the recycling rate increases to the peak projected 29% rate. For this reason, Table 2.10 identifies the projected trash and recycling tonnages that the new facility would be designed around: 1) 903 tons of recyclables representing a maximum anticipated recycling rate of 29.2%; and 2) 2788 tons of solid waste representing a maximum trash disposal rate of 90%.

The information provided in Tables 2.8 through 2.10 is used to estimate the loose volume storage requirements for trash and source-separated recyclables in the new building, as well as the estimated bale production rate and bale storage requirements. This facility sizing methodology is described in Section 3.0.

3.0 FACILITY SIZING

3.1 Bunker Bay Sizing for Recyclable Materials

Determining bunker bay storage requirements for residential drop-offs of recycling represents one of the primary sizing criteria for the proposed facility. Using the annual tonnages for each recycling stream provided in Tables 2.8 through 2.10, we can estimate the required bunker sizes for these materials using typical loose density volumes associated with each material. This information is presented in Tables 3.1 through 3.3. Table 3.1 depicts criteria relevant to estimating bunker bay storage requirements based on 2021 average estimated recycling activities (i.e., a 29 percent recycling rate) and Tables 3.2 and 3.3 depicts similar criteria used to estimate future (2040) and maximum seasonal peak bunker bay storage requirements.

As shown in Tables 3.1 through 3.3, the estimated annual tonnage of each recyclable material is converted into an average daily, weekly, and monthly tonnage based on a 3-day operating week. These tonnages are then converted into daily, weekly, and monthly volumes (cubic yards) using the loose volume densities for each material. The bunker bay sizes required to store these volumes can be estimated by establishing a standard bay height and bay depth and then calculating the bunker width required to meet the loose volume storage needs.

For this evaluation, all recycling bunker bays are assumed to have a 10-foot storage height and 15-foot depth into the building, resulting in a cross-sectional area of 150 square feet for each bay. Accounting for an angle of repose on the stockpiled material (45 degrees), the effective cross-sectional area that can be stored in a 10-foot high by 15-foot-deep bunker bay reduces to 112.5 square feet. Using the effective cross-sectional area of 112.5 square feet for each bay, the bay width may then be calculated. For example, as shown in Table 3.1, the loose storage volume for old, corrugated cardboard (OCC) was calculated at 22.1 cubic yards per day. This equates to approximately 597 cubic feet per day. Based upon a cross-sectional storage area of 112.5 square feet for a 10-foot high by 15-foot-deep bay, the required bunker bay width for one day of storage for OCC is estimated to be:

602.1 cubic feet/day ÷ 112.5 square feet = 5.35 feet for one day of storage; and
One week's worth of storage (3 operating days) for OCC would be 5.35 x 3 = 16.05 feet.

As such, the bunker bay dimensions required to store a day's worth, weeks' worth, and months' worth of each recyclable material was calculated, and the results are shown in Tables 3.1 through 3.3. As shown in the tables, some materials can be provided with small bay widths that will provide for a week's worth of storage (e.g., steel and metal cans), while other materials require notably greater widths to meet a day's worth of storage (e.g., cardboard). The final column in Tables 3.1 through 3.3 identifies the theoretical bunker width that would be required (for a 10-foot high by 15-foot-deep bay) to store one bale's worth of material. These "unit widths" are useful in that they can be used to estimate the equivalent bale storage provided in each bay. For example, the bunker bay width required to store one bale's worth of cardboard in a 10-foot-high by 15-foot-deep bunker is 2.93 feet. Therefore, if a bay width of 10 feet was provided for this material, it would, when full, provide sufficient storage to make approximately 2 bales (10 foot wide ÷ 4.40 feet/bale = 2.27 bales).

Table 3.1
Recyclable Material Bunker Bay Storage Sizing for 2021 Estimated Peak Demands

Material Characteristics		Typical Bale Characteristics[2, 3]						Peak 2021 Tonnage Rates and Equivalent Loose Storage Volumes							Assumed Fixed Bunker Dimensions (ft): Height 10 Depth (front to back) 15	Effective Cross-Section 112.5		
Material	Loose Density (lb/cy)[1]	Bale Density lb/cf	Bale Density lb/cy	Bale Volume (cy)[3]	Bale Weight (lbs)	Bale Wt at 90%	Loose Storage Reqd for 1 Bale (cy)	Estimated Current Peak Tonnages Delivered to Facility (30%) Recycle Tons/Yr[4]	Tons/Month	Tons/Day	Tons/Week	Loose Storage Volume Requirements cy/day	cy/wk	cy/month	Bunker Width for Current TPD (ft)	Bunker Width for Current TPW (ft)	Bunker Width for Current TPM (ft)	Unit Bunker Width for 1 bale (ft)
Glass	500	---	---	---	---	---	---	50.21	4.18	0.32	0.97	1.3	3.9	16.7	0.31	0.93	4.02	---
Steel Cans	135	22	594	1.85	1100	990	7.3	11.33	0.94	0.07	0.22	1.1	3.2	14.0	0.26	0.78	3.36	1.76
Alum. Cans	50	12	324	1.85	600	540	10.8	9.85	0.82	0.06	0.19	2.5	7.6	32.8	0.61	1.82	7.88	2.59
PETE	27	13	351	1.85	650	585	21.7	20.84	1.74	0.13	0.40	9.9	29.7	128.7	2.38	7.13	30.88	5.20
HDPE	27	14	378	1.85	700	630	23.3	21.23	1.77	0.14	0.41	10.1	30.2	131.0	2.42	7.26	31.45	5.60
No. 3-7	27	14	378	1.85	700	630	23.3	37.73	3.14	0.24	0.73	17.9	53.7	232.9	4.30	12.90	55.89	5.60
OCC	81	22	594	1.85	1100	990	12.2	138.28	11.52	0.89	2.66	21.9	65.7	284.5	5.25	15.76	68.29	2.93
ONP/OMG	216	26	702	1.85	1299	1169	5.4	141.69	11.81	0.91	2.72	8.4	25.2	109.3	2.02	6.06	26.24	1.30
								431.17		2.76	8.29				17.54	52.62	228.01	

Table 3.2
Recyclable Material Bunker Bay Storage Sizing for 2040 Estimated Peak Demands

Material Characteristics		Typical Bale Characteristics[2, 3]						Peak 2040 Tonnage Rates and Equivalent Loose Storage Volumes							Assumed Fixed Bunker Dimensions (ft): Height 10 Depth (front to back) 15	Effective Cross-Section 112.5		
Material	Loose Density (lb/cy)[1]	Bale Density lb/cf	Bale Density lb/cy	Bale Volume (cy)[3]	Bale Weight (lbs)	Bale Wt at 90%	Loose Storage Reqd for 1 Bale (cy)	Estimated Current Peak Tonnages Delivered to Facility (30%) Recycle Tons/Yr[4]	Tons/Month	Tons/Day	Tons/Week	Loose Storage Volume Requirements cy/day	cy/wk	cy/month	Bunker Width for Current TPD (ft)	Bunker Width for Current TPW (ft)	Bunker Width for Current TPM (ft)	Unit Bunker Width for 1 bale (ft)
Glass	500	---	---	---	---	---	---	54.56	4.55	0.35	1.05	1.4	4.2	18.2	0.34	1.01	4.37	---
Steel Cans	135	22	594	1.85	1100	990	7.3	12.32	1.03	0.08	0.24	1.2	3.5	15.2	0.28	0.84	3.65	1.76
Alum. Cans	50	12	324	1.85	600	540	10.8	10.70	0.89	0.07	0.21	2.7	8.2	35.7	0.66	1.98	8.56	2.59
PETE	27	13	351	1.85	650	585	21.7	23.07	1.92	0.15	0.44	11.0	32.9	142.4	2.63	7.89	34.18	5.20
HDPE	27	14	378	1.85	700	630	23.3	22.65	1.89	0.15	0.44	10.8	32.3	139.8	2.58	7.74	33.56	5.60
No. 3-7	27	14	378	1.85	700	630	23.3	41.00	3.42	0.26	0.79	19.5	58.4	253.1	4.67	14.02	60.74	5.60
OCC	81	22	594	1.85	1100	990	12.2	150.27	12.52	0.96	2.89	23.8	71.4	309.2	5.71	17.13	74.21	2.93
ONP/OMG	216	26	702	1.85	1299	1169	5.4	153.98	12.83	0.99	2.96	9.1	27.4	118.8	2.19	6.58	28.51	1.30
								468.56	39.05	3.00	9.01				19.06	57.18	247.78	

Table 3.3
Recyclable Material Bunker Bay Storage Sizing for Estimated 2040 Max Seasonal Peak Demands

Material Characteristics		Typical Bale Characteristics[2, 3]						Peak 2040 Tonnage Rates and Equivalent Loose Storage Volumes							Assumed Fixed Bunker Dimensions (ft): Height 10 Depth (front to back) 15	Effective Cross-Section 112.5		
Material	Loose Density (lb/cy)[1]	Bale Density lb/cf	Bale Density lb/cy	Bale Volume (cy)[3]	Bale Weight (lbs)	Bale Wt at 90%	Loose Storage Reqd for 1 Bale (cy)	Estimated Current Peak Tonnages Delivered to Facility (30%) Recycle Tons/Yr[4]	Tons/Month	Tons/Day	Tons/Week	Loose Storage Volume Requirements cy/day	cy/wk	cy/month	Bunker Width for Current TPD (ft)	Bunker Width for Current TPW (ft)	Bunker Width for Current TPM (ft)	Unit Bunker Width for 1 bale (ft)
Glass	500	---	---	---	---	---	---	79.64	6.64	0.51	1.53	2.0	6.1	26.5	0.49	1.47	6.37	---
Steel Cans	135	22	594	1.85	1100	990	7.3	17.98	1.50	0.12	0.35	1.7	5.1	22.2	0.41	1.23	5.33	1.76
Alum. Cans	50	12	324	1.85	600	540	10.8	15.62	1.30	0.10	0.30	4.0	12.0	52.1	0.96	2.88	12.50	2.59
PETE	27	13	351	1.85	650	585	21.7	33.06	2.76	0.21	0.64	15.7	47.1	204.1	3.77	11.30	48.98	5.20
HDPE	27	14	378	1.85	700	630	23.3	33.67	2.81	0.22	0.65	16.0	48.0	207.9	3.84	11.51	49.89	5.60
No. 3-7	27	14	378	1.85	700	630	23.3	59.85	4.99	0.38	1.15	28.4	85.2	369.4	6.82	20.46	88.66	5.60
OCC	81	22	594	1.85	1100	990	12.2	219.34	18.28	1.41	4.22	34.7	104.2	451.3	8.33	25.00	108.32	2.93
ONP/OMG	216	26	702	1.85	1299	1169	5.4	224.75	18.73	1.44	4.32	13.3	40.0	173.4	3.20	9.60	41.62	1.30
								683.92	56.99	4.38	13.15				27.82	83.46	361.66	

1. Loose material densities are based on typical values provided in solid waste literature, including EPA data and data provided by the American Public Works Association (Solid Waste Pocket Guide).
2. Bale density and bale volumes are based on Wastecare Corporation Extra High Density Baler - 60" Vertical baler. These criteria are consistent with the type of baler selected for the proposed Tamworth facility.
3. Bale volume assumes bale size of: 30" high x 48" wide x 60" long = approx 50 cf/bale = 1.85 cy/bale.
4. Tons per year obtained from Table 2.10.

3.2 Summary of Bunker Sizing and Bale Production Rates

The results of the storage bay sizing for residential recyclables drop-offs are summarized in Table 3.4. For recyclable materials, the table shows the selected bunker widths for each material type and identifies whether the bunker can provide at least 2 days of loose storage volume based on volume of the bunker divided by the 2 days of loose storage volume of each material. These volumes would provide the facility the ability of collecting recyclables for the two busiest days of the week (typically Saturday and Sunday) in the short-term based on current population and allow baling operations to occur on Wednesday's or another day of the week.

The "raw" bunker width value shown in Table 3.4 provides a value on how wide the bunker needs to be to provide a day's worth of storage. These raw bunker widths are then used in conjunction with the "Unit Bunker Widths" provided in Tables 3.1 through 3.3 to calculate the estimated number of bales produced for each material type (for the day, week, or month depending on the storage duration provided by the bunker size). This information allows us to estimate the total number of bales that will be produced at the proposed facility on a daily, weekly, and monthly basis under current and future conditions.

As shown in Table 3.4, the total clear opening length for the recycling bays is estimated to be 90 feet. Accounting for partition walls that separate each bunker (assumed to be 12-inches thick), access stairs, and a storage room, the recommended building length would be approximately 110 feet, which would be appropriate to accommodate the recycling bunker bay storage requirements anticipated under future conditions. The 2021 numbers provided in Table 3.4 are provided as a means of comparing the relative size difference in the building if it were designed to meet current peak demands only. For planning purposes, the data associated with the 2040 max seasonal future projections will be used as the preferred data for designing the proposed facility for the recycling bays.

The bunker bay sizing includes a dedicated bay for storing commingled #3 through #7 plastic. Currently, these plastics (PVC, LDPE, polypropylene, and polystyrene) are not highly valued as a recycling commodity and under current conditions may be more likely to be disposed of as MSW. However, in the interest of estimating the potential space that would be dedicated to this material should it be recovered more deliberately in the future, we included a separate plastic stream in our evaluation. As shown in Table 3.3, under future conditions, #3 through #7 plastic represents almost 50 percent of the total bay storage dedicated to plastics. For planning purposes, we recommend that the facility be sized to include #3 through #7 plastic and that until this stream becomes a valued commodity, the space reserved for it would be shared between the HDPE bunker and the PET bunker, the bay could be used for the storage of rigid plastic (large plastic items).

Table 3.4

Summary of Bunker Bay Sizing, Trash Floor Storage Needs and Bale Production Estimates for Proposed Facility

Table 3.4 - Summary of Bunker Bay Sizing, Trash Floor Storage Needs and Bale Production Estimates for Proposed Facility											
Year		1 Glass	2 Steel	3 Aluminum	4 No. 1 (PET)	5 No. 2 (HDPE)	6 No. 3 thru 7	7 OCC	8 ONP/Mixed Paper	Recyclable Materials Totals[3]	
Base 2021	"Raw" Bunker Width (ft)[1]	4.0	0.3	0.6	2.4	2.4	4.3	5.3	2.0		
	Round Up Size[2]	**10**	**10**	**10**	**10**	**10**	**10**	**20**	**10**	***90***	***Linear Feet***
	Bunker Volume (ft^3)	**1125**	**1125**	**1125**	**1125**	**1125**	**1125**	**2250**	**1125**		
	2-Day Loose Storage Volume based on Generation Rate	**70**	**58**	**136**	**534**	**544**	**967**	**1182**	**454**		
	Days of Storage in Bunker	**16.2**	**19.4**	**8.3**	**2.1**	**2.1**	**1.2**	**1.9**	**2.5**		
	Bales based on "Raw" Bunker Width	NA	0.1	0.2	0.5	0.4	0.8	1.8	1.6		
	Bales/day	NA	0.15	0.23	0.5	0.4	0.8	1.8	1.6	3	Bales/day
	Bales/week	NA	0.4	0.70	1.4	1.3	2.3	5.4	4.7	15	Bales/week
	Bales/month	NA	1.9	3.0	5.9	5.6	10.0	23.3	20.2	70	Bales/month
Base 2040	"Raw" Bunker Width (ft)[1]	4.4	0.3	0.7	2.6	2.6	4.7	5.7	2.2		
	Round Up Size[2]	**10**	**10**	**10**	**10**	**10**	**10**	**20**	**10**	***90***	***Linear Feet***
	Bunker Volume (ft^3)	**1125**	**1125**	**1125**	**1125**	**1125**	**1125**	**2250**	**1125**		
	2-Day Loose Storage Volume based on Generation Rate	**76**	**63**	**148**	**592**	**581**	**1051**	**1284**	**494**		
	Days of Storage in Bunker	**14.9**	**17.8**	**7.6**	**1.9**	**1.9**	**1.1**	**1.8**	**2.3**		
	Bales based on "Raw" Bunker Width	NA	0.2	0.3	0.5	0.5	0.8	1.9	1.7		
	Bales/day	NA	0.16	0.25	0.5	0.5	0.8	1.9	1.7	4	Bales/day
	Bales/week	NA	0.5	0.76	1.5	1.4	2.5	5.8	5.1	16	Bales/week
	Bales/month	NA	2.1	3.3	6.6	6.0	10.8	25.3	22.0	76	Bales/month
2040 Max Seasonal	"Raw" Bunker Width (ft)[1]	6.4	0.4	1.0	3.8	3.8	6.8	8.3	3.2		
	Round Up Size[2]	**10**	**10**	**10**	**10**	**10**	**10**	**20**	**10**	***90***	***Linear Feet***
	Bunker Volume (ft^3)	**1125**	**1125**	**1125**	**1125**	**1125**	**1125**	**2250**	**1125**		
	2-Day Loose Storage Volume based on Generation Rate	**110**	**92**	**216**	**848**	**863**	**1534**	**1875**	**720**		
	Days of Storage in Bunker	**10.2**	**12.2**	**5.2**	**1.3**	**1.3**	**0.7**	**1.2**	**1.6**		
	Bales based on "Raw" Bunker Width	NA	0.2	0.4	0.7	0.7	1.2	2.8	2.5		
	Bales/day	NA	0.23	0.37	0.7	0.7	1.2	2.8	2.5	8	Bales/day
	Bales/week	NA	0.7	1.11	2.2	2.1	3.7	8.5	7.4	26	Bales/week
	Bales/month	NA	3.0	4.8	9.4	8.9	15.8	36.9	32.0	111	Bales/month

1. Bunker bay widths for recyclables are based on bay heights of 10 feet and depths of 10 feet (widths shown are from Tables 3.1 for 2021, 3.2 for 2040, and 3.3 for Max Seasonal). Widths shown reflect clear dimensions for bunker storage (dimensions do not include bunker wall partition widths - see Note 3 below).
2. Round-up sizes for bunker widths are based on rounding up the "raw" widths to the nearest whole number, unless the raw width was less than 10 feet, in which case the bay width was rounded to 10 feet. The minimum clear width for all bays is set at 10 feet for accessibility purposes, reflecting the minimum recommended width for removing recyclables from the bay by skid-steer loader.
3. Total linear footage calculated for recyclable bay storage does not include partition wall widths. For space planning purposes, it is assumed that the width of each bunker wall partition is 12-inches. Based upon the number of bunker bays (eight), a 12-inch partition for each bunker wall partition would add 7 feet to the clear opening bay widths provided in Table 3.4.
4. Bale storage on trailers (based on bale weight ranges and a 20 ton trailer load):
   If all steel bales: 35 bales;
   If all aluminum bales: approximately 65 bales;
   If OCC & ONP/Mixed Paper: approximately 27 bales

3.3 Municipal Solid Waste Storage for Proposed Facility

Table 3.5 shows the estimated MSW tonnage that would be brought to the facility under current and future projections. Table 3.5 uses this information to estimate the total estimated tonnage disposed of per operating day at the Transfer Station (3 operating days per week). This estimate is used to find the amount of 40-yard compaction containers the transfer station will fill per month. The total tonnage of MSW that would be brought the facility is based on the MSW per capita generation rates obtained from Table 2.1.

Using the average tonnage of the 40-yard compaction MSW container of 12.3 tons, the estimated total operating days to fill the container was estimated for 2021, 2040, and 2040 max seasonal. The configuration of the transfer station would be developed in a manner to allow the residents to direct dump their trash into the MSW compactor to eliminate the need for floor storage of MSW. The 2021 numbers provided in Table 3.5 are provided as a means of comparing the current day compaction container filling time to the proposed future values.

Table 3.5
Municipal Solid Waste Current and Future Tonnage Projections

Year	Population[1]	MSW Per Capita Generation Rate (lbs/person/day)[2]	Total Estimated Tonnage (tons/operating day)	Average Tonnage within 40 Yard Compaction MSW Container[3]	Total Operating Days to Fill One Compaction Container	Total Hauls per Month (Based on 12 operating days/month)	Total Hauls per Year
2021	2837	2.44	8.11	12.3	1.52	8	95
2040	3083	2.44	8.81	12.3	1.40	9	108
2040 Max Seasonal	4500	2.44	12.86	12.3	0.96	13	156

1. Population estimates for projected years provided within the New Hampshire Population Projections: 2020 – 2050, September 2022. The population projection data provided for 2040 was used to estimate the 2040 base population of 3083. The max seasonal population for 2040 is based on estimates made of increased population during summer months and additional communities outside Tamworth using the Transfer Station.
2. Per capita generation rates taken from average rates recorded for each material type for 2020 through 2022 (see Table 2.1).
3. Average Tonnage within 40 Yard Compactor MSW Container calculated from MSW hauling for 2020 through 2022 provided by the Town of Tamworth.

3.4 Construction and Demolition Debris Planning

Provisions for accepting C&D debris will be included in the conceptual planning for the facility. C&D disposal currently is performed in the open air, where 40-yard containers are loaded and hauled off-site. As shown in Table 2.1, the average per capita generation rate recorded during 2020 through 2022 was 0.61 pounds per person per year. Applying this rate to the population figures for 2021, 2040, and 2040 max seasonal yields the estimated annual C&D disposal tonnages provided in Table 3.6.

Table 3.6
Construction & Demolition Debris Current and Future Tonnage Projections

Year	Population	C&D Per Capita Generation Rate (lbs/person/day)	Total Estimated Tonnage
2021	2837	0.61	1735
2040	3083	0.61	1885
2040 Max Seasonal	4500	0.61	2752

3.5 Interior Bale Storage

The projections in Table 3.3 indicate that the facility may, under future conditions, produce as many as 8 bales per day, 26 bales per week, and 111 bales per month. It is reasonable to assume that approximately 27 bales would fill a 20-ton long-haul trailer based on the bale weight ranges of OCC and mixed paper. Continuing forward the interior bale storage will be evaluated as part of the concept design phase and will help develop required building depth of the recycling building.

Figures

TOWN OF TAMWORTH TAMWORTH, NEW HAMPSHIRE	TAMWORTH TRANSFER STATION STUDY SITE PLAN		
SANBORN HEAD	SCALE: 1"=100'	DRAWN BY: AJW	FILE NO. 5511.00
	MARCH 2023	CHECKED BY: RSM	FIGURE NO. 1

IMAGES:

FILE: P:\5500s\5511.00\Graphics Files\CAD\Work\Tamworth Base Map_Study.dwg
LAYOUT: SITE PLAN
CTB FILE: SHA Standard.ctb
PLOT DATE: 3-30-23

Appendix A
Traffic Observation Field Sheets

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: MSW Compactor/Bulky Waste/C&D Material

Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle* (Relative to Queue Line) QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time (Relative to Queue Line) QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
1		Grey	C	8:00		8:00	8:10	8:10		
2		Blue	PU	8:00	1 Lane 1	8:06	8:08	8:08		
3		Green	SUV	8:08	1 Lane 1	8:08	8:10	8:11		
4		Silver	SUV	8:18	1 Lane 2	8:16	8:18	8:21		
5		White	PU	8:19	1 Lane 1	8:10	8:15	8:25		
6		Grey	PU	8:24	1 Lane 2	8:25	8:26	8:28		
7		Red	PU	8:29	1 Lane 1	8:29	8:30	8:32		
8		Silver	C	8:30	1 Lane 2	8:37	8:38	8:38		
9		Silver	SUV	8:40	1 Lane 1	8:40	8:41	8:41		
10		White	PU	8:41	1 Lane 1	8:41	8:43	8:43		
11		Blue	SUV	8:43	1 Lane 1	8:43	8:43	8:45		
12		Black	SUV	8:48	1 Lane 1	8:50	8:53	8:52		
13		Black	PU	8:50	1 Lane 1	8:52	8:53	8:53		
14		Blue	SUV	8:51	2 Lane 1	8:52	8:55	8:59		Spoke with attendant
15		Black	c	8:51	1 Lane 2	8:54	8:55	8:55		
16		Black	SUV	8:58	1 Lane 1	8:59	8:59	9:01		Walked across to throw out recyclables.
17		Black	SUV	9:01	1 Lane 1	9:01	9:03	9:15		Walked across to throw out recyclables.
18		White	SUV	9:02	1 Lane 1	9:02	9:03	9:03		
19		Blue	SUV	9:05	1 Lane 1	9:05	9:06	9:08		

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: MSW Compactor/Bulky Waste/C&D Material

Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle* (Relative to Queue Line) QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time (Relative to Queue Line) QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
20		Blue	SUV	9:06	1 Lane 1	9:07	9:08	9:08		
21		Silver	SUV	9:09	1 Lane 1	9:09	9:10	9:11		
22		Black	PU	9:10	1 Lane 1	9:10	9:11	9:12		
23		White	SUV	9:12	1 Lane 1	9:12	9:13	9:14		
24		White	SUV	9:13	1 Lane 1	9:13	9:14	9:15		
25		Blue	SUV	9:14	2 Lane 1	9:15	9:16	9:16		
26		Blue	PU	9:15	1 Lane 2	9:15	9:16	9:17		
27		White	PU	9:19	1 Lane 2	9:19	9:21	9:21		
28		Grey	PU	9:19	1 Lane 1	9:21	9:22	9:22		
29		Red	C	9:22	1 Lane 1	9:22	9:23	9:24		
30		Grey	PU	9:22	1 Lane 2	9:23	9:25	9:25		
31		Grey	SUV	9:23	1 Lane 1	9:24	9:24	9:26		
32		Grey	PU	9:24	1 Lane 2	9:24	9:25	9:25		
33		Silver	SUV	9:25	1 Lane 1	9:26	9:26	9:27		
34		Red	SUV	9:28	1 Lane 1	9:29	9:33	9:34		Walked across to throw out recyclables.
35		Black	PU	9:34	1 Lane 1	9:34	9:35	9:35		
36		White	SUV	9:35	1 Lane 1	9:35	9:36	9:36		
37		Black	C	9:38	2 Lane 1	9:36	9:39	9:39		
38		Black	PU	9:40	1 Lane 1	9:40	9:40	9:40		

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: MSW Compactor/Bulky Waste/C&D Material

Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle* (Relative to Queue Line) QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time (Relative to Queue Line) QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
39		Blue	PU	9:43	1 Lane 1	9:43	9:43	9:43		
40		Silver	SUV	9:47	1 Lane 2	9:47	9:48	9:48		
41		Black	PU	9:52	1 Lane 1	9:52	9:52	9:42		
42		Red	PU	9:59	1 Lane 2	10:00	10:01	10:06		Spoke with attendant
43		White	PU	9:57	1 Lane 1	9:57	9:59	9:59		
44		Grey	PU	9:58	2 Lane 1	9:58	10:00	10:00		
45		Tan	SUV	10:01	1 Lane 1	10:01	10:02	10:02		
46		Grey	SUV	10:04	1 Lane 1	10:01	10:03	10:06		
47		Grey	PU	10:07	1 Lane 1	10:07	10:08	10:08		
48		Black	PU	10:07	1 Lane 2	10:07	10:09	10:09		
49		Red	PU	10:07	2 Lane 1	10:08	10:09	10:10		Spoke with attendant
50		White	SUV	10:10	1 Lane 1	10:10	10:11	10:12		
51		Blue	PU	10:10	1 Lane 2	10:10	10:10	10:10		
52		Black	SUV	10:12	1 Lane 2	10:12	10:13	10:14		
53		Silver	C	10:17	1 Lane 1	10:17	10:18	10:18		
54		White	PU	10:20	1 Lane 2	10:20	10:21	10:21		
55		Blue	C	10:21	1 Lane 1	10:22	10:23	10:24		
56		Tan	PU	10:26	1 Lane 1	10:28	10:28	10:28		
57		Green	SUV		2 Lane 1	10:28	10:28	10:28		

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: MSW Compactor/Bulky Waste/C&D Material

Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle* (Relative to Queue Line) QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time (Relative to Queue Line) QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
58		Blue	PU	10:28	1 Lane 2	10:29	10:30	10:30		
59		Blue	C	10:29	2 Lane 1	10:29	10:30	10:30		
60		Red	PU	10:30	2 Lane 2	10:31	10:31	10:31		
61		Tan	PU	10:30	2 Lane 1	10:31	10:33	10:33		
62		Blue	PU	10:30	2 Lane 2	10:31	10:33	10:34		
63		Silver	SUV	10:33	2 Lane 2	10:34	10:35	10:35		
64		Black	SUV	10:34	1 Lane 1	10:35	10:36	10:36		
65		Black	SUV	10:35	1 Lane 2	10:36	10:37	10:37		
66		Black	SUV	10:35	1 Lane 1	10:36	10:37	10:37		
67		Blue	SUV	10:38	1 Lane 1	10:38	10:38	10:38		
68		Red	PU	10:39	1 Lane 1	10:39	10:40	10:44		Spoke with attendant
69		White	SUV	10:43	2 Lane 1	10:44	10:45	10:45		
70		Black	SUV	10:44	1 Lane 2	10:44	10:45	10:45		
71		Red	PU	10:45	1 Lane 1	10:45	10:47	10:47		
72		Black	PU	10:46	1 Lane 2	10:46	10:48	10:48		
73		White	PU	10:47	2 Lane 1	10:47	10:48	10:48		
74		Silver	PU	10:49	1 Lane 1	10:49	10:50	10:50		
75		Green	SUV	10:51	1 Lane 1	10:50	10:51	10:51		
76		Silver	PU	10:52	1 Lane 2	10:52	10:53	10:53		

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: MSW Compactor/Bulky Waste/C&D Material

Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle* (Relative to Queue Line) QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time (Relative to Queue Line) QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
77		Silver	PU	10:53	1 Lane 1	10:53	10:53	10:53		
78		Brown	SUV	10:53	1 Lane 1	10:54	10:54	10:54		
79		Black	PU	10:56	1 Lane 1	10:56	10:56	10:56		
80		Black	PU	10:56	1 Lane 2	10:56	10:57	10:57		
81		Green	C	10:56	1 Lane 1	10:57	10:58	10:58		
82		Red	SUV	10:58	1 Lane 1	10:58	10:58	10:58		
83		Black	PU	11:00	1 Lane 2	11:01	11:03	11:01		
84		Red	SUV	11:01	1 Lane 1	11:01	11:03	11:03		
85		Silver	PU	11:02	1 Lane 2	11:02	11:03	11:03		
86		Black	C	11:03	1 Lane 1	11:03	11:04	11:04		
87		Blue	SUV	11:04	1 Lane 1	11:04	11:06	11:06		
88		Blue	PU	11:06	1 Lane 1	11:06	11:07	11:07		
89		White	PU	11:06	1 Lane 2	11:06	11:07	11:07		Moved truck to other side to dispose C&D
90		Black	C	11:10	1 Lane 1	11:10	11:11	11:11		
91		Black	C	11:13	1 Lane 1	11:13	11:14	11:15		
92		Black	PU	11:15	1 Lane 1	11:15	11:16	11:18		Moved truck over to dispose C&D
93		Black	SUV	11:16	1 Lane 2	11:17	11:19	11:19		
94		Red	SUV	11:17	2 Lane 1	11:17	11:18	11:18		
95		Silver	SUV	11:20	1 Lane 1	11:20	11:20	11:21		

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: MSW Compactor/Bulky Waste/C&D Material

Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle* (Relative to Queue Line) QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time (Relative to Queue Line) QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
96		Black	PU	11:20	2 Lane 1	11:20	11:22	11:23		
97		Black	PU	11:23	1 Lane 1	11:23	11:23	11:24		
98		Blue	PU	11:23	2 Lane 1	11:24	11:25	11:25		
99		White	PU	11:23	1 Lane 2	11:24	11:25	11:25		
100		Silver	PU	11:25	1 Lane 1	11:26	11:27	11:27		
101		Black	PU	11:25	1 Lane 2	11:26	11:26	11:26		
102		Red	PU	11:26	2 Lane 1	11:27	11:30	11:30		
103		Blue	PU	11:27	1 Lane 2	11:27	11:28	11:28		
104		Grey	PU	11:29	1 Lane 2	11:29	11:30	11:30		
105		Black	SUV	11:31	1 Lane 1	11:31	11:32	11:32		
106		White	PU	11:39	1 Lane 1	11:39	11:39	11:39		
107		Blue	SUV	11:43	1 Lane 2	11:43	11:43	11:43		
108		Silver	C	11:40	1 Lane 1	11:40	11:42	11:43		
109		White	PU	11:45		11:46	11:47	11:48		Avoided lanes and parked down from compactor. (Did a complete circle back)
110		White	PU	11:46	1 Lane 1	11:46	11:47	11:48		
111		Silver	PU	11:46	1 Lane 2	11:46	11:48	11:48		Parked again in front of Heavy Metals.
112		Red	C	11:47	2 Lane 2	11:47	11:48	11:48		
113		Tan	C	11:47	2 Lane 2	11:47	11:48	11:48		
114		Grey	PU	11:50	1 Lane 1	11:50	11:51	11:52		

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: MSW Compactor/Bulky Waste/C&D Material

Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle* (Relative to Queue Line) QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time (Relative to Queue Line) QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
115		Silver	PU	11:54	1 Lane 1	11:55	11:55	11:55		
116		Black	PU	11:56	1 Lane 1	11:57	11:57	11:58		
117		Blue	PU	12:00	1 Lane 1	12:00	12:00	12:00		
118		Black	SUV	12:00	2 Lane 1	12:01	12:02	12:02		Parked near Metals, C&D after MSW Station.
119		Silver	C	12:01	1 Lane 1	12:02	12:02	12:02		
120		White	C	12:02	1 Lane 1	12:02	12:03	12:04		
121		Grey	SUV	12:03	2 Lane 1	12:04	12:06	12:06		
122		Grey	PU	12:05	2 Lane 1	12:06	12:07	12:07		Parked at Metals, C&D after MSW Station.
123		Grey	PU	12:16	1 Lane 1	12:16	12:18	12:19		
124		Grey	PU	12:19	1 Lane 2	12:19	12:20	12:20		
125		Grey	PU	12:21	1 Lane 1	12:21	12:22	12:22		
126		White	SUV	12:21	2 Lane 1	12:22	12:23	12:23		
127		Black	C	12:24	1 Lane 2	12:26	12:28	12:28		Parked on side for Brush. Parked in Lane 2.
128		Blue	PU	12:25	1 Lane 1	12:26	12:29	12:29		
129		Black	PU	12:25		12:27	12:28	12:33		Dropped of C&D and Metals.
130		White	PU	12:28	1 Lane 2	12:28	12:29	12:29		
131		Red	C	12:28	2 Lane 1	12:29	12:30	12:30		
132		Tan	PU	12:29	2 Lane 2	12:29	12:31	12:31		
133		Red	SUV	12:31	1 Lane 1	12:31	12:32	12:32		

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: MSW Compactor/Bulky Waste/C&D Material

Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle* (Relative to Queue Line) QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time (Relative to Queue Line) QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
134		Tan	PU	12:32	1 Lane 1	12:32	12:33	12:33		
135		Blue	PU	12:33	1 Lane 2	12:33	12:34	12:35		
136		Silver	PU	12:34	1 Lane 1	12:36	12:37	12:37		
137		Blue	C	12:34	2 Lane 1	12:37	12:38	12:38		
138		Blue	SUV	12:35	1 Lane 2	12:36	12:37	12:38		
139		Blue	PU	12:35		12:35	12:37	12:38		Drove Around to C&D, Metals - left.
140		Red	C	12:36	1 Lane 2	12:36	12:37	12:37		
141		Black	C	12:38	1 Lane 2	12:38	12:39	12:39		
142		Tan	PU	12:38	1 Lane 1	12:39	12:41	12:41		
143		Red	PU	12:39	1 Lane 2	12:39	12:42	12:42		
144		Black	PU	12:40	2 Lane 1	12:42	12:42	12:42		
145		White	SUV	12:40	2 Lane 2	12:42	12:43	12:43		
146		Red	PU	12:40	2 Lane 2	12:43	12:43	12:43		
147		Silver	SUV	12:43	1 Lane 2	12:43	12:44	12:44		
148		Black	SUV	12:43	1 Lane 1	12:44	12:45	12:45		
149		Black	PU	12:45	1 Lane 1	12:45	12:46	12:46		
150		Silver	SUV	12:47	1 Lane 1	12:47	12:51	12:51		
151		White	PU	12:47	1 Lane 2	12:48	12:53	12:54		Walked across to recycling. Pedestrians from vehicle all over. Lots of movement. Drove to C&D, Metals. Went around lanes.
152		Tan	PU	12:51	1 Lane 2	12:51	12:53	12:53		

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: MSW Compactor/Bulky Waste/C&D Material

Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle* (Relative to Queue Line) QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time (Relative to Queue Line) QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
153		Blue	PU	12:51	1 Lane 1	12:52	12:53	12:52		
154		Red	SUV	12:54	1 Lane 1	12:54	12:55	12:55		
155		White	PU	12:55	1 Lane 1	12:56	12:57	12:57		
156		Blue	PU	12:56	1 Lane 2	12:56	12:57	12:57		
157		Silver	C	13:00	1 Lane 1	13:01	13:04	13:01		
158		White	C	13:03	1 Lane 1	13:03	13:04	13:04		Went to Bulky, C&D, Metals.
159		Black	PU	13:03	2 Lane 1	13:03	13:04	13:04		
160		White	SUV	13:04	1 Lane 2	13:04	13:05	13:05		
161										
162		Black	C	13:10	1 Lane 1	13:11	13:11	13:11		
163		Black	SUV	13:10	1 Lane 2	13:11	13:12	13:12		
164		Tan	C	13:16	1 Lane 1	13:16	13:18	13:18		
165		Silver	SUV	13:22	1 Lane 1	13:23	13:26	13:27		Went to Metals and C&D.
166		Black	PU	13:27	1 Lane 1	13:27	13:29	13:29		
167		Black	PU	13:27	1 Lane 2	13:27	13:29	13:29		
168		Black	PU	13:32	1 Lane 1	13:33	13:33	13:34		
169		Silver	C	13:34	1 Lane 1					Pulled off in brush didn't dispose waste.
170		Blue	SUV	13:36	1 Lane 1	13:38	13:38	13:38		
171		Silver	SUV	13:36	1 Lane 2	13:36	13:38	13:38		

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: MSW Compactor/Bulky Waste/C&D Material

Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle* (Relative to Queue Line) QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time (Relative to Queue Line) QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
172		Silver	SUV	13:38	2 Lane 2	13:38	13:40	13:40		
173		Silver	SUV	13:41	1 Lane 1	13:41	13:41	13:41		
174		Black	PU	13:45	1 Lane 1	13:46	13:46	13:46		Dropped off Metals & Bulky
175		Black	C	13:46	1 Lane 2	13:46	13:47	13:47		
176		Blue	SUV	13:50	1 Lane 1	13:50	13:52	13:52		Dropped off Bulky and C&D.
177		Grey	SUV	13:58	1 Lane 1	13:58	13:59	13:59		
178		White	PU	13:59	1 Lane 1	14:00	14:01	14:01		
179		Grey	PU	14:02	1 Lane 1	14:01	14:04	14:04		
180		Black	SUV	14:02	1 Lane 2	14:03	14:04	14:04		Dropped off Bulky
181		Tan	C	14:03	2 Lane 1	14:04	14:05	14:05		
182		Blue	PU	14:06	1 Lane 1	14:07	14:07	14:07		
183		Red	SUV	14:17	1 Lane 1	14:17	14:18	14:18		
184		Silver	PU	14:26	1 Lane 1	14:26	14:27	14:27		
185		Grey	SUV	14:37	1 Lane 1	14:37	14:38	14:38		Dropped of C&D.
186		Blue	SUV	14:37	1 Lane 2	14:37	14:38	14:38		
187		Grey	SUV	14:39	1 Lane 1	14:39	14:40	14:40		
188		Red	PU	14:40	1 Lane 2	14:41	14:41	14:42		
189		Silver	PU	14:48	1 Lane 1	14:48	14:50	14:50		
190		Silver	SUV	14:50	2 Lane 1	14:50	14:52	14:52		

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: MSW Compactor/Bulky Waste/C&D Material

Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle* (Relative to Queue Line) QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time (Relative to Queue Line) QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
191		Green	SUV	14:50	1 Lane 2	14:50	14:52	14:52		
192		Blue	PU	14:53	1 Lane 1	14:56	14:56	14:56		
193		Green	PU	14:53	1 Lane 2	14:53	14:54	14:54		Dropped off Metals.
194		Grey	PU	14:59	1 Lane 1	15:00	15:00	15:00		Dropped off Metals.
195		Grey	SUV	15:05	1 Lane 1	15:05	15:06	15:06		
196		Black	PU	15:05	1 Lane 2	15:05	15:06	15:06		
197		Grey	C	15:17	1 Lane 1	15:18	15:19	15:19		
198		Black	PU	15:17	1 Lane 1	15:17	15:17	15:17		
199		Red	PU	15:23	1 Lane 1	15:24	15:25	15:25		
200		Grey	PU	15:28	1 Lane 1	15:28	15:29	15:29		
201		Silver	C	15:29	1 Lane 2	15:30	15:30	15:30		
202		Black	PU	15:30	1 Lane 1	15:30	15:31	15:32		
203		Grey	C	15:39	1 Lane 1	15:39	15:40	15:40		
204		Black	C	15:39	2 Lane 1	15:40	15:41	15:41		

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: Recycling and Refrigeration/Electronics/Tires

Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
1		Silver	SUV	8:18		8:16	8:18	8:21		Dropped off Glass/Aluminum then to MSW
2		Black	PU	8:23		8:24	8:24	8:26		Dropped off Glass/Aluminum then to MSW
3		Silver	Sedan	8:30		8:31	8:36	8:37		Dropped off Aluminum/Steel then to MSW
4		Black	SUV	8:48		8:49	8:50	8:51		Dropped off Aluminum/Glass then to MSW
5		Black	PU	8:51		8:51	8:52	8:52		Dropped off Glass then to MSW
6		Black	Sedan	8:54		8:54	8:54	8:54		Dropped off Glass/cans then to MSW
7		Black	SUV	9:00		9:00	9:03	9:03		Dropped off Glass/Plastic/Cans/Electronics then to MSW
8		Grey	SUV	9:13		9:13	9:14	9:14		Dropped off Cardboard then to MSW
9		Blue	PU	9:14		9:14	9:15	9:15		Dropped off Aluminum then to MSW
10		Grey	PU	9:20		9:20	9:21	9:21		Dropped off Aluminum then to MSW
11		Grey	SUV	9:22		9:22	9:23	9:23		Dropped off Aluminum then to MSW
12		Red	Van							Walked over from MSW side
13		Silver	Van	9:46		9:46	9:46	9:46		Dropped off Glass then to MSW
14		Red	PU	9:56		9:57	9:59	9:59		Dropped off Cardboard/Cans/Glass then to MSW
15		Silver	SUV	10:02		10:02	10:03	10:03		Dropped off Cans then to MSW
16		Blue	PU	10:06		10:06	10:09	10:09		Dropped off Steel/Glass/Aluminum then to MSW
17		Black	PU	10:06		10:07	10:07	10:07		Dropped off Cardboard then to MSW
18		Blue	PU	10:28		10:26	10:27	10:27		Dropped off Cans then to MSW
19		Gray	Sedan	10:28		10:28	10:29	10:29		Dropped off Cardboard then to MSW

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: Recycling and Refrigeration/Electronics/Tires

Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
20		Black	PU	10:30		10:30	10:32	10:32		Dropped off Glass then to MSW
21		Silver	SUV	10:30		10:30	10:32	10:32		Dropped off Aluminum/Glass then to MSW
22		Black	SUV	10:43		10:43	10:43	10:43		Dropped off Steel/Aluminum then to MSW
23		Silver	SUV	10:43		10:43	10:43	10:43		Dropped off Cardboard then to MSW
24		White	PU	10:44		10:44	10:46	10:46		Dropped off Cardboard/Glass/Steel/Aluminum then to MSW
25		Silver	PU	10:49		10:49	10:49	10:49		Dropped off Aluminum Cans then to MSW
26		Green	SUV	10:49		10:49	10:51	10:51		Dropped off Glass/Steel/Aluminum then to MSW
27		Silver	PU	10:50	1	10:50	10:52	10:52	1	Dropped off Cardboard then to MSW
28		Silver	PU	10:50	1	10:51	10:52	10:52	1	Dropped off Glass then to MSW
29		Bronze	SUV	10:51	1	10:51	10:53	10:53		Dropped off Glass/Steel then to MSW
30		Black	PU	11:01		11:01	11:02	11:02		Dropped off Cardboard then to MSW
31		Silver	PU	11:05		11:05	11:05	11:05		Dropped off Glass then to MSW
32		White	PU	11:05		11:05	11:05	11:05		Dropped off Glass then to MSW
33		Black	PU	11:15		11:15	11:15	11:15		Dropped off Cardboard then to MSW
34		Black	PU	11:21		11:21	11:23	11:23		Dropped off Aluminum/Glass then to MSW (back and forth)
35		Blue	PU	11:25		11:25	11:26	11:26		Dropped off Steel then to MSW
36		Grey	PU	11:28		11:29	11:29	11:29		Dropped off Glass/Steel then to MSW
37		Blue	SUV	11:40		11:40	11:42	11:42		Dropped off Aluminum/Steel then to MSW (Two people)
38		White	PU	11:44		11:45	11:45	11:45		Dropped off Cardboard then to MSW

Tamworth Transfer Station
Traffic Observations
NODE LOCATION: Recycling and Refrigeration/Electronics/Tires

Saturday, January 21, 2023

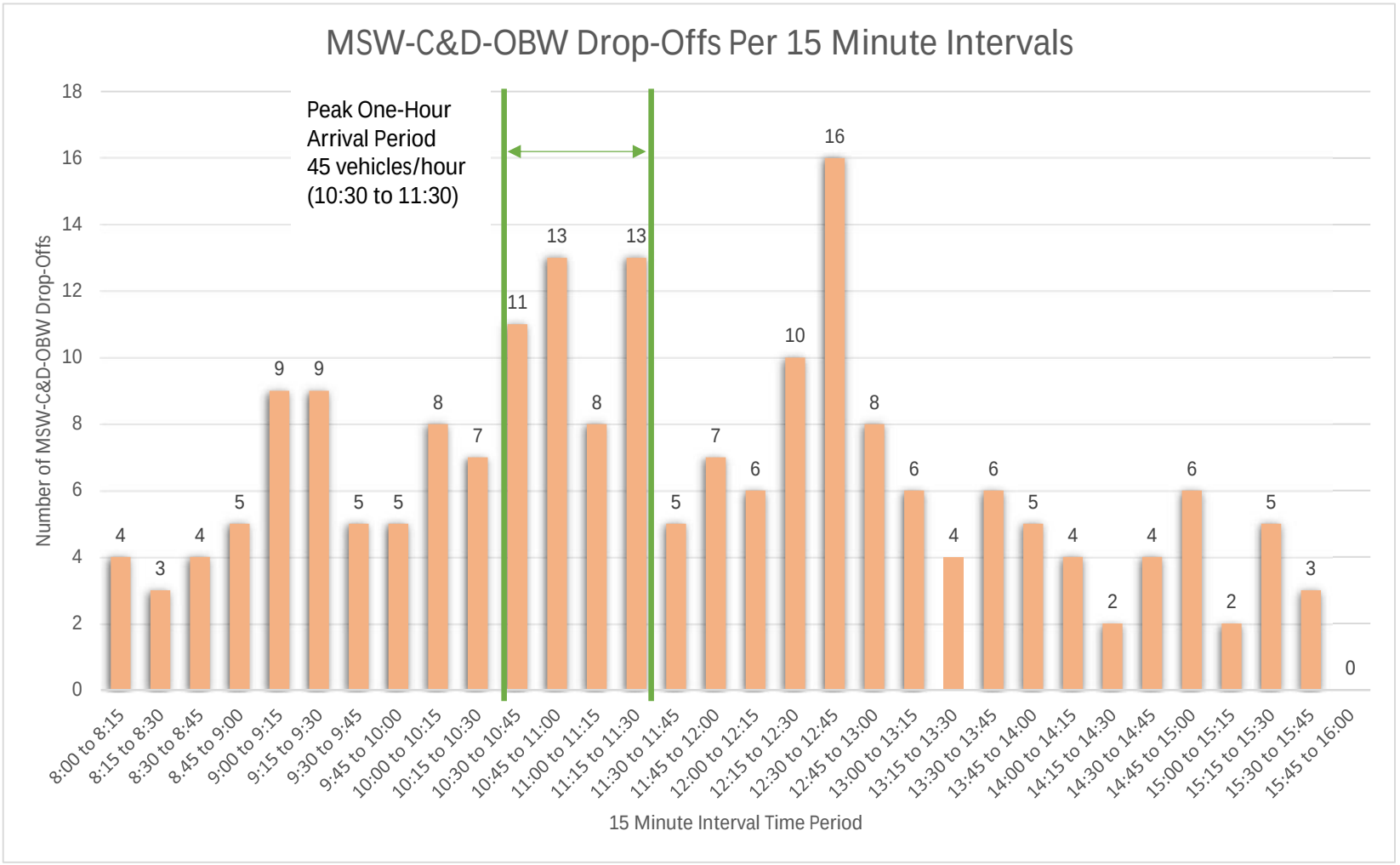
	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
39		Silver	PU	11:45		11:46	11:46	11:46		Dropped off Cardboard then to MSW
40		Black	SUV	11:58		11:56	12:00	12:00		Dropped off Steel/Aluminum then to MSW
41		Silver	C	11:58		11:58	12:01	12:01		Dropped off Cardboard/Glass then to MSW (Dropped off carseat and TV for bulky waste)
42		Blue	PU	11:59		11:59	11:59	11:59		Dropped off Steel/Glass then to MSW
43		Grey	PU	12:04		12:04	12:04	12:05		Dropped off Glass then to MSW
44		Silver	PU	12:17		12:17	12:18	12:18		Dropped off Aluminum then to MSW
45		White	SUV	12:21		12:21	12:21	12:21		Dropped off Cardboard then to MSW
46		Grey	SUV	12:23		12:23	12:24	12:24		Dropped off Cardboard then to MSW
47		White	PU	12:27		12:27	12:27	12:27	2	Dropped off Cardboard then to MSW
48		Gold	PU	12:28		12:28	12:31	12:31	1	Dropped off Cardboard/Glass/Steel then to MSW (Talking with other customers)
49		Black	C	12:28	1	12:28	12:33	12:34	1	Dropped off Glass/Steel then to MSW (Talking to other customers)
50		Grey	PU	12:35	3	12:30	12:35	12:35		Came from MSW and Dropped off Glass/Cardboard/Aluminum/Steel (Talking with others)
51		Red	SUV	12:35	1	12:35	12:37	12:37		Dropped off Glass/Steel/Aluminum/Cardboard then to MSW
52		Red	PU	12:38		12:38	12:39	12:39	2	Dropped off Cardboard then to MSW
53		Silver	SUV	12:42		12:42	12:42	12:42	1	Dropped off Cardboard then to MSW
54		Grey	SUV	12:42	1	12:42	12:43	12:43		Came from MSW and Dropped off Aluminum
55		Silver	PU	12:43	2	12:43	12:51	12:51	1	Dropped off Cardboard/Glass/Steel/Aluminum then to MSW (Back and forth)
56		Blue	PU	12:46	1	12:47	12:51	12:51	1	Dropped off Glass/Cardboard then to MSW (Two people)
57		Red	PU	12:51	1	12:51	12:54	12:54		Dropped off Glass then to MSW (Talked with attendant)

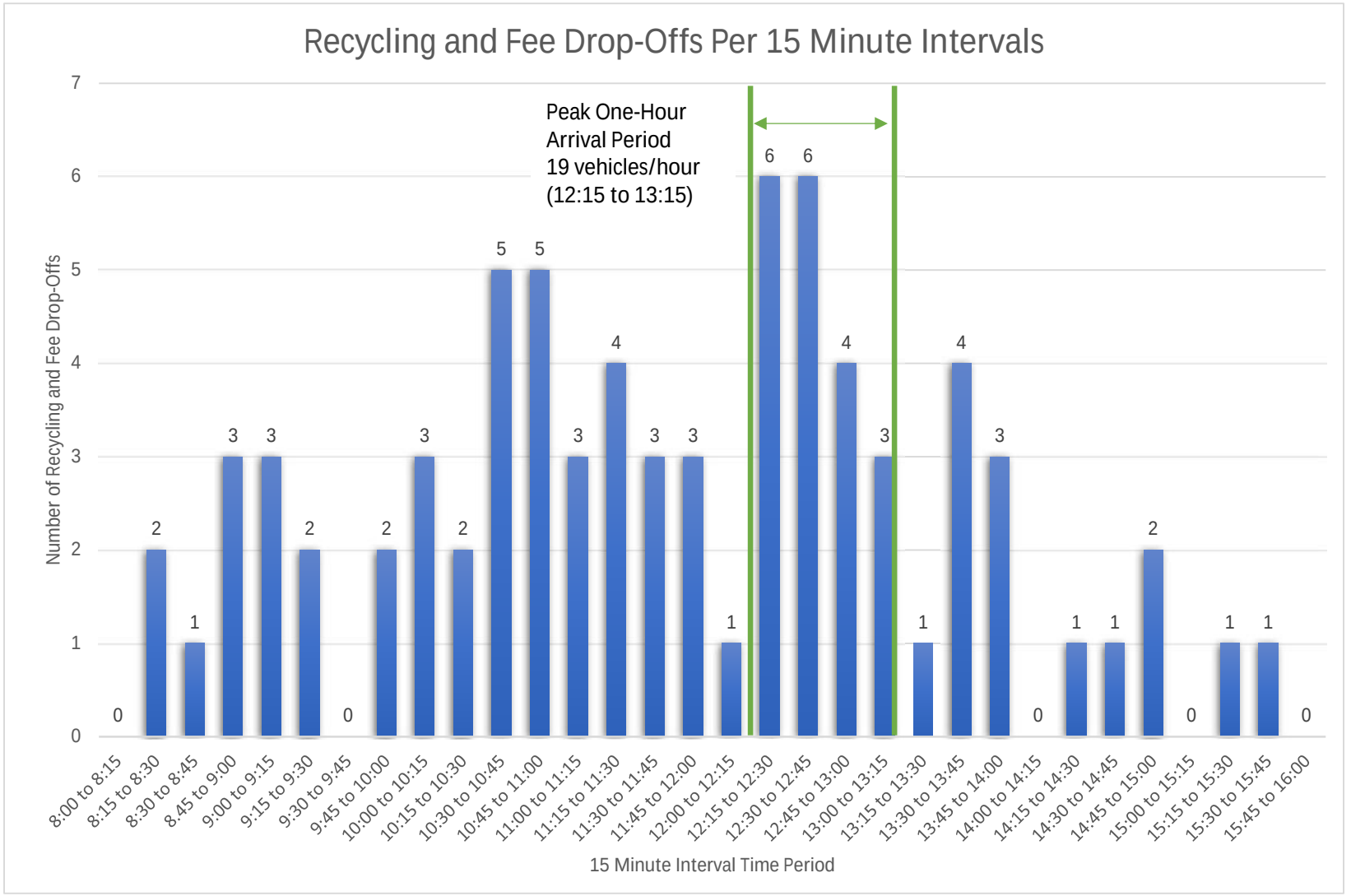
Tamworth Transfer Station
Traffic Observations
NODE LOCATION: Recycling and Refrigeration/Electronics/Tires

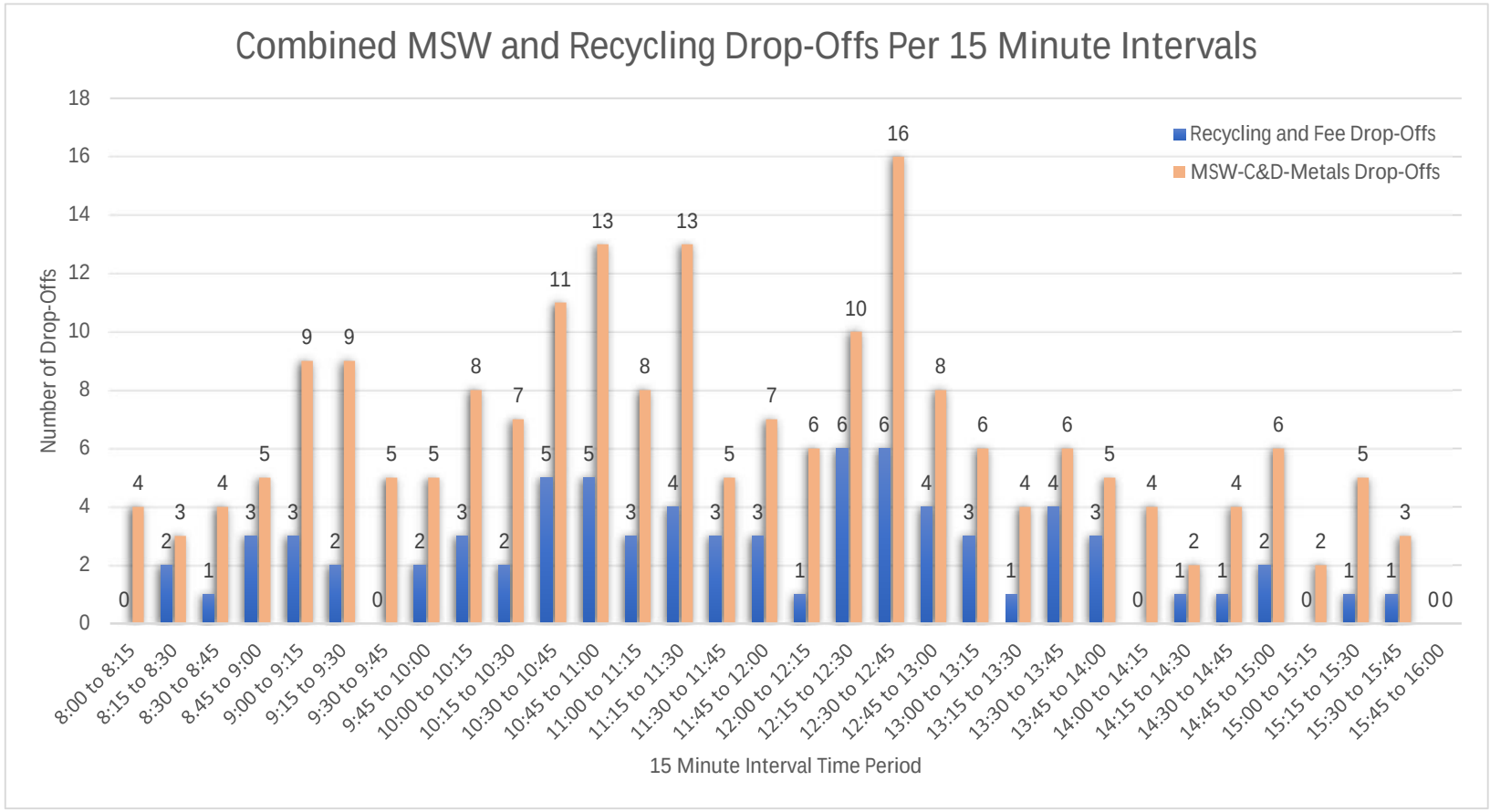
Saturday, January 21, 2023

	Vehicle Information			Time Recording and Queue Observations						Comments
	Plate No.	Color	Vehicle Type (C, SUV, PU, Other)	Arrival Time	Vehicles in Queue at Arrival Time - Including Arriving Vehicle QUEUE at IN	Drop-off Start Time	Drop-off Completion Time	Departure Time	Vehicles in Queue at Departure Time QUEUE at OUT	Note items such as: - where was vehicle during drop-off activities; - how much walking to complete drop-off; - does vehicle stay parked in one spot during drop-off; - pedestrian/vehicle conflicts (safety); - excessive communication/lingering; - operational conflicts; - queue observations at entrance.
58		Blue	PU	12:56		12:56	12:56	12:56		Dropped off Cardboard then to MSW
59		Silver	C	12:59		12:59	13:00	13:00	1	Dropped off Cardboard then to MSW
60		White	SUV	13:00	1	13:00	13:00	13:00		Dropped off Steel/Glass/Aluminum then to MSW
61		White	Van	13:03		13:03	13:03	13:02		Dropped off Cardboard then to MSW
62		White	SUV	13:08		13:08	13:28	13:08		Came from MSW and Dropped off Cardboard and in the Donation Boxes
63		Grey	PU	13:25		13:25	13:27	13:27		Dropped off Steel/Glass/Aluminum then to MSW
64		Black	PU	13:32		13:30	13:32	13:32		Came from MSW and Dropped off Cardboard
65		Silver	SUV	13:35	1	13:35	13:37	13:37	1	Dropped off Aluminum/Glass then to MSW
66		White	SUV	13:35	2	13:35	13:37	13:37	1	Dropped off Glass/Aluminum then to MSW
67		Grey	SUV	13:37	2	13:37	13:40	13:40		Dropped off Glass/Aluminum then to MSW
68		Grey	SUV	13:56		13:56	13:56	13:56		Dropped off Glass/Aluminum then to MSW
69		White	PU	13:58		13:58	13:59	13:59	1	Dropped off Steel/Glass/Aluminum then to MSW
70		Grey	PU	13:59	1	13:59	14:01	14:01		Dropped off Glass/Steel then to MSW
71		Red	SUV	14:17		14:17	14:17	14:17		Dropped off Cardboard then to MSW
72		Silver	Van	14:39		14:39	14:39	14:40		Dropped off Glass/Cardboard then to MSW
73		Green	SUV	14:47		14:47	14:50	14:50		Dropped off Cardboard/Glass/Aluminum/Steel then to MSW
74		Blue	PU	14:51		14:51	14:56	14:56		Dropped off Glass/Steel/Aluminum then to MSW (Unfamiliar with area - two people)
75		Grey	Sedan	15:15		15:15	15:18	15:18		Dropped off Cardboard/Steel/Glass then to MSW
76		Black	Sedan	15:38		15:38	15:39	15:39		Dropped off Cardboard/Steel then to MSW

Appendix B
Graphical Summary of Table 1.3


MSW-C&D-OBW Drop-Offs Per 15 Minute Intervals
Peak One-Hour
Arrival Period
45 vehicles/hour
(10:30 to 11:30)
Number of MSW-C&D-OBW Drop-Offs
15 Minute Interval Time Period
8:00 to 8:15
8:15 to 8:30
8:30 to 8:45
8:45 to 9:00
9:00 to 9:15
9:15 to 9:30
9:30 to 9:45
9:45 to 10:00
10:00 to 10:15
10:15 to 10:30
10:30 to 10:45
10:45 to 11:00
11:00 to 11:15
11:15 to 11:30
11:30 to 11:45
11:45 to 12:00
12:00 to 12:15
12:15 to 12:30
12:30 to 12:45
12:45 to 13:00
13:00 to 13:15
13:15 to 13:30
13:30 to 13:45
13:45 to 14:00
14:00 to 14:15
14:15 to 14:30
14:30 to 14:45
14:45 to 15:00
15:00 to 15:15
15:15 to 15:30
15:30 to 15:45
15:45 to 16:00
4 3 4 5 9 9 5 5 8 7 11 13 8 13 5 7 6 10 16 8 6 4 6 5 4 2 4 6 2 5 3 0


Recycling and Fee Drop-Offs Per 15 Minute Intervals
Peak One-Hour
Arrival Period
19 vehicles/hour
(12:15 to 13:15)
Number of Recycling and Fee Drop-Offs
15 Minute Interval Time Period
0 2 1 3 3 2 0 2 3 2 5 5 3 4 3 3 1 6 6 4 3 1 4 3 0 1 1 2 0 1 1 0
8:00 to 8:15
8:15 to 8:30
8:30 to 8:45
8:45 to 9:00
9:00 to 9:15
9:15 to 9:30
9:30 to 9:45
9:45 to 10:00
10:00 to 10:15
10:15 to 10:30
10:30 to 10:45
10:45 to 11:00
11:00 to 11:15
11:15 to 11:30
11:30 to 11:45
11:45 to 12:00
12:00 to 12:15
12:15 to 12:30
12:30 to 12:45
12:45 to 13:00
13:00 to 13:15
13:15 to 13:30
13:30 to 13:45
13:45 to 14:00
14:00 to 14:15
14:15 to 14:30
14:30 to 14:45
14:45 to 15:00
15:00 to 15:15
15:15 to 15:30
15:30 to 15:45
15:45 to 16:00


Combined MSW and Recycling Drop-Offs Per 15 Minute Intervals
Recycling and Fee Drop-Offs
MSW-C&D-Metals Drop-Offs
Number of Drop-Offs
15 Minute Interval Time Period
8:00 to 8:15
8:15 to 8:30
8:30 to 8:45
8:45 to 9:00
9:00 to 9:15
9:15 to 9:30
9:30 to 9:45
9:45 to 10:00
10:00 to 10:15
10:15 to 10:30
10:30 to 10:45
10:45 to 11:00
11:00 to 11:15
11:15 to 11:30
11:30 to 11:45
11:45 to 12:00
12:00 to 12:15
12:15 to 12:30
12:30 to 12:45
12:45 to 13:00
13:00 to 13:15
13:15 to 13:30
13:30 to 13:45
13:45 to 14:00
14:00 to 14:15
14:15 to 14:30
14:30 to 14:45
14:45 to 15:00
15:00 to 15:15
15:15 to 15:30
15:30 to 15:45
15:45 to 16:00