Step by Step Process Utilized for Bus Utilization Analysis
As Part of Educational Impact Fee Updated for the Board
For the 2018-2019 Study Effort
(February 22, 2019)

Step 1: The LCS project number to be utilized for this updated bus transportation utilization analysis will be the same as previously utilized for student generation rates of _0150_. The primary analysis will be accomplished within the following ArcMap document: _Bus Capacity Analysis -- 20190209.mxd_. I received an Excel spreadsheet (_BUS DATA IMPACT FEE.xlsx_) on January 9th, from Scott Pfender, the Director of Transportation, containing 349 records representing an updated bus inventory information. This file contained their unique bus identification number, the VIN number, FDOE bus type, seating capacity, build date, body model, chassis & body make, date received and county inventory number (see an example in the graphic below). This spreadsheet was to replace the two Excel documents (BUS LIST.xls & STIMS VEHICLE VIN.xlsx) sent by Lori Mattox, Transportation Operation Manager, on December 5th, 2018. Her original list was missing critical capacity information and had not been updated since the last major set of bus purchases.

Bus #	VIN #	Type	Seating Capacity	Build Date	Body Model	Chassis Make	Body Make	Date Received	COUNTY_NO
'0429	1T7YU4B2X41139648	D	83	1/9/2003	MVP-ER	THOMAS	THOMAS	7/28/2003	113368
'0430	1T7YU4B2141139649	D	83	1/9/2003	MVP-ER	THOMAS	THOMAS	7/9/2003	113674
'0432	4UZAAXCSX4CM09002	C	27	12/29/2002	CONV	FREIGHTLINER	THOMAS	5/29/2003	113392
'0433	4UZAAXCS14CM09003	C	27	12/29/2002	CONV	FREIGHTLINER	THOMAS	5/29/2003	113675
'0434	4UZAAXCS34CM09004	C	27	12/29/2002	CONV	FREIGHTLINER	THOMAS	5/29/2003	113676
'0435	4UZAAXCS54CM09005	C	27	1/9/2003	CONV	FREIGHTLINER	THOMAS	7/9/2003	113677
'0437	4UZAAXCS74CM08874	C	47	12/29/2002	CONV	FREIGHTLINER	THOMAS	5/29/2003	113678
'0500	1T7YU4B2151147350	D	84	11/17/2003	SAF-T-LINER-RE	THOMAS	THOMAS	4/15/2004	113679
'0501	1T7YU4B2751149913	D	84	1/30/2004	SAF-T-LINER-RE	THOMAS	THOMAS	4/23/2004	113369
'0502	1T7YU4B2951149914	D	84	1/30/2004	SAF-T-LINER-RE	THOMAS	THOMAS	5/7/2004	113679

STEP 2: Exported the _BUS DATA IMPACT FEE.xlsx_ file into a new spreadsheet titled _LCS Bus Transportation Inventory Sheet.xlsx_. Worked to clean up the field headers and prepare the data for the transformation into a usable File Geodatabase. Created a comma delimited (csv) file and then imported the file into a newly created File Geodatabase (_Bus Capacity Analysis -- 20190208.gdb_) with the following attribute table name "_LCS Bus Transportation Inventory Sheet_" containing all 349 bus records. Pulled together various bus capacity tables utilized back in 2013 (under project number _0122_) in an effort to utilize them as the starting basis for the creation of a master bus inventory table with all the necessary information needed to accommodate the updated ridership capacity analysis. I also copied various tables (from project number _0193_) that were created from the last October 2018 Transportation FTE Survey 2 student ridership assessment. These initial 20,374 students from the Survey 2 submittal to FDOE provided by Stephannie Wiley on November 6th, 2018 will become the basis for determining the necessary ridership utilization that is needed for the impact study effort.

STEP 3: The following procedure will be to determine the particular student riders of interest based on their associated cost center number that will be correlated against the same schools of interest from the list utilized in the determination of the student generation rates. This will be accomplished by generating a summary table of the unique route numbers to determine the associated schools assigned to each bus. As part of my efforts to review the Transportation FTE student membership requirements from the October Survey 2 efforts, I utilized the same Excel spreadsheet (*Survey 2 -- Transportation FTE from Stephannie – 20181106.xlsx)* that was received (November 11, 2018) from Stephannie Wiley (Student FTE Analyst) as part of the final FTE transmittal to FDOE back in October of last year. This spreadsheet table was ultimately imported to create a new table in the *Bus Capacity Analysis -- 20190208.gdb* File Geodatabase with the assigned name of "*State_FTE_Report_from_Stephannie_20374*".

State_FTE_Report_from_Stephannie_20374

District	StuNbrFL	Survey	SrvYear	RdrStatus	SvrTerm	MembCode	VehType	BusNumb	RouteNumb	Active	Dist2	Hazard	LkStudID	FlaID	Bus & Route Number
35	001020262X	2	1819	Z	090	M	B	1713	ERH-7342-AM	A	35	000000	1300350353	FL000002280417	1713 / ERH-7342-AM
35	001965490X	2	1819	Z	090	M	B	1500	THS-7614-AM	A	35	000000	3516840834	FL000002291137	1500 / THS-7614-AM
35	001987528X	2	1819	Z	090	M	B	1713	ERH-7342-AM	A	35	000000	3505221104	FL000002268374	1713 / ERH-7342-AM
35	002062499X	2	1819	Z	090	M	B	L716	PRE-7919-AM	A	35	000000	3581771586	FL000002278392	L716 / PRE-7919-AM
35	002064316X	2	1819	Z	090	M	B	SCCS008	SCCS004	A	35	000000	3510111401	FL000001302528	SCCS008 / SCCS004
35	002068192X	2	1819	Z	090	M	B	1718	FPK-7403-AM	A	35	000000	3512321571	FL000001962746	1718 / FPK-7403-AM
35	002081334X	2	1819	Z	090	M	B	0611	TRI/EHT-7505AM	A	35	000000	3513841935	FL000007331434	0611 / TRI/EHT-7505AM
35	002960691X	2	1819	Z	090	M	B	1112	ERH-7943-AM	A	35	000000	3560570970	FL000002254193	1112 / ERH-7943-AM
35	002981429X	2	1819	Z	090	M	B	1716	ERH-7336-AM	A	35	000000	3569810995	FL000002270391	1716 / ERH-7336-AM
35	002989496X	2	1819	Z	090	M	B	1810	THS-7615-AM	A	35	000000	3545580931	FL000002288583	1810 / THS-7615-AM
35	003022241X	2	1819	Z	090	M	B	0802	WHM-7348-AM	A	35	000000	3519411768	FL000005391148	0802 / WHM-7348-AM
35	003968814X	2	1819	Z	090	M	B	1703	THS-7601-AM	A	35	000000	3508300834	FL000002259817	1703 / THS-7601-AM
35	003985002X	2	1819	Z	090	M	B	0725	WHM-7329-AM	A	35	000000	3553511096	FL000002275681	0725 / WHM-7329-AM
35	003985620X	2	1819	Z	090	M	B	1810	THS-7615-AM	A	35	000000	3515511535	FL000002282856	1810 / THS-7615-AM
35	004087842X	2	1819	Z	090	M	B	1105	MDM-7502-AM	A	35	000000	3510591788	FL000004878483	1105 / MDM-7502-AM
35	004117405X	2	1819	Z	090	M	B	L729	TRE-7608-AM	A	35	000000	3510611434	FL000002259063	L729 / TRE-7608-AM
35	004513037X	2	1819	Z	090	L	B	0634	TRI/EHTS-7857-A	A	35	000000	4900763186	FL000002702921	0634 / TRI/EHTS-7857-A
35	004792552X	2	1819	Z	090	M	B	SCCS007	SCCS001	A	35	000000	6422102301	FL000001309541	SCCS007 / SCCS001
35	004916971X	2	1819	Z	090	L	B	0818	LH/EHTS-7806-AM	A	35	000000	3564091736	FL000006123745	0818 / LH/EHTS-7806-AM
35	005069123X	2	1819	Z	090	M	B	0744	MDM-7511-AM	A	35	000000	3576111688	FL000002395994	0744 / MDM-7511-AM
35	006024225X	2	1819	Z	090	M	B	1711	ERH-7340-AM	A	35	000000	3597491195	FL000002270824	1711 / ERH-7340-AM

Within the "*State_FTE_Report_from_Stephannie_20374*" table a new field in the attribute table with a field name of "*BusRteNo*" (alias name: name "Bus & Route Number") was created (note graphic above). I calculated the field by combining the bus number and the route number utilizing the following field calculation: "*[BusNumb] & " / " & [RouteNumb]*". From this newly created field, I generated another summary table (*SummaryTable_of_Bus_and_Route_Numbers*) from the combined bus and route numbers to determine the unique routes from Survey 2. This generated 718 unique bus run records from the total of 20,374 student records generated in the FDOE report. The "*Cnt_BusRteNo*" field within this table represents the total number of students represented on each of the unique routes. This field will become the basis for evaluating student ridership vs. bus capacity later in the analysis process.

STEP 4: Nine new fields were added to the summary table created in the previous step (*SummaryTable_of_Bus_and_Route_Numbers*). These fields consisted of the following: "SchoolCode", "SchoolName", "CNTR", "Status", "RouteNumber", "ESEBus", "GradeLevel", "Interest", and "RTNumber". A new summary table was created ("*SummaryTable_of_SchoolCodes*") from this table on the "School Code" field to determine the possible unique school codes to match with the school names table. This table was merged with a series of tables and hand-coded in some instances to populate all nine fields just created. See the example below.

SummaryTable_of_Bus_and_Route_Numbers

BusRteNo	Cnt_BusRte	First_BusNumb	First_RouteNumb	SchoolCode	SchoolName	CNTR	Status	RouteNumber	ESEBus	GradeLevel	Interest	RtNumber
AA11 / AAHC01	1	AA11	AAHC01	AAHC	Alee Academy Charter School	9018	N/A	AAHC	No	Special	No	01
AA11 / AAHC03	55	AA11	AAHC03	AAHC	Alee Academy Charter School	9018	N/A	AAHC	No	Special	No	03
AA11 / AAHC05	15	AA11	AAHC05	AAHC	Alee Academy Charter School	9018	N/A	AAHC	No	Special	No	05
AA12 / AAHC02	74	AA12	AAHC02	AAHC	Alee Academy Charter School	9018	N/A	AAHC	No	Special	No	02
AA12 / AAHC06	3	AA12	AAHC06	AAHC	Alee Academy Charter School	9018	N/A	AAHC	No	Special	No	06
AA9802 / AAHC01	46	AA9802	AAHC01	AAHC	Alee Academy Charter School	9018	N/A	AAHC	No	Special	No	01
E001 / ACS-001	54	E001	ACS-001	ACS	Altoona Charter School	9028	N/A	ACS	No	Elementary Charter (Pri*	No	001
E002 / ACS-001	1	E002	ACS-001	ACS	Altoona Charter School	9028	N/A	ACS	No	Elementary Charter (Pri*	No	001
E002 / ACS-002	66	E002	ACS-002	ACS	Altoona Charter School	9028	N/A	ACS	No	Elementary Charter (Pri*	No	002
0433 / AST-7840-AM	15	0433	AST-7840-AM	AST	Astatula Elementary School	0271	AM	AST	Yes	Elementary	Yes	7840
0714 / AST-7621-AM	23	0714	AST-7621-AM	AST	Astatula Elementary School	0271	AM	AST	No	Elementary	Yes	7621
0715 / AST-7613-AM	26	0715	AST-7613-AM	AST	Astatula Elementary School	0271	AM	AST	No	Elementary	Yes	7613
0734 / AST-7872-AM	24	0734	AST-7872-AM	AST	Astatula Elementary School	0271	AM	AST	Yes	Elementary	Yes	7872
1101 / AST-7604-AM	32	1101	AST-7604-AM	AST	Astatula Elementary School	0271	AM	AST	No	Elementary	Yes	7604
1117 / AST-7603-AM	45	1117	AST-7603-AM	AST	Astatula Elementary School	0271	AM	AST	No	Elementary	Yes	7603
1128 / AST-7846-AM	13	1128	AST-7846-AM	AST	Astatula Elementary School	0271	AM	AST	Yes	Elementary	Yes	7846
1401 / AST-7606-AM	26	1401	AST-7606-AM	AST	Astatula Elementary School	0271	AM	AST	No	Elementary	Yes	7606
1405 / AST-7825-AM	14	1405	AST-7825-AM	AST	Astatula Elementary School	0271	AM	AST	Yes	Elementary	Yes	7825
1632 / AST-7835-AM	7	1632	AST-7835-AM	AST	Astatula Elementary School	0071	AM	AST	Yes	Elementary	Yes	7835
1704 / AST-7617-AM	52	1704	AST-7617-AM	AST	Astatula Elementary School	0271	AM	AST	No	Elementary	Yes	7617
L711 / AST-7605-AM	43	L711	AST-7605-AM	AST	Astatula Elementary School	0271	AM	AST	No	Elementary	Yes	7605
0622 / BEV-7407-AM	80	0622	BEV-7407-AM	BEV	Beverly Shores Elementary School	0031	AM	BEV	No	Elementary	Yes	7407
0718 / BEV-7405-AM	46	0718	BEV-7405-AM	BEV	Beverly Shores Elementary School	0031	AM	BEV	No	Elementary	Yes	7405
0718 / BEV-7405-PM	1	0718	BEV-7405-PM	BEV	Beverly Shores Elementary School	0031	PM	BEV	No	Elementary	Yes	7405
1608 / BEV-7423-AM	38	1608	BEV-7423-AM	BEV	Beverly Shores Elementary School	0031	AM	BEV	No	Elementary	Yes	7423
1717 / BEV-7401-AM	49	1717	BEV-7401-AM	BEV	Beverly Shores Elementary School	0031	AM	BEV	No	Elementary	Yes	7401
1805 / BEV-7410-AM	25	1805	BEV-7410-AM	BEV	Beverly Shores Elementary School	0031	AM	BEV	No	Elementary	Yes	7410

STEP 5: Bus transportation for students is a complicated process that involves constant modifications as part of daily student changes and a highly transient population. Add to that fact that the District is required to maintain student ridership information on buses for private charter schools and conversion charter schools that have their own bus fleets makes it even more difficult to understand the complicated elements of attempting to pick up and deliver over 20,000 students twice daily. That sounds like a reasonable task until you understand that the operational mechanics involve nearly 300 buses, more than 9,000 bus stops, traveling more than 27,000 miles a day and burning more than 5,000 gallons of diesel fuel each day. The primary objective is to maximize the use and efficiency of each bus without jeopardizing passenger safety.

Our bus system operates on a "tiered approach". Depending upon the distance and time involved in the route/run and the number of students transported on a given run determines whether or not the route is a two or three-tier run. Routes are associated with a particular bus and a driver/attendant. Our bell schedule is staggered at different times allowing for a bus to leave the bus lot as early as 5:30 in the morning and start at the farthest distance from the high school to start picking up students. They will drop those students at the high school just prior to the start bell and then leave the school to pick up the elementary students. Once they drop the students off at the elementary school, they will start the process of picking up the middle schools students. Once they complete that particular run, they will head back to the bus lot to wait until the reverse of the process starts where they head to the high school and pick up the high school students to deliver back to their respective homes. This process follows through the elementary and middle school students with the buses arriving back at the lot as late as 5:30 each day after the middle school run. In long routes that are in rural areas like Astor or the Green Swamp, a bus may only have a two-tier run for high school and middle school because of the time and distance to service the students for elementary is just not available.

Routes are also divided between morning (AM) and afternoon (PM) in servicing the same students from the same school. Morning routes are commonly more representative of the driving force behind the creation of a route. This is because the ridership on the morning runs is typically higher. Afternoon runs are impacted by after school activities and thus can reduce the ridership on middle and high school buses by as much as fifty percent. Some Route Managers don't even track the afternoon routes in the system unless a student will only ride in the afternoon because of parental custody issues and doesn't take a morning bus to school. This is why the vast majority of the ridership count for the PM routes is typically only one student. By placing these afternoon runs in the system, it assures that the student will be counted for FTE reimbursement purposes. That is why the "*Status*" field will be utilized in determining the actual runs to be utilized for this bus ridership or capacity utilizing analysis if there is a corresponding PM route assignment in the system. The "*Status*" field was populated with "*AM*" or "*PM*" and if the bus run had no designation it was assigned an "*AM*".

The next to the last column in the attribute table (field name "*Interest*") was coded on the basis of the "schools of interest" associated with those utilized in the student generation rate analysis. Those coded as "*No*" are typically charter school buses that were not purchased as part of our fleet that had an AM and PM run, so they will be removed from further consideration. The 718 records in the summary table (*SummaryTable_of_Bus_and_Route_Numbers)* were queried on the basis of "*Interest = Yes*" which resulted in a total of 655 unique elementary, middle and high school runs. These selected bus runs of interest broken down by elementary, middle and high students were exported to create a new attribute table (*Student_Buses_and_Routes_of_Interest_2018)*

STEP 6: Back in 2013, a seating capacity table (*Summary_Table_Seating_Capacity*) was developed (under project number *0122*) in an effort to evaluate various ridership capacity issues for efficiency purposes. The "*LCS Bus Transportation Inventory Sheet*" attribute table created back in Step 2 from the inventory information supplied by Transportation contains a field (Seat_Capty) that supplies the maximum seating capacity for each bus based on the manufactures specifications. This maximum capacity varies from 14 students to 84 students depending upon the size and configuration of the bus by a given manufacturer and is usually correlated with smaller elementary students. As you can imagine, where you might get three elementary students to sit on a standard three student bench seat you may only get one or two middle or high school students on the same seat. That is why there is a need in calculating the overall bus capacity to understand the relative size of the students along with the size and number of bench seats on a given bus model. The older ESE buses along with most of the newer buses purchased after 2015 have what is called "convertible seating", "flexible seating" or for Thomas buses it is called the "S.T.A.R.S Mounting System." This convertible seating allows for the flexibility for the removal of two bench seats to accommodate a wheelchair.

A summary table (*SummaryTable_Seating_Capacity_From_BusInventory*) was created from the "*LCS Bus Transportation Inventory Sheet*" on the (*Seat_Capty*) field to determine if any changes need to be made to the original seating capacity table. A comparison of the seating capacity was reviewed and noticed that there were new seating capacities of 35, 38, 43 and 44 noted. A further investigation revealed that many of these were new buses that indicated the lower capacity. A joining of the latest 2018 inventory sheet with the 2013 inventory sheet was done to create a new attribute table "*Bus_Inventory_Comparison_2013_vs_2018*" that was exported to an Excel spreadsheet for further analysis. An analysis was performed within Excel to determine records between the two survey's that did not match for the same bus and was emailed to Scott Pfender, Director of Transportation, to have his staff review the information before proceeding further in the analysis.

I received an updated table from Randy Belton of Transportation that was consolidated into a new spreadsheet (*2018 Bus Inventory - Updated.xlsx*). Taking his updated inventory list, I created the following student capacity table based on the two-grade level categories. An abbreviated version with smaller field headers was exported into a CSV, from the *2018_Bus_Capacity_Updated* tab in the spreadsheet and was then imported into the *Bus Capacity Analysis -- 20190208.gdb* File Geodatabase (*Bus_Capacity_2018_Updated*). The table expressing these student capacities against the number and style of bench seats is depicted on the following page.

Bus Capacity	Elementary Student Capacity	Middle & High Student Capacity	Number of 3-Student Bench Seat	Number of 2-Student Bench Seat	Number of 1-Student Bench Seat
14	14	9	4	1	0
21	21	14	7	0	0
24	24	16	8	0	0
27	27	18	9	0	0
30	30	20	10	0	0
35	35	23	11	1	0
38	38	25	12	1	0
39	39	26	13	0	0
42	42	27	13	1	1
43	43	27	13	1	2
44	44	29	14	1	0
47	47	30	14	2	1
56	56	36	17	2	1
65	65	43	21	1	0
77	77	51	25	1	0
78	78	52	26	0	0
83	83	55	27	1	0
84	84	56	28	0	0

STEP 7: The updated bus inventory information (*2018 Bus Inventory - Updated.xlsx*) from Transportation was reduced to ten (10) primary fields of interest (see example graphic below) and exported to a CSV file. This CSV was then imported into the *Bus Capacity Analysis -- 20190208.gdb* File Geodatabase as a table with the following name: *Bus_Inventory_2018_Updated* which included 349 fleet records. The bus student capacity table created in the previous step was also imported into the same File Geodatabase as a table (*Bus_Capacity_2018_Updated*) containing 18 records.

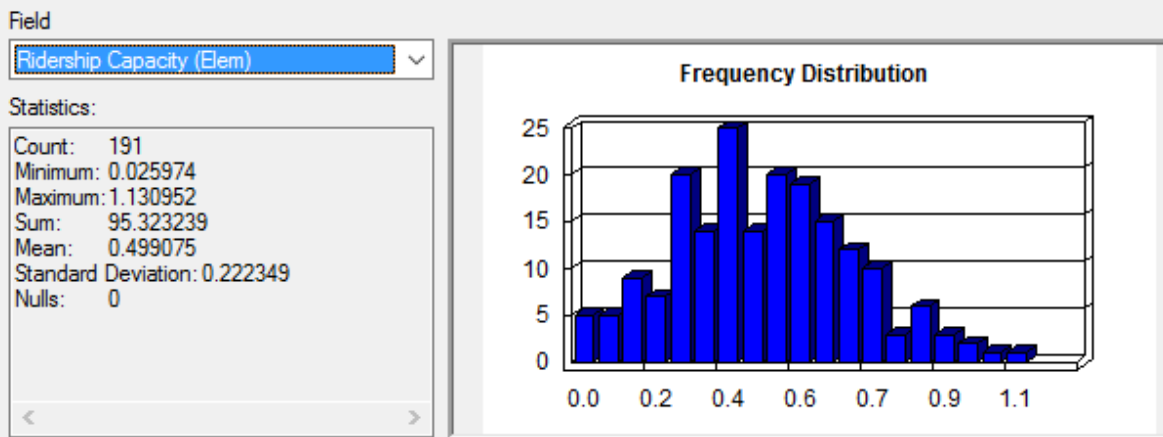| Bus_No	VIN_No	Bus_Type	Seat_Capty	Build_Date	Body_Type	Chassis_Ma	Body_Make	Date_Rec	County_No
0407	1T7YU4B2441139659	D	83	1/9/2003	MVP-ER	THOMAS	THOMAS	7/9/2003	107050
0408	1T7YU4B2241139658	D	83	1/28/2003	MVP-ER	THOMAS	THOMAS	7/28/2003	107115
0409	1T7YU4B2041139660	D	83	1/25/2003	MVP-ER	THOMAS	THOMAS	7/28/2003	107346
0410	1T7YU4B2241139661	D	83	1/28/2003	MVP-ER	THOMAS	THOMAS	7/28/2003	107347
0411	1T7YU4B2441139662	D	83	1/28/2003	MVP-ER	THOMAS	THOMAS	7/28/2003	113662
0412	1T7YU4B2641139663	D	83	1/28/2003	MVP-ER	THOMAS	THOMAS	7/28/2003	113663
0413	1T7YU4B2841139664	D	83	1/28/2003	MVP-ER	THOMAS	THOMAS	7/28/2003	113664
0414	1T7YU4B2X41139665	D	83	1/28/2003	MVP-ER	THOMAS	THOMAS	7/28/2003	113665
0415	1T7YU4B2141139666	D	83	1/28/2003	MVP-ER	THOMAS	THOMAS	7/28/2003	113365
0416	1T7YU4B2341139667	D	83	1/28/2003	MVP-ER	THOMAS	THOMAS	7/28/2003	113366
0417	1T7YU4B2541139668	D	83	1/9/2003	MVP-ER	THOMAS	THOMAS	7/9/2003	113754
0418	1T7YU4B2741139669	D	83	1/9/2003	MVP-ER	THOMAS	THOMAS	7/9/2003	113668
0419	1T7YU4B2341139670	D	83	1/9/2003	MVP-ER	THOMAS	THOMAS	7/9/2003	113669
0421	1T7YU4B2741139672	D	83	1/9/2003	MVP-ER	THOMAS	THOMAS	7/9/2003	113681
0422	1T7YU4B2741139641	D	83	1/28/2003	MVP-ER	THOMAS	THOMAS	7/28/2003	113670
0423	1T7YU4B2941139642	D	83	1/28/2003	MVP-ER	THOMAS	THOMAS	7/28/2003	113671

STEP 8: Utilizing the "Join" command, I established a connection of the _Bus_Inventory_2018_Updated_ file with the _Bus_Capacity_2018_Updated_ file to establish a one-to-many relationship between the corresponding "_Seat_Capty_" fields. The resultant table was exported into the _Bus Capacity Analysis -- 20190208.gdb_ File Geodatabase as a table with the following name: _Bus_InventoryCapacity_2018_Updated._ This tied the respective grade level student capacity to an actual bus number in order to form an additional correlation with the Transportation Survey 2 student ridership information.

STEP 9: Taking the enhanced student ridership summary table consisting of 655 unique bus routes created in Step 5 (_Student_Buses_and_Routes_of_Interest_2018)_ and joining it with the _Bus_InventoryCapacity_2018_Updated_ table created in the previous step will finally combine the capacity information from the bus inventory information with the actual bus runs. During the join process, 654 of the 655 records found to have a suitable match. The one unmatched record involved the bus number (_ANYVEHICLE_) that apparently changes frequently, so no particular bus was assigned to this Mount Dora High School (MDH-7505) bus run. These combined 654 records were coupled together into an attribute table (_FINAL_Student_Routes_with_Capacity_2018_) and placed within the _Bus Capacity Analysis -- 20190208.gdb_ File Geodatabase.

Two additional floating point numeric fields were added to the attribute table (_FINAL_Student_Routes_with_Capacity_2018_) in order to incorporate the calculated percent utilization for the two assigned grade levels. These fields for elementary and middle/high are "_Pct_Elem_Capty_" and "_Pct_MH_Capty_", respectively. A third field was added ("_Pct_Capty_")to represent the overall ridership capacity for each run. A fourth field ("_Run_Interest_") was added to remove those "_PM_" bus runs as described in detail in the fourth paragraph of Step 5. These "_PM_" bus runs make up 68 of the 654 runs, thus representing a little more than 10 percent of the runs from the Transportation FTE Survey 2 information.

STEP 10: The *Student_Buses_and_Routes_of_Interest_2018* attribute table created in Step 5 was coded with six "*Grade Level Assignments*" based on their assigned school. These included the following: *Elementary*, *Middle*, *High*, *K-8 (Conversion Charter)*, *K-8 (Private Charter)*, and *Special Needs (K-Adult)*. For the purposes of these ridership capacity calculations, both the K-8 bus runs will be calculated as "*Elementary*" and the *Special Needs (K-Adult)* as "*Middle/High*" for bus capacity.

Utilizing the selection calculation of *GradeLevel = 'Elementary' OR GradeLevel = 'K-8 (Conversion Charter)' OR GradeLevel = 'K-8 (Private Charter)'* a total of 218 bus runs were selected. A total of 27 PM routes were removed leaving 191 of interest. The resultant calculation of [Cnt_BusRteNo] / [Elem_Capty] yielded a mean student ridership capacity of 49.91%.

Field

Ridership Capacity (Elem)

Statistics:

Count: 191
Minimum: 0.025974
Maximum: 1.130952
Sum: 95.323239
Mean: 0.499075
Standard Deviation: 0.222349
Nulls: 0

Frequency Distribution

Selecting the attribute table records for Middle/High utilizing the following formula *GradeLevel = 'Middle' OR GradeLevel = 'High' OR GradeLevel = 'Special Needs (K-Adult)'* captured the remaining 436 bus runs. Performed a calculation on the middle school ridership capacity field using *[Cnt_BusRteNo] / [MidHgh_Capty].* This set contained 41 PM runs leaving an overall middle/high capacity category to 395 runs producing a mean bus capacity of 56.5%. This attribute table was exported into an Excel spreadsheet (*FINAL -- Bus Runs with Ridership Capacity -- 2018.xlsx*) for further analysis.
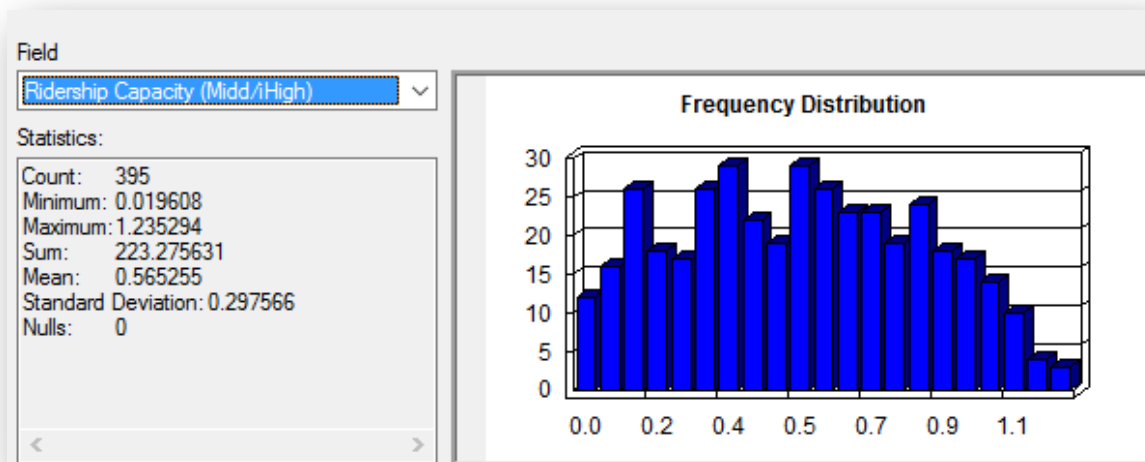

STEP 11: The updated bus inventory attribute table (*Bus_InventoryCapacity_2018_Updated*) that was finalized in Step 9 was exported into an Excel spreadsheet (*Bus Inventory Capacity -- 2018 -- Updated.xlsx*). The existing bus fleet as provided by the Transportation Department indicates 349 buses are in inventory. There are 8 buses with a bogus received date, but they all appear to have been manufactured in 2011. It would appear that 86% of the fleet were purchased since 2014. These 349 buses carry a maximum student capacity of 24,042 seats for elementary and 15,908 seats for middle/high.

STEP 12: Utilizing the Excel spreadsheet (*FINAL -- Bus Runs with Ridership Capacity -- 2018.xlsx*) a series of tables were created from pivot tables to capture the student ridership vs. bus utilization capacity by the different attending schools that are under the control of the Lake County School District. These tables were broken down into an elementary, middle, high, private charter, public charter, and special needs schools and can be viewed in the respective tabs included within the spreadsheet and viewed on the following pages. The table and chart on the following two pages depict the overall breakdown of the percent utilization.

District-wide Bus Utilization Table by School

Attending School	Number of Buses	Maximum Available Bus Capacity	Actual Student Ridership	Percent Utilization of Available Bus Capacity
Astatula Elementary School	12	750	320	42.62%
Beverly Shores Elementary School	11	662	391	57.74%
Carver Middle School	13	975	424	65.17%
Cecil E. Gray Middle School	22	1,565	586	53.74%
Clermont Elementary School	5	308	115	36.40%
Clermont Middle School	12	802	302	51.44%
East Ridge High School	37	2,623	1,398	75.75%
East Ridge Middle School	22	1,625	679	61.26%
Eustis Elementary School	2	154	59	38.31%
Eustis Heights Elementary School	8	461	258	51.10%
Eustis High School	23	1,553	538	49.48%
Eustis Middle School	24	1,724	514	43.54%
Four Corners Charter School	3	231	149	64.50%
Fruitland Park Elementary School	3	245	224	90.58%
Grassy Lake Elementary School	13	820	366	39.83%
Groveland Elementary School	14	967	411	41.33%
Lake Hills School	22	968	217	34.41%
Lake Minneola High School	19	1,302	567	60.89%
Leesburg Elementary School	7	539	339	62.89%
Leesburg High School	23	1,686	581	50.41%
Lost Lake Elementary School	13	920	424	44.17%
Minneola Charter Elementary School	4	308	164	53.25%
Mount Dora High School	17	1,223	480	57.32%
Mount Dora Middle School	15	1,130	496	64.91%
Oak Park Middle School	9	667	189	42.27%
Pine Ridge Elementary School	15	1,067	377	34.56%
Round Lake Charter Elementary School	7	512	272	51.78%
Sawgrass Bay Elementary School	17	1,285	710	55.75%
Seminole Springs Elementary School	8	616	282	45.78%
Sorrento Elementary School	10	739	371	48.86%
South Lake High School	31	2,241	1,037	66.73%
Tavares Elementary School	7	500	366	68.76%
Tavares High School	22	1,644	661	59.56%
Tavares Middle School	27	2,008	780	56.78%
The Villages Elementary School	8	583	408	69.03%
Treadway Elementary School	9	646	391	57.45%
Triangle Elementary School	8	555	296	54.91%
Umatilla Elementary School	7	504	193	36.58%
Umatilla High School	12	856	222	37.60%
Umatilla Middle School	15	1,073	262	35.96%
Windy Hill Middle School	30	2,145	1,025	68.11%
Conbined Total & Average	**586**	**41,182**	**17,844**	**54.37%**

District-wide Bus Utilization Chart by School

Percent Utilization of Available Bus Capacity
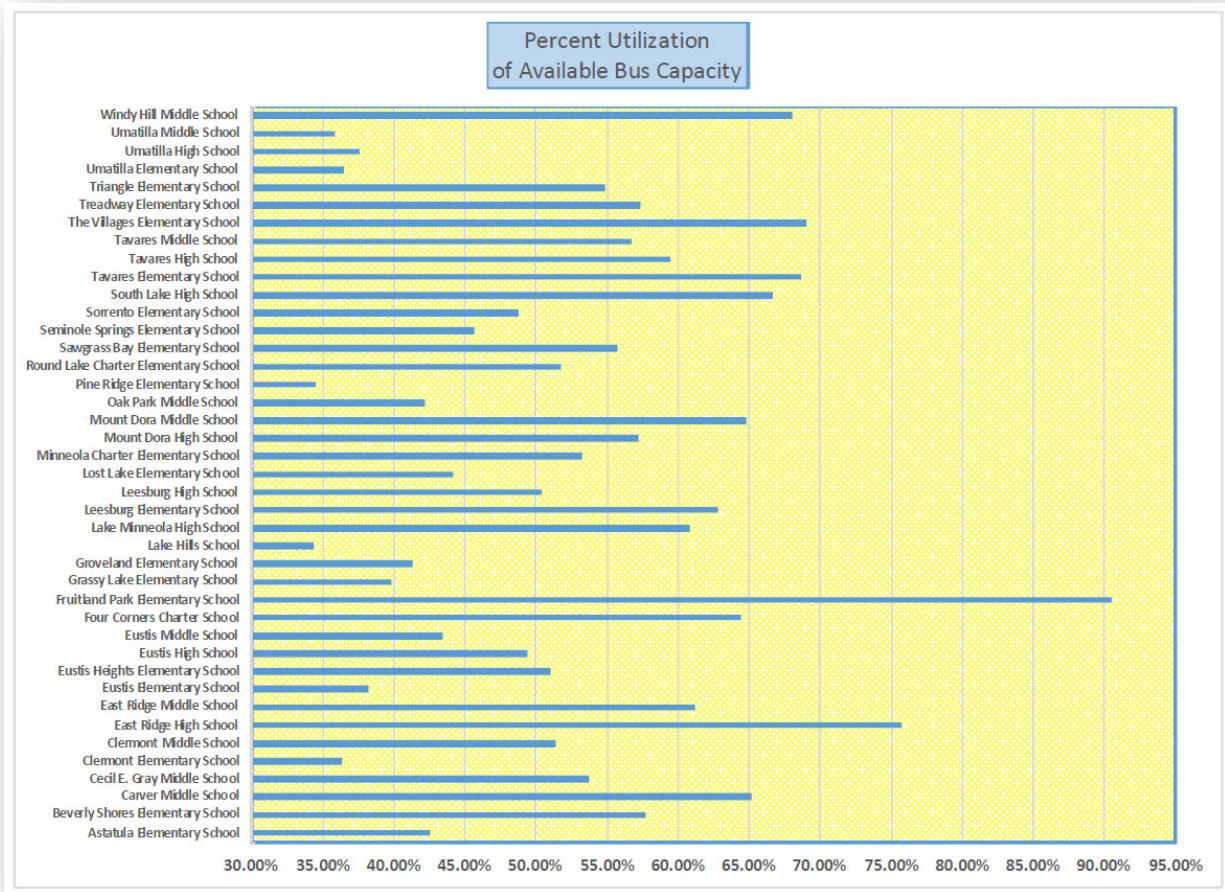
Elementary Schools Bus Utilization Table

Attending School	Number of Buses	Maximum Available Bus Capacity	Actual Student Ridership	Percent Utilization of Available Bus Capacity
Astatula Elementary School	12	750	320	42.62%
Beverly Shores Elementary School	11	662	391	57.74%
Clermont Elementary School	5	308	115	36.40%
Eustis Elementary School	2	154	59	38.31%
Eustis Heights Elementary School	8	461	258	51.10%
Fruitland Park Elementary School	3	245	224	90.58%
Grassy Lake Elementary School	13	820	366	39.83%
Groveland Elementary School	14	967	411	41.33%
Leesburg Elementary School	7	539	339	62.89%
Lost Lake Elementary School	13	920	424	44.17%
Pine Ridge Elementary School	15	1,067	377	34.56%
Sawgrass Bay Elementary School	17	1,285	710	55.75%
Seminole Springs Elementary School	8	616	282	45.78%
Sorrento Elementary School	10	739	371	48.86%
Tavares Elementary School	7	500	366	68.76%
The Villages Elementary School	8	583	408	69.03%
Treadway Elementary School	9	646	391	57.45%
Triangle Elementary School	8	555	296	54.91%
Umatilla Elementary School	7	504	193	36.58%
Grand Total	**177**	**12,321**	**6,301**	**49.51%**

Middle Schools Bus Utilization Table

Attending School	Number of Buses	Maximum Available Bus Capacity	Actual Student Ridership	Percent Utilization of Available Bus Capacity
Carver Middle School	13	975	424	65.17%
Cecil E. Gray Middle School	22	1,565	586	53.74%
Clermont Middle School	12	802	302	51.44%
East Ridge Middle School	22	1,625	679	61.26%
Eustis Middle School	24	1,724	514	43.54%
Mount Dora Middle School	15	1,130	496	64.91%
Oak Park Middle School	9	667	189	42.27%
Tavares Middle School	27	2,008	780	56.78%
Umatilla Middle School	15	1,073	262	35.96%
Windy Hill Middle School	30	2,145	1,025	68.11%
Grand Total	**189**	**13,714**	**5,257**	**55.60%**

High Schools Bus Utilization Table

Attending School	Number of Buses	Maximum Available Bus Capacity	Actual Student Ridership	Percent Utilization of Available Bus Capacity
East Ridge High School	37	2,623	1,398	75.75%
Eustis High School	23	1,553	538	49.48%
Lake Minneola High School	19	1,302	567	60.89%
Leesburg High School	23	1,686	581	50.41%
Mount Dora High School	17	1,223	480	57.32%
South Lake High School	31	2,241	1,037	66.73%
Tavares High School	22	1,644	661	59.56%
Umatilla High School	12	856	222	37.60%
Grand Total	**184**	**13,128**	**5,484**	**60.12%**

Private Charter School Bus Utilization Table

Attending School	Number of Buses	Maximum Available Bus Capacity	Actual Student Ridership	Percent Utilization of Available Bus Capacity
Four Corners Charter School	3	231	149	64.50%

Conversion Charter School Bus Utilization Table

Attending School	Number of Buses	Maximum Available Bus Capacity	Actual Student Ridership	Percent Utilization of Available Bus Capacity
Minneola Charter Elementary School	4	308	164	53.25%
Round Lake Charter Elementary School	7	512	272	51.78%
Grand Total	11	820	436	52.31%

Special Needs School Bus Utilization Table

Attending School	Number of Buses	Maximum Available Bus Capacity	Actual Student Ridership	Percent Utilization of Available Bus Capacity
Lake Hills School	22	968	217	34.41%