**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

# Prince George's County

## Fleet Maintenance Audit

**Inspection #75**
**Twenty-seven (27) Buses**

Conducted February 9 - 11, 2019

**TRANSIT RESOURCE CENTER**

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**Winter Springs, FL 32708**
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February 13, 2019

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Twenty-seven (27) Buses
# Conducted February 9 – 11, 2019

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# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Twenty-seven (27) Buses
# Conducted February 9 - 11, 2019

## EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted February 9 – 11, 2019 by TRC for Prince George's County. Thirty-seven (37) buses were scheduled for the fleet inspection and maintenance record review. In total, twenty-seven (27) buses were inspected. Ten (10) buses were not available for inspection due to the following reasons: Bus 62624/accident, Bus 62639/engine, Bus 62652/engine, Bus 63092/wheelchair & A/C, Bus 63148/accident, Bus 63162/engine, Bus 63168/king pins, Bus 63189/accident, Bus 63198/engine, and Bus 63214/transmission. As with previous audits, TRC is concerned about the high number of buses not available for inspection. In this case, 27% of buses selected were not available for the various reasons listed above.

The results of this current audit are as follows:

| | |
|---|---|
| Total Defects | 92 |
| Average Defects per Bus | 3.41 |
| Total Class "A" Safety-Related Defects | 81 |
| Average Class "A" Safety-Related Defects per Bus | 3.00 |

The Audit Trend Comparison table found on Page 6 shows the audit results annual averages for years 2014-18, the audit results for the previous audit conducted December 15 – 17, 2018, and results for this current audit. Results from this current audit show an increase in both average number of defects per bus and average number of Class "A" defects per bus compared to the audit results from the previous audit and the annual averages.

TRC voiced serious concerns about the deteriorating condition of the fleet. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. TRC previously reported a noticeable improvement in the condition of the fleet during subsequent audits, but cautioned that it was too early to tell if the improvement was sustainable. The results of this audit showed a marked deterioration in the condition of the fleet, bringing into questions Transdev's corrective actions and improvement plan.

As with previous audits, the "engine compartment" category remains the most significant area of concern. This single category accounted for more than 40% of all defects found. TRC continues to be concerned about the lack of progress in addressing engine compartment leaks and related defects.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

# Audit Report

## BUSES INSPECTED

Twenty-seven (27) buses received a physical inspection during this audit. Table 1 below identifies these 27 buses.

**Table 1**
**Buses Inspected**

| PHYSICAL INSPECTION | MODEL YEAR | VEHICLE MAKE | MOST RECENT PM |
|---|---|---|---|
| 62620 | 2011 | Gillig | 01/11/19 |
| 62621 | 2011 | Gillig | 01/15/19 |
| 62625 | 2011 | Gillig | 01/27/19 |
| 62627 | 2011 | Gillig | 01/27/19 |
| 62632 | 2011 | Gillig | 01/25/19 |
| 62634 | 2011 | Gillig | 12/28/18 |
| 62635 | 2011 | Gillig | 01/25/19 |
| 62636 | 2011 | Gillig | 01/03/19 |
| 62642 | 2012 | Gillig | 01/12/19 |
| 62645 | 2012 | Gillig | 01/14/19 |
| 62647 | 2012 | Gillig | 12/26/18 |
| 62648 | 2012 | Gillig | 01/29/19 |
| 63145 | 2007 | Gillig | 09/26/18 |
| 63147 | 2007 | Gillig | 01/28/19 |
| 63151 | 2007 | Gillig | 12/26/18 |
| 63159 | 2008 | Gillig | 11/19/18 |
| 63160 | 2008 | Gillig | 01/04/19 |
| 63163 | 2008 | Gillig | 01/23/19 |
| 63169 | 2008 | Gillig | 01/30/19 |
| 63188 | 2009 | Gillig | 01/29/19 |
| 63191 | 2009 | Gillig | 01/23/19 |
| 63194 | 2009 | Gillig | 01/18/19 |
| 63197 | 2010 | Gillig | 02/06/19 |
| 63201 | 2010 | Gillig | 01/17/19 |
| 63202 | 2010 | Gillig | 01/18/19 |
| 63204 | 2010 | Gillig | 12/24/18 |
| 63209 | 2010 | Gillig | 11/25/18 |

Table 2 which follows identifies the ten buses that were not available for inspection. *TRC continues to be concerned about the high number of buses not available for inspection. Twenty-seven percent (27%) of buses selected for this audit were not available for inspection.*

**Table 2**
**Buses Not Available for Inspection**

| BUSES NOT INSPECTED | MODEL YEAR | VEHICLE MAKE | REASON |
|---|---|---|---|
| 62624* | 2011 | Gillig | Accident |
| 62639* | 2012 | Gillig | Engine |
| 62652 | 2012 | Gillig | Engine |
| 63092* | 2006 | Gillig | Wheelchair & A/C |
| 63148 | 2007 | Gillig | Accident |
| 63162 | 2008 | Gillig | Engine |
| 63168 | 2008 | Gillig | King Pins |
| 63189* | 2009 | Gillig | Accident |
| 63198 | 2010 | Gillig | Engine |
| 63214 | 2010 | Gillig | Transmission |

*Note: Bus has been unavailable for inspections for 3 months or longer

## EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Jim Wilson, Sylvester Fikes, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

### Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering

17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

**Class A** – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

**Maintenance Record Review**

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the twenty-seven (27) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the twenty-seven (27) buses to determine if and when defects defined during the PMI process were repaired.

2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

## FINDINGS

### Overall Fleet Condition

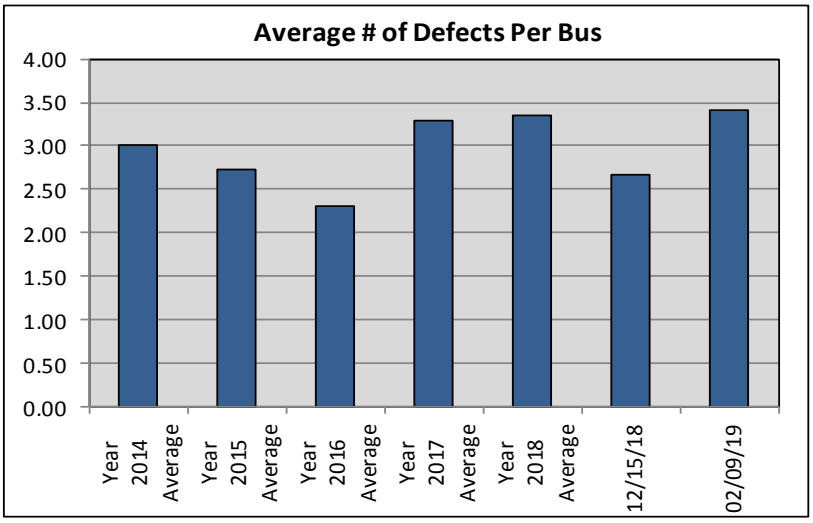
Ninety-two (92) defects were found during this current audit, or 3.41 average defects per bus. This is a significant increase over the previous audit and is also higher than all other annual averages. TRC encourages the County to demand immediate action from Transdev to reverse this trend.

The Audit Trend Comparison table which follows shows the annual average number of defects per audit and the annual average number of defects per bus for the audits conducted in years 2014-18 and the audit results for the previous audit conducted in December 2018 and this current audit. Table 3 also shows the annual average number of Class "A" defects per audit and the annual average number of Class "A" defects per bus for years 2014-18 and the audit results for the previous audit and this current audit.

**Table 3**
**Audit Trend Comparison**

| Date | Average Defects Per Audit | Average Defects per Bus | Average Class "A" Defects Per Audit | Average Class "A" Defects per Bus |
|---|---|---|---|---|
| Year 2014 | 126 | 3.00 | 62 | 1.48 |
| Year 2015 | 98 | 2.72 | 74 | 2.06 |
| Year 2016 | 74 | 2.31 | 59 | 1.84 |
| Year 2017 | 105 | 3.28 | 88 | 2.75 |
| Year 2018 | 97 | 3.34 | 85 | 2.93 |
| Dec. 15 – 17, 2018 | 80 | 2.63 | 66 | 2.20 |
| Feb. 9 – 11, 2019 | 92 | 3.41 | 81 | 3.00 |

As shown in the table above and the chart which follows, the average number of defects per bus increased this current audit. The sharp increase is cause for concern, and the County must work with Transdev to develop a corrective action plan or enforce the agreement reached on November 15, 2018. As previously mentioned, TRC recommends that the County establish a realistic defect goal for Transdev to meet during these audits. Short term actions have proven ineffective in achieving lasting improvement.



**Defects Findings**

Defects were found in the Accessibility Features, Air System/Brake System, Climate Control, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Structure/Chassis/Fuel Tank, Suspension/Steering, Tires, and Transmission categories. The Engine Compartment remains as the primary concern, comprising over 40% of the total defects. **Engine compartment defects represent a critical fire risk.** The Suspension/Steering category increased from nine to 13 defects, possibly reversing an improving trend in this category. In addition, the "Lights" category saw a three-fold increase from previous audits and annual averages. This is concerning because it may represent lack of attention and care by the maintenance personnel to repair simple items.

The Summary of Defects by Category table below compares key performance indicators from this current audit to the average annual results and the previous audit conducted in December 2018. A critical area of concern for this current audit continues to be in the Engine Compartment which is highlighted in Table 4 below.

**Table 4**
**Summary of Defect by Category**

| Summary of Defects by Category | Year 2014 Avg | Year 2015 Avg | Year 2016 Avg | Year 2017 Avg | Year 2018 Avg | Insp #74 Dec 2018 | Insp #75 Feb 2019 |
|---|---|---|---|---|---|---|---|
| Accessibility Features | 7 | 2 | 3 | 3 | 2 | 1 | 3 |
| Air System/Brake System | 15 | 8 | 7 | 7 | 4 | 2 | 1 |
| Climate Control | 2 | 0 | 0 | 1 | 0 | 0 | 2 |
| Destination Signs | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Differential | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| Driver's Controls | 5 | 2 | 1 | 2 | 1 | 1 | 3 |
| Electrical System | 2 | 1 | 1 | 1 | 0 | 0 | 0 |
| Engine Compartment | 36 | 27 | 24 | 34 | 44 | 44 | 37 |
| Exhaust | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exterior Body Condition | 15 | 18 | 12 | 12 | 13 | 14 | 9 |
| Interior Condition | 13 | 13 | 4 | 10 | 2 | 3 | 2 |
| Lights | 7 | 6 | 5 | 6 | 5 | 5 | 15 |
| Passenger Controls | 1 | 1 | 1 | 2 | 1 | 0 | 0 |
| Safety Equipment | 7 | 4 | 1 | 1 | 0 | 0 | 0 |
| Structure/Chassis/ Fuel Tank | 2 | 1 | 1 | 2 | 0 | 0 | 1 |
| Suspension/Steering | 10 | 10 | 10 | 19 | 22 | 9 | 13 |
| Tires | 3 | 1 | 3 | 2 | 2 | 0 | 2 |
| Transmission | 2 | 2 | 2 | 1 | 2 | 1 | 4 |
| **Total Defects** | **126** | **98** | **74** | **105** | **97** | **80** | **92** |
| **Average Defects Per Bus** | **3.00** | **2.72** | **2.31** | **3.28** | **3.34** | **2.67** | **3.41** |

**PMI Paperwork Review Findings**

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

For example, despite recent PM inspections that would have captured burned out light bulbs, multiple lights were found to be inoperable. Table 5 below lists the defects found in the "Lights" category. It is possible that the lights burned out after the PMI was completed, but more likely the lights were not repaired either due to parts shortages or lack of attention to detail. These minor defects (yet still a Class A defect) represent the lack of attention from the maintenance department that may lead to substantial safety lapses.

**Table 5**

| Bus # | Last PMI | Class A "Lights" Defects |
|---|---|---|
| 62627 | 01/27/19 | Dome light, S/S #3, inop |
| 62632 | 01/25/19 | Turn signal light, S/S rear, inop |
| 62632 | 01/25/19 | Turn signal foot switch, C/S, sticking |
| 62648 | 01/29/19 | Step well lights, front, inop |
| 63147 | 01/28/19 | Step well lamp, by #2 door, inop |
| 63151 | 12/26/18 | Marker lamp, S/S rear, inop |
| 63151 | 12/26/18 | Step well lamp, by #2 door, inop |
| 63159 | 11/19/18 | Dome lamps, C/S #2, #3, #4, #5, inop |
| 63160 | 01/04/19 | Dome lamps, C/S #4 & #5, inop |
| 63163 | 01/23/19 | Dome lamps, S/S #1 & C/S #3, #5, inop |
| 63169 | 01/30/19 | Courtesy lamp assembly, by #3 door, missing |
| 63188 | 01/29/19 | Dome lamps, C/S, all inop |
| 63191 | 01/23/19 | Dome lamps, C/S #1, #, #4, #5, inop |
| 63194 | 01/18/19 | Dome lamp, C/S #2, inop |
| 63201 | 01/17/19 | Marker lamp, front roof, inop |

**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defects Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **Year-to-Year Defects Summary:** includes a year-to-year summary of defect totals and a year-to-year summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects

- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

**Class A –** Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

**Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Eighty-one (81) Class "A" safety-related defects were found during this inspection, for an average of 3.00 Class "A" safety-related defects per bus compared to 2.20 average Class "A" safety-related defects the previous audit and 2.93 average Class "A" defects per bus for the Year 2018. The 81 Class "A" defects found during this current audit are listed in Table 6 which follows.

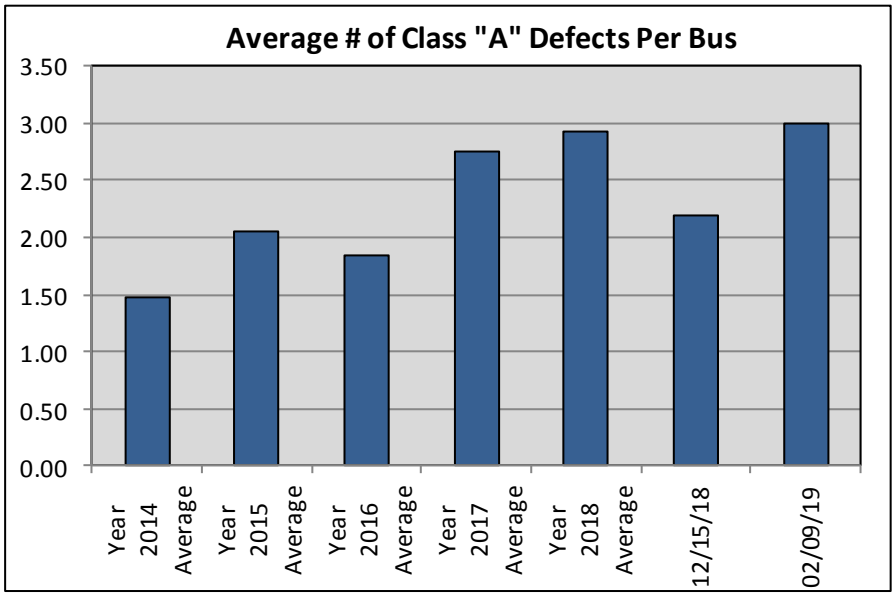
**Table 6**

| Bus # | Year | Make | Last PMI | Class "A" Defects |
|---|---|---|---|---|
| 62620 | 2011 | Gillig | 01/11/19 | A/C belt, engine compartment, cracked |
| 62620 | 2011 | Gillig | 01/11/19 | Coolant leak, engine compartment, pre heater leaking |
| 62621 | 2011 | Gillig | 01/15/19 | Oil leak, engine compartment, alternator seal leaking |
| 62621 | 2011 | Gillig | 01/15/19 | Oil leak, transmission, both drain plugs leaking |
| 62621 | 2011 | Gillig | 01/15/19 | Oil leaks, engine compartment, multiple oil leaks |
| 62625 | 2011 | Gillig | 01/27/19 | Wheelchair ramp, front, slow moving |
| 62625 | 2011 | Gillig | 01/27/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62627 | 2011 | Gillig | 01/27/19 | Fuel leak, under bus, fuel tank leaking |
| 62627 | 2011 | Gillig | 01/27/19 | Dome light, S/S #3, inop |
| 62632 | 2011 | Gillig | 01/25/19 | Turn signal light, S/S rear, inop |
| 62632 | 2011 | Gillig | 01/25/19 | Turn signal foot switch, C/S, sticking |
| 62634 | 2011 | Gillig | 12/28/18 | King pins, both, worn |
| 62634 | 2011 | Gillig | 12/28/18 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62634 | 2011 | Gillig | 12/28/18 | Oil leak, C/S front, shock absorber leaking |
| 62635 | 2011 | Gillig | 01/25/19 | Coolant leak, engine compartment, coolant pipe hose leaking |
| 62636 | 2011 | Gillig | 01/03/19 | Oil leak, engine compartment, rear main seal leaking |
| 62636 | 2011 | Gillig | 01/03/19 | Oil leak, engine compartment, timing cover leaking |
| 62636 | 2011 | Gillig | 01/03/19 | Radius rod, C/S rear lower, worn |
| 62636 | 2011 | Gillig | 01/03/19 | Coolant leak, engine compartment, pre heater leaking |
| 62642 | 2012 | Gillig | 01/12/19 | Oil leak, engine compartment, alternator seal leaking front & rear |

| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 62642 | 2012 | Gillig | 01/12/19 | Alternator belt, engine compartment, cracked |
| 62642 | 2012 | Gillig | 01/12/19 | A/C belt, engine compartment, cracked |
| 62642 | 2012 | Gillig | 01/12/19 | Brake shoes, front, worn to wear line |
| 62647 | 2012 | Gillig | 12/26/18 | Oil leak, engine compartment, alternator seal leaking |
| 62647 | 2012 | Gillig | 12/26/18 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62647 | 2012 | Gillig | 12/26/18 | Tires, S/S rear, both worn (replaced by mechanic) |
| 62647 | 2012 | Gillig | 12/26/18 | Tire, C/S inner, flat (replaced by mechanic) |
| 62648 | 2012 | Gillig | 01/29/19 | Oil leak, engine compartment, oil leak between air compressor & hydraulic pump |
| 62648 | 2012 | Gillig | 01/29/19 | Step well lights, front, inop |
| 62648 | 2012 | Gillig | 01/29/19 | Window release handles, S/S #1 & #2, hard to release |
| 63145 | 2007 | Gillig | 09/26/18 | Sway bar link bushing, S/S front, coming out |
| 63145 | 2007 | Gillig | 09/26/18 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63145 | 2007 | Gillig | 09/26/18 | Radius rod, rear upper, worn |
| 63145 | 2007 | Gillig | 09/26/18 | Radius rod, C/S rear lower, worn |
| 63147 | 2007 | Gillig | 01/28/19 | Oil leak, C/S rear front, shock absorber leaking |
| 63147 | 2007 | Gillig | 01/28/19 | Radius rods, both front lower, worn |
| 63147 | 2007 | Gillig | 01/28/19 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63147 | 2007 | Gillig | 01/28/19 | Step well lamp, by #2 door, inop |
| 63151 | 2007 | Gillig | 12/26/18 | Radius rod, S/S rear lower, worn |
| 63151 | 2007 | Gillig | 12/26/18 | Oil leak, C/S rear front suspension, shock absorber leaking |
| 63151 | 2007 | Gillig | 12/26/18 | Oil leak, engine compartment, oil leak between air compressor & hydraulic pump |
| 63151 | 2007 | Gillig | 12/26/18 | Marker lamp, S/S rear, inop |
| 63151 | 2007 | Gillig | 12/26/18 | Step well lamp, by #2 door, inop |
| 63159 | 2008 | Gillig | 11/19/18 | Dome lamps, C/S #2, #3, #4, #5, inop |
| 63159 | 2008 | Gillig | 11/19/18 | Auxiliary fan, driver's area, inop |
| 63160 | 2008 | Gillig | 01/04/19 | Wheelchair ramp, front, inop |
| 63160 | 2008 | Gillig | 01/04/19 | Radius rods, S/S rear upper & lower, both worn |
| 63160 | 2008 | Gillig | 01/04/19 | Coolant leak, engine compartment, leak at surge tank |
| 63160 | 2008 | Gillig | 01/04/19 | Oil leak, engine compartment, alternator seal leaking |
| 63160 | 2008 | Gillig | 01/04/19 | Dome lamps, C/S #4 & #5, inop |
| 63160 | 2008 | Gillig | 01/04/19 | Blower motor, driver's area, no high speed |
| 63163 | 2008 | Gillig | 01/23/19 | Dome lamps, S/S #1 & C/S #3, #5, inop |
| 63169 | 2008 | Gillig | 01/30/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63169 | 2008 | Gillig | 01/30/19 | A/C belt, engine compartment, missing |
| 63169 | 2008 | Gillig | 01/30/19 | Courtesy lamp assembly, by #3 door, missing |
| 63188 | 2009 | Gillig | 01/29/19 | Dome lamps, C/S, all inop |
| 63191 | 2009 | Gillig | 01/23/19 | Coolant leak, front, front heater core leaking |
| 63191 | 2009 | Gillig | 01/23/19 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63191 | 2009 | Gillig | 01/23/19 | Oil leak, engine compartment, oil filler tube leaking @ block |
| 63191 | 2009 | Gillig | 01/23/19 | Coolant pipe bracket, on transmission, missing |
| 63191 | 2009 | Gillig | 01/23/19 | Dome lamps, C/S #1, #, #4, #5, inop |
| 63194 | 2009 | Gillig | 01/18/19 | Oil leak, engine compartment, oil leak between air compressor & steering pump |

| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 63194 | 2009 | Gillig | 01/18/19 | Coolant leak, @ front heater core, coolant shutoff valve leaking |
| 63194 | 2009 | Gillig | 01/18/19 | Dome lamp, C/S #2, inop |
| 63197 | 2010 | Gillig | 02/06/19 | Check engine light, dashboard, on (steady) |
| 63197 | 2010 | Gillig | 02/06/19 | Oil leaks, engine compartment, multiple oil leaks |
| 63201 | 2010 | Gillig | 01/17/19 | A/C belt, engine compartment, cracked |
| 63201 | 2010 | Gillig | 01/17/19 | Alternator belt, engine compartment, cracked |
| 63201 | 2010 | Gillig | 01/17/19 | Oil leak, steering, gear box leaking |
| 63201 | 2010 | Gillig | 01/17/19 | Radius rod, SS rear lower, worn |
| 63201 | 2010 | Gillig | 01/17/19 | Oil leak, engine compartment, oil filler tube leaking @ block |
| 63201 | 2010 | Gillig | 01/17/19 | Marker lamp, front roof, inop |
| 63202 | 2010 | Gillig | 01/18/19 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63202 | 2010 | Gillig | 01/18/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63202 | 2010 | Gillig | 01/18/19 | Coolant pipe bracket, engine compartment, broken |
| 63204 | 2010 | Gillig | 12/24/18 | Wheelchair ramp, front, sticks at times / noisy |
| 63204 | 2010 | Gillig | 12/24/18 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63209 | 2010 | Gillig | 11/25/18 | Alternator belt, engine compartment, cracked |
| 63209 | 2010 | Gillig | 11/25/18 | Oil leak, engine compartment, alternator body leaking |
| 63209 | 2010 | Gillig | 11/25/18 | Coolant leak, engine compartment, coolant filter leaking |
| 63209 | 2010 | Gillig | 11/25/18 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |

The average number of Class "A" defects per bus increased during this current audit when compared to the annual average number of Class "A" defects per bus for the audits conducted in 2014-18 and the audit results for the previous audit conducted in December 2018. <u>This substantial increase in Class "A" defects requires immediate attention by the County and Transdev to reverse the trend.</u>



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity
TRC did not observe any structural defects during this audit.

**PMI Schedule Adherence**

TRC examined the PMI records of the twenty-seven (27) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects (see "Lights" example above). A review of inspector's qualifications and training is recommended.*

**SUMMARY OF RECOMMENDATIONS**

The number of defects identified in this audit increased sharply from the last audit and is higher than all annual averages previously recorded. Eighty-one (81) Class "A" safety-related defects were found during this current audit, or 3.00 average Class "A" defects per bus compared to 2.20 average Class "A" defects per bus last audit and 2.93 average Class "A" defects per bus for Year 2018. TRC cautioned that the improvements shown after the November 15, 2018 meeting would be sustainable only if a proper plan was put in place. Further corrective action and intervention by the County is again recommended.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that the County establish a maximum defects-per-bus goal to hold Transdev accountable.

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC recommends that buses that have been out of service for an extended period of time be repaired immediately or disposed of to get them 'off the books'.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). In addition, maintenance must reinforce the importance of identifying and repairing simple defects. The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue or lack of attention.

**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

# Prince George's County

## Fleet Maintenance Audit

**Inspection #74**
**Thirty (30 Buses)**

Conducted December 15 - 17, 2018

**TRANSIT RESOURCE CENTER**

**5840 Red Bug Lake Road**
**Suite 165**
**Winter Springs, FL 32708**
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December 19, 2018

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty (30) Buses
# Conducted December 15 – 17, 2018

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# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty (30) Buses
# Conducted December 15 - 17, 2018

## EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted December 15 - 17, 2018 by TRC for Prince George's County. Forty-eight (48) buses were scheduled for the fleet inspection and maintenance record review. In total, thirty (30) buses were inspected; fourteen (14) buses were not available for inspection due to the following reasons: Bus 62624/accident, Bus 62632/air compressor, Bus 62639/at Cummins, Bus 63092/wheelchair (electrical), Bus 63145/flooring, Bus 63160/blow by, Bus 63162/blow by, 63163/air compressor, Bus 63189/accident, Bus 63191/at Cummins, Bus 63194/accident, Bus 63198/injectors, Bus 63201/flooring, and Bus 63214/HT module. As with previous audits, TRC is concerned about the high number of buses not available for inspection, in this case nearly 30% of buses selected were not available for the various reasons listed above. Four (4) buses were not inspected due to lack of inspection time.

The results of this current audit are as follows:

| | |
|---|---|
| Total Defects | 80 |
| Average Defects per Bus | 2.67 |
| Total Class "A" Safety-Related Defects | 66 |
| Average Class "A" Safety-Related Defects per Bus | 2.20 |

The Audit Trend Comparison table, which can be found on Page 6, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the audit results for all audits conducted to date in Year 2018. Results from this audit show a slight increase in both Class "A" and Class "B" defects, but still below the recent audit results. The long-term trend is not yet known.

Over the past several months, TRC voiced serious concerns about the deteriorating condition of the fleet and the lack of progress shown by Transdev. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. Transdev committed to repairing all defects found within three weeks of their reporting. The result of this audit continues to show an improvement from the August-November performance. Although the results for this week show a slight increase over the previous inspection, TRC is encouraged to find possible stabilizing of the fleet condition. TRC cautions that it is still too early to determine if this is a sustainable pattern.

Despite overall improvement, the "engine compartment" category continues to be an area of significant concern. This single category accounted for more than half (55%) of all defects found. TRC continues to be concerned about the lack of progress in addressing engine compartment leaks and related defects.

Positive observations from this audit include the following:

- TRC is encouraged to see the condition of the fleet beginning to stabilize and in better condition than the long term average;
- Steering/Suspension defects reduced significantly:
- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

# Audit Report

## BUSES INSPECTED

Thirty (30) buses received a physical inspection during this audit. Table 1 below identifies these 30 buses.

**Table 1**
**Buses Inspected**

| PHYSICAL INSPECTION | MODEL YEAR | VEHICLE MAKE | MOST RECENT PM |
|---|---|---|---|
| 62622 | 2011 | Gillig | 10/25/18 |
| 62623 | 2012 | Gillig | 11/16/18 |
| 62626 | 2011 | Gillig | 09/18/18 |
| 62628 | 2011 | Gillig | 11/23/18 |
| 62631 | 2011 | Gillig | 10/05/18 |
| 62633 | 2011 | Gillig | 11/23/18 |
| 62637 | 2011 | Gillig | 10/21/18 |
| 62638 | 2011 | Gillig | 09/19/18 |
| 62640 | 2012 | Gillig | 11/23/18 |
| 62643 | 2012 | Gillig | 10/21/18 |
| 62646 | 2012 | Gillig | 10/28/18 |
| 62649 | 2012 | Gillig | 11/07/18 |
| 62650 | 2012 | Gillig | 10/19/18 |
| 63142 | 2007 | Gillig | 07/06/18 |
| 63143 | 2007 | Gillig | 11/07/18 |
| 63149 | 2007 | Gillig | 11/30/18 |
| 63161 | 2008 | Gillig | 11/27/18 |
| 63164 | 2008 | Gillig | 09/27/18 |
| 63165 | 2008 | Gillig | 11/20/18 |
| 63166 | 2008 | Gillig | 11/14/18 |
| 63167 | 2008 | Gillig | 11/09/18 |
| 63190 | 2009 | Gillig | 11/27/18 |
| 63193 | 2009 | Gillig | 10/17/18 |
| 63203 | 2010 | Gillig | 11/26/18 |
| 63205 | 2010 | Gillig | 11/19/18 |
| 63206 | 2010 | Gillig | 11/29/18 |
| 63207 | 2010 | Gillig | 10/26/18 |
| 63213 | 2010 | Gillig | 10/11/18 |
| 63215 | 2010 | Gillig | 07/30/18 |
| 63216 | 2010 | Gillig | 11/30/18 |

Table 2 which follows identifies the fourteen buses that were not available for inspection. *TRC is concerned about the high number of buses not available for inspection. Twenty nine percent (29%) of buses selected for this audit were not available for inspection.*

| Table 2<br>Buses Not Available for Inspection | | | |
|---|---|---|---|
| **BUSES NOT INSPECTED** | **MODEL YEAR** | **VEHICLE MAKE** | **REASON** |
| 62624* | 2011 | Gillig | Accident |
| 62632 | 2011 | Gillig | Air Compressor |
| 62639 | 2012 | Gillig | At Cummins |
| 63092* | 2006 | Gillig | Wheelchair (electrical) |
| 63145 | 2007 | Gillig | Flooring |
| 63160 | 2008 | Gillig | Blow By |
| 63162 | 2008 | Gillig | Blow By |
| 63163 | 2008 | Gillig | Air Compressor |
| 63189* | 2009 | Gillig | Accident |
| 63191 | 2009 | Gillig | At Cummins |
| 63194* | 2009 | Gillig | Accident |
| 63198 | 2010 | Gillig | Injectors |
| 63201 | 2010 | Gillig | Flooring |
| 63214 | 2010 | Gillig | HT Module |

*Note: Buses not available for two months or longer

## EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

### Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls

14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

**Class A** – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

**Maintenance Record Review**

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty (30) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty (30) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

## FINDINGS

### Overall Fleet Condition

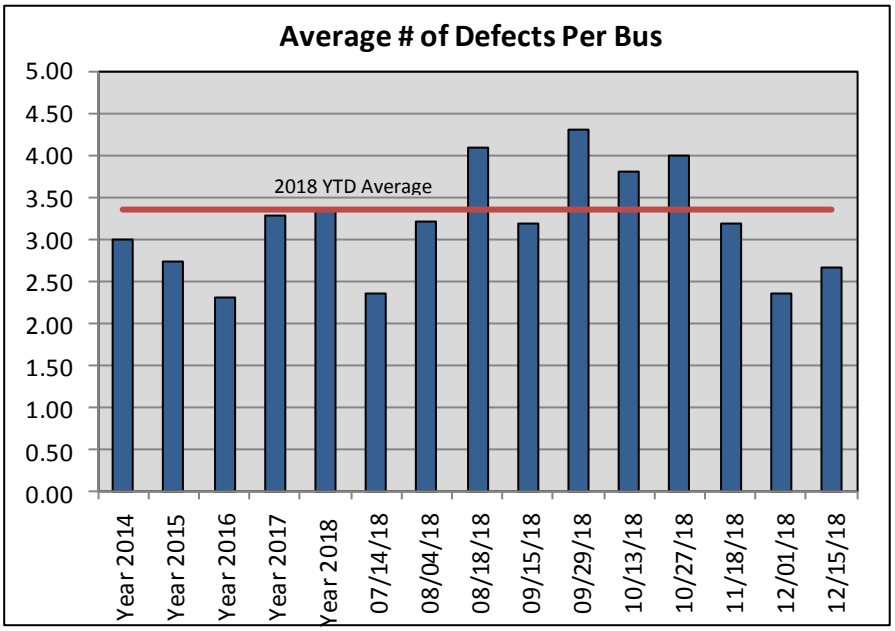
Eighty (80) defects were found during this current audit, or 2.67 average defects per bus. While this shows a slight increase from the previous audit, it does represent a decrease from the 2018 long term average. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted in Year 2018. Table 3 also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted in Year 2018.

**Table 3**
**Audit Trend Comparison**

| Date | Average Defects Per Audit | Average Defects per Bus | Average Class "A" Defects Per Audit | Average Class "A" Defects per Bus |
|---|---|---|---|---|
| Year 2014 | 126 | 3.00 | 62 | 1.48 |
| Year 2015 | 98 | 2.72 | 74 | 2.06 |
| Year 2016 | 74 | 2.31 | 59 | 1.84 |
| Year 2017 | 105 | 3.28 | 88 | 2.75 |
| July 14–16,2018 | 59 | 2.36 | 54 | 2.16 |
| Aug. 4–6, 2018 | 103 | 3.22 | 88 | 2.75 |
| Aug. 18–20, 2018 | 98 | 4.08 | 81 | 3.38 |
| Sept. 15-17, 2018 | 105 | 3.18 | 90 | 2.73 |
| Sept. 29–Oct. 1, 2018 | 133 | 4.29 | 125 | 4.03 |
| Oct. 13 – 15, 2018 | 129 | 3.79 | 120 | 3.53 |
| Oct. 27 – 29, 2018 | 140 | 4.00 | 128 | 3.66 |
| Nov. 18, 2018 | 51* | 3.19 | 44* | 2.75 |
| Dec. 1 – 3, 2018 | 75 | 2.34 | 55 | 1.72 |
| **Dec. 15 – 17, 2018** | **80** | **2.67** | **66** | **2.20** |

*Note: Due to low sample size, the November 18, 2018 figures do not represent comparable values.

As can be seen in the table above and the chart which follows, the average number of defects per bus increased during this current audit when compared to the previous audit. TRC notes that Transdev seems engaged in properly maintaining the bus fleet. Following the November 15, 2018 meeting when Transdev committed to repairing buses within a three-week period, this audit appears to confirm Transdev's commitment. Although encouraged by the present results, TRC notes that the sustainability of this trend is still unknown and will only be known after several additional audits. TRC recognizes that achieving zero defects is the ultimate goal; however, it is not realistic. To this end, TRC recommends that the County determine a realistic defect goal for Transdev to meet during these audits.




**Defects Findings**

Defects were found in the Accessibility Features, Air System/Brake System, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Suspension/Steering, and Transmission categories. The Engine Compartment category comprised 55% of the total defects, with the Engine Compartment category showing a total of 44 defects compared to 35 engine compartment defects the previous audit. **Engine compartment defects represent a critical fire risk, and steering/suspension defects represent a critical accident risk. TRC does not yet see a sustained decrease in engine compartment.**

The Year-to-Year Summary of Defects by Category Table (which is attached as Appendix C) compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted in Year 2018. A critical area of concern for this current audit continues to be in the Engine Compartment which is highlighted in the Year-to-Year Summary of Defects by Category Table (Appendix C).

**PMI Paperwork Review Findings**

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defects Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **Year-to-Year Defects Summary:** includes a year-to-year summary of defect totals and a year-to-year summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

**Class A –** Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

**Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Sixty-six (66) Class "A" safety-related defects were found during this inspection, for an average of 2.20 Class "A" safety-related defects per bus compared to an average of 1.72 Class "A" safety-related defects the previous audit, and a 2018 average of 2.93 Class "A" defects per bus. The 66 Class "A" defects found during this current audit are listed in Table 5 which follows.

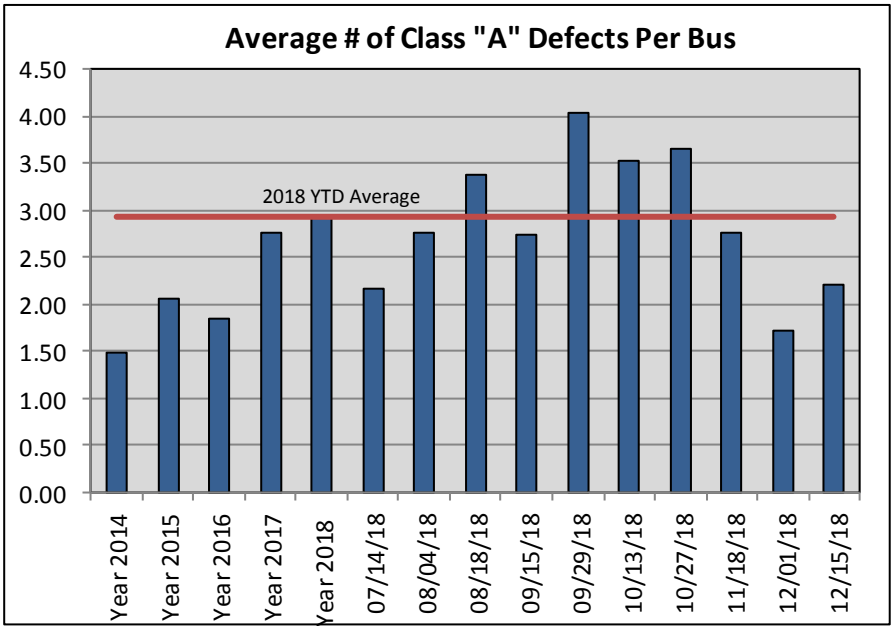
**Table 5**

| Bus # | Year | Make | Last PMI | Class "A" Defects |
|---|---|---|---|---|
| 62623 | 2012 | Gillig | 11/16/18 | Flooring, around floor hatch, coming up / trip hazard |
| 62623 | 2012 | Gillig | 11/16/18 | Oil leak, steering, leak @ gear box |
| 62623 | 2012 | Gillig | 11/16/18 | Dome lamp, S/S #2 & #3, inop |
| 62626 | 2011 | Gillig | 09/18/18 | Brake shoes, S/S rear, worn below wear line |
| 62628 | 2011 | Gillig | 11/23/18 | Oil leak, engine compartment, oil pan leaking |

| Table 5 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 62628 | 2011 | Gillig | 11/23/18 | Oil leak, engine compartment, oil cooler leaking |
| 62628 | 2011 | Gillig | 11/23/18 | Oil leak, engine compartment, rear main seal leaking |
| 62631 | 2011 | Gillig | 10/05/18 | Breather tube, engine compartment, broken off |
| 62633 | 2011 | Gillig | 11/23/18 | Oil leak, engine compartment, oil cooler leaking |
| 62633 | 2011 | Gillig | 11/23/18 | Oil leak, engine compartment, oil filler tube leaking at block |
| 62637 | 2011 | Gillig | 10/21/18 | Drag link, at pitman arm, worn |
| 62637 | 2011 | Gillig | 10/21/18 | Oil leak, engine compartment, oil cooler leaking |
| 62637 | 2011 | Gillig | 10/21/18 | Oil leak, engine compartment, steering pump to air compressor gasket leaking |
| 62638 | 2011 | Gillig | 09/19/18 | Oil leak, engine compartment, alternator seal leaking |
| 62638 | 2011 | Gillig | 09/19/18 | Oil leak, engine compartment, timing cover leaking |
| 62640 | 2012 | Gillig | 11/23/18 | Oil leak, engine compartment, timing cover leaking |
| 62640 | 2012 | Gillig | 11/23/18 | Oil leak, engine compartment, oil pressure switch leaking |
| 62640 | 2012 | Gillig | 11/23/18 | Oil leak, engine compartment, rear main seal leaking |
| 62643 | 2012 | Gillig | 10/21/18 | Oil leaks, engine compartment, multiple oil leaks |
| 62646 | 2012 | Gillig | 10/28/18 | Radius rods, rear lower, both worn |
| 62646 | 2012 | Gillig | 10/28/18 | Flooring, around floor hatch, coming up / trip hazard |
| 62649 | 2012 | Gillig | 11/07/18 | Oil leak, engine compartment, timing cover seal leaking |
| 62649 | 2012 | Gillig | 11/07/18 | Oil leak, engine compartment, air compressor leaking |
| 62650 | 2012 | Gillig | 10/19/18 | Oil leak, engine compartment, oil cooler leaking |
| 62650 | 2012 | Gillig | 10/19/18 | Oil leak, engine compartment, timing cover leaking |
| 62650 | 2012 | Gillig | 10/19/18 | Oil leak, engine compartment, air compressor & steering pumping gasket leaking |
| 63142 | 2007 | Gillig | 07/06/18 | Radius rod, C/S rear upper, worn |
| 63142 | 2007 | Gillig | 07/06/18 | Windshield washer, front, inop |
| 63143 | 2007 | Gillig | 11/07/18 | Courtesy lights, by #3 & #4 doors, inop |
| 63149 | 2007 | Gillig | 11/30/18 | Radius rod, C/S rear upper, worn |
| 63161 | 2008 | Gillig | 11/27/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63164 | 2008 | Gillig | 09/27/18 | A/C belt, engine compartment, cracked |
| 63164 | 2008 | Gillig | 09/27/18 | Dome lamps, C/S #3 #4 #5 & S/S #1 #2, inop |
| 63164 | 2008 | Gillig | 09/27/18 | Oil leak, engine compartment, timing cover leaking |
| 63164 | 2008 | Gillig | 09/27/18 | Oil leak, engine compartment, alternator front seal leaking |
| 63165 | 2008 | Gillig | 11/20/18 | Oil leaks, C/S of engine, multiple oil leaks |
| 63166 | 2008 | Gillig | 11/14/18 | Oil leak, engine compartment, alternator seal leaking |
| 63166 | 2008 | Gillig | 11/14/18 | Dome lamps, C/S #3 #4 #5, inop |
| 63167 | 2008 | Gillig | 11/09/18 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63190 | 2009 | Gillig | 11/27/18 | Kneel alarm, front, inop |
| 63190 | 2009 | Gillig | 11/27/18 | Breather tube, engine compartment, broken off |
| 63190 | 2009 | Gillig | 11/27/18 | Oil leak, engine compartment, hydraulic fan motor wet with oil |
| 63190 | 2009 | Gillig | 11/27/18 | Oil leak, engine compartment, oil filler tube at block leaking |
| 63193 | 2009 | Gillig | 10/17/18 | Oil leak, engine compartment, oil filler tube leaking |
| 63193 | 2009 | Gillig | 10/17/18 | Dome lamps, S/S #1 & S/S #3 #4 #5, inop (replaced by mechanic) |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, alternator seal & gasket leaking |

| Table 5 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, oil cooler leaking |
| 63206 | 2010 | Gillig | 11/29/18 | Oil leak, engine compartment, oil cooler leaking |
| 63206 | 2010 | Gillig | 11/29/18 | Oil leak, engine compartment, oil pan leaking |
| 63206 | 2010 | Gillig | 11/29/18 | Oil leak, engine compartment, air compressor gasket leaking |
| 63206 | 2010 | Gillig | 11/29/18 | Oil leak, engine compartment, breather tube leaking |
| 63207 | 2010 | Gillig | 10/26/18 | Drag link, at pitman arm, worn |
| 63207 | 2010 | Gillig | 10/26/18 | Coolant pipe bracket, transmission, broken |
| 63207 | 2010 | Gillig | 10/26/18 | Oil leak, engine compartment, oil filler tube leaking |
| 63207 | 2010 | Gillig | 10/26/18 | Oil leak, engine compartment, rear main seal leaking |
| 63207 | 2010 | Gillig | 10/26/18 | Oil pressure gauge, engine compartment, no reading |
| 63213 | 2010 | Gillig | 10/11/18 | Oil leak, engine compartment, oil line leaking behind alternator |
| 63213 | 2010 | Gillig | 10/11/18 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63213 | 2010 | Gillig | 10/11/18 | Flooring, around floor hatch, coming up / trip hazard |
| 63215 | 2010 | Gillig | 07/30/18 | Drag link, at pitman arm, worn |
| 63215 | 2010 | Gillig | 07/30/18 | Radius rods, rear lower, both worn |
| 63215 | 2010 | Gillig | 07/30/18 | Oil leak, engine compartment, oil filler tube leaking at block |
| 63216 | 2010 | Gillig | 11/30/18 | Drag link, at pitman arm, worn |
| 63216 | 2010 | Gillig | 11/30/18 | Brake shoes, front, worn to wear line |
| 63216 | 2010 | Gillig | 11/30/18 | Oil leak, engine compartment, oil filer tube leaking at block |
| 63216 | 2010 | Gillig | 11/30/18 | Oil leak, engine compartment, timing cover leaking |

The average number of Class "A" defects per bus increased during this current audit, but falls below the 2018 average.



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition. However, defects relating to the exterior condition of buses increased during this audit.
Structural Integrity
TRC did not observe any structural defects during this audit.

**PMI Schedule Adherence**

TRC examined the PMI records of the thirty (30) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**SUMMARY OF RECOMMENDATIONS**

Sixty-six (66) Class "A" safety-related defects were found during this current audit, or 2.20 average Class "A" defects per bus compared to or 1.72 average Class "A" defects per bus last audit. The average number of Class "A" defects per bus increased during this current audit when compared the previous audit, but is an improvement over previous 2018 results. As noted earlier, TRC observed that Transdev has made positive changes and seems to be following the commitment made during the November 15, 2018 meeting with the County. However, future inspections are necessary to properly verify the sustainability and long-term impact of the corrective actions in place.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that the County establish a maximum defects-per-bus goal to hold Transdev accountable.

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC recommends that more attention be paid to the exterior body condition of the buses. There has been an increase in exterior body damage defects (scrapes, dings, dents, damaged bumpers, etc.) during the past several

audits. These defects include minor accidents, suggesting additional driver training may be necessary.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue.

**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

## APPENDIX C - Year-To Year Summary of Defects by Category Table

| Summary of Defects by Category | Year 2014 Avg | Year 2015 Avg | Year 2016 Avg | Year 2017 Avg | Insp #65 2018 | Insp #66 2018 | Insp #67 2018 | Insp #68 2018 | Insp #69 2018 | Insp #70 2018 | Insp #71 2018 | Insp #72 2018 | Insp #73 2018 | Insp #74 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Accessibility Features | 7 | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 1 | 0 | 2 | 1 |
| Air System/Brake System | 15 | 8 | 7 | 7 | 2 | 3 | 7 | 8 | 4 | 7 | 2 | 0 | 1 | 2 |
| Climate Control | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Destination Signs | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Differential | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Driver's Controls | 5 | 2 | 1 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| Electrical System | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Engine Compartment | 36 | 27 | 24 | 34 | 18 | 34 | 29 | 50 | 69 | 60 | 73 | 31* | 35 | 44 |
| Exhaust | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exterior Body Condition | 15 | 18 | 12 | 12 | 8 | 18 | 18 | 14 | 9 | 11 | 12 | 7* | 16 | 14 |
| Interior Condition | 13 | 13 | 4 | 10 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 0 | 3 | 3 |
| Lights | 7 | 6 | 5 | 6 | 2 | 3 | 10 | 1 | 4 | 8 | 13 | 1* | 2 | 5 |
| Passenger Controls | 1 | 1 | 1 | 2 | 0 | 2 | 2 | 0 | 1 | 4 | 0 | 0 | 0 | 0 |
| Safety Equipment | 7 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Structure/Chassis/ Fuel Tank | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Suspension/Steering | 10 | 10 | 10 | 19 | 21 | 28 | 26 | 19 | 28 | 28 | 35 | 10* | 13 | 9 |
| Tires | 3 | 1 | 3 | 2 | 1 | 4 | 0 | 3 | 2 | 4 | 1 | 0 | 0 | 0 |
| Transmission | 2 | 2 | 2 | 1 | 0 | 4 | 0 | 3 | 12 | 2 | 0 | 2* | 0 | 1 |
| **Total Defects** | **126** | **98** | **74** | **105** | **59** | **103** | **98** | **105** | **133** | **129** | **140** | **51*** | **75** | **80** |
| **Average Defects Per Bus** | **3.00** | **2.72** | **2.31** | **3.28** | **2.36** | **3.22** | **4.08** | **3.18** | **4.29** | **3.79** | **4.00** | **3.19** | **2.34** | **2.67** |

*Note: Due to low sample size for Inspection #72 above, the figures for this inspection do not represent comparable values.

# Prince George's County

***REVISED REPORT***

## Fleet Maintenance Audit

**Inspection #73**
**Thirty-two (32 Buses)**

Conducted December 1 - 3, 2018

**TRANSIT RESOURCE CENTER**

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December 6, 2018

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty-two (32) Buses
# Conducted December 1 - 3, 2018

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# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty-two (32) Buses
# Conducted December 1 - 3, 2018

## EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted December 1 - 3, 2018 by TRC for Prince George's County. Fifty-four (54) buses were scheduled for the fleet inspection and maintenance record review. In total, thirty two (32) buses were inspected; thirteen (13) buses were not available for inspection due to the following reasons: Bus 62623/at Cummins, Bus 62624/accident, Bus 62626/air compressor, Bus 62633/excess smoke, Bus 62638/at Cummins, Bus 62639/at Cummins, Bus 62649/suspension, Bus 63092/wheelchair (electrical), Bus 63142/radiator, Bus 63159/brakes, Bus 63189/accident, Bus 63194/accident, and Bus 63215/engine; and ten (10) buses were not inspected due to lack of inspection time.

The results of this current audit are as follows:

| | |
|---|---|
| Total Defects | 75 |
| Average Defects per Bus | 2.34 |
| Total Class "A" Safety-Related Defects | 55 |
| Average Class "A" Safety-Related Defects per Bus | 1.72 |

The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the audit results for all audits conducted to date in Year 2018. Results from this audit show a decrease in both Class "A" and Class "B" defects. It is unknown yet if this is a sustainable trend.

Over the past month, TRC voiced serious concerns about the deteriorating condition of the fleet and the lack of progress shown by Transdev. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. Transdev committed to repairing all defects found within three weeks of their reporting. The result of this audit shows a clear improvement from previous performance. TRC is encouraged by the results of this audit but finds that this single data point is insufficient to determine if this will be a lasting and sustainable turnaround.

The "engine compartment" and "steering/suspension" categories showed significant improvement, but they continue to account for the majority (64%) of all defects found.

Positive observations from this audit include the following:

- TRC observed a significant improvement in the condition of the fleet;
- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;

- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

# Audit Report

## BUSES INSPECTED

Thirty-two (32) buses received a physical inspection during this audit. Table 1 below identifies these 32 buses.

**Table 1**
**Buses Inspected**

| PHYSICAL INSPECTION | MODEL YEAR | VEHICLE MAKE | MOST RECENT PM |
|---|---|---|---|
| 62617 | 2011 | Gillig | 10/22/18 |
| 62618 | 2012 | Gillig | 10/19/18 |
| 62619 | 2011 | Gillig | 11/08/18 |
| 62629 | 2011 | Gillig | 10/17/18 |
| 62630 | 2011 | Gillig | 11/27/18 |
| 62641 | 2012 | Gillig | 11/15/18 |
| 62644 | 2012 | Gillig | 06/20/18 |
| 62646 | 2012 | Gillig | 10/04/18 |
| 62651 | 2012 | Gillig | 11/07/18 |
| 62652 | 2012 | Gillig | 11/27/18 |
| 63139 | 2007 | Gillig | 10/31/18 |
| 63140 | 2007 | Gillig | 11/23/18 |
| 63141 | 2007 | Gillig | 11/09/18 |
| 63144 | 2007 | Gillig | 10/26/18 |
| 63146 | 2007 | Gillig | 11/17/18 |
| 63150 | 2007 | Gillig | 11/30/18 |
| 63160 | 2008 | Gillig | 11/19/18 |
| 63161 | 2008 | Gillig | 11/27/18 |
| 63188 | 2009 | Gillig | 11/09/18 |
| 63192 | 2010 | Gillig | 11/30/18 |
| 63195 | 2009 | Gillig | 11/13/18 |
| 63196 | 2010 | Gillig | 11/27/18 |
| 63199 | 2010 | Gillig | 10/26/18 |
| 63200 | 2010 | Gillig | 11/12/18 |
| 63204 | 2010 | Gillig | 11/04/18 |
| 63205 | 2010 | Gillig | 11/19/18 |
| 63206 | 2010 | Gillig | 11/29/18 |
| 63208 | 2010 | Gillig | 07/30/18 |
| 63210 | 2010 | Gillig | 11/30/18 |
| 63211 | 2010 | Gillig | 11/09/18 |

| Table 1<br>Buses Inspected | | | |
|---|---|---|---|
| **PHYSICAL INSPECTION** | **MODEL YEAR** | **VEHICLE MAKE** | **MOST RECENT PM** |
| 63212 | 2010 | Gillig | 11/17/18 |
| 63217 | 2010 | Gillig | 10/19/18 |

Table 2 which follows identifies the thirteen buses that were not available for inspection. *The number of buses not available for inspection is 24% and has been increasing the past few audits and is cause for concern.*

| Table 2<br>Buses Not Available for Inspection | | | |
|---|---|---|---|
| **BUSES NOT INSPECTED** | **MODEL YEAR** | **VEHICLE MAKE** | **REASON** |
| 62623 | 2012 | Gillig | At Cummins |
| 62624* | 2011 | Gillig | Accident |
| 62626 | 2011 | Gillig | Air Compressor |
| 62633 | 2011 | Gillig | Excess Smoke |
| 62638 | 2011 | Gillig | At Cummins |
| 62639 | 2012 | Gillig | At Cummins |
| 62649 | 2012 | Gillig | Suspension |
| 63092* | 2006 | Gillig | Wheelchair / Electrical |
| 63142 | 2007 | Gillig | Radiator |
| 63159 | 2008 | Gillig | Brakes |
| 63189* | 2009 | Gillig | Accident |
| 63194* | 2009 | Gillig | Accident |
| 63215 | 2010 | Gillig | Engine |

*Note: Buses not available for two months or longer

## EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of four bus inspectors to perform the maintenance audit on December 1, 2018. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, and Alusine Kanu. An additional inspector, Anthony Greenfield, was added to the original team of four inspectors to assist in performing the inspections on December 2, 2018. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

### Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs

5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

**Class A** – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

**Maintenance Record Review**

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals

To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty-two (32) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs

To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty-two (32) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

## FINDINGS

### Overall Fleet Condition

Seventy-five (75) defects were found during this current audit, or 2.34 average defects per bus. This is a significant decrease from previous audits. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Table 3 also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018.

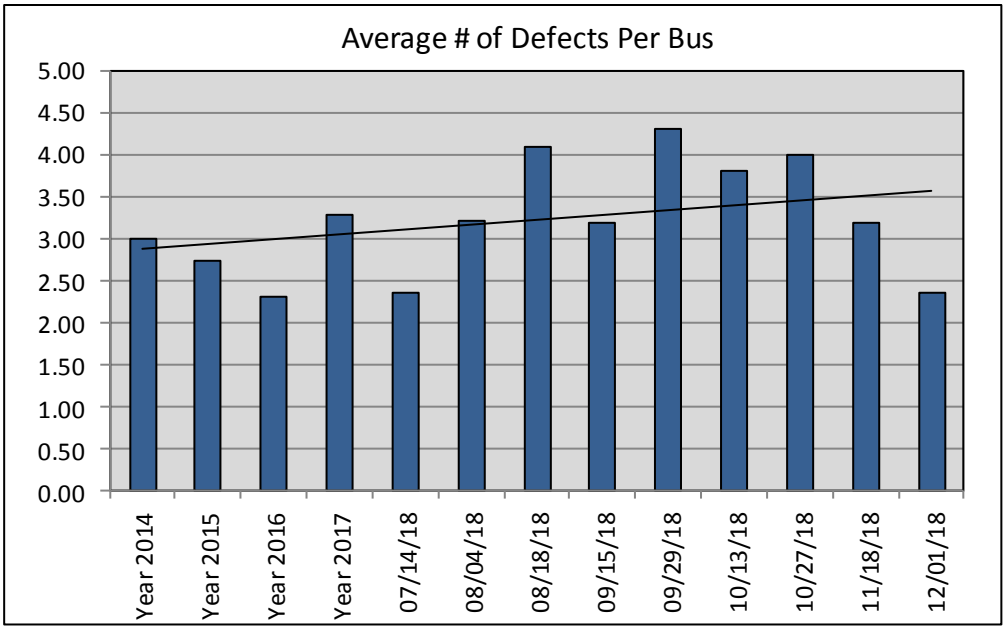
**Table 3**
**Audit Trend Comparison**

| Date | Average Defects Per Audit | Average Defects per Bus | Average Class "A" Defects Per Audit | Average Class "A" Defects per Bus |
|---|---|---|---|---|
| Year 2014 | 126 | 3.00 | 62 | 1.48 |
| Year 2015 | 98 | 2.72 | 74 | 2.06 |
| Year 2016 | 74 | 2.31 | 59 | 1.84 |
| Year 2017 | 105 | 3.28 | 88 | 2.75 |
| July 14–16,2018 | 59 | 2.36 | 54 | 2.16 |
| Aug. 4–6, 2018 | 103 | 3.22 | 88 | 2.75 |
| Aug. 18–20, 2018 | 98 | 4.08 | 81 | 3.38 |
| Sept. 15-17, 2018 | 105 | 3.18 | 90 | 2.73 |
| Sept. 29–Oct. 1, 2018 | 133 | 4.29 | 125 | 4.03 |
| Oct. 13 – 15, 2018 | 129 | 3.79 | 120 | 3.53 |
| Oct. 27 – 29, 2018 | 140 | 4.00 | 128 | 3.66 |
| Nov. 18, 2018 | 51* | 3.19 | 44* | 2.75 |
| **Dec. 1 – 3, 2018** | **75** | **2.34** | **55** | **1.72** |

*Note: Due to low sample size, the November 18, 2018 figures do not represent comparable values.

As can be seen in the table above and the chart which follows, the average number of defects per bus decreased during this current audit. TRC notes that this is a positive sign that Transdev is engaged in properly maintaining the bus fleet.

Following the November 15, 2018 meeting when Transdev committed to repairing buses within a three-week period, this audit appears to confirm Transdev's commitment. Although encouraged by the present results, TRC notes that the sustainability of this trend is still unknown and will only be known after several additional audits.




**Defects Findings**

Defects were found in the Accessibility Features, Air System/Brake System, Destination Signs, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, and Suspension categories. The Engine Compartment and Suspension/Steering categories comprised 64% of the total defects, with the Engine Compartment category showing a total of 35 defects and Suspension/Steering category defects showing a total of 13 defects. **Engine compartment defects represent a critical fire risk, and steering/suspension defects represent a critical accident risk. TRC recognizes that the County and the vendor have taken noticeable steps to reducing defects in these categories.**

The Year-to-Year Summary of Defects by Category Table (which is attached as Appendix C) compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Critical areas of concern for this current audit continue to be in the Engine Compartment and Suspension/Steering categories which are highlighted in the Year-to-Year Summary of Defects by Category Table (Appendix C).

**PMI Paperwork Review Findings**

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are*

*not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

**Class A –** Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

**Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Fifty-five (55) Class "A" safety-related defects were found during this inspection, for an average of 1.72 Class "A" safety-related defects per bus compared to an average of 2.75 Class "A" safety-related defects the previous audit. Along with total defects, Class A defects reduced significantly in this audit. TRC notes that the decrease in Class "A" defects is significant and may be the result of Transdev's renewed commitment to maintenance. TRC will continue to monitor the condition of the fleet

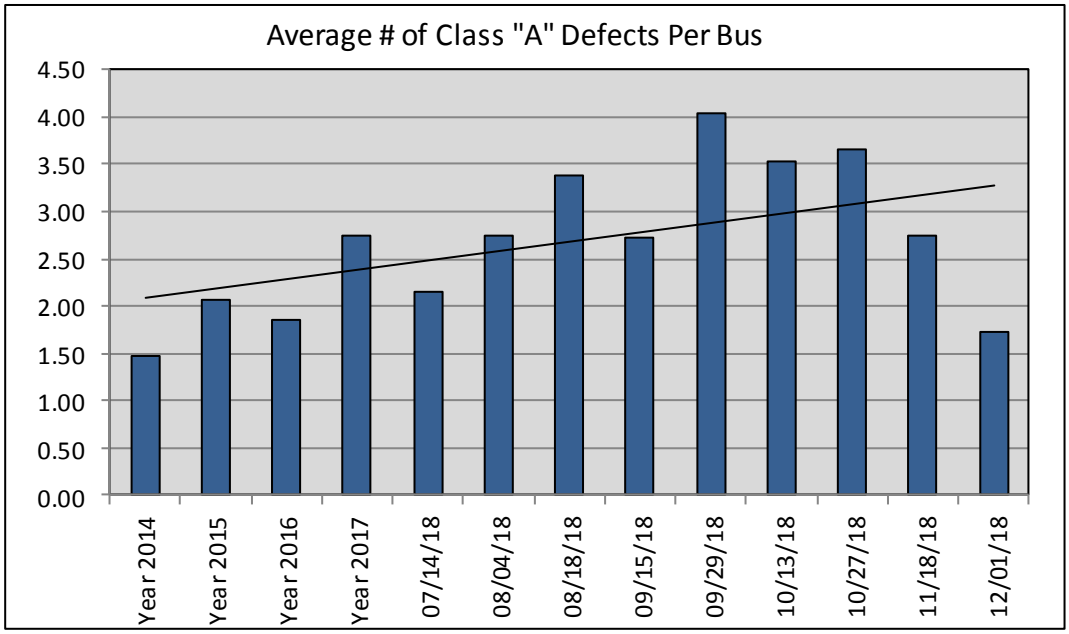
to determine if this is a long term and sustainable trend. The 55 Class "A" defects found during this current audit are listed in Table 5 which follows.

**Table 5**

| Bus # | Year | Make | Last PMI | Class "A" Defects |
|---|---|---|---|---|
| 62618 | 2012 | Gillig | 10/19/18 | Radiator, engine compartment, dirty |
| 62619 | 2011 | Gillig | 11/08/18 | Oil leak, engine compartment, rear main seal leaking |
| 62629 | 2011 | Gillig | 10/17/18 | Oil leak, engine compartment, reservoir / all lines wet with oil |
| 62630 | 2011 | Gillig | 11/27/18 | A/C belt, engine compartment, cracked |
| 62630 | 2011 | Gillig | 11/27/18 | Oil leak, engine compartment, rear main seal leaking |
| 62641 | 2012 | Gillig | 11/15/18 | Radius rod, C/S rear lower, worn |
| 62641 | 2012 | Gillig | 11/15/18 | Oil leak, engine compartment, valve cover leaking |
| 62641 | 2012 | Gillig | 11/15/18 | Oil leak, engine compartment, rear main seal leaking |
| 62646 | 2012 | Gillig | 10/04/18 | Oil leak, engine compartment, rear main seal leaking |
| 62646 | 2012 | Gillig | 10/04/18 | Radius rods, both rear lower, worn |
| 62646 | 2012 | Gillig | 10/04/18 | Flooring, around floor hatch, torn & coming up / trip hazard |
| 62651 | 2012 | Gillig | 11/07/18 | Oil leaks, engine compartment, multiple oil leaks |
| 62652 | 2012 | Gillig | 11/27/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63140 | 2007 | Gillig | 11/23/18 | Shock absorber, S/S front, loose |
| 63141 | 2007 | Gillig | 11/09/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63144 | 2007 | Gillig | 10/26/18 | Wheelchair lift, front, inop |
| 63146 | 2007 | Gillig | 11/17/18 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63150 | 2007 | Gillig | 11/30/18 | Coolant leak, engine compartment, pre heater leaking |
| 63150 | 2007 | Gillig | 11/30/18 | Windshield washer, front, inop |
| 63161 | 2008 | Gillig | 11/27/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63161 | 2008 | Gillig | 11/27/18 | Radius rod, S/S rear lower, worn |
| 63188 | 2009 | Gillig | 11/09/18 | Oil leak, engine compartment, oil cooler leaking |
| 63188 | 2009 | Gillig | 11/09/18 | Oil leak, engine compartment, rear main seal leaking |
| 63188 | 2009 | Gillig | 11/09/18 | Oil leak, engine compartment, timing cover leaking |
| 63192 | 2010 | Gillig | 11/30/18 | Radius rod, C/S rear lower, worn |
| 63195 | 2009 | Gillig | 11/13/18 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63196 | 2010 | Gillig | 11/27/18 | Radius rod, S/S rear lower, worn |
| 63196 | 2010 | Gillig | 11/27/18 | Oil leak, engine compartment, rear main seal leaking |
| 63196 | 2010 | Gillig | 11/27/18 | Oil leak, engine compartment, leaking around fuel rail |
| 63199 | 2010 | Gillig | 10/26/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63200 | 2010 | Gillig | 11/12/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63204 | 2010 | Gillig | 11/04/18 | Oil leak, engine compartment, crank shaft seal leaking |
| 63204 | 2010 | Gillig | 11/04/18 | Oil leak, engine compartment, oil cooler leaking |
| 63204 | 2010 | Gillig | 11/04/18 | Oil leak, engine compartment, rear main seal leaking |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, alternator front seal & end plate gasket leaking |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, oil pan leaking |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, timing cover leaking |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, oil cooler leaking |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, steering pump leaking |
| 63205 | 2010 | Gillig | 11/19/18 | King pins, both front, worn |
| 63205 | 2010 | Gillig | 11/19/18 | Drag link, at pitman arm, worn |
| 63206 | 2010 | Gillig | 11/29/18 | Drag link, at pitman arm, worn |

| Table 5 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 63206 | 2010 | Gillig | 11/29/18 | Oil leak, engine compartment, oil cooler leaking |
| 63206 | 2010 | Gillig | 11/29/18 | Oil leak, engine compartment, leaking around fuel rail |
| 63208 | 2010 | Gillig | 07/30/18 | Oil leak, engine compartment, steering pump leaking |
| 63208 | 2010 | Gillig | 07/30/18 | Oil leak, engine compartment, oil filter leaking |
| 63210 | 2010 | Gillig | 11/30/18 | Wheelchair lift ramp, front, inop (repaired by mechanic) |
| 63210 | 2010 | Gillig | 11/30/18 | Marker & tail lights, rear, all inop (repaired by mechanic) |
| 63210 | 2010 | Gillig | 11/30/18 | Dome lights, C/S #3 #4 #5 & S/S #3 #4 #5, inop (repaired by mechanic) |
| 63210 | 2010 | Gillig | 11/30/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63211 | 2010 | Gillig | 11/09/18 | Oil leak, engine compartment, line to oil pressure switch leaking |
| 63211 | 2010 | Gillig | 11/09/18 | Oil leak, engine compartment, air compressor oil line leaking |
| 63211 | 2010 | Gillig | 11/09/18 | Oil leak, engine compartment, pump leaking |
| 63211 | 2010 | Gillig | 11/09/18 | Oil leak, engine compartment, oil filter leaking |
| 63217 | 2010 | Gillig | 10/19/18 | Oil leaks, engine compartment, multiple oil leaks |

The average number of Class "A" defects per bus decreased during this current audit, but it is not known yet if this is a sustainable trend.




Comfort and Convenience

During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition. However, defects relating to the exterior condition of buses increased during this audit.

Structural Integrity

TRC did not observe any structural defects during this audit.

**PMI Schedule Adherence**

TRC examined the PMI records of the thirty-two (32) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**SUMMARY OF RECOMMENDATIONS**

Fifty-five (55) Class "A" safety-related defects were found during this current audit, or 1.72 average Class "A" defects per bus compared to or 2.75 average Class "A" defects per bus last audit. The average number of Class "A" defects per bus decreased during this current audit and the previous audit which is a positive sign. As noted earlier, TRC observed that Transdev has made positive changes and seems to be following the commitment made during the November 15, 2018 meeting with the County. However, future inspections are necessary to properly verify the sustainability and long-term impact of the corrective actions in place.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The average number of Class "A" defects per bus in this category decreased to .41 from .62 during the last audit. TRC will monitor to ensure this trend is maintained.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue.

**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

## APPENDIX C - Year-To Year Summary of Defects by Category Table

| Summary of Defects by Category | Year 2014 Avg | Year 2015 Avg | Year 2016 Avg | Year 2017 Avg | Insp #65 2018 | Insp #66 2018 | Insp #67 2018 | Insp #68 2018 | Insp #69 2018 | Insp #70 2018 | Insp #71 2018 | Insp #72 2018 | Insp #73 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Accessibility Features | 7 | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 1 | 0 | 2 |
| Air System/Brake System | 15 | 8 | 7 | 7 | 2 | 3 | 7 | 8 | 4 | 7 | 2 | 0 | 1 |
| Climate Control | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Destination Signs | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Differential | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Driver's Controls | 5 | 2 | 1 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Electrical System | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Engine Compartment | 36 | 27 | 24 | 34 | 18 | 34 | 29 | 50 | 69 | 60 | 73 | 31* | 35 |
| Exhaust | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exterior Body Condition | 15 | 18 | 12 | 12 | 8 | 18 | 18 | 14 | 9 | 11 | 12 | 7* | 16 |
| Interior Condition | 13 | 13 | 4 | 10 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 0 | 3 |
| Lights | 7 | 6 | 5 | 6 | 2 | 3 | 10 | 1 | 4 | 8 | 13 | 1* | 2 |
| Passenger Controls | 1 | 1 | 1 | 2 | 0 | 2 | 2 | 0 | 1 | 4 | 0 | 0 | 0 |
| Safety Equipment | 7 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Structure/Chassis/ Fuel Tank | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Suspension/Steering | 10 | 10 | 10 | 19 | 21 | 28 | 26 | 19 | 28 | 28 | 35 | 10* | 13 |
| Tires | 3 | 1 | 3 | 2 | 1 | 4 | 0 | 3 | 2 | 4 | 1 | 0 | 0 |
| Transmission | 2 | 2 | 2 | 1 | 0 | 4 | 0 | 3 | 12 | 2 | 0 | 2* | 0 |
| **Total Defects** | **126** | **98** | **74** | **105** | **59** | **103** | **98** | **105** | **133** | **129** | **140** | **51*** | **75** |
| **Average Defects Per Bus** | **3.00** | **2.72** | **2.31** | **3.28** | **2.36** | **3.22** | **4.08** | **3.18** | **4.29** | **3.79** | **4.00** | **3.19** | **2.34** |

*Note: Due to low sample size for Inspection #72 above, the figures for this inspection do not represent comparable values.

# Prince George's County

## Fleet Maintenance Audit

**Inspection #72**
**Sixteen (16) Buses**

Conducted November 18, 2018

**TRANSIT RESOURCE CENTER**

**5840 Red Bug Lake Road**
**Suite 165**
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November 21, 2018

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Sixteen (16) Buses
# Conducted November 18, 2018

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# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Sixteen (16) Buses
# Conducted November 18, 2018

## EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted on November 18, 2018 by TRC for Prince George's County. Due to County snowplow truck inspections, the team was limited to a single day of inspections. Forty-six (46) buses were scheduled for the fleet inspection and maintenance record review; however, thirteen (13) buses were not available for inspection due to the following reasons: Bus 62622/suspension, Bus 62624/accident, Bus 62639/engine, Bus 63092/wheelchair lift & A/C, Bus 63145/accident, Bus 63159/engine, Bus 63189/accident, Bus 63194/accident, Bus 63205/electrical, Bus 63206/brakes, Bus 63211/at Cummins, Bus 63214/overheat, and Bus 63215/transmission. The remaining 17 buses could not be inspected due to lack of time as a result of the County snowplow inspections. The number of buses not available for inspection has been increasing the past several audits and is cause for concern.

Due to the low number of buses inspected, the results of this audit have a high degree of uncertainty.

The results of this current audit are as follows:

| | |
|---|---|
| Total Defects (note: only 16 buses inspected this audit) | 51 |
| Average Defects per Bus | 3.19 |
| Total Class "A" Safety-Related Defects | 44 |
| Average Class "A" Safety-Related Defects per Bus | 2.75 |

The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the audit results for all audits conducted to date in Year 2018. Results from this audit show a slight decrease in both Class "A" and Class "B" defects. It is unknown yet if this is a sustainable trend.

Although both categories showed an improvement, engine compartment and steering/suspension defects continue to account for over 80% of the total defects found.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

# Audit Report

## BUSES INSPECTED

Due to County snowplow inspections, this audit was limited in time to a single day of inspections. Therefore, only sixteen (16) buses received a physical inspection. Two days and over 30 buses are inspected during a normal audit. Table 1 below identifies these 16 buses.

**Table 1**
**Buses Inspected**

| PHYSICAL INSPECTION | MODEL YEAR | VEHICLE MAKE |
|---|---|---|
| 62627 | 2011 | Gillig |
| 62634 | 2011 | Gillig |
| 62635 | 2011 | Gillig |
| 62636 | 2011 | Gillig |
| 62642 | 2012 | Gillig |
| 62645 | 2012 | Gillig |
| 62647 | 2012 | Gillig |
| 62648 | 2012 | Gillig |
| 62652 | 2012 | Gillig |
| 63163 | 2008 | Gillig |
| 63168 | 2008 | Gillig |
| 63188 | 2009 | Gillig |
| 63197 | 2010 | Gillig |
| 63202 | 2010 | Gillig |
| 63204 | 2010 | Gillig |
| 63209 | 2010 | Gillig |

Table 2 which follows identifies the thirteen buses that were not available for inspection. *The number of buses not available for inspection is over 28% and has been increasing the past few audits and is cause for concern.*

**Table 2**
**Buses Not Available for Inspection**

| BUSES NOT INSPECTED | MODEL YEAR | VEHICLE MAKE | REASON |
|---|---|---|---|
| 62622 | 2011 | Gillig | Suspension |
| 62624 | 2011 | Gillig | Accident |
| 62639 | 2012 | Gillig | Engine |
| 63092 | 2006 | Gillig | Wheelchair Lift & A/C |
| 63145 | 2007 | Gillig | Accident |
| 63159 | 2008 | Gillig | Engine |
| 63189 | 2009 | Gillig | Accident |
| 63194 | 2009 | Gillig | Accident |

| Table 2<br>Buses Not Available for Inspection | | | |
|---|---|---|---|
| **BUSES NOT INSPECTED** | **MODEL YEAR** | **VEHICLE MAKE** | **REASON** |
| 63205 | 2010 | Gillig | Electrical |
| 63206 | 2010 | Gillig | Brakes |
| 63211 | 2010 | Gillig | At Cummins |
| 63214 | 2010 | Gillig | Overheat |
| 63215 | 2010 | Gillig | Transmission |

## EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of four bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

### Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

**Class A** – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

**Maintenance Record Review**

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals

To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the sixteen (16) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs

To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the sixteen (16) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

**FINDINGS**

**Overall Fleet Condition**

Fifty-one (51) defects were found during this current audit, or 3.19 average defects per bus. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Table 3 also shows the average number of

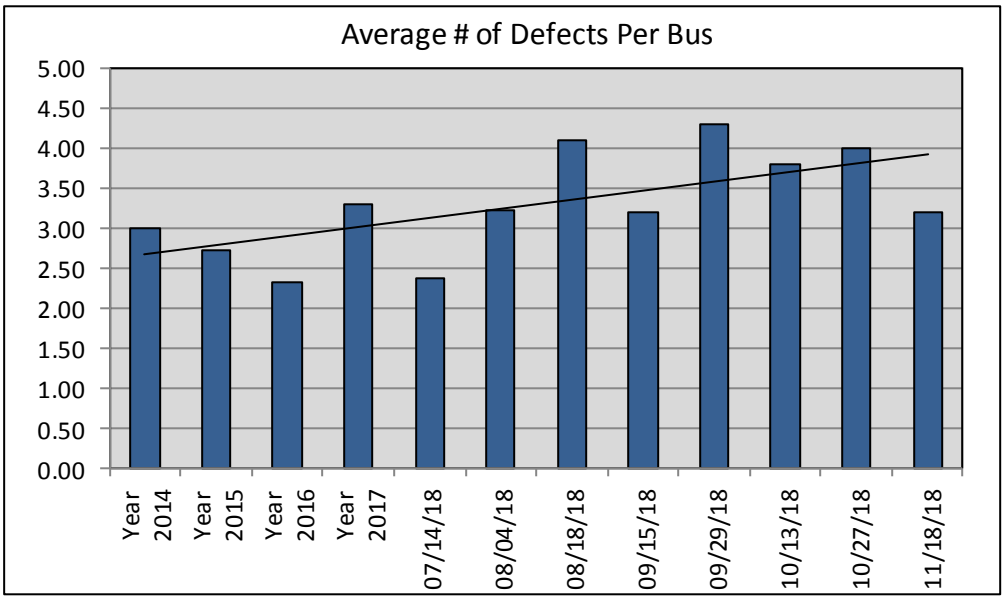
Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018.

**Table 3**
**Audit Trend Comparison**

| Date | Average Defects Per Audit | Average Defects per Bus | Average Class "A" Defects Per Audit | Average Class "A" Defects per Bus |
|---|---|---|---|---|
| Year 2014 | 126 | 3.00 | 62 | 1.48 |
| Year 2015 | 98 | 2.72 | 74 | 2.06 |
| Year 2016 | 74 | 2.31 | 59 | 1.84 |
| Year 2017 | 105 | 3.28 | 88 | 2.75 |
| July 14–16,2018 | 59 | 2.36 | 54 | 2.16 |
| Aug. 4–6, 2018 | 103 | 3.22 | 88 | 2.75 |
| Aug. 18–20, 2018 | 98 | 4.08 | 81 | 3.38 |
| Sept. 15-17, 2018 | 105 | 3.18 | 90 | 2.73 |
| Sept. 29–Oct. 1, 2018 | 133 | 4.29 | 125 | 4.03 |
| Oct. 13 – 15, 2018 | 129 | 3.79 | 120 | 3.53 |
| Oct. 27 – 29, 2018 | 140 | 4.00 | 128 | 3.66 |
| **Nov. 18, 2018** | **51*** | **3.19** | **44*** | **2.75** |

*Note: Due to low sample size, these figures do not represent comparable values.

The average number of defects per bus decreased during this current audit, but as can be seen by the trend line in the chart below, results are still above the long-term average.



**Defects Findings**

Defects were found in the Engine Compartment, Exterior Body Condition, Lights, Suspension/Steering, and Transmission categories. The Engine Compartment category and the Suspension/Steering category comprised over 80% of the total defects, with the Engine Compartment category showing a total of 31 defects and Suspension/Steering category defects showing a total of 10 defects. **Engine Compartment defects represent a critical fire risk, and steering/suspension defects represent a critical accident risk. TRC recommends immediate corrective action to reduce defects in these categories.**

Table 4 which follows compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Critical areas of concern are highlighted in Table 4 below.

**Table 4**

| Summary of Defects by Category | Year 2014 Avg | Year 2015 Avg | Year 2016 Avg | Year 2017 Avg | Insp #65 2018 | Insp #66 2018 | Insp #67 2018 | Insp #68 2018 | Insp #69 2018 | Insp #70 2018 | Insp #71 2018 | Insp #72 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Accessibility Features | 7 | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 1 | 0 | |
| Air System/Brake System | 15 | 8 | 7 | 7 | 2 | 3 | 7 | 8 | 4 | 7 | 2 | 0 | |
| Climate Control | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | |
| Destination Signs | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Differential | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | |
| Driver's Controls | 5 | 2 | 1 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | |
| Electrical System | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | |
| Engine Compartment | 36 | 27 | 24 | 34 | 18 | 34 | 29 | 50 | 69 | 60 | 73 | 31* | ⇦ |
| Exhaust | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Exterior Body Condition | 15 | 18 | 12 | 12 | 8 | 18 | 18 | 14 | 9 | 11 | 12 | 7* | |
| Interior Condition | 13 | 13 | 4 | 10 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 0 | |
| Lights | 7 | 6 | 5 | 6 | 2 | 3 | 10 | 1 | 4 | 8 | 13 | 1* | |
| Passenger Controls | 1 | 1 | 1 | 2 | 0 | 2 | 2 | 0 | 1 | 4 | 0 | 0 | |
| Safety Equipment | 7 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Structure/Chassis/ Fuel Tank | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Suspension/Steering | 10 | 10 | 10 | 19 | 21 | 28 | 26 | 19 | 28 | 28 | 35 | 10* | ⇦ |
| Tires | 3 | 1 | 3 | 2 | 1 | 4 | 0 | 3 | 2 | 4 | 1 | 0 | |
| Transmission | 2 | 2 | 2 | 1 | 0 | 4 | 0 | 3 | 12 | 2 | 0 | 2* | |
| **Total Defects** | **126** | **98** | **74** | **105** | **59** | **103** | **98** | **105** | **133** | **129** | **140** | **51*** | |
| **Average Defects Per Bus** | **3.00** | **2.72** | **2.31** | **3.28** | **2.36** | **3.22** | **4.08** | **3.18** | **4.29** | **3.79** | **4.00** | **3.19** | |

*Note: Due to low sample size, these figures do not represent comparable values.

**PMI Paperwork Review Findings**

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

**Class A –** Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

**Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

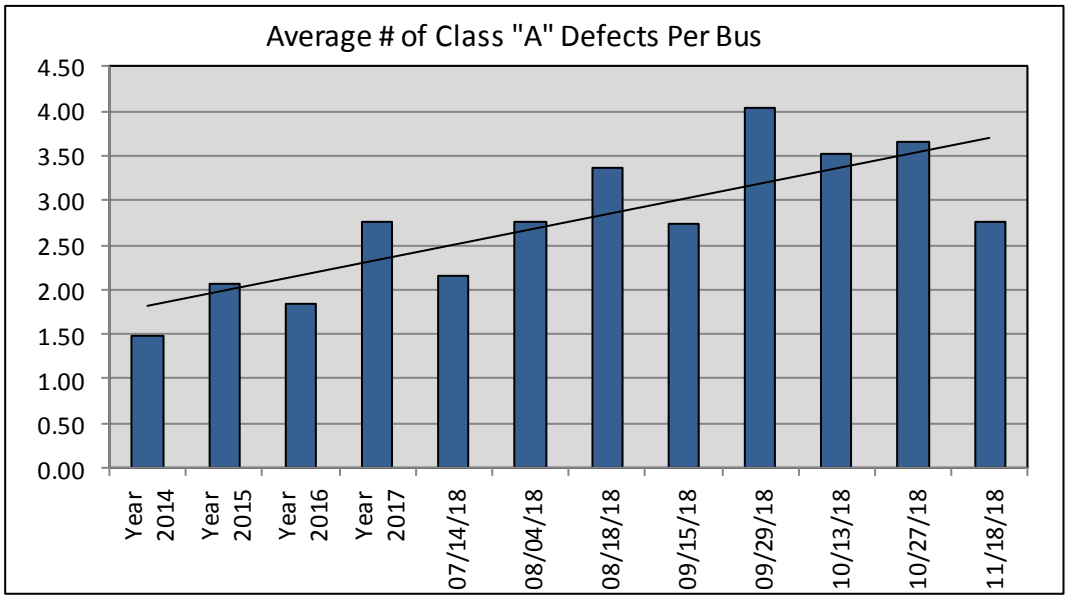
Safety

Forty-four (44) Class "A" safety-related defects were found during this inspection, for an average of 2.75 Class "A" safety-related defects per bus compared to an average of 3.66 Class "A" safety-related defects the previous audit. The 44 Class "A" defects found during this current audit are listed in Table 5 which follows.

| Table 5 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 62627 | 2011 | Gillig | 10-Oct-18 | Marker light, S/S rear roof, inop |
| 62627 | 2011 | Gillig | 10-Oct-18 | Radius rod, S/S rear lower, worn |
| 62627 | 2011 | Gillig | 10-Oct-18 | Oil leak, engine compartment, oil cooler leaking |
| 62627 | 2011 | Gillig | 10-Oct-18 | Oil leak, engine compartment, timing chain cover leaking |
| 62627 | 2011 | Gillig | 10-Oct-18 | Oil leak, transmission, dip stick tube fitting leaking on transmission pan |
| 62627 | 2011 | Gillig | 10-Oct-18 | Oil leak, transmission, transmission pan drain plug leaking |
| 62634 | 2011 | Gillig | 12-Oct-18 | Oil leak, engine compartment, alternator oil feed line leaking |
| 62634 | 2011 | Gillig | 12-Oct-18 | Radius rods, both rear lower, worn |
| 62634 | 2011 | Gillig | 12-Oct-18 | Oil leaks, engine compartment, multiple oil leaks |
| 62635 | 2011 | Gillig | 26-Sep-18 | Oil leak, engine compartment, alternator front seal leaking |
| 62635 | 2011 | Gillig | 26-Sep-18 | Oil leak, engine compartment, oil pan leaking |
| 62635 | 2011 | Gillig | 26-Sep-18 | Radius rods, both rear lower, worn |
| 62635 | 2011 | Gillig | 26-Sep-18 | Oil leak, engine compartment, oil leaking above air compressor |
| 62636 | 2011 | Gillig | 8-Oct-18 | Oil leak, engine compartment, alternator front seal leaking |
| 62636 | 2011 | Gillig | 8-Oct-18 | Coolant leak, engine compartment, radiator leaking |
| 62636 | 2011 | Gillig | 8-Oct-18 | Oil leak, engine compartment, rear main seal leaking |
| 62636 | 2011 | Gillig | 8-Oct-18 | Oil leak, engine compartment, timing chain cover leaking |
| 62636 | 2011 | Gillig | 8-Oct-18 | Oil leak, engine compartment, drain tube from turbo leaking |
| 62642 | 2012 | Gillig | 13-Nov-18 | Alternator belt, engine compartment, cracked |
| 62642 | 2012 | Gillig | 13-Nov-18 | Radius rod, S/S rear lower, worn |
| 62645 | 2012 | Gillig | 2-Nov-18 | Oil leak, engine compartment, alternator front seal leaking |
| 62645 | 2012 | Gillig | 2-Nov-18 | Radius rod, both rear lower, worn |
| 62645 | 2012 | Gillig | 2-Nov-18 | Coolant leak, engine compartment, coolant leak from Pro Heater |
| 62647 | 2012 | Gillig | 7-Nov-18 | Oil leak, engine compartment, rear main seal leaking |
| 62647 | 2012 | Gillig | 7-Nov-18 | Oil leak, engine compartment, oil pressure switch leaking |
| 62647 | 2012 | Gillig | 7-Nov-18 | Oil leak, engine compartment, oil filler tube leaking @ block |
| 62648 | 2012 | Gillig | 24-Oct-18 | Drag link, at pitman arm, worn |
| 62648 | 2012 | Gillig | 24-Oct-18 | Oil leak, engine compartment, oil filler tube leaking |
| 62648 | 2012 | Gillig | | Oil leak, engine compartment, oil leaking between air compressor & steering pump |
| 62652 | 2012 | Gillig | 14-Oct-18 | Oil leaks, C/S of engine, multiple oil leaks |
| 63163 | 2008 | Gillig | 14-Nov-18 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63163 | 2008 | Gillig | 14-Nov-18 | Radius rod, C/S upper rear, worn |
| 63163 | 2008 | Gillig | 14-Nov-18 | Radius rod, S/S rear lower, worn |
| 63188 | 2009 | Gillig | 9-Nov-18 | Oil leaks, engine compartment, multiple oil leaks |
| 63197 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, oil filler tube leaking @ block |
| 63197 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, oil cooler leaking |

| Table 5 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 63197 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, reservoir line fitting leaking |
| 63202 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, A/C compressor front seal leaking |
| 63202 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, alternator front seal leaking |
| 63202 | 2010 | Gillig | 14-Nov-18 | A/C belt, engine compartment, cracked |
| 63202 | 2010 | Gillig | 14-Nov-18 | Radius rods, all rear, worn |
| 63202 | 2010 | Gillig | 14-Nov-18 | Oil leaks, C/S of engine, multiple oil leaks |
| 63209 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, alternator front seal leaking |
| 63209 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, breather tube leaking |

The average number of Class "A" defects per bus decreased during this current audit, but it is not known yet if this is a sustainable trend.




Comfort and Convenience

During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity

TRC did not observe any structural defects during this audit.

**PMI Schedule Adherence**

TRC examined the PMI records of the sixteen (16) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**SUMMARY OF RECOMMENDATIONS**

Forty-four (44) Class "A" safety-related defects were found during this current audit, or 2.75 average Class "A" defects compared to or 3.66 average Class "A" defects per bus last audit. The average number of Class "A" defects per bus decreased during this current audit which is a positive sign. As previously noted, due to a conflict with snowplow inspections, this audit was time-constrained which permitted the inspection of only sixteen (16) buses. The decreased number of inspections leads to a high degree of uncertainty in the results. Future inspections are necessary to properly verify the efficacy of the corrective actions in place.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The average number of Class "A" defects per bus in this category decreased to .62 from 1.00 during the last audit. TRC will monitor to ensure this trend is maintained.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue.

**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty-five (35) Buses
# Conducted October 27 – 29, 2018

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# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty-five (35) Buses
# Conducted October 27 - 29, 2018

## EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted on October 27 - 29, 2018 by TRC for Prince George's County. Forty-six (46) buses were scheduled for a fleet inspection and maintenance record review; however, eleven (11) buses were not available for inspection due to the following reasons: Bus 62624/accident, Bus 62626/engine, Bus 62629/suspension, Bus 62642/transmission, Bus 62644/engine, Bus 63092/wheelchair (electrical), Bus 63168/air compressor, Bus 63189/accident, Bus 63194/accident, Bus 63214/overheat, and Bus 63215/transmission. The number of buses not available for inspection has been increasing the past several audits and is cause for concern.

The results of this current audit are as follows:

| | |
|---|---|
| Total Defects | 140 |
| Average Defects per Bus | 4.00 |
| Total Class "A" Safety-Related Defects | 128 |
| Average Class "A" Safety-Related Defects per Bus | 3.66 |

The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the audit results for all audits conducted to date in Year 2018. Results show a continued increase in Class "A" defects over the long-term average. Note that nearly all defects found were Class A defects.

Engine compartment defects and Steering/Suspension defects continue to increase with no observable plan for improvement.

**The condition of the fleet is deteriorating and poses unnecessary risk to the County and its riders. TRC recommends immediate corrective action. TRC is concerned that no corrective actions have been observed on the part of the County or from Trandev.**

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a

separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

# Audit Report

**BUSES INSPECTED**

Thirty-five (35) buses received a physical inspection during this audit. Table 1 below identifies these 35 buses.

**Table 1**
**Buses Inspected**

| PHYSICAL INSPECTION | MODEL YEAR | VEHICLE MAKE |
|---|---|---|
| 62620 | 2011 | Gillig |
| 62621 | 2011 | Gillig |
| 62625 | 2011 | Gillig |
| 62628 | 2011 | Gillig |
| 62632 | 2011 | Gillig |
| 62633 | 2011 | Gillig |
| 62637 | 2011 | Gillig |
| 62640 | 2012 | Gillig |
| 62643 | 2012 | Gillig |
| 62646 | 2012 | Gillig |
| 62650 | 2012 | Gillig |
| 63143 | 2007 | Gillig |
| 63149 | 2007 | Gillig |
| 63151 | 2007 | Gillig |
| 63160 | 2008 | Gillig |
| 63161 | 2008 | Gillig |
| 63162 | 2008 | Gillig |
| 63163 | 2008 | Gillig |
| 63164 | 2008 | Gillig |
| 63165 | 2008 | Gillig |
| 63166 | 2008 | Gillig |
| 63167 | 2008 | Gillig |
| 63169 | 2008 | Gillig |
| 63190 | 2009 | Gillig |
| 63193 | 2009 | Gillig |
| 63198 | 2010 | Gillig |
| 63201 | 2010 | Gillig |
| 63203 | 2010 | Gillig |
| 63205 | 2010 | Gillig |
| 63206 | 2010 | Gillig |
| 63207 | 2010 | Gillig |
| 63212 | 2010 | Gillig |
| 63213 | 2010 | Gillig |
| 63216 | 2010 | Gillig |
| 63217 | 2010 | Gillig |

Table 2 which follows identifies the nine buses that were not available for inspection. *The number of buses not available for inspection is over 20% and has been increasing the past few audits and is cause for concern.*

| Table 2<br>Buses Not Available for Inspection | | | |
|---|---|---|---|
| **BUSES NOT INSPECTED** | **MODEL YEAR** | **VEHICLE MAKE** | **REASON** |
| 62624 | 2011 | Gillig | Accident |
| 62626 | 2011 | Gillig | Engine |
| 62629 | 2011 | Gillig | Suspension |
| 62642 | 2012 | Gillig | Transmission |
| 62644 | 2012 | Gillig | Engine |
| 63092 | 2006 | Gillig | Wheelchair (electrical) |
| 63168 | 2008 | Gillig | Air Compressor |
| 63189 | 2009 | Gillig | Accident |
| 63194 | 2009 | Gillig | Accident |
| 63214 | 2010 | Gillig | Overheat |
| 63215 | 2010 | Gillig | Transmission |

## EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

### Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank

16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

**Class A** – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

**Maintenance Record Review**

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty-five (35) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty-five (35) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

## FINDINGS

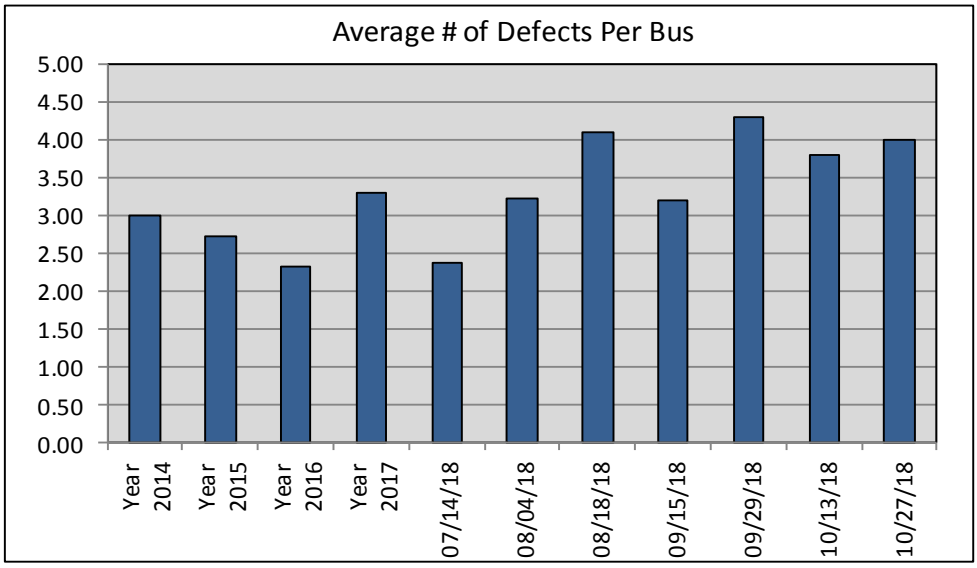
### Overall Fleet Condition

One hundred forty (140) defects were found during this current audit, or 4.00 average defects per bus. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Table 3 also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018.

**Table 3**
**Audit Trend Comparison**

| Date | Average Defects Per Audit | Average Defects per Bus | Average Class "A" Defects Per Audit | Average Class "A" Defects per Bus |
|---|---|---|---|---|
| Year 2014 | 126 | 3.00 | 62 | 1.48 |
| Year 2015 | 98 | 2.72 | 74 | 2.06 |
| Year 2016 | 74 | 2.31 | 59 | 1.84 |
| Year 2017 | 105 | 3.28 | 88 | 2.75 |
| July 14–16,2018 | 59 | 2.36 | 54 | 2.16 |
| Aug. 4–6, 2018 | 103 | 3.22 | 88 | 2.75 |
| Aug. 18–20, 2018 | 98 | 4.08 | 81 | 3.38 |
| Sept. 15-17, 2018 | 105 | 3.18 | 90 | 2.73 |
| Sept. 29–Oct. 1, 2018 | 133 | 4.29 | 125 | 4.03 |
| Oct. 13 – 15, 2018 | 129 | 3.79 | 120 | 3.53 |
| **Oct. 27 – 29, 2018** | **140** | **4.00** | **128** | **3.66** |

As can be seen from Table 3 above and the chart below, when compared to past audits, the 4.00 average defects per bus found during this current inspection is the third highest average defects per bus since TRC first began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014. **The condition of the fleet is rapidly deteriorating, exposing the County to unnecessary risk.**



**Defects Findings**

Defects were found in the Accessibility Features, Air System/Brake System, Climate Control, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Suspension/Steering, and Tires categories. The Engine Compartment category and the Suspension/Steering category comprised over three-quarters of all defects (77%). The engine compartment category had the highest number of defects with a total of 73 defects compared to 60 defects last audit, and Suspension/Steering category defects showed a total of 35 defects compared to 28 defects last audit. **Engine Compartment defects represent a critical fire risk, and steering/suspension defects represent a critical accident risk. TRC recommends immediate corrective action to reduce defects in these categories.**

Table 4 which follows compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Critical areas of concern are highlighted in Table 4 below.

**Table 4**

| Summary of Defects by Category | Year 2014 Avg | Year 2015 Avg | Year 2016 Avg | Year 2017 Avg | Insp #65 2018 | Insp #66 2018 | Insp #67 2018 | Insp #68 2018 | Insp #69 2018 | Insp #70 2018 | Insp #71 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Accessibility Features | 7 | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 1 | |
| Air System/Brake System | 15 | 8 | 7 | 7 | 2 | 3 | 7 | 8 | 4 | 7 | 2 | |
| Climate Control | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| Destination Signs | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Differential | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | |
| Driver's Controls | 5 | 2 | 1 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | |
| Electrical System | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | |
| Engine Compartment | 36 | 27 | 24 | 34 | 18 | 34 | 29 | 50 | 69 | 60 | 73 | ⇦ |
| Exhaust | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Exterior Body Condition | 15 | 18 | 12 | 12 | 8 | 18 | 18 | 14 | 9 | 11 | 12 | |
| Interior Condition | 13 | 13 | 4 | 10 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | |
| Lights | 7 | 6 | 5 | 6 | 2 | 3 | 10 | 1 | 4 | 8 | 13 | |
| Passenger Controls | 1 | 1 | 1 | 2 | 0 | 2 | 2 | 0 | 1 | 4 | 0 | |
| Safety Equipment | 7 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Structure/Chassis/ Fuel Tank | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Suspension/Steering | 10 | 10 | 10 | 19 | 21 | 28 | 26 | 19 | 28 | 28 | 35 | ⇦ |
| Tires | 3 | 1 | 3 | 2 | 1 | 4 | 0 | 3 | 2 | 4 | 1 | |
| Transmission | 2 | 2 | 2 | 1 | 0 | 4 | 0 | 3 | 12 | 2 | 0 | |
| **Total Defects** | **126** | **98** | **74** | **105** | **59** | **103** | **98** | **105** | **133** | **129** | **140** | |
| **Average Defects Per Bus** | **3.00** | **2.72** | **2.31** | **3.28** | **2.36** | **3.22** | **4.08** | **3.18** | **4.29** | **3.79** | **4.00** | |

**PMI Paperwork Review Findings**

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are*

*not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

**Class A –** Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

**Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

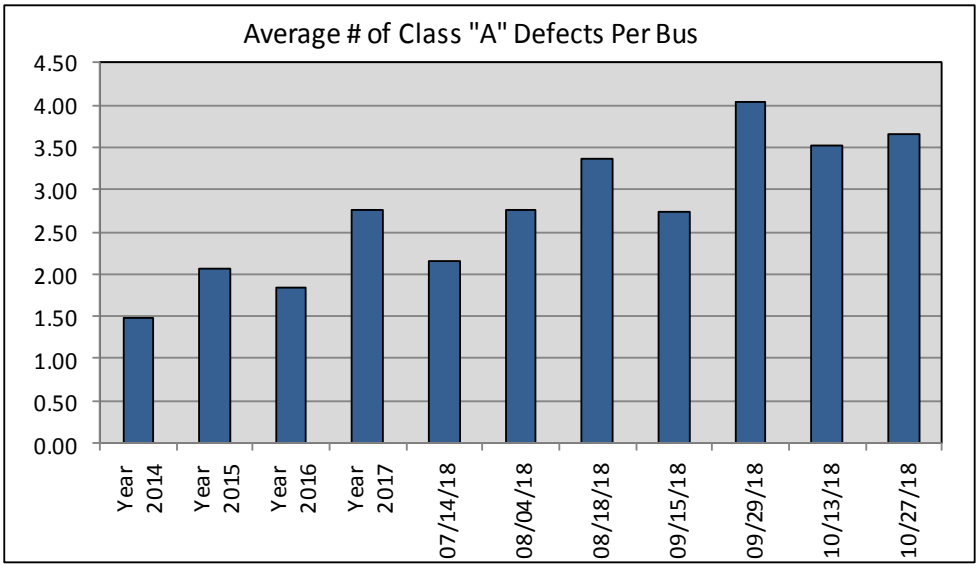
One hundred twenty-eight (128) Class "A" safety-related defects were found during this inspection, for an average of 3.66 Class "A" safety-related defects per bus. The 128 Class "A" defects found during this current audit are listed in Table 5 which follows.

| Table 5 | | | |
|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Class "A" Defects** |
| 62620 | 2011 | Gillig | Oil leak, engine compartment, oil cooler leaking |
| 62620 | 2011 | Gillig | Oil leak, engine compartment, alternator seal & gasket leaking |
| 62620 | 2011 | Gillig | Dome lamp, C/S #3, inop |
| 62620 | 2011 | Gillig | Windshield, S/S, cracked |
| 62621 | 2011 | Gillig | Oil leak, engine compartment, rear main seal leaking |
| 62621 | 2011 | Gillig | Oil leak, engine compartment, oil pressure switch leaking |
| 62621 | 2011 | Gillig | Oil leak, engine compartment, oil cooler leaking |
| 62621 | 2011 | Gillig | Pre heater tail pipe, engine compartment, broken off |
| 62625 | 2011 | Gillig | Oil leak, engine compartment, rear main seal leaking |
| 62625 | 2011 | Gillig | Radius rods, both rear lower, worn |
| 62625 | 2011 | Gillig | Oil leak, engine compartment, oil pan leaking |
| 62625 | 2011 | Gillig | Blow by tube, engine compartment, broken off |
| 62628 | 2011 | Gillig | Oil leak, engine compartment, rear main seal leaking |
| 62628 | 2011 | Gillig | Oil leak, engine compartment, oil pan leaking |
| 62628 | 2011 | Gillig | Oil leak, engine compartment, oil cooler leaking |
| 62628 | 2011 | Gillig | Drag link, at pitman arm, worn |
| 62628 | 2011 | Gillig | Radius rods, both rear lower, worn |
| 62632 | 2011 | Gillig | Oil leak, engine compartment, rear main seal leaking |
| 62632 | 2011 | Gillig | Oil leak, engine compartment, oil leak @ block |
| 62633 | 2011 | Gillig | Radius rods, both rear lower, worn |
| 62633 | 2011 | Gillig | Oil leak, engine compartment, oil pressure switch leaking |
| 62633 | 2011 | Gillig | Oil leak, engine compartment, oil cooler leaking |
| 62633 | 2011 | Gillig | Oil leak, engine compartment, rear main seal leaking |
| 62633 | 2011 | Gillig | Oil leak, engine compartment, oil filler tube leaking |
| 62637 | 2011 | Gillig | Oil leak, engine compartment, oil cooler leaking |
| 62637 | 2011 | Gillig | Oil leak, engine compartment, oil leak between air compressor & hydraulic pump |
| 62640 | 2012 | Gillig | Alternator belt, engine compartment, cracked |
| 62640 | 2012 | Gillig | Radius rods, both rear lower, worn |
| 62640 | 2012 | Gillig | Oil leak, engine compartment, rear main seal leaking |
| 62640 | 2012 | Gillig | Oil leak, engine compartment, timing cover leaking |
| 62640 | 2012 | Gillig | Oil leak, engine compartment, oil pressure switches leaking |
| 62640 | 2012 | Gillig | Oil leak, engine compartment, alternator seal leaking |
| 62643 | 2012 | Gillig | Drag link, at pitman arm, worn |
| 62643 | 2012 | Gillig | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62643 | 2012 | Gillig | Radius rods, both rear lower, worn |
| 62643 | 2012 | Gillig | Oil leak, engine compartment, oil filler tube leaking |
| 62643 | 2012 | Gillig | Oil leak, engine compartment, drain plug leaking |
| 62646 | 2012 | Gillig | Courtesy lights, rear doors, inop |
| 62646 | 2012 | Gillig | Alternator belt, engine compartment, cracked |
| 62646 | 2012 | Gillig | A/C belt, engine compartment, cracked (replaced by mechanic) |
| 62646 | 2012 | Gillig | Oil leak, front, alternator seal leaking (replaced by mechanic) |
| 62646 | 2012 | Gillig | King pin, S/S, loose |
| 62650 | 2012 | Gillig | Oil leak, engine compartment, oil cooler leaking |
| 62650 | 2012 | Gillig | Air leak, S/S front rear, leaking |
| 63143 | 2007 | Gillig | Courtesy lights, by #3 & #4 doors, inop |
| 63143 | 2007 | Gillig | Oil leak, engine compartment, oil pressure switches leaking |
| 63143 | 2007 | Gillig | Radius rod, S/S front lower, worn |
| 63149 | 2007 | Gillig | Oil leak, engine compartment, gear box leaking |
| 63149 | 2007 | Gillig | Radius rods, all front, worn |
| 63149 | 2007 | Gillig | Oil leak, C/S front, shock absorber leaking |

| Table 5 | | | |
|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Class "A" Defects** |
| 63149 | 2007 | Gillig | Air leak, rear, brake valve leaking |
| 63149 | 2007 | Gillig | Oil leak, engine compartment, oil filler tube leaking @ block |
| 63151 | 2007 | Gillig | Radius rods, both front lower, worn |
| 63151 | 2007 | Gillig | Radius rods, both rear lower, worn |
| 63151 | 2007 | Gillig | Oil leak, engine compartment, valve cover gasket leaking |
| 63151 | 2007 | Gillig | Oil leak, engine compartment, gasket between air compressor & hydraulic pump leaking |
| 63151 | 2007 | Gillig | Dome lamp, C/S #3, inop |
| 63160 | 2008 | Gillig | Radius rod, S/S rear lower, worn |
| 63160 | 2008 | Gillig | Pre heater tail pipe, engine compartment, missing |
| 63161 | 2008 | Gillig | Alternator belt, engine compartment, cracked |
| 63161 | 2008 | Gillig | Pre heater tail pipe, engine compartment, hanging |
| 63161 | 2008 | Gillig | Pre heater box, engine compartment, damaged (weld broken) |
| 63161 | 2008 | Gillig | Air leak, S/S front rear, leaking |
| 63161 | 2008 | Gillig | Oil leak, engine compartment, oil filler tube leaking |
| 63161 | 2008 | Gillig | Oil leak, engine compartment, alternator drain oil line leaking |
| 63161 | 2008 | Gillig | Oil leak, engine compartment, oil cooler leaking |
| 63162 | 2008 | Gillig | Oil leak, engine compartment, alternator body leaking |
| 63162 | 2008 | Gillig | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63162 | 2008 | Gillig | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63162 | 2008 | Gillig | Radius rods, both rear lower, worn |
| 63162 | 2008 | Gillig | Dome lamp, C/S #2, inop |
| 63162 | 2008 | Gillig | Dome lamp, S/S #1, inop |
| 63163 | 2008 | Gillig | Oil leak, engine compartment, air compressor gasket leaking |
| 63163 | 2008 | Gillig | Blow by tube, engine compartment, missing |
| 63163 | 2008 | Gillig | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63164 | 2008 | Gillig | Oil leak, engine compartment, oil filter housing @ block leaking |
| 63164 | 2008 | Gillig | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63165 | 2008 | Gillig | Dome light, C/S #3, inop |
| 63165 | 2008 | Gillig | Radius rods, both rear lower, worn |
| 63165 | 2008 | Gillig | Oil leak, engine compartment, oil filler tube leaking |
| 63165 | 2008 | Gillig | King pins, both, worn |
| 63166 | 2008 | Gillig | Oil leak, engine compartment, alternator front seal & rear gasket leaking |
| 63166 | 2008 | Gillig | Breather tube, engine compartment, missing |
| 63166 | 2008 | Gillig | Oil leak, engine compartment, rear main seal leaking |
| 63167 | 2008 | Gillig | Dome lamps, S/S #3, #4 & #5, inop |
| 63167 | 2008 | Gillig | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63169 | 2008 | Gillig | Radius rods, both rear lower, worn |
| 63169 | 2008 | Gillig | Courtesy lights, rear doors, inop |
| 63169 | 2008 | Gillig | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63190 | 2009 | Gillig | Dome lamp, S/S #4, inop |
| 63190 | 2009 | Gillig | Oil leak, engine compartment, alternator return oil line leaking |
| 63193 | 2009 | Gillig | Dome lamps, C/S #3, #4 & #5, inop |
| 63193 | 2009 | Gillig | Radius rods, both rear lower, worn |
| 63193 | 2009 | Gillig | Drag link, at pitman arm, worn |
| 63193 | 2009 | Gillig | Air leak, C/S rear, air bag leaking |
| 63193 | 2009 | Gillig | Chamber hose, C/S rear, rubbing & worn (replaced by mechanic) |
| 63198 | 2010 | Gillig | Wheelchair ramp, front, inop |
| 63198 | 2010 | Gillig | Dome lamp, C/S #3, inop |

| Table 5 | | | |
|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Class "A" Defects** |
| 63198 | 2010 | Gillig | King pins, front, worn |
| 63198 | 2010 | Gillig | Radius rods, both rear lower, worn |
| 63198 | 2010 | Gillig | Oil leak, engine compartment, rear main seal leaking |
| 63201 | 2010 | Gillig | Flooring, around floor hatch, torn / section missing / trip hazard |
| 63201 | 2010 | Gillig | Flooring front, coming up / trip hazard |
| 63201 | 2010 | Gillig | Radius rod, S/S rear lower, worn |
| 63201 | 2010 | Gillig | Pre heater tail pipe, engine compartment, missing |
| 63203 | 2010 | Gillig | Belts, engine compartment, all belts cracked |
| 63203 | 2010 | Gillig | Drag link, at pitman arm, worn |
| 63205 | 2010 | Gillig | Drag link, at pitman arm, worn |
| 63205 | 2010 | Gillig | Coolant leak, engine compartment, both pre heater coolant pipes leaking (repaired by mechanic) |
| 63206 | 2010 | Gillig | Dome lamp, S/S #3, half inop (repaired by mechanic) |
| 63206 | 2010 | Gillig | Alternator belt, engine compartment, cracked |
| 63206 | 2010 | Gillig | Tires, rear C/S inner & S/S outer, worn (replaced by mechanic) |
| 63207 | 2010 | Gillig | A/C belt, engine compartment, cracked |
| 63207 | 2010 | Gillig | Drag link, at pitman arm, worn |
| 63212 | 2010 | Gillig | A/C belt, engine compartment, cracked |
| 63212 | 2010 | Gillig | Coolant leak, front, heater core leaking |
| 63212 | 2010 | Gillig | Drag link, at pitman arm, worn |
| 63212 | 2010 | Gillig | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63213 | 2010 | Gillig | Oil leak, engine compartment, alternator end plate leaking |
| 63213 | 2010 | Gillig | Drag link, at pitman arm, worn |
| 63213 | 2010 | Gillig | Radius rods, both rear lower, worn |
| 63213 | 2010 | Gillig | Oil leak, engine compartment, rear main seal leaking |
| 63216 | 2010 | Gillig | Oil leak, engine compartment, timing chain cover leaking |
| 63216 | 2010 | Gillig | Oil leak, engine compartment, oil pan leaking |
| 63216 | 2010 | Gillig | Radius rods, both rear lower, worn |
| 63216 | 2010 | Gillig | Drag link, at pitman arm, worn |
| 63217 | 2010 | Gillig | Oil leak, engine compartment, oil leak behind air compressor |
| 63217 | 2010 | Gillig | Oil leak, engine compartment, alternator front seal leaking |

As can be seen in the Audit Trend Comparison table on Page 5 and the chart which follows, the 3.66 average Class "A" defects per bus found during this current inspection is the second highest average Class "A" defects per bus experienced since TRC began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014. **The number of safety-critical defects is unacceptably high and increasing, exposing the County and its riders to unnecessary risk.**




Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity
TRC did not observe any structural defects during this audit.

**PMI Schedule Adherence**

TRC examined the PMI records of the thirty-five (35) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**SUMMARY OF RECOMMENDATIONS**

One hundred twenty (128) Class "A" safety-related defects were found during this current audit, or 3.66 average Class "A" defects per bus compared to 120, or 3.53 average Class "A" defects per bus last audit. The average number of Class "A" defects per bus found during this current audit is the second highest since TRC began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014. **Overall, the fleet is deteriorating and placing the County at increased risk for vehicle fires and accidents**.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The total number of Class "A" defects in this category was 35 during this current audit, compared to 28 the last audit. This could be a result of improper inspections or deferred maintenance. Steering and suspension components are a critical safety item and defects identified continue to increase.

- The inspection revealed nine steering drag links that were worn and should have been replaced. Failure of a steering drag link causes loss of steering control and is therefore a highly critical item. TRC recommends the worn drag links be replaced as soon as possible.

- TRC continues to recommend that utility personnel be instructed on how to properly fill the engines with fluids, such as hydraulic fluid. The hydraulic reservoir is being overfilled, causing fluid to overflow all over the bottom of the engines.

- TRC continues to recommend renewed emphasis on preventing and correcting engine compartment fluid leaks. This inspection showed a total of 56 engine compartment oil leak defects compared to 47 engine compartment oil leak defects last audit and one coolant leak defect compared to two coolant leak defects last audit. As noted above, engine leaks are a major risk factor contributing to vehicle fires.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue.

- TRC continues to recommend when washing buses that special attention be paid to the front corners of the bus exteriors. The soap used to wash the buses is causing black streaks and water run marks on the front corners of the buses below the windshield.

**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

# Prince George's County

## Fleet Maintenance Audit

**Inspection #79**
**Thirty-nine (39) Buses**

Conducted June 1 - 2, 2019

**TRANSIT RESOURCE CENTER**

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**Winter Springs, FL 32708**
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June 6, 2019

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty-nine (39) Buses
# Conducted June 1 - 2, 2019

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# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty-nine (39) Buses
# Conducted June 1 - 2, 2019

## EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted June 1- 2, 2019 by TRC for Prince George's County. Fifty-three (53) buses were scheduled for the fleet inspection and maintenance record review. In total, thirty-nine (39) buses were inspected. Ten (10) buses were not available for inspection due to the following reasons: Bus 62639/engine, Bus 63092/A/C and W/C inop, Bus 63139/charge air cooler, Bus/63148 accident, Bus 63166/transmission, Bus 63189/accident, Bus 63192/accident, Bus 63201/accident, Bus 63214/oil cooler, and Bus 63216/stop engine light. As with previous audits, *TRC is concerned about the high number of buses not available for inspection*. In this case, **19% of the buses selected were not available for inspection** for the various reasons listed above, compared to 33% the previous audit. This is a significant improvement, and in line with the FTA guideline to carry a maximum spare ratio of 20% to account for vehicle downtime. The four remaining buses (units 62644, 62652, 63150 and 63164) were not inspected due to time limitation.

The results of this current audit are as follows:

| | |
|---|---|
| Total Defects | 196 |
| Average Defects per Bus | 5.03 |
| Total Class "A" Safety-Related Defects | 132 |
| Average Class "A" Safety-Related Defects per Bus | 3.38 |

The Audit Trend Comparison table found on Page 6 shows the audit results annual averages for years 2014-18 and the audit results for all audits conducted to date in 2019. **The average number of total defects and Class "A" defects per bus continues to be unacceptably high and increased this current audit when compared to the previous audit.** The average number of total defects per bus is the highest when compared to all annual averages and the audit results of all audits conducted to date in 2019, and the average number of Class "A" defects is the highest of all audits conducted by TRC with the exception of the March 2-4, 2019 audit.

TRC has repeatedly voiced our concerns about the deteriorating condition of the fleet. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. After this meeting, TRC reported a noticeable but short-lasting improvement in the condition of the fleet during the December 2018 audits. The short-term improvement has proven to be non-sustainable. The results of this current audit continue to show increases when compared to previous audit results. TRC does not have confidence in Transdev's corrective action and improvement plan.

As with previous audits, the "engine compartment" category remains the most significant area of concern. This single category accounted for 37% of all defects found, compared to 53% last audit. Although this is a slight improvement, TRC continues to be concerned about the lack of progress in addressing engine compartment leaks and related defects.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

# Audit Report

## BUSES INSPECTED

Thirty-nine (39) buses received a physical inspection during this audit. Table 1 below identifies these 39 buses.

**Table 1**
**Buses Inspected**

| PHYSICAL INSPECTION | MODEL YEAR | VEHICLE MAKE | MOST RECENT PM |
|---|---|---|---|
| 62617 | 2011 | Gillig | 05/16/19 |
| 62618 | 2012 | Gillig | 05/05/19 |
| 62619 | 2011 | Gillig | 05/07/19 |
| 62620 | 2011 | Gillig | 05/29/19 |
| 62621 | 2011 | Gillig | 05/23/19 |
| 62624 | 2011 | Gillig | 05/09/19 |
| 62629 | 2011 | Gillig | 05/19/19 |
| 62630 | 2011 | Gillig | 05/18/19 |
| 62632 | 2011 | Gillig | 05/28/19 |
| 62635 | 2011 | Gillig | 05/26/19 |
| 62637 | 2011 | Gillig | 05/17/19 |
| 62641 | 2012 | Gillig | 05/16/19 |
| 62646 | 2012 | Gillig | 05/20/19 |
| 62651 | 2012 | Gillig | 05/06/19 |
| 63140 | 2007 | Gillig | 05/22/19 |
| 63144 | 2007 | Gillig | 05/17/19 |
| 63145 | 2007 | Gillig | 05/06/19 |
| 63146 | 2007 | Gillig | 05/20/19 |
| 63147 | 2007 | Gillig | 05/14/19 |
| 63160 | 2008 | Gillig | 05/30/19 |
| 63161 | 2008 | Gillig | 05/13/19 |
| 63162 | 2008 | Gillig | 05/23/19 |
| 63168 | 2008 | Gillig | 05/19/19 |
| 63188 | 2009 | Gillig | 05/24/19 |
| 63195 | 2009 | Gillig | 05/25/19 |
| 63196 | 2010 | Gillig | 05/19/19 |
| 63197 | 2010 | Gillig | 03/04/19 |
| 63198 | 2010 | Gillig | 05/26/19 |
| 63199 | 2010 | Gillig | 05/23/19 |
| 63200 | 2010 | Gillig | 05/25/19 |
| 63204 | 2010 | Gillig | 05/12/19 |
| 63205 | 2010 | Gillig | 05/24/19 |
| 63206 | 2010 | Gillig | 05/29/19 |
| 63207 | 2010 | Gillig | 05/15/19 |
| 63208 | 2010 | Gillig | 05/03/19 |
| 63211 | 2010 | Gillig | 05/18/19 |
| 63212 | 2010 | Gillig | 05/22/19 |
| 63215 | 2010 | Gillig | 05/20/19 |
| 63217 | 2010 | Gillig | 04/30/19 |

Table 2 which follows identifies the 10 buses that were not inspected during this current audit. *TRC continues to be concerned about the high number of buses not available for inspection. Nineteen percent (19%) of buses selected for this audit were not available for inspection compared to 33% the previous audit.*

**Table 2**
**Buses Not Available for Inspection**

| BUSES NOT INSPECTED | MODEL YEAR | VEHICLE MAKE | REASON |
|---|---|---|---|
| 62639* | 2012 | Gillig | Engine |
| 63092* | 2006 | Gillig | A/C & W/C inop |
| 63139 | 2007 | Gillig | Charge air cooler |
| 63148* | 2007 | Gillig | Accident |
| 63166* | 2008 | Gillig | Transmission |
| 63189* | 2009 | Gillig | Accident |
| 63192 | 2010 | Gillig | Accident |
| 63201* | 2010 | Gillig | Accident |
| 63214 | 2010 | Gillig | Oil cooler |
| 63216 | 2010 | Gillig | Stop engine light |

*Note: Bus has been unavailable for inspections for 2 months or longer

## EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of four bus inspectors to perform the maintenance audit. The inspection team members were Sebastian Silvani, Sylvester Fikes, Alusine Kanu, and Anthony Greenfield. Sebastian Silvani also served as the project manager, organized the overall inspection process, and prepared the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

### Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights

13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

**Class A** – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

**Maintenance Record Review**

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;

- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty-nine (39) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty-nine (39) buses to determine if and when defects defined during the PMI process were repaired.

2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

**FINDINGS**

**Overall Fleet Condition**

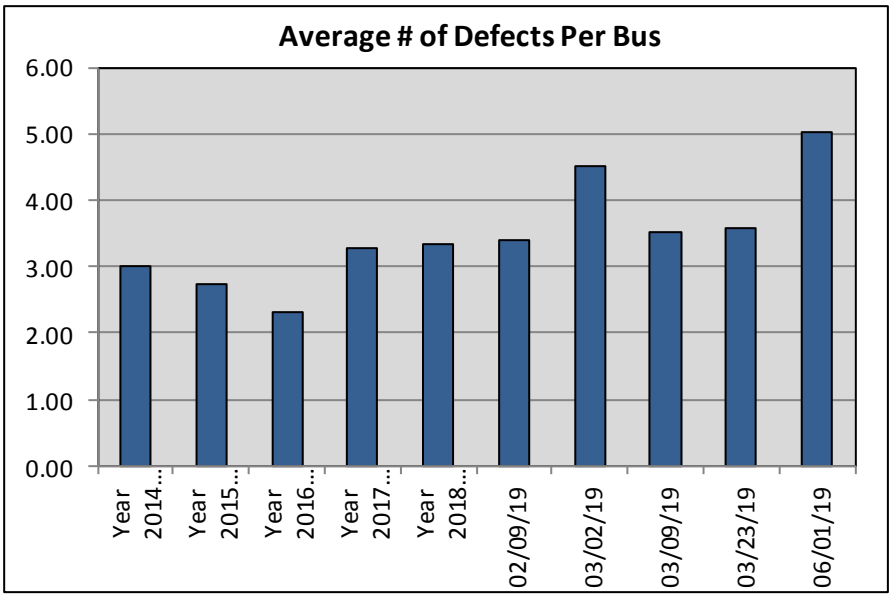
One hundred & ninety-six (196) defects were found during this current audit, or 5.03 average defects per bus. The average number of total defects per bus increased this current audit when compared to all annual averages and the audit results of all audits conducted to date in 2019. TRC encourages the County to demand immediate action from Transdev to reverse this trend.

The Audit Trend Comparison table which follows shows the annual average number of total defects per audit and the annual average number of total defects per bus for the audits conducted in years 2014-18 and the audit results for all audits conducted to date in 2019. Table 3 also shows the annual average number of Class "A" defects per audit and the annual average number of Class "A" defects per bus for years 2014-18 and the audit results for all audits conducted to date in 2019.

**Table 3**
**Audit Trend Comparison**

| Date | Average Defects Per Audit | Average Defects per Bus | Average Class "A" Defects Per Audit | Average Class "A" Defects per Bus |
|---|---|---|---|---|
| Year 2014 | 126 | 3.00 | 62 | 1.48 |
| Year 2015 | 98 | 2.72 | 74 | 2.06 |
| Year 2016 | 74 | 2.31 | 59 | 1.84 |
| Year 2017 | 105 | 3.28 | 88 | 2.75 |
| Year 2018 | 97 | 3.34 | 85 | 2.93 |
| Feb. 9–11, 2019 | 92 | 3.41 | 81 | 3.00 |
| March 2–4, 2019 | 135 | 4.50 | 114 | 3.80 |
| March 9–11, 2019 | 102 | 3.52 | 81 | 2.79 |
| March 23-25, 2019 | 104 | 3.59 | 93 | 3.21 |
| June 1-2, 2019 | 196 | 5.03 | 132 | 3.38 |

As shown in the table above and the chart which follows, the average number of defects per bus increased when compared to all annual averages and all audits conducted to date in 2019. **The number of defects remains unacceptably high.** As previously mentioned, TRC recommends that the County establish a realistic defect goal for Transdev to meet during these audits. Short term actions have proven ineffective in achieving lasting improvement.




**Defects Findings**

Defects were found in the Accessibility Features, Air System/Brake System, Differential, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Passenger Controls, Suspension/Steering, Tires, and Transmission categories. The Engine Compartment remains as the primary concern, comprising 37% of the total defects, compared to 53% last audit. **Engine compartment defects represent a critical fire risk.** This audit showed a significant increase in Air System/Brake System related defects. Earlier this year, a bus with presumed water in the air lines nearly caught on fire. Along with other issues, the County is cautioned that poor air system maintenance could lead to catastrophic failures, including fires. Other categories of concern due to a higher than acceptable number of defects include Exterior Body Condition, Lights, and Suspension/Steering.

The Summary of Defects by Category table which follows compares key performance indicators from this current audit to the average annual results and the results of the all audits conducted to date in 2019. The number of Engine Compartment defects discovered during this current audit is the highest amount experienced to date and continues to be a critical area of concern for this current audit.

**Table 4**
**Summary of Defect by Category**

| Summary of Defects by Category | Year 2014 Avg | Year 2015 Avg | Year 2016 Avg | Year 2017 Avg | Year 2018 Avg | Insp #75 Feb 2019 | Insp #76 Mar 2019 | Insp #77 Mar 2019 | Insp #78 Mar 2019 | Insp #79 Jun 2019 |
|---|---|---|---|---|---|---|---|---|---|---|
| Accessibility Features | 7 | 2 | 3 | 3 | 2 | 3 | 4 | 6 | 5 | 5 |
| Air System/Brake System | 15 | 8 | 7 | 7 | 4 | 1 | 13 | 5 | 2 | 40 |
| Climate Control | 2 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 |
| Destination Signs | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| Differential | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Driver's Controls | 5 | 2 | 1 | 2 | 1 | 3 | 2 | 1 | 3 | 3 |
| Electrical System | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Engine Compartment | 36 | 27 | 24 | 34 | 44 | 37 | 48 | 39 | 55 | 72 |
| Exhaust | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Table 4<br>Summary of Defect by Category | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Summary of Defects by Category | Year 2014 Avg | Year 2015 Avg | Year 2016 Avg | Year 2017 Avg | Year 2018 Avg | Insp #75 Feb 2019 | Insp #76 Mar 2019 | Insp #77 Mar 2019 | Insp #78 Mar 2019 | Insp #79 Jun 2019 |
| Exterior Body Condition | 15 | 18 | 12 | 12 | 13 | 9 | 16 | 22 | 12 | 27 |
| Interior Condition | 13 | 13 | 4 | 10 | 2 | 2 | 16 | 3 | 0 | 7 |
| Lights | 7 | 6 | 5 | 6 | 5 | 15 | 22 | 10 | 13 | 15 |
| Passenger Controls | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 1 |
| Safety Equipment | 7 | 4 | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 0 |
| Structure/Chassis/ Fuel Tank | 2 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 |
| Suspension/Steering | 10 | 10 | 10 | 19 | 22 | 13 | 9 | 11 | 10 | 14 |
| Tires | 3 | 1 | 3 | 2 | 2 | 2 | 0 | 2 | 0 | 3 |
| Transmission | 2 | 2 | 2 | 1 | 2 | 4 | 1 | 3 | 2 | 8 |
| **Total Defects** | **126** | **98** | **74** | **105** | **97** | **92** | **135** | **102** | **104** | **196** |
| **Average Defects Per Bus** | **3.00** | **2.72** | **2.31** | **3.28** | **3.34** | **3.41** | **4.50** | **3.52** | **3.59** | **5.03** |

**PMI Paperwork Review Findings**

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

For example, despite recent PM inspections that would have captured burned out light bulbs, multiple lights were found to be inoperable. Table 5 below lists the defects found in the Lights category. It is possible that the lights burned out after the PMI was completed, but more likely the lights were not repaired either due to parts shortages or lack of attention to detail. These minor defects represent the lack of attention from the maintenance department that may lead to substantial safety lapses. **If simple defects are not detected and repaired, TRC has little confidence in Transdev's ability to identify and repair serious or complex issues**.

| Table 5 | | |
|---|---|---|
| Bus # | Last PMI | Class A "Lights" Defects |
| 62617 | 05/16/19 | Door, interior front door, inop |
| 62620 | 05/29/19 | H5 light, S/S, inop |
| 62630 | 05/18/19 | Door light, front interior door, inop |
| 63145 | 05/06/19 | Light, C/S interior #3 light, inop |
| 63146 | 05/20/19 | Light, C/S interior #1 light, inop |
| 63146 | 05/20/19 | Light, S/S #5 light, inop |
| 63160 | 05/30/19 | Light, C/S #5 interior light, inop |
| 63168 | 05/19/19 | Light, C/S #4 light, inop |
| 63188 | 05/24/19 | Lights, C/S all lights, inop |
| 63198 | 05/26/19 | Light, C/S #3 interior light, inop |
| 63204 | 05/12/19 | Light, C/S #4 interior light, inop |
| 63204 | 05/12/19 | Dome light, front, inop |
| 63211 | 05/18/19 | Lights, C/S interior #1 & #2, inop |
| 63211 | 05/18/19 | Light, S/S interior #1, inop |
| 63217 | 04/30/19 | Light, S/S interior #2 light, inop |

**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defects Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **Year-to-Year Defects Summary:** includes a year-to-year summary of defect totals and a year-to-year summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

**Class A –** Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

**Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

One hundred & thirty-two (132) Class "A" safety-related defects were found during this inspection, for an average of 3.38 Class "A" safety-related defects per bus compared to 3.21 average Class "A" safety-related defects the previous audit. The 132 Class "A" defects found during this current audit are listed in Table 6 which follows.

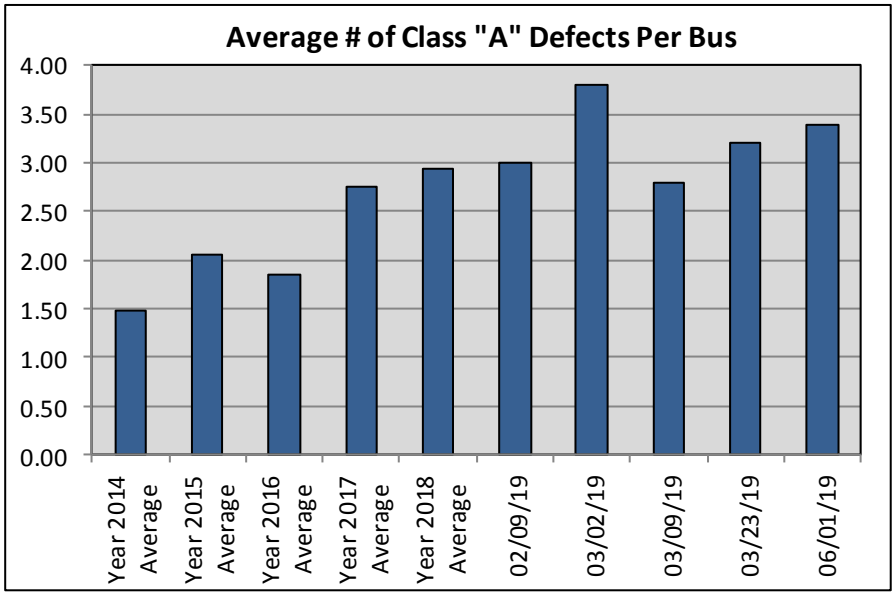
| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 62617 | 2011 | Gillig | 05/16/19 | Coolant leak, engine compartment, radiator hose |
| 62618 | 2012 | Gillig | 05/05/19 | Windshield, S/S, has a chip |
| 62618 | 2012 | Gillig | 05/05/19 | Windshield, C/S, has a chip |
| 62618 | 2012 | Gillig | 05/05/19 | Slack adjuster, front brake, out of adjustment |
| 62618 | 2012 | Gillig | 05/05/19 | Air leak, S/S, brake chamber leaking |
| 62619 | 2011 | Gillig | 05/07/19 | Roller, rear, knocking / flat spot |
| 62620 | 2011 | Gillig | 05/29/19 | Wheelchair ramp, front door, inop |
| 62620 | 2011 | Gillig | 05/29/19 | Oil leaks, engine compartment, multiple oil leaks |
| 62620 | 2011 | Gillig | 05/29/19 | Brake chambers, front both sides, out of adjustment |
| 62621 | 2011 | Gillig | 05/23/19 | Brake chamber, C/S rear, brake not releasing properly |
| 62621 | 2011 | Gillig | 05/23/19 | Windshield, C/S, has a chip |
| 62621 | 2011 | Gillig | 05/23/19 | Oil leak, engine compartment, oil cooler leaking |
| 62621 | 2011 | Gillig | 05/23/19 | Oil leak, engine compartment, oil pan leaking |
| 62624 | 2011 | Gillig | 05/09/19 | Check engine light, driver's controls, on |
| 62624 | 2011 | Gillig | 05/09/19 | Oil leak, engine compartment, air compressor leaking |
| 62629 | 2011 | Gillig | 05/19/19 | Oil leak, engine compartment, front alternator seal |
| 62629 | 2011 | Gillig | 05/19/19 | A/C belt & idler, engine compartment, alignment off |
| 62629 | 2011 | Gillig | 05/19/19 | Bench seat, S/S, does not latch on bottom position |
| 62629 | 2011 | Gillig | 05/19/19 | Check engine light, driver's controls, on |
| 62629 | 2011 | Gillig | 05/19/19 | Oil leak, transmission, small leak @ drain plug |
| 62630 | 2011 | Gillig | 05/18/19 | Door light, front interior door, inop |
| 62630 | 2011 | Gillig | 05/18/19 | Windshield wiper blades, C/S & S/S, worn |
| 62630 | 2011 | Gillig | 05/18/19 | Oil leak, transmission, light transmission leak |
| 62632 | 2011 | Gillig | 05/28/19 | Oil leak, engine compartment, alternator seal leaking |
| 62632 | 2011 | Gillig | 05/28/19 | A/C belt, engine compartment, cracked |
| 62632 | 2011 | Gillig | 05/28/19 | Check engine light, driver's controls, on |
| 62635 | 2011 | Gillig | 05/26/19 | Kneel alarm, front, inop |
| 62635 | 2011 | Gillig | 05/26/19 | ABS light, driver's controls, on |
| 62637 | 2011 | Gillig | 05/17/19 | Oil leak, engine compartment, air compressor leaking |
| 62637 | 2011 | Gillig | 05/17/19 | Oil leak, engine compartment, filler mount gasket leaking |
| 62637 | 2011 | Gillig | 05/17/19 | Oil leak, engine compartment, drain plug leaking (mechanic tightened) |
| 62641 | 2012 | Gillig | 05/16/19 | Tire, C/S rear inside, worn |
| 62641 | 2012 | Gillig | 05/16/19 | Coolant pipe, transmission, bracket/bolt missing |
| 62641 | 2012 | Gillig | 05/16/19 | Water separator, engine compartment, bolt missing in bracket |
| 62641 | 2012 | Gillig | 05/16/19 | Oil leak, engine compartment, fan motor leaking |
| 62641 | 2012 | Gillig | 05/16/19 | Oil leaks, engine compartment, multiple oil leaks |
| 62646 | 2012 | Gillig | 05/20/19 | King pin, front, worn (both sides) |
| 62646 | 2012 | Gillig | 05/20/19 | Radius rods, rear bottom both sides, worn |
| 62646 | 2012 | Gillig | 05/20/19 | Oil leak, engine compartment, oil pressure switch |
| 62646 | 2012 | Gillig | 05/20/19 | Oil leak, transmission, leak at transmission vent |
| 62646 | 2012 | Gillig | 05/20/19 | Brakes, rear both sides, out of adjustment |
| 62651 | 2012 | Gillig | 05/06/19 | Tie rod end, C/S front, worn |
| 62651 | 2012 | Gillig | 05/06/19 | Drag link, C/S front @ pitman arm, worn |
| 62651 | 2012 | Gillig | 05/06/19 | Radius rods, rear lower, both worn |
| 62651 | 2012 | Gillig | 05/06/19 | Oil leak, engine compartment, drain plug leaking |
| 62651 | 2012 | Gillig | 05/06/19 | Oil leak, engine compartment, oil pan gasket leaking |
| 63140 | 2007 | Gillig | 05/22/19 | Air leak, rear, brake valve leaking |
| 63140 | 2007 | Gillig | 05/22/19 | Oil leak, top of engine, leak undetermined |
| 63140 | 2007 | Gillig | 05/22/19 | ABS light, driver's controls, on |

| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 63144 | 2007 | Gillig | 05/17/19 | Wheelchair ramp, front, won't deploy |
| 63144 | 2007 | Gillig | 05/17/19 | Oil leak, engine compartment, air compressor leaking |
| 63146 | 2007 | Gillig | 05/20/19 | Oil leak, engine compartment, hydraulic leak @ fan motor |
| 63146 | 2007 | Gillig | 05/20/19 | Oil leak, engine compartment, filler tube @ block leaking |
| 63147 | 2007 | Gillig | 05/14/19 | Oil leak, engine compartment, alternator front seal |
| 63160 | 2008 | Gillig | 05/30/19 | Wheelchair lift, front, inop |
| 63160 | 2008 | Gillig | 05/30/19 | ABS light, driver's controls, on |
| 63160 | 2008 | Gillig | 05/30/19 | Brakes, all four, out of adjustment |
| 63160 | 2008 | Gillig | 05/30/19 | Battery compartment door, S/S front, lock broken |
| 63161 | 2008 | Gillig | 05/13/19 | Windshield, S/S, has a chip |
| 63161 | 2008 | Gillig | 05/13/19 | Oil leak, engine compartment, fan motor leaking |
| 63161 | 2008 | Gillig | 05/13/19 | Oil leak, engine compartment, oil cooler leaking |
| 63162 | 2008 | Gillig | 05/23/19 | Slack adjusters, S/S & C/S rear, out of adjustment |
| 63162 | 2008 | Gillig | 05/23/19 | Slack adjuster, S/S front, out of adjustment |
| 63162 | 2008 | Gillig | 05/23/19 | Coolant leak, engine compartment, coolant leak @ preheat box |
| 63162 | 2008 | Gillig | 05/23/19 | Oil leak, engine compartment, oil cooler leaking |
| 63162 | 2008 | Gillig | 05/23/19 | Oil leak, engine compartment, oil filler tube leaking |
| 63162 | 2008 | Gillig | 05/23/19 | Oil leak, transmission, transmission drain plug leaking |
| 63168 | 2008 | Gillig | 05/19/19 | Oil leak, engine compartment, front alternator seal |
| 63168 | 2008 | Gillig | 05/19/19 | Oil leak, engine compartment, A/C compressor seal |
| 63168 | 2008 | Gillig | 05/19/19 | Oil leak, engine compartment, fan motor leaking |
| 63168 | 2008 | Gillig | 05/19/19 | Oil leak, engine compartment, oil leak @ rear main seal |
| 63168 | 2008 | Gillig | 05/19/19 | Oil leak, transmission, leak @ drain plug |
| 63188 | 2009 | Gillig | 05/24/19 | Lights, C/S all lights, inop |
| 63188 | 2009 | Gillig | 05/24/19 | Shock absorber, C/S front, loose |
| 63188 | 2009 | Gillig | 05/24/19 | Tires, 3 rear tires, worn |
| 63188 | 2009 | Gillig | 05/24/19 | Oil leak, engine compartment, oil cooler leaking |
| 63188 | 2009 | Gillig | 05/24/19 | Coolant leak, engine compartment, air compressor leaking |
| 63195 | 2009 | Gillig | 05/25/19 | Oil leak, engine compartment, alternator bottom seal leaking |
| 63195 | 2009 | Gillig | 05/25/19 | Check engine light, driver's controls, on |
| 63195 | 2009 | Gillig | 05/25/19 | Wheelchair ramp, front, won't deploy |
| 63195 | 2009 | Gillig | 05/25/19 | Oil leak, engine compartment, fan motor leaking |
| 63196 | 2010 | Gillig | 05/19/19 | Radius rod, C/S front upper, worn |
| 63196 | 2010 | Gillig | 05/19/19 | Radius rod, S/S front upper, worn |
| 63196 | 2010 | Gillig | 05/19/19 | Check engine light, driver's controls, on |
| 63196 | 2010 | Gillig | 05/19/19 | Oil leak, engine compartment, rear oil pan or rear main seal leaking |
| 63196 | 2010 | Gillig | 05/19/19 | Oil leak, engine compartment, leak near air compressor & oil pump |
| 63197 | 2010 | Gillig | 03/04/19 | Oil leak, engine compartment, small oil leak @ front cover |
| 63197 | 2010 | Gillig | 03/04/19 | Brakes, front, need adjustment |
| 63198 | 2010 | Gillig | 05/26/19 | Check engine light, driver's controls, on |
| 63198 | 2010 | Gillig | 05/26/19 | ABS light, driver's controls, on |
| 63198 | 2010 | Gillig | 05/26/19 | Brakes, all four, out of adjustment |
| 63199 | 2010 | Gillig | 05/23/19 | ABS light, driver's controls, on |
| 63199 | 2010 | Gillig | 05/23/19 | King pin, front, worn |
| 63199 | 2010 | Gillig | 05/23/19 | Oil leak, engine compartment, air compressor gasket |

| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| | | | | leaking |
| 63200 | 2010 | Gillig | 05/25/19 | Radius rod, C/S front, worn |
| 63200 | 2010 | Gillig | 05/25/19 | Oil leak, engine compartment, leak @ air compressor |
| 63200 | 2010 | Gillig | 05/25/19 | Oil leak, engine compartment, oil filler tube leaking @ housing |
| 63200 | 2010 | Gillig | 05/25/19 | Oil leak, engine compartment, leak @ crankcase vent tube |
| 63204 | 2010 | Gillig | 05/12/19 | Dome light, front, inop |
| 63204 | 2010 | Gillig | 05/12/19 | ABS light, driver's controls, on |
| 63204 | 2010 | Gillig | 05/12/19 | Slack adjusters, all brakes, need adjustment |
| 63204 | 2010 | Gillig | 05/12/19 | Oil leak, engine compartment, oil cooler has small leak |
| 63204 | 2010 | Gillig | 05/12/19 | Oil leak, engine compartment, oil leak @ pan gasket |
| 63205 | 2010 | Gillig | 05/24/19 | Check engine light, driver's controls, on |
| 63205 | 2010 | Gillig | 05/24/19 | Oil leak, engine compartment, oil leak @ oil cooler |
| 63206 | 2010 | Gillig | 05/29/19 | Check engine light, driver's controls, on |
| 63206 | 2010 | Gillig | 05/29/19 | Oil leaks, engine compartment, multiple leaks |
| 63206 | 2010 | Gillig | 05/29/19 | Coolant leak, engine compartment, leak @ filter (mechanic tightened) |
| 63206 | 2010 | Gillig | 05/29/19 | Radius rod, C/S rear upper, worn |
| 63207 | 2010 | Gillig | 05/15/19 | Tie rod, front, loose @ pitman arm |
| 63207 | 2010 | Gillig | 05/15/19 | Brake shoes, front, worn |
| 63207 | 2010 | Gillig | 05/15/19 | Slack adjusters, front, not properly adjusted |
| 63207 | 2010 | Gillig | 05/15/19 | Check engine light, driver's controls, on |
| 63207 | 2010 | Gillig | 05/15/19 | Transmission coolant line bracket, S/S transmission, broken |
| 63207 | 2010 | Gillig | 05/15/19 | Oil leak, engine compartment, oil leak @ oil pan |
| 63208 | 2010 | Gillig | 05/03/19 | ABS light, driver's controls, on |
| 63208 | 2010 | Gillig | 05/03/19 | King pin, R/S front, worn |
| 63211 | 2010 | Gillig | 05/18/19 | Brakes, S/S rear, need adjustment |
| 63211 | 2010 | Gillig | 05/18/19 | Oil leak, engine compartment, leak @ oil filter |
| 63211 | 2010 | Gillig | 05/18/19 | Coolant pipe, transmission, bracket broken |
| 63211 | 2010 | Gillig | 05/18/19 | Oil leak, engine compartment, alternator front seal leaking |
| 63212 | 2010 | Gillig | 05/22/19 | Brake shoes, both front shoes, shoes worn to wear bar |
| 63212 | 2010 | Gillig | 05/22/19 | Tire, C/S rear inside tire, flat (replaced) |
| 63212 | 2010 | Gillig | 05/22/19 | Oil leak, engine compartment, hose going to oil filler tube leaking |
| 63215 | 2010 | Gillig | 05/20/19 | Radius rods, rear lower radius rods, both worn |
| 63215 | 2010 | Gillig | 05/20/19 | Oil leak, C/S engine compartment, oil leak (unknown source) |
| 63217 | 2010 | Gillig | 04/30/19 | Oil leak, engine compartment, front seal leaking oil |
| 63217 | 2010 | Gillig | 04/30/19 | ABS light, driver's controls, on |
| 63217 | 2010 | Gillig | 04/30/19 | Oil leak, engine compartment, oil pan leaking |
| 63217 | 2010 | Gillig | 04/30/19 | Oil leak, engine compartment, timing cover leaking |
| 63217 | 2010 | Gillig | 04/30/19 | Oil leak, engine compartment, oil filler tube @ block leaking |
| 63217 | 2010 | Gillig | 04/30/19 | Oil leak, engine compartment, oil cooler leaking |

Note in the table above that several significant defects were found even when the last PMI occurred within a week of our inspection.

The average number of Class "A" defects per bus increased this current audit when compared to all annual averages and the audit results of all audits conducted to date in 2019 with the exception of the March 2-4, 2019 audit. **Engine oil leaks continue to be a major defect found and contribute to increased fire risk.**




Comfort and Convenience
During this audit, TRC found the interiors of buses to be kept clean.

Structural Integrity
TRC did not observe any structural defects during this audit.

**PMI Schedule Adherence**

TRC examined the PMI records of the thirty-nine (39) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Sebastian Silvani reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. ***Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects****. A review of inspector's qualifications and training is recommended.*

## SUMMARY OF RECOMMENDATIONS

The average number of total defects per bus is the highest when compared to all annual averages and the audit results of all audits conducted to date in 2019, and the average number of Class "A" defects is the highest of all audits conducted by TRC with the exception of the March 2-4, 2019 audit.

One hundred & thirty two (132) Class "A" safety-related defects were found during this current audit, or 3.38 average Class "A" defects per bus, compared to 3.21 average Class "A" defects per bus last audit. TRC continues to caution the County noting that the improvements shown after the November 15, 2018 meeting have proven to not be sustainable, and a proper corrective plan must be put in place. Further corrective action and intervention by the County is again recommended.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- **TRC continues to recommend that the County establish a maximum defects-per-bus goal to hold Transdev accountable.**

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC recommends a thorough review of Air System/Brake System inspection and maintenance. This audit discovered multiple brakes out of adjustment and multiple air tanks with excess water. Without improved inspection and maintenance practices, the County is at elevated risk of bus accident or fire.

- TRC continues to recommend that buses that have been out of service for an extended period of time be repaired immediately or disposed of to get them 'off the books'.

- TRC continues to recommend a review of the number of buses that are unavailable for inspection during each audit. The current number of unavailable buses is unacceptable to maintain operations and meet daily pull-out.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). In addition, maintenance must reinforce the importance of identifying and repairing simple defects. The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue or lack of attention.

**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

# Prince George's County

## Fleet Maintenance Audit

**Inspection #78**
**Twenty-nine (29) Buses**

Conducted March 23 - 25, 2019

**TRANSIT RESOURCE CENTER**

**5840 Red Bug Lake Road**
**Suite 165**
**Winter Springs, FL 32708**
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March 27, 2019

# PRINCE GEORGE'S COUNTY
# Twenty-nine (29) Buses
# Conducted March 23 - 25, 2019

## TABLE OF CONTENTS

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Twenty-nine (29) Buses
# Conducted March 23 - 25, 2019

## EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted March 23-25, 2019 by TRC for Prince George's County. Fifty (50) buses were scheduled for the fleet inspection and maintenance record review. In total, twenty-nine (29) buses were inspected. Fourteen (14) buses were not available for inspection due to the following reasons: Bus 62637/engine, Bus 62639/engine, Bus 62652/engine, Bus 63092/wheelchair & air conditioning, Bus 63147/would not start, Bus 63148/accident, Bus 63164/accident, Bus 63166/transmission, Bus 63189/accident, Bus 63197/at Cummins, Bus 63199/transmission, Bus 63201/accident, Bus 63207/transmission, and Bus 63216/engine. As with previous audits, *TRC is concerned about the high number of buses not available for inspection*. In this case, **33% of the buses selected were not available for inspection** for the various reasons listed above, compared to 36% the previous audit. The FTA guideline is to carry a maximum spare ratio of 20% to account for vehicle downtime. The seven remaining buses (units 62620, 62621, 62629, 62632, 63145, 63146 & 63168) were not inspected due to time limitation and lack of manpower.

The results of this current audit are as follows:

| | |
|---|---|
| Total Defects | 104 |
| Average Defects per Bus | 3.59 |
| Total Class "A" Safety-Related Defects | 93 |
| Average Class "A" Safety-Related Defects per Bus | 3.21 |

The Audit Trend Comparison table found on Page 6 shows the audit results annual averages for years 2014-18 and the audit results for all audits conducted to date in 2019. The average number of **total defects and Class "A" defects per bus continues to be unacceptably high and increased this current audit** when compared to all annual averages and the audit results of all audits conducted to date in 2019 with the exception of the March 2-4, 2019 audit.

TRC has repeatedly voiced our concerns about the deteriorating condition of the fleet. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. After this meeting, TRC reported a noticeable, but short lasting improvement in the condition of the fleet during the December 2018 audits. The short-term improvement has proven to be non-sustainable. The results of this current audit continue to show increases when compared to previous audit results. TRC does not have confidence in Transdev's corrective action and improvement plan.

As with previous audits, the "engine compartment" category remains the most significant area of concern. This single category accounted for 53% of all defects found and increased from 38% last audit. TRC continues to be concerned about the lack of progress in addressing engine compartment leaks and related defects.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

# Audit Report

## BUSES INSPECTED

Twenty-nine (29) buses received a physical inspection during this audit. Table 1 below identifies these 29 buses.

**Table 1**
**Buses Inspected**

| PHYSICAL INSPECTION | MODEL YEAR | VEHICLE MAKE | MOST RECENT PM |
|---|---|---|---|
| 62625 | 2011 | Gillig | 02/28/19 |
| 62627 | 2011 | Gillig | 03/21/19 |
| 62634 | 2011 | Gillig | 03/14/19 |
| 62635 | 2011 | Gillig | 02/28/19 |
| 62636 | 2011 | Gillig | 03/24/19 |
| 62642 | 2012 | Gillig | 03/20/19 |
| 62645 | 2012 | Gillig | 03/05/19 |
| 62647 | 2012 | Gillig | 02/13/19 |
| 62648 | 2012 | Gillig | 03/13/19 |
| 63139 | 2007 | Gillig | 03/20/19 |
| 63140 | 2007 | Gillig | 02/21/19 |
| 63144 | 2007 | Gillig | 02/28/19 |
| 63151 | 2007 | Gillig | 03/21/19 |
| 63159 | 2008 | Gillig | 03/05/19 |
| 63160 | 2008 | Gillig | 02/28/19 |
| 63163 | 2008 | Gillig | 03/20/19 |
| 63169 | 2008 | Gillig | 03/20/19 |
| 63188 | 2009 | Gillig | 03/13/19 |
| 63191 | 2009 | Gillig | 03/14/19 |
| 63192 | 2010 | Gillig | 03/06/19 |
| 63194 | 2009 | Gillig | 02/28/19 |
| 63196 | 2010 | Gillig | 02/24/19 |
| 63198 | 2010 | Gillig | 12/06/18 |
| 63202 | 2010 | Gillig | 03/20/19 |
| 63204 | 2010 | Gillig | 02/23/19 |
| 63209 | 2010 | Gillig | 02/28/19 |
| 63212 | 2010 | Gillig | 12/03/18 |
| 63214 | 2010 | Gillig | 03/12/19 |
| 63215 | 2010 | Gillig | 03/08/19 |

Table 2 which follows identifies the 21 buses that were not inspected during this current audit. Fourteen of these buses were unavailable for inspection and the remaining seven were not inspected due to time limitation. *TRC continues to be concerned about the high number of buses not available for inspection. Thirty-three percent (33%) of buses selected for this audit were not available for inspection compared to 36% the previous audit.*

**Table 2**
**Buses Not Available for Inspection**

| BUSES NOT INSPECTED | MODEL YEAR | VEHICLE MAKE | REASON |
|---|---|---|---|
| 62637 | 2011 | Gillig | Engine |
| 62639* | 2012 | Gillig | Engine |
| 62652* | 2012 | Gillig | Engine |
| 63092* | 2006 | Gillig | Wheelchair & A/C |
| 63147 | 2007 | Gillig | Would Not Start |
| 63148* | 2007 | Gillig | Accident |
| 63164 | 2008 | Gillig | Accident |
| 63166 | 2008 | Gillig | Transmission |
| 63189* | 2009 | Gillig | Accident |
| 63197 | 2010 | Gillig | At Cummins |
| 63199 | 2010 | Gillig | Transmission |
| 63201 | 2010 | Gillig | Accident |
| 63207 | 2010 | Gillig | Transmission |
| 63216 | 2010 | Gillig | Engine |
| 62620 | 2011 | Gillig | Time Limitation |
| 62621 | 2011 | Gillig | Time Limitation |
| 62629 | 2011 | Gillig | Time Limitation |
| 62632 | 2011 | Gillig | Time Limitation |
| 63145 | 2007 | Gillig | Time Limitation |
| 63146 | 2007 | Gillig | Time Limitation |
| 63168 | 2008 | Gillig | Time Limitation |

*Note: Bus has been unavailable for inspections for 2 months or longer

## EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of four bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Alusine Kanu, and Anthony Greenfield. Sebastian Silvani served as the project manager, organized the overall inspection process, and prepared the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

### Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment

9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

**Class A** – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

**Maintenance Record Review**

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;

- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the twenty-nine (29) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the twenty-nine (29) buses to determine if and when defects defined during the PMI process were repaired.

2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

## FINDINGS

### Overall Fleet Condition

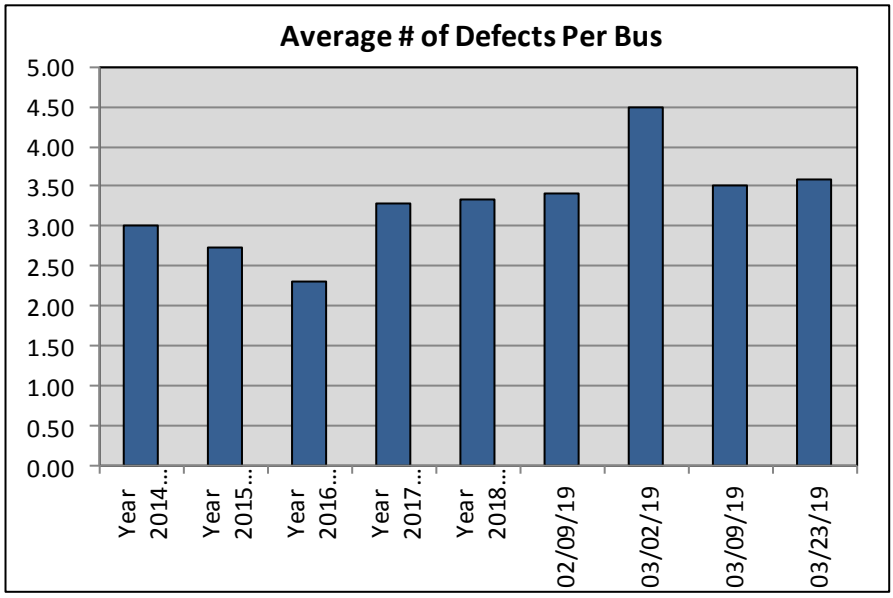
One hundred & four (104) defects were found during this current audit, or 3.59 average defects per bus. The average number of total defects per bus increased this current audit when compared to all annual averages and the audit results of all audits conducted to date in 2019 with the exception of the March 2-4, 2019 audit. TRC encourages the County to demand immediate action from Transdev to reverse this trend.

The Audit Trend Comparison table which follows shows the annual average number of total defects per audit and the annual average number of total defects per bus for the audits conducted in years 2014-18 and the audit results for all audits conducted to date in 2019. Table 3 also shows the annual average number of Class "A" defects per audit and the annual average number of Class "A" defects per bus for years 2014-18 and the audit results for all audits conducted to date in 2019.

**Table 3**
**Audit Trend Comparison**

| Date | Average Defects Per Audit | Average Defects per Bus | Average Class "A" Defects Per Audit | Average Class "A" Defects per Bus |
|---|---|---|---|---|
| Year 2014 | 126 | 3.00 | 62 | 1.48 |
| Year 2015 | 98 | 2.72 | 74 | 2.06 |
| Year 2016 | 74 | 2.31 | 59 | 1.84 |
| Year 2017 | 105 | 3.28 | 88 | 2.75 |
| Year 2018 | 97 | 3.34 | 85 | 2.93 |
| Feb. 9–11, 2019 | 92 | 3.41 | 81 | 3.00 |
| March 2–4, 2019 | 135 | 4.50 | 114 | 3.80 |
| March 9–11, 2019 | 102 | 3.52 | 81 | 2.79 |
| March 23-25, 2019 | 104 | 3.59 | 93 | 3.21 |

As shown in the table above and the chart which follows, the average number of total defects per bus increased when compared to all annual averages and all audits conducted to date in 2019 with the exception of the March 2-4, 2019 audit. **The number of defects remains unacceptably high.** As previously mentioned, TRC recommends that the County establish a realistic defect goal for Transdev to meet during these audits. Short term actions have proven ineffective in achieving lasting improvement.




**Defects Findings**

Defects were found in the Accessibility Features, Air System/Brake System, Destination Signs, Driver's Controls, Engine Compartment, Exterior Body Condition, Lights, Safety Equipment, Suspension/Steering, and Transmission categories. The Engine Compartment remains as the primary concern, comprising 53% of the total defects, compared to 38% last audit. **Engine compartment defects represent a critical fire risk.** Other categories of concern due to higher than acceptable number of defects include Suspension/Steering, Exterior Body Condition, and Lights. On a positive note, the Air System/Brake System category continued to see a significant decrease in defects.

The Summary of Defects by Category table which follows compares key performance indicators from this current audit to the average annual results and the results of the all audits conducted to date in 2019. The number of Engine Compartment defects discovered during this current audit is the highest amount experienced to date and continues to be a critical area of concern for this current audit.

| Table 4<br>Summary of Defect by Category | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Summary of Defects by Category** | **Year 2014 Avg** | **Year 2015 Avg** | **Year 2016 Avg** | **Year 2017 Avg** | **Year 2018 Avg** | **Insp #75 Feb 2019** | **Insp #76 Mar 2019** | **Insp #77 Mar 2019** | **Insp #78 Mar 2019** |
| Accessibility Features | 7 | 2 | 3 | 3 | 2 | 3 | 4 | 6 | 5 |
| Air System/Brake System | 15 | 8 | 7 | 7 | 4 | 1 | 13 | 5 | 2 |
| Climate Control | 2 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 |
| Destination Signs | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Differential | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Driver's Controls | 5 | 2 | 1 | 2 | 1 | 3 | 2 | 1 | 3 |
| Electrical System | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Engine Compartment | 36 | 27 | 24 | 34 | 44 | 37 | 48 | 39 | 55 |
| Exhaust | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exterior Body Condition | 15 | 18 | 12 | 12 | 13 | 9 | 16 | 22 | 12 |
| Interior Condition | 13 | 13 | 4 | 10 | 2 | 2 | 16 | 3 | 0 |
| Lights | 7 | 6 | 5 | 6 | 5 | 15 | 22 | 10 | 13 |
| Passenger Controls | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 0 |
| Safety Equipment | 7 | 4 | 1 | 1 | 0 | 0 | 2 | 0 | 1 |
| Structure/Chassis/ Fuel Tank | 2 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 0 |
| Suspension/Steering | 10 | 10 | 10 | 19 | 22 | 13 | 9 | 11 | 10 |
| Tires | 3 | 1 | 3 | 2 | 2 | 2 | 0 | 2 | 0 |
| Transmission | 2 | 2 | 2 | 1 | 2 | 4 | 1 | 3 | 2 |
| **Total Defects** | **126** | **98** | **74** | **105** | **97** | **92** | **135** | **102** | **104** |
| **Average Defects Per Bus** | **3.00** | **2.72** | **2.31** | **3.28** | **3.34** | **3.41** | **4.50** | **3.52** | **3.59** |

**PMI Paperwork Review Findings**

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

For example, despite recent PM inspections that would have captured burned out light bulbs, multiple lights were found to be inoperable. Table 5 below lists the defects found in the Lights category. It is possible that the lights burned out after the PMI was completed, but more likely the lights were not repaired either due to parts shortages or lack of attention to detail. These minor defects (yet still a Class A defect) represent the lack of attention from the maintenance department that may lead to substantial safety lapses. **If simple defects are not detected and repaired, TRC has little confidence in Transdev's ability to identify and repair serious or complex issues**.

| Table 5 | | |
|---|---|---|
| **Bus #** | **Last PMI** | **Class A "Lights" Defects** |
| 62625 | 02/28/19 | Marker lamp, rear roof center, inop |
| 62636 | 03/24/19 | Marker lamp, rear roof, inop |
| 62648 | 03/13/19 | Dome lamp, C/S #2, inop |
| 63140 | 02/21/19 | Dome lamp, C/S #5, inop |
| 63144 | 02/28/19 | Light, driver's light, inop |
| 63151 | 03/21/19 | Stepwell & courtesy lights, front & rear, inop |
| 63159 | 03/05/19 | Dome lamp, C/S #2, inop |

| Table 5 | | |
|---|---|---|
| **Bus #** | **Last PMI** | **Class A "Lights" Defects** |
| 63163 | 03/20/19 | Dome lamps, C/S #3 & #4, inop |
| 63188 | 03/13/19 | Dome lamps, C/S, all inop |
| 63191 | 03/14/19 | Dome lamps, C/S #3 #4 #5 & S/S #1, inop |
| 63194 | 02/28/19 | Dome lamp, C/S #2, inop |
| 63196 | 02/24/19 | Marker lamp, rear roof, inop |
| 63214 | 03/12/19 | Dome lamp, C/S #4, inop |

**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defects Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **Year-to-Year Defects Summary:** includes a year-to-year summary of defect totals and a year-to-year summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

**Class A –** Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

**Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Ninety-three (93) Class "A" safety-related defects were found during this inspection, for an average of 3.21 Class "A" safety-related defects per bus compared to 2.79 average Class "A" safety-related defects the previous audit. The 93 Class "A" defects found during this current audit are listed in Table 6 which follows.

**Table 6**

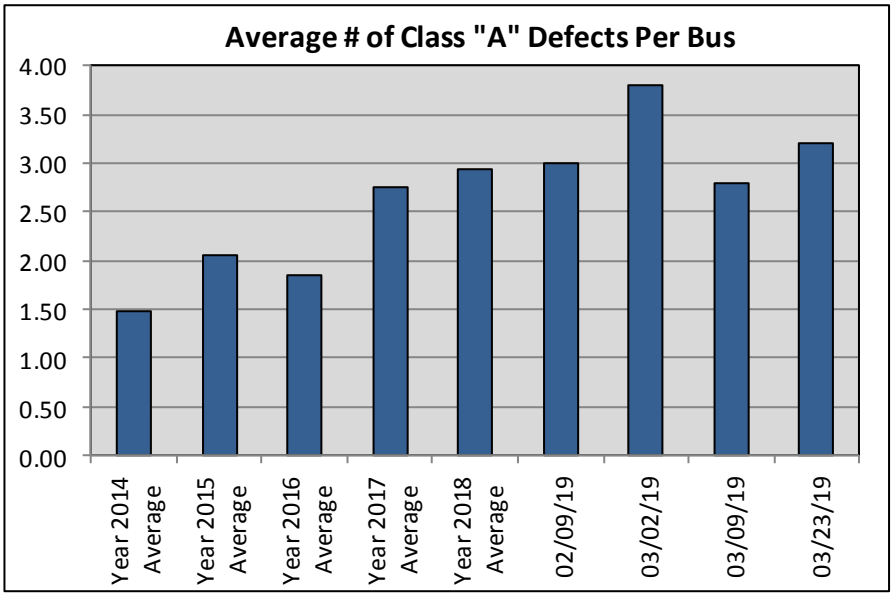
| Bus # | Year | Make | Last PMI | Class "A" Defects |
|---|---|---|---|---|
| 62625 | 2011 | Gillig | 02/28/19 | Oil leak, engine compartment, alternator seal leaking |
| 62625 | 2011 | Gillig | 02/28/19 | Marker lamp, rear roof center, inop |
| 62625 | 2011 | Gillig | 02/28/19 | Oil leak, engine compartment, rear main seal leaking |
| 62625 | 2011 | Gillig | 02/28/19 | Oil leak, engine compartment, oil cooler leaking |
| 62625 | 2011 | Gillig | 02/28/19 | Oil leak, engine compartment, leaking between air compressor & hydraulic pump |
| 62625 | 2011 | Gillig | 02/28/19 | Windshield washer, front, inop |
| 62627 | 2011 | Gillig | 03/21/19 | Oil leak, engine compartment, rear main seal leaking |
| 62627 | 2011 | Gillig | 03/21/19 | Oil leak, engine compartment, oil cooler leaking |
| 62627 | 2011 | Gillig | 03/21/19 | Oil leak, engine compartment, air compressor gasket leaking |
| 62634 | 2011 | Gillig | 03/14/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62635 | 2011 | Gillig | 02/28/19 | Oil leak, engine compartment, #1 injector connection leaking @ wire plug |
| 62636 | 2011 | Gillig | 03/24/19 | Marker lamp, rear roof, inop |
| 62636 | 2011 | Gillig | 03/24/19 | Oil leak, engine compartment, air compressor gasket leaking |
| 62636 | 2011 | Gillig | 03/24/19 | Oil leak, engine compartment, oil pan leaking |
| 62636 | 2011 | Gillig | 03/24/19 | Oil leak, engine compartment, rear main seal leaking |
| 62636 | 2011 | Gillig | 03/24/19 | Oil leak, engine compartment, alternator seal leaking |
| 62642 | 2012 | Gillig | 03/20/19 | Wheelchair alarm, front, inop |
| 62642 | 2012 | Gillig | 03/20/19 | Oil leak, engine compartment, steering reservoir leaking |
| 62642 | 2012 | Gillig | 03/20/19 | Oil leak, engine compartment, rear main seal leaking |
| 62642 | 2012 | Gillig | 03/20/19 | Oil leak, engine compartment, oil pressure switch leaking |
| 62645 | 2012 | Gillig | 03/05/19 | Oil leak, engine compartment, valve cover gasket leaking |
| 62645 | 2012 | Gillig | 03/05/19 | Oil leak, engine compartment, alternator seal leaking |
| 62645 | 2012 | Gillig | 03/05/19 | Coolant leak, engine compartment, coolant leak around turbo |
| 62645 | 2012 | Gillig | 03/05/19 | Oil leak, engine compartment, oil pan leaking |
| 62645 | 2012 | Gillig | 03/05/19 | Oil leak, engine compartment, timing cover leaking |
| 62647 | 2012 | Gillig | 02/13/19 | Oil leak, engine compartment, rear main seal leaking |
| 62647 | 2012 | Gillig | 02/13/19 | Oil leak, engine compartment, air compressor gasket leaking |
| 62647 | 2012 | Gillig | 02/13/19 | Oil leak, engine compartment, alternator seal leaking |
| 62647 | 2012 | Gillig | 02/13/19 | Radius rod, S/S rear lower, worn |
| 62647 | 2012 | Gillig | 02/13/19 | Oil leak, engine compartment, oil filler tube leaking |
| 62648 | 2012 | Gillig | 03/13/19 | Oil leak, engine compartment, leaking between air compressor & hydraulic pump |
| 62648 | 2012 | Gillig | 03/13/19 | Dome lamp, C/S #2, inop |
| 63139 | 2007 | Gillig | 03/20/19 | Oil leak, engine compartment, alternator seal leaking |
| 63139 | 2007 | Gillig | 03/20/19 | Oil leak, engine compartment, oil cooler leaking |
| 63139 | 2007 | Gillig | 03/20/19 | Oil leak, engine compartment, rear main seal leaking |
| 63140 | 2007 | Gillig | 02/21/19 | Dome lamp, C/S #5, inop |

| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 63140 | 2007 | Gillig | 02/21/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63140 | 2007 | Gillig | 02/21/19 | Booster fan, driver's compartment, inop |
| 63144 | 2007 | Gillig | 02/28/19 | Wheelchair lift, front, very slow / gets stuck at times |
| 63144 | 2007 | Gillig | 02/28/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63144 | 2007 | Gillig | 02/28/19 | Oil leak, engine compartment, steering reservoir leaking |
| 63144 | 2007 | Gillig | 02/28/19 | Light, driver's light, inop |
| 63144 | 2007 | Gillig | 02/28/19 | Auxiliary fan, driver's compartment, inop |
| 63151 | 2007 | Gillig | 03/21/19 | Radius rods, both rear lower, worn |
| 63151 | 2007 | Gillig | 03/21/19 | Oil leak, engine compartment, leaking between air compressor & hydraulic pump |
| 63151 | 2007 | Gillig | 03/21/19 | Wheelchair lift, front, intermittent |
| 63151 | 2007 | Gillig | 03/21/19 | Coolant line, engine compartment, coolant line to hydraulic fan collapsed / gets stuck |
| 63151 | 2007 | Gillig | 03/21/19 | Stepwell & courtesy lights, front & rear, inop |
| 63159 | 2008 | Gillig | 03/05/19 | Fuel leak, engine compartment, fuel leak by injector pump |
| 63159 | 2008 | Gillig | 03/05/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63159 | 2008 | Gillig | 03/05/19 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63159 | 2008 | Gillig | 03/05/19 | Dome lamp, C/S #2, inop |
| 63160 | 2008 | Gillig | 02/28/19 | Oil leak, engine compartment, fan control valve leaking |
| 63160 | 2008 | Gillig | 02/28/19 | Radius rod, S/S rear lower, worn |
| 63163 | 2008 | Gillig | 03/20/19 | Dome lamps, C/S #3 & #4, inop |
| 63163 | 2008 | Gillig | 03/20/19 | Hydraulic fan, engine compartment, inop |
| 63169 | 2008 | Gillig | 03/20/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63188 | 2009 | Gillig | 03/13/19 | Dome lamps, C/S, all inop |
| 63188 | 2009 | Gillig | 03/13/19 | Test lamp switch, driver's compartment, inop |
| 63188 | 2009 | Gillig | 03/13/19 | Brake shoes, front, worn to wear line |
| 63188 | 2009 | Gillig | 03/13/19 | Oil leak, engine compartment, rear main seal leaking |
| 63188 | 2009 | Gillig | 03/13/19 | Oil leak, engine compartment, oil cooler leaking |
| 63191 | 2009 | Gillig | 03/14/19 | Dome lamps, C/S #3 #4 #5 & S/S #1, inop |
| 63191 | 2009 | Gillig | 03/14/19 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63191 | 2009 | Gillig | 03/14/19 | Oil leak, S/S transmission, drain plug leaking |
| 63191 | 2009 | Gillig | 03/14/19 | A/C belt, engine compartment, cracked |
| 63192 | 2010 | Gillig | 03/06/19 | Brake shoes, S/S rear, worn to wear line |
| 63192 | 2010 | Gillig | 03/06/19 | Route sign, rear, scrambled |
| 63194 | 2009 | Gillig | 02/28/19 | Wheelchair ramp, front, no power |
| 63194 | 2009 | Gillig | 02/28/19 | Oil leak, engine compartment, oil cooler leaking |
| 63194 | 2009 | Gillig | 02/28/19 | Oil leak, engine compartment, leaking between air compressor & hydraulic pump |
| 63194 | 2009 | Gillig | 02/28/19 | Radius rod, C/S upper rear, worn |
| 63194 | 2009 | Gillig | 02/28/19 | Dome lamp, C/S #2, inop |
| 63196 | 2010 | Gillig | 02/24/19 | Marker lamp, rear roof, inop |
| 63196 | 2010 | Gillig | 02/24/19 | Oil leak, engine compartment, rear main seal leaking |
| 63196 | 2010 | Gillig | 02/24/19 | Oil leak, engine compartment, air compressor gasket leaking |
| 63204 | 2010 | Gillig | 02/23/19 | Oil leak, engine compartment, air compressor gasket |

| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| | | | | leaking |
| 63204 | 2010 | Gillig | 02/23/19 | Oil leak, engine compartment, oil cooler leaking |
| 63204 | 2010 | Gillig | 02/23/19 | Oil leak, at transmission, filler tube leaking |
| 63204 | 2010 | Gillig | 02/23/19 | Oil leak, engine compartment, rear main seal leaking |
| 63209 | 2010 | Gillig | 02/28/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63212 | 2010 | Gillig | 12/03/18 | Oil leak, engine compartment, steering reservoir leaking |
| 63214 | 2010 | Gillig | 03/12/19 | Window, C/S #2, shattered |
| 63214 | 2010 | Gillig | 03/12/19 | Dome lamp, C/S #4, inop |
| 63214 | 2010 | Gillig | 03/12/19 | Radius rods, both rear lower, worn |
| 63214 | 2010 | Gillig | 03/12/19 | Oil leak, engine compartment, oil cooler leaking |
| 63214 | 2010 | Gillig | 03/12/19 | Oil leak, engine compartment, leaking between air compressor & hydraulic pump |
| 63214 | 2010 | Gillig | 03/12/19 | Wheelchair ramp, front, won't deploy |
| 63215 | 2010 | Gillig | 03/08/19 | Drag link, at pitman arm, worn |
| 63215 | 2010 | Gillig | 03/08/19 | Radius rods, both rear lower, worn |
| 63215 | 2010 | Gillig | 03/08/19 | Oil leak, engine compartment, oil cooler leaking |
| 63215 | 2010 | Gillig | 03/08/19 | Oil leak, engine compartment, oil pan leaking |
| 63215 | 2010 | Gillig | 03/08/19 | Oil leak, engine compartment, air compressor gasket leaking |

Note in the table above that several significant defects were found even when the last PMI occurred within a week of our inspection.

The average number of Class "A" defects per bus increased this current audit when compared to all annual averages and the audit results of all audits conducted to date in 2019 with the exception of the March 2-4, 2019 audit. **Engine oil leaks continue to be a major defect found and contribute to increased fire risk.**




Comfort and Convenience

During this audit, TRC found the interiors of buses to be kept clean.

Structural Integrity
TRC did not observe any structural defects during this audit.

**PMI Schedule Adherence**

TRC examined the PMI records of the thirty-six (36) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. ***Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects****. A review of inspector's qualifications and training is recommended.*

**SUMMARY OF RECOMMENDATIONS**

The average number of total defects and Class "A" defects per bus is the second highest recorded, and higher than all annual averages.

Ninety-three (93) Class "A" safety-related defects were found during this current audit, or 3.21 average Class "A" defects per bus, compared to 2.79 average Class "A" defects per bus last audit. TRC cautioned that the improvements shown after the November 15, 2018 meeting would be sustainable only if a proper plan was put in place. Further corrective action and intervention by the County is again recommended.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- **TRC continues to recommend that the County establish a maximum defects-per-bus goal to hold Transdev accountable.**

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- Due to the numerous damaged curbside compartment door defects found during this current audit, TRC recommends that a road supervisor investigate the cause of these defects (i.e. obstacles at bus stops, etc.) or additional driver training be provided.

- TRC continues to recommend that buses that have been out of service for an extended period of time be repaired immediately or disposed of to get them 'off the books'.

- TRC continues to recommend a review of the number of buses that are unavailable for inspection during each audit. The current number of unavailable buses is unacceptable to maintain operations and meet daily pull-out.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). In addition, maintenance must reinforce the importance of identifying and repairing simple defects. The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue or lack of attention.

**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

# Prince George's County

## Fleet Maintenance Audit

**Inspection #77**
**Twenty-nine (29) Buses**

Conducted March 9 - 11, 2019

March 13, 2019

**TRANSIT RESOURCE CENTER**

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**Winter Springs, FL 32708**
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# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Twenty-nine (29) Buses
# Conducted March 9 - 11, 2019

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# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Twenty-nine (29) Buses
# Conducted March 9 - 11, 2019

## EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted March 9-11, 2019 by TRC for Prince George's County. Forty-five (45) buses were scheduled for the fleet inspection and maintenance record review. In total, twenty-nine (29) buses were inspected. Sixteen (16) buses were not available for inspection due to the following reasons: Bus 62629/transmission, Bus 62637 /would not start, Bus 62639/engine, Bus 62652/engine, Bus 63092/wheelchair & air conditioning, Bus 63148/accident, Bus 63164/accident, Bus 63166/transmission, Bus 63189/accident, Bus 63198/engine, Bus 63199/transmission, Bus 63201/accident, Bus 63207/transmission, Bus 63212/engine, Bus 63215/DPF, and Bus 63216/engine. As with previous audits, *TRC is concerned about the high number of buses not available for inspection*. In this case, **over 35% of the buses selected were not available for inspection** for the various reasons listed above, compared to 27% the previous audit. The FTA guideline is to carry a maximum spare ratio of 20% to account for vehicle downtime.

The results of this current audit are as follows:

| | |
|---|---|
| Total Defects | 102 |
| Average Defects per Bus | 3.52 |
| Total Class "A" Safety-Related Defects | 81 |
| Average Class "A" Safety-Related Defects per Bus | 2.79 |

The Audit Trend Comparison table found on Page 6 shows the audit results annual averages for years 2014-18 and the audit results for all audits conducted to date in 2019. Results from this current audit show a decrease in both the average number of total defects per bus and the average number of Class "A" defects per bus compared to the audit results from the previous audit. Although the total defects per bus declined, the results for this current audit are higher than desired and higher than all annual averages and the February 9–11, 2019 audit results. The number of Class "A" defects per bus results for this current audit are also higher than the annual averages for years 2014-17.

TRC has repeatedly voiced our concerns about the deteriorating condition of the fleet. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. After this meeting, TRC reported a noticeable improvement in the condition of the fleet during the December 2018 audits, but cautioned that it was too early to tell if the improvement was sustainable. As mentioned above, the results of this current audit show an improvement when compared to the March 2-4, 2019 audit; however, continue to show increases when compared to previous audit results. TRC does not have confidence in Transdev's corrective action and improvement plan.

As with previous audits, the "engine compartment" category remains the most significant area of concern. This single category accounted for more than 38% of all defects found and increased from more than 35% last audit. TRC continues to be concerned about the lack of progress in addressing engine compartment leaks and related defects.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

# Audit Report

## BUSES INSPECTED

Twenty-nine (29) buses received a physical inspection during this audit. Table 1 below identifies these 29 buses.

**Table 1**
**Buses Inspected**

| PHYSICAL INSPECTION | MODEL YEAR | VEHICLE MAKE | MOST RECENT PM |
|---|---|---|---|
| 62622 | 2011 | Gillig | 02/12/19 |
| 62623 | 2012 | Gillig | 03/03/19 |
| 62625 | 2011 | Gillig | 02/28/19 |
| 62626 | 2011 | Gillig | 02/28/19 |
| 62627 | 2011 | Gillig | 01/27/19 |
| 62628 | 2011 | Gillig | 01/30/19 |
| 62631 | 2011 | Gillig | 01/07/19 |
| 62633 | 2011 | Gillig | 03/05/19 |
| 62638 | 2011 | Gillig | 03/01/19 |
| 62640 | 2012 | Gillig | 02/19/19 |
| 62643 | 2012 | Gillig | 02/28/19 |
| 62646 | 2012 | Gillig | 02/28/19 |
| 62649 | 2012 | Gillig | 02/07/19 |
| 62650 | 2012 | Gillig | 02/11/19 |
| 63141 | 2007 | Gillig | 03/07/19 |
| 63142 | 2007 | Gillig | 01/14/19 |
| 63143 | 2007 | Gillig | 02/15/19 |
| 63149 | 2007 | Gillig | 02/28/19 |
| 63161 | 2008 | Gillig | 01/13/19 |
| 63165 | 2008 | Gillig | 02/28/19 |
| 63167 | 2008 | Gillig | 02/15/19 |
| 63190 | 2009 | Gillig | 02/17/19 |
| 63193 | 2009 | Gillig | 02/27/19 |
| 63202 | 2010 | Gillig | 02/28/19 |
| 63203 | 2010 | Gillig | 03/05/19 |
| 63205 | 2010 | Gillig | 02/06/19 |
| 63206 | 2010 | Gillig | 03/05/19 |
| 63210 | 2010 | Gillig | 02/16/19 |
| 63213 | 2010 | Gillig | 02/28/19 |

Table 2 which follows identifies the sixteen buses that were not available for inspection. *TRC continues to be concerned about the high number of buses not available for inspection. Thirty-six percent (36%) of buses selected for this audit were not available for inspection compared to 27% the previous audit.*

**Table 2**
**Buses Not Available for Inspection**

| BUSES NOT INSPECTED | MODEL YEAR | VEHICLE MAKE | REASON |
|---|---|---|---|
| 62629 | 2011 | Gillig | Transmission |
| 62637 | 2011 | Gillig | Would not start |
| *62639 | 2012 | Gillig | Engine |
| 62652 | 2012 | Gillig | Engine |
| *63092 | 2006 | Gillig | Wheelchair & A/C |
| 63148 | 2007 | Gillig | Accident |
| 63164 | 2006 | Gillig | Accident |
| 63166 | 2006 | Gillig | Transmission |
| *63189 | 2009 | Gillig | Accident |
| *63198 | 2010 | Gillig | Engine |
| 63199 | 2010 | Gillig | Transmission |
| 63201 | 2010 | Gillig | Accident |
| 63207 | 2010 | Gillig | Transmission |
| 63212 | 2010 | Gillig | Engine |
| 63215 | 2010 | Gillig | DPG |
| 63216 | 2010 | Gillig | Engine |

*Note: Bus has been unavailable for inspections for 3 months or longer

## EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Jim Wilson, Sylvester Fikes, Alusine Kanu, and Anthony Greenfield. Sebastian Silvani served as the project manager, organized the overall inspection process, and prepared the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

### Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights

13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

**Class A** – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

**Maintenance Record Review**

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;

- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the twenty-nine (29) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the twenty-nine (29) buses to determine if and when defects defined during the PMI process were repaired.

2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

## FINDINGS

### Overall Fleet Condition

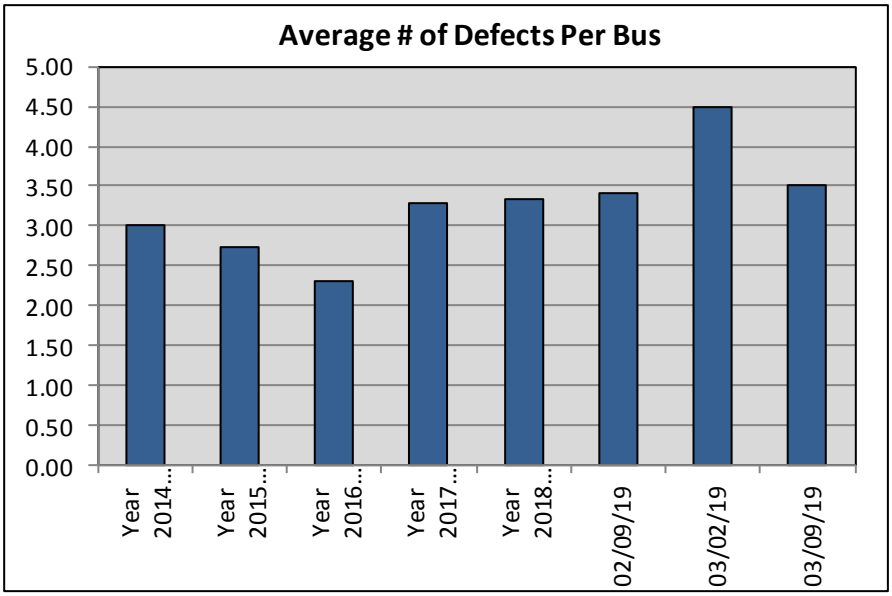
One hundred & two (102) defects were found during this current audit, or 3.52 average defects per bus. This is a decrease when compared to the previous audit conducted March 2–4, 2019, however, is higher than all annual averages and the February 9–11, 2019 audit results. TRC encourages the County to demand immediate action from Transdev to reverse this trend.

The Audit Trend Comparison table which follows shows the annual average number of defects per audit and the annual average number of defects per bus for the audits conducted in years 2014-18 and the audit results for all audits conducted to date in 2019. Table 3 also shows the annual average number of Class "A" defects per audit and the annual average number of Class "A" defects per bus for years 2014-18 and the audit results for all audits conducted to date in 2019.

**Table 3**
**Audit Trend Comparison**

| Date | Average Defects Per Audit | Average Defects per Bus | Average Class "A" Defects Per Audit | Average Class "A" Defects per Bus |
|---|---|---|---|---|
| Year 2014 | 126 | 3.00 | 62 | 1.48 |
| Year 2015 | 98 | 2.72 | 74 | 2.06 |
| Year 2016 | 74 | 2.31 | 59 | 1.84 |
| Year 2017 | 105 | 3.28 | 88 | 2.75 |
| Year 2018 | 97 | 3.34 | 85 | 2.93 |
| Feb. 9 – 11, 2019 | 92 | 3.41 | 81 | 3.00 |
| March 2 – 4, 2019 | 135 | 4.50 | 114 | 3.80 |
| March 9 – 11, 2019 | 102 | 3.52 | 81 | 2.79 |

As shown in the table above and the chart which follows, the average number of defects per bus decreased this current audit, however, is higher than all annual averages and the February 9–11, 2019 audit results. This slight decrease is not expected to be part of a longer term trend and the condition of the fleet continues to be a cause for concern. As previously mentioned, TRC recommends that the County establish a realistic defect goal for Transdev to meet during these audits. Short term actions have proven ineffective in achieving lasting improvement.




**Defects Findings**

Defects were found in the Accessibility Features, Air System/Brake System, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Suspension/Steering, Tires, and Transmission categories. The Engine Compartment remains as the primary concern, comprising over 38% of the total defects. **Engine compartment defects represent a critical fire risk.** Other categories of concern due to higher than acceptable number of defects include Suspension/Steering, Exterior Body Condition, and Lights. On a positive note, the Air System/Brake System category saw a significant decrease in defects.

The Summary of Defects by Category table which follows compares key performance indicators from this current audit to the average annual results and the results of the all audits conducted to date in 2019. Although the Engine Compartment defects decreased when compared to the previous audit, the number remains high and continues to be a critical area of concern for this current audit.

| Table 4<br>Summary of Defect by Category | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Summary of Defects by Category** | **Year 2014 Avg** | **Year 2015 Avg** | **Year 2016 Avg** | **Year 2017 Avg** | **Year 2018 Avg** | **Insp #75 Feb 2019** | **Insp #76 Mar 2019** | **Insp #77 Mar 2019** |
| Accessibility Features | 7 | 2 | 3 | 3 | 2 | 3 | 4 | 6 |
| Air System/Brake System | 15 | 8 | 7 | 7 | 4 | 1 | 13 | 5 |
| Climate Control | 2 | 0 | 0 | 1 | 0 | 2 | 0 | 0 |
| Destination Signs | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Differential | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| Driver's Controls | 5 | 2 | 1 | 2 | 1 | 3 | 2 | 1 |
| Electrical System | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| Engine Compartment | 36 | 27 | 24 | 34 | 44 | 37 | 48 | 39 |
| Exhaust | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exterior Body Condition | 15 | 18 | 12 | 12 | 13 | 9 | 16 | 22 |
| Interior Condition | 13 | 13 | 4 | 10 | 2 | 2 | 16 | 3 |
| Lights | 7 | 6 | 5 | 6 | 5 | 15 | 22 | 10 |
| Passenger Controls | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 0 |
| Safety Equipment | 7 | 4 | 1 | 1 | 0 | 0 | 2 | 0 |
| Structure/Chassis/ Fuel Tank | 2 | 1 | 1 | 2 | 0 | 1 | 0 | 0 |
| Suspension/Steering | 10 | 10 | 10 | 19 | 22 | 13 | 9 | 11 |
| Tires | 3 | 1 | 3 | 2 | 2 | 2 | 0 | 2 |
| Transmission | 2 | 2 | 2 | 1 | 2 | 4 | 1 | 3 |
| **Total Defects** | **126** | **98** | **74** | **105** | **97** | **92** | **135** | **102** |
| **Average Defects Per Bus** | **3.00** | **2.72** | **2.31** | **3.28** | **3.34** | **3.41** | **4.50** | **3.52** |

**PMI Paperwork Review Findings**

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

For example, despite recent PM inspections that would have captured burned out light bulbs, multiple lights were found to be inoperable. Table 5 below lists the defects found in the Lights category. It is possible that the lights burned out after the PMI was completed, but more likely the lights were not repaired either due to parts shortages or lack of attention to detail. These minor defects (yet still a Class A defect) represent the lack of attention from the maintenance department that may lead to substantial safety lapses. **If simple defects are not detected and repaired, TRC has little confidence in Transdev's ability to identify and repair serious or complex issues**.

| Table 5 | | |
|---|---|---|
| **Bus #** | **Last PMI** | **Class A "Lights" Defects** |
| 62623 | 03/03/19 | Dome lamps, S/S #4 & #5, inop |
| 63141 | 03/07/19 | Step well light, by #1 door, inop |
| 63141 | 03/07/19 | Overhead light, driver's compartment, inop |
| 63143 | 02/15/19 | Dome lamps, S/S #2 & #5, inop |
| 63149 | 02/28/19 | Courtesy lights, by #3 & #4 doors, inop |
| 63161 | 01/13/19 | Dome lamp, C/S #5, inop |

| Table 5 | | |
|---|---|---|
| **Bus #** | **Last PMI** | **Class A "Lights" Defects** |
| 63165 | 02/28/19 | Dome lamps, C/S #1 #3 #4 #5 & S/S #5, inop |
| 63190 | 02/17/19 | Courtesy lamps, by #3 & #4 doors, inop |
| 63190 | 02/17/19 | Dome lamp, C/S #5, inop |
| 63202 | 02/28/19 | Dome lamp, S/S #1, inop |

**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defects Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **Year-to-Year Defects Summary:** includes a year-to-year summary of defect totals and a year-to-year summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

**Class A –** Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

**Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Eighty-one (81) Class "A" safety-related defects were found during this inspection, for an average of 2.79 Class "A" safety-related defects per bus compared to 3.80 average Class "A" safety-related defects the previous audit. The 81 Class "A" defects found during this current audit are listed in Table 6 which follows.

**Table 6**

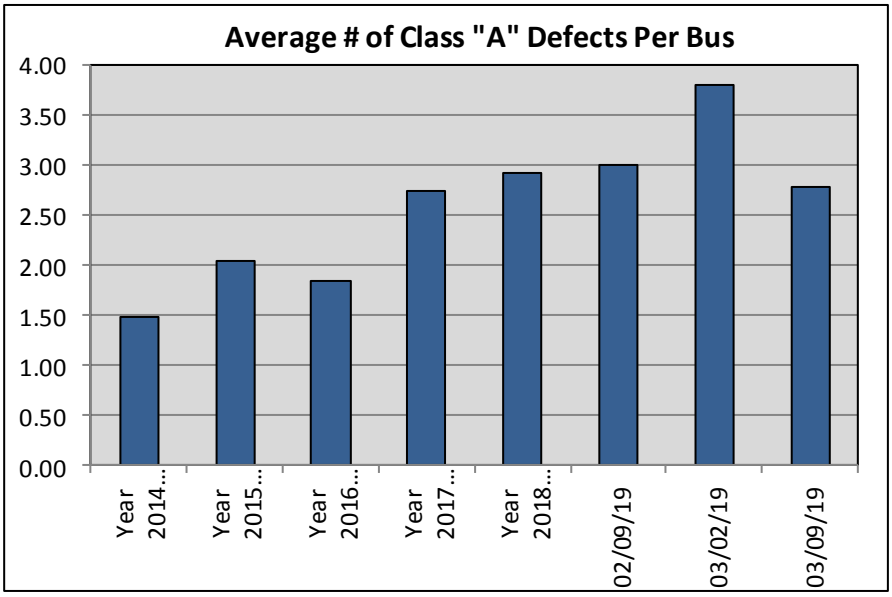
| Bus # | Year | Make | Last PMI | Class "A" Defects |
|---|---|---|---|---|
| 62622 | 2011 | Gillig | 02/12/19 | Oil leak, engine compartment, alternator front seal leaking |
| 62622 | 2011 | Gillig | 02/12/19 | Coolant leak, engine compartment, surge tank cap leaking |
| 62622 | 2011 | Gillig | 02/12/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62622 | 2011 | Gillig | 02/12/19 | Coolant pipe bracket, engine compartment, bolt broken in transmission |
| 62623 | 2012 | Gillig | 03/03/19 | Dome lamps, S/S #4 & #5, inop |
| 62623 | 2012 | Gillig | 03/03/19 | Windshield, S/S, BB hole |
| 62625 | 2011 | Gillig | 02/28/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62626 | 2011 | Gillig | 02/28/19 | A/C belt, engine compartment, cracked |
| 62626 | 2011 | Gillig | 02/28/19 | Oil leak, engine compartment, alternator front seal leaking |
| 62626 | 2011 | Gillig | 02/28/19 | Oil leak, steering, reservoir leaking |
| 62627 | 2011 | Gillig | 01/27/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62627 | 2011 | Gillig | 01/27/19 | Wheelchair flip-up seat, S/S #1 forward facing seat, won't lock |
| 62628 | 2011 | Gillig | 01/30/19 | Oil leak, engine compartment, rear main seal leaking |
| 62628 | 2011 | Gillig | 01/30/19 | Interlock, rear door, won't come on (repaired by mechanic) |
| 62628 | 2011 | Gillig | 01/30/19 | Wheelchair flip-up seat, C/S, won't lock in down position |
| 62631 | 2011 | Gillig | 01/07/19 | Drag link, both ends, worn |
| 62631 | 2011 | Gillig | 01/07/19 | Brake shoes, both rear, half of shoes making contact with drum |
| 62633 | 2011 | Gillig | 03/05/19 | King pin, C/S, worn |
| 62633 | 2011 | Gillig | 03/05/19 | Coolant leak, engine compartment, surge tank cap leaking |
| 62633 | 2011 | Gillig | 03/05/19 | Oil leak, engine compartment, air compressor gasket leaking |
| 62633 | 2011 | Gillig | 03/05/19 | Oil leak, engine compartment, oil cooler leaking |
| 62633 | 2011 | Gillig | 03/05/19 | Oil leak, C/S engine compartment, oil pan gasket leaking |
| 62638 | 2011 | Gillig | 03/01/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62640 | 2012 | Gillig | 02/19/19 | Wheelchair ramp, front, won't stow (gets stuck) |
| 62640 | 2012 | Gillig | 02/19/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62643 | 2012 | Gillig | 02/28/19 | Oil leak, engine compartment, oil cooler leaking |
| 62643 | 2012 | Gillig | 02/28/19 | Oil leak, engine compartment, gasket between A/C compressor & hydraulic pump leaking |
| 62643 | 2012 | Gillig | 02/28/19 | Oil leak, engine compartment, oil coming out of oil filler tube (blow by) |
| 62646 | 2012 | Gillig | 02/28/19 | Oil leak, transmission, leaking from top |

| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 62646 | 2012 | Gillig | 02/28/19 | Oil leak, engine compartment, oil cooler leaking |
| 62646 | 2012 | Gillig | 02/28/19 | Oil leak, engine compartment, oil filler tube leaking @ block |
| 62646 | 2012 | Gillig | 02/28/19 | Oil leak, S/S engine compartment, oil pan leaking |
| 62649 | 2012 | Gillig | 02/07/19 | Tie rod end, @ pitman arm, worn |
| 62649 | 2012 | Gillig | 02/07/19 | Drag link, C/S end, worn |
| 62649 | 2012 | Gillig | 02/07/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62650 | 2012 | Gillig | 02/11/19 | Brake shoes, S/S rear, worn below wear line |
| 62650 | 2012 | Gillig | 02/11/19 | Window shade, driver's side, broken (won't lock) |
| 62650 | 2012 | Gillig | 02/11/19 | Oil leak, engine compartment, timing chain cover leaking |
| 63141 | 2007 | Gillig | 03/07/19 | Compartment door, S/S rear, damaged |
| 63141 | 2007 | Gillig | 03/07/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63141 | 2007 | Gillig | 03/07/19 | Step well light, by #1 door, inop |
| 63141 | 2007 | Gillig | 03/07/19 | Overhead light, driver's compartment, inop |
| 63142 | 2007 | Gillig | 01/14/19 | Oil leak, engine compartment, alternator end plate leaking |
| 63142 | 2007 | Gillig | 01/14/19 | Radius rods, both rear upper, worn |
| 63142 | 2007 | Gillig | 01/14/19 | Radius rods, S/S rear lower, worn |
| 63142 | 2007 | Gillig | 01/14/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63142 | 2007 | Gillig | 01/14/19 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63143 | 2007 | Gillig | 02/15/19 | Wheelchair lift restraint, front, won't come down |
| 63143 | 2007 | Gillig | 02/15/19 | Oil leak, C/S rear, shock absorber leaking |
| 63143 | 2007 | Gillig | 02/15/19 | Dome lamps, S/S #2 & #5, inop |
| 63149 | 2007 | Gillig | 02/28/19 | Radius rods, both rear upper, worn |
| 63149 | 2007 | Gillig | 02/28/19 | Courtesy lights, by #3 & #4 doors, inop |
| 63161 | 2008 | Gillig | 01/13/19 | Dome lamp, C/S #5, inop |
| 63161 | 2008 | Gillig | 01/13/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63161 | 2008 | Gillig | 01/13/19 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63161 | 2008 | Gillig | 01/13/19 | Wheelchair ramp, front, won't deploy |
| 63165 | 2008 | Gillig | 02/28/19 | Air tanks, air system, full of water |
| 63165 | 2008 | Gillig | 02/28/19 | Dome lamps, C/S #1 #3 #4 #5 & S/S #5, inop |
| 63165 | 2008 | Gillig | 02/28/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63165 | 2008 | Gillig | 02/28/19 | Compartment door, C/S rear, damaged |
| 63165 | 2008 | Gillig | 02/28/19 | Oil leak, engine compartment, oil filler tube leaking |
| 63190 | 2009 | Gillig | 02/17/19 | Courtesy lamps, by #3 & #4 doors, inop |
| 63190 | 2009 | Gillig | 02/17/19 | Tire, S/S rear inner, worn |
| 63190 | 2009 | Gillig | 02/17/19 | Dome lamp, C/S #5, inop |
| 63193 | 2009 | Gillig | 02/27/19 | Oil leak, engine compartment, timing cover seal leaking |
| 63193 | 2009 | Gillig | 02/27/19 | Oil leak, engine compartment, oil leak between air compressor & hydraulic pump |
| 63193 | 2009 | Gillig | 02/27/19 | Oil leak, engine compartment, oil filler tube leaking @ block |
| 63193 | 2009 | Gillig | 02/27/19 | Wheelchair flip-up seats, C/S & S/S, won't lock in down position |
| 63202 | 2010 | Gillig | 02/28/19 | Dome lamp, S/S #1, inop |

| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 63202 | 2010 | Gillig | 02/28/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63202 | 2010 | Gillig | 02/28/19 | Coolant pipe bracket, engine compartment, broken (replaced by mechanic) |
| 63202 | 2010 | Gillig | 02/28/19 | Tires. C/S rear, worn (replaced by mechanic) |
| 63202 | 2010 | Gillig | 02/28/19 | Coolant leak, engine compartment, surge tank cap leaking |
| 63203 | 2010 | Gillig | 03/05/19 | Oil leak, engine compartment, oil pressure switch leaking |
| 63205 | 2010 | Gillig | 02/06/19 | King pin, S/S, worn |
| 63205 | 2010 | Gillig | 02/06/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63206 | 2010 | Gillig | 03/05/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63206 | 2010 | Gillig | 03/05/19 | Radius rods, both front upper, worn |
| 63210 | 2010 | Gillig | 02/16/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63210 | 2010 | Gillig | 02/16/19 | Windshield, S/S, large crack |
| 63213 | 2010 | Gillig | 02/28/19 | Oil leak, engine compartment, rear main seal leaking (engine dirty) |

Note in the table above that several significant defects were found even when the last PMI occurred within a week of our inspection.

The average number of Class "A" defects per bus decreased this current audit when compared to the 2018 annual average number of Class "A" defects per bus and the audit results for the audits conducted February 9-11, 2019 and March 2-4, 2019, however, increased when compared to the annual averages for years 2014-2017.




Comfort and Convenience

During this audit, TRC found the interiors of buses to be kept clean.

Structural Integrity
TRC did not observe any structural defects during this audit.

**PMI Schedule Adherence**

TRC examined the PMI records of the twenty-nine (29) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. ***Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects****. A review of inspector's qualifications and training is recommended.*

**SUMMARY OF RECOMMENDATIONS**

The total number of defects identified in this audit decreased when compared to the previous audit conducted March 2–4, 2019, however, is higher than all annual averages and the February 9–11, 2019 audit results. Eighty-one (81) Class "A" safety-related defects were found during this current audit, or 2.79 average Class "A" defects per bus compared to 3.80 average Class "A" defects per bus last audit. The average number of Class "A" defects per bus decreased this current audit when compared to the 2018 annual average number of Class "A" defects per bus and the audit results for the audits conducted February 9-11, 2019 and March 2-4, 2019, however, increased when compared to the annual averages for years 2014-2017. TRC cautioned that the improvements shown after the November 15, 2018 meeting would be sustainable only if a proper plan was put in place. Further corrective action and intervention by the County is again recommended.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- **TRC continues to recommend that the County establish a maximum defects-per-bus goal to hold Transdev accountable.**

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- Due to the numerous damaged curbside compartment door defects found during this current audit, TRC recommends that a road supervisor investigate the cause of these defects (i.e. obstacles at bus stops, etc.) or additional driver training be provided.

- TRC continues to recommend that buses that have been out of service for an extended period of time be repaired immediately or disposed of to get them 'off the books'.

- TRC continues to recommend a review of the number of buses that are unavailable for inspection during each audit. The current number of unavailable buses is unacceptable to maintain operations and meet daily pull-out.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). In addition, maintenance must reinforce the importance of identifying and repairing simple defects. The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue or lack of attention.

**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

# Prince George's County

## Fleet Maintenance Audit

**Inspection #76**
**Thirty (30) Buses**

Conducted March 2 - 4, 2019

**TRANSIT RESOURCE CENTER**

**5840 Red Bug Lake Road**
**Suite 165**
**Winter Springs, FL 32708**
**Phone: (407) 977-4500**
**Fax: (407) 977-7333**
**tranrc@earthlink.net**

March 6, 2019

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty (30) Buses
# Conducted March 2 - 4, 2019

## TABLE OF CONTENTS

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty (30) Buses
# Conducted March 2 - 4, 2019

## EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted March 2 - 4, 2019 by TRC for Prince George's County. Forty-one (41) buses were scheduled for the fleet inspection and maintenance record review. In total, thirty (30) buses were inspected. Eleven (11) buses were not available for inspection due to the following reasons: Bus 62629/transmission, Bus 62639/engine, Bus 62652/engine, Bus 63092/wheelchair & A/C, Bus 63141/oil leak, Bus 63148, accident, Bus 63189/accident, Bus 63198/engine, Bus 63199/transmission, Bus 63210/windshield, and Bus 63212/engine. As with previous audits, *TRC is concerned about the high number of buses not available for inspection*. In this case, as with the previous audit, 27% of buses selected were not available for the various reasons listed above.

The results of this current audit are as follows:

| | |
|---|---|
| Total Defects | 135 |
| Average Defects per Bus | 4.50 |
| Total Class "A" Safety-Related Defects | 114 |
| Average Class "A" Safety-Related Defects per Bus | 3.80 |

The Audit Trend Comparison table found on Page 6 shows the audit results annual averages for years 2014-18, the audit results for the audit conducted February 9 – 11, 2019 and results for this current audit. Results from this current audit show an increase in both average number of defects per bus and average number of Class "A" defects per bus compared to the audit results from the previous audit and the annual averages.

TRC has voiced serious concerns about the deteriorating condition of the fleet. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. TRC previously reported a noticeable improvement in the condition of the fleet during subsequent December 2018 audits, but cautioned that it was too early to tell if the improvement was sustainable. The results of this current audit and the previous audit show a marked deterioration in the condition of the fleet. TRC does not have confidence in Transdev's corrective action and improvement plan.

As with previous audits, the "engine compartment" category remains the most significant area of concern. This single category accounted for more than 35% of all defects found. TRC continues to be concerned about the lack of progress in addressing engine compartment leaks and related defects.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

# Audit Report

## BUSES INSPECTED

Thirty (30) buses received a physical inspection during this audit. Table 1 below identifies these 30 buses.

**Table 1**
**Buses Inspected**

| PHYSICAL INSPECTION | MODEL YEAR | VEHICLE MAKE | MOST RECENT PM |
|---|---|---|---|
| 62617 | 2011 | Gillig | 01/30/19 |
| 62618 | 2012 | Gillig | 02/06/19 |
| 62619 | 2011 | Gillig | 02/28/19 |
| 62624 | 2011 | Gillig | 05/06/18 |
| 62630 | 2011 | Gillig | 02/12/19 |
| 62641 | 2012 | Gillig | 02/28/19 |
| 62644 | 2012 | Gillig | 02/07/19 |
| 62646 | 2012 | Gillig | 02/28/19 |
| 62651 | 2012 | Gillig | 02/11/19 |
| 63139 | 2007 | Gillig | 01/29/19 |
| 63140 | 2007 | Gillig | 02/21/19 |
| 63144 | 2007 | Gillig | 02/28/19 |
| 63146 | 2007 | Gillig | 02/14/19 |
| 63150 | 2007 | Gillig | 02/28/19 |
| 63160 | 2008 | Gillig | 02/28/19 |
| 63161 | 2008 | Gillig | 01/13/19 |
| 63162 | 2008 | Gillig | 01/17/19 |
| 63168 | 2008 | Gillig | 02/17/19 |
| 63188 | 2009 | Gillig | 02/17/19 |
| 63192 | 2010 | Gillig | 02/28/19 |
| 63195 | 2009 | Gillig | 02/28/19 |
| 63196 | 2010 | Gillig | 02/24/19 |
| 63200 | 2010 | Gillig | 02/28/19 |
| 63204 | 2010 | Gillig | 02/23/19 |
| 63205 | 2010 | Gillig | 02/06/19 |
| 63206 | 2010 | Gillig | 02/27/19 |
| 63208 | 2010 | Gillig | 01/27/19 |
| 63211 | 2010 | Gillig | 02/28/19 |
| 63214 | 2010 | Gillig | 10/12/18 |
| 63217 | 2010 | Gillig | 02/27/19 |

Table 2 which follows identifies the eleven buses that were not available for inspection. *TRC continues to be concerned about the high number of buses not available for inspection. Twenty-seven percent (27%) of buses selected for this audit were not available for inspection.*

| Table 2<br>Buses Not Available for Inspection | | | |
|---|---|---|---|
| **BUSES NOT INSPECTED** | **MODEL YEAR** | **VEHICLE MAKE** | **REASON** |
| 62629 | 2011 | Gillig | Transmission |
| 62639* | 2012 | Gillig | Engine |
| 62652 | 2012 | Gillig | Engine |
| 63092* | 2006 | Gillig | Wheelchair & A/C |
| 63141 | 2007 | Gillig | Oil leak |
| 63148* | 2007 | Gillig | Accident |
| 63189 | 2009 | Gillig | Accident |
| 63198* | 2010 | Gillig | Engine |
| 63199 | 2010 | Gillig | Transmission |
| 63210 | 2010 | Gillig | Windshield |
| 63212 | 2010 | Gillig | Engine |

*Note: Bus has been unavailable for inspections for 3 months or longer

## EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of four bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Jim Wilson, Sylvester Fikes, and Alusine Kanu. Sebastian Silvani served as the project manager, organized the overall inspection process, and prepared the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

### Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering

17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

**Class A** – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

**Maintenance Record Review**

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;

- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty (30) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty (30) buses to determine if and when defects defined during the PMI process were repaired.

2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

## FINDINGS

### Overall Fleet Condition

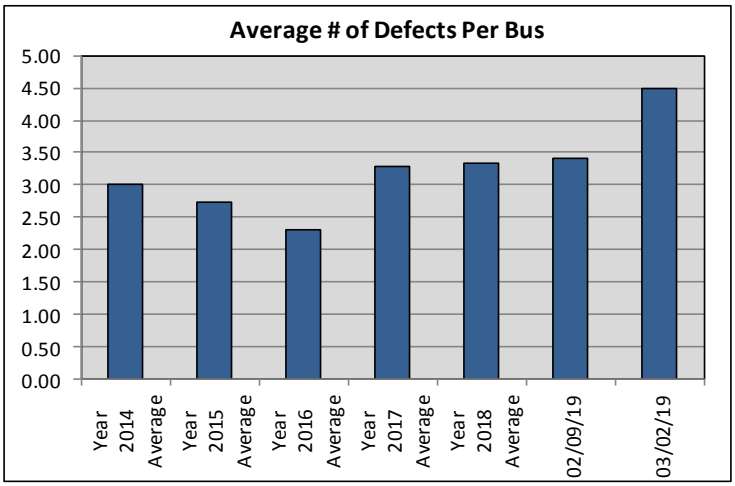
One hundred & thirty-five (135) defects were found during this current audit, or 4.50 average defects per bus. This is a significant increase over the previous audit conducted February 9–11, 2019 and is also higher than all other annual averages. TRC encourages the County to demand immediate action from Transdev to reverse this trend.

The Audit Trend Comparison table which follows shows the annual average number of defects per audit and the annual average number of defects per bus for the audits conducted in years 2014-18, the audit results for the audit conducted February 9-11, 2019 and the audit results of this current audit. Table 3 also shows the annual average number of Class "A" defects per audit and the annual average number of Class "A" defects per bus for years 2014-18, the audit results for the previous audit and the audit results for this current audit.

**Table 3**
**Audit Trend Comparison**

| Date | Average Defects Per Audit | Average Defects per Bus | Average Class "A" Defects Per Audit | Average Class "A" Defects per Bus |
|---|---|---|---|---|
| Year 2014 | 126 | 3.00 | 62 | 1.48 |
| Year 2015 | 98 | 2.72 | 74 | 2.06 |
| Year 2016 | 74 | 2.31 | 59 | 1.84 |
| Year 2017 | 105 | 3.28 | 88 | 2.75 |
| Year 2018 | 97 | 3.34 | 85 | 2.93 |
| Feb. 9 – 11, 2019 | 92 | 3.41 | 81 | 3.00 |
| March 2 – 4, 2019 | 135 | 4.50 | 114 | 3.80 |

As shown in the table above and the chart which follows, the average number of defects per bus increased this current audit. The sharp increase is cause for concern, and the County must work with Transdev to develop a corrective action plan or enforce the agreement reached on November 15, 2018. As previously mentioned, TRC recommends that the County establish a realistic defect goal for Transdev to meet during these audits. Short term actions have proven ineffective in achieving lasting improvement.



**Defects Findings**

Defects were found in the Accessibility Features, Air System/Brake System, Destination Signs, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Passenger Controls, Safety Equipment, Suspension/Steering, and Transmission categories. The Engine Compartment remains as the primary concern, comprising over 35% of the total defects. **Engine compartment defects represent a critical fire risk.** The Suspension/Steering category defects decreased when compared to the previous audit and the annual audit averages, however, the Lights category, once again, experienced an increase when compared to the previous audit and all annual averages. This is concerning because it may represent lack of attention and care by the maintenance personnel to repair simple items. In addition, the Air System/Brake System category saw a sharp increase in the number of defects. Air System/Brake System defects present a critical safety and fire risk. An air system defect was identified as the probable root cause of a dragging brake and near-fire incident by Transdev.

The Summary of Defects by Category table below compares key performance indicators from this current audit to the average annual results and the results of the previous audit conducted February 9-11, 2019. A critical area of concern for this current audit continues to be in the Engine Compartment, Air System, and Lights which are highlighted in Table 4 below.

**Table 4**
**Summary of Defect by Category**

| Summary of Defects by Category | Year 2014 Avg | Year 2015 Avg | Year 2016 Avg | Year 2017 Avg | Year 2018 Avg | Insp #75 Feb 2019 | Insp #76 Mar 2019 |
|---|---|---|---|---|---|---|---|
| Accessibility Features | 7 | 2 | 3 | 3 | 2 | 3 | 4 |
| Air System/Brake System | 15 | 8 | 7 | 7 | 4 | 1 | 13 |
| Climate Control | 2 | 0 | 0 | 1 | 0 | 2 | 0 |
| Destination Signs | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Differential | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| Driver's Controls | 5 | 2 | 1 | 2 | 1 | 3 | 2 |
| Electrical System | 2 | 1 | 1 | 1 | 0 | 0 | 0 |
| Engine Compartment | 36 | 27 | 24 | 34 | 44 | 37 | 48 |
| Exhaust | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exterior Body Condition | 15 | 18 | 12 | 12 | 13 | 9 | 16 |
| Interior Condition | 13 | 13 | 4 | 10 | 2 | 2 | 16 |
| Lights | 7 | 6 | 5 | 6 | 5 | 15 | 22 |
| Passenger Controls | 1 | 1 | 1 | 2 | 1 | 0 | 1 |
| Safety Equipment | 7 | 4 | 1 | 1 | 0 | 0 | 2 |
| Structure/Chassis/ Fuel Tank | 2 | 1 | 1 | 2 | 0 | 1 | 0 |
| Suspension/Steering | 10 | 10 | 10 | 19 | 22 | 13 | 9 |
| Tires | 3 | 1 | 3 | 2 | 2 | 2 | 0 |
| Transmission | 2 | 2 | 2 | 1 | 2 | 4 | 1 |
| **Total Defects** | **126** | **98** | **74** | **105** | **97** | **92** | **135** |
| **Average Defects Per Bus** | **3.00** | **2.72** | **2.31** | **3.28** | **3.34** | **3.41** | **4.50** |

**PMI Paperwork Review Findings**

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be*

*in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

For example, despite recent PM inspections that would have captured burned out light bulbs, multiple lights were found to be inoperable. Table 5 below lists the defects found in the Lights category. It is possible that the lights burned out after the PMI was completed, but more likely the lights were not repaired either due to parts shortages or lack of attention to detail. These minor defects (yet still a Class A defect) represent the lack of attention from the maintenance department that may lead to substantial safety lapses. **If simple defects are not detected and repaired, TRC has little confidence in Transdev's ability to identify and repair serious or complex issues**.

**Table 5**

| Bus # | Last PMI | Class A "Lights" Defects |
|---|---|---|
| 62618 | 02/06/19 | Dome lamp, C/S #4 lamp, inop (repaired by mechanic) |
| 62619 | 02/28/19 | Courtesy light, by #2 door, inop (replaced by mechanic) |
| 62619 | 02/28/19 | Aisle lights, S/S rear, inop |
| 62646 | 02/28/19 | Courtesy lights, by rear doors, inop |
| 63140 | 02/21/19 | Strobe light, engine door, inop |
| 63144 | 02/28/19 | Dome lamp, S/S #5, inop |
| 63144 | 02/28/19 | Driver's lamp, driver's compartment, inop |
| 63146 | 02/14/19 | Step well lights, front & rear, all inop (replaced by mechanic) |
| 63146 | 02/14/19 | Dome lamp, S/S #1, inop (replaced by mechanic) |
| 63150 | 02/28/19 | Strobe light, engine door, inop |
| 63160 | 02/28/19 | Dome lamps, C/S #3 #4 & #5, inop |
| 63161 | 01/13/19 | Dome lamp, C/S #5 lamp, inop |
| 63162 | 01/17/19 | Dome lamps, C/S, all inop |
| 63162 | 01/17/19 | Dome lamps, S/S #1 & #4, inop |
| 63168 | 02/17/19 | Dome lamp, C/S #4, inop |
| 63188 | 02/17/19 | Dome lamps, C/S, all inop |
| 63192 | 02/28/19 | Dome lamps, C/S #3 #4 & #5, inop |
| 63192 | 02/28/19 | Dome lamp, S/S #1 lamp, inop |
| 63195 | 02/28/19 | Dome lamp, S/S #5, inop |
| 63208 | 01/27/19 | Courtesy lights, rear doors, inop |
| 63211 | 02/28/19 | Dome lamp, C/S #4, inop |
| 63217 | 02/27/19 | Lamps, interior & exterior front door, inop |

**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defects Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **Year-to-Year Defects Summary:** includes a year-to-year summary of defect totals and a year-to-year summary of the 18 defect categories

- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

**Class A –** Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

**Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

One hundred & fourteen (114) Class "A" safety-related defects were found during this inspection, for an average of 3.80 Class "A" safety-related defects per bus compared to 3.00 average Class "A" safety-related defects the previous audit. The 114 Class "A" defects found during this current audit are listed in Table 6 which follows.

**Table 6**

| Bus # | Year | Make | Last PMI | Class "A" Defects |
|---|---|---|---|---|
| 62617 | 2011 | Gillig | 01/30/19 | Wheel rim, C/S rear outer wheel, damaged (bent) / repaired by mechanic |
| 62617 | 2011 | Gillig | 01/30/19 | Oil leak, engine compartment, multiple oil leaks |
| 62618 | 2012 | Gillig | 02/06/19 | Oil leak, engine compartment, alternator front seal leaking |
| 62618 | 2012 | Gillig | 02/06/19 | Oil leak, engine compartment, oil cooler gasket leaking |
| 62618 | 2012 | Gillig | 02/06/19 | Dome lamp, C/S #4 lamp, inop (repaired by mechanic) |
| 62618 | 2012 | Gillig | 02/06/19 | Check engine light, dash, check engine light on |
| 62618 | 2012 | Gillig | 02/06/19 | Flooring, on hatch, coming up / trip hazard |
| 62619 | 2011 | Gillig | 02/28/19 | A/C belt, engine compartment, cracked (replaced by mechanic) |
| 62619 | 2011 | Gillig | 02/28/19 | Alternator belt, engine compartment, cracked (replaced by mechanic) |

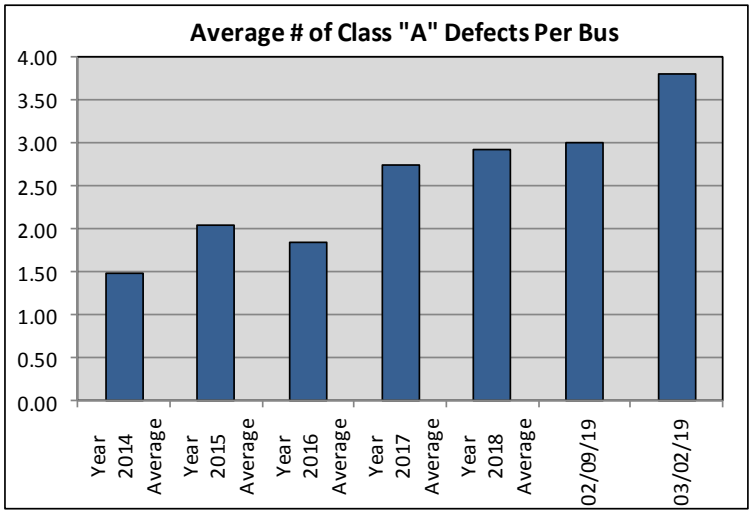
| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 62619 | 2011 | Gillig | 02/28/19 | Courtesy light, by #2 door, inop (replaced by mechanic) |
| 62619 | 2011 | Gillig | 02/28/19 | Oil leak, S/S rear, shock absorber leaking |
| 62619 | 2011 | Gillig | 02/28/19 | Oil leak, engine compartment, rear main seal leaking |
| 62619 | 2011 | Gillig | 02/28/19 | Flooring, around hatch, coming up / trip hazard |
| 62619 | 2011 | Gillig | 02/28/19 | Aisle lights, S/S rear, inop |
| 62624 | 2011 | Gillig | 05/06/18 | Alternator belt, engine compartment, cracked |
| 62624 | 2011 | Gillig | 05/06/18 | Oil leak, engine compartment, oil filler tube leaking |
| 62624 | 2011 | Gillig | 05/06/18 | Flooring, front yellow strip, coming up / trip hazard |
| 62630 | 2011 | Gillig | 02/12/19 | Brake shoes, front, worn to wear line |
| 62630 | 2011 | Gillig | 02/12/19 | Oil leak, engine compartment, oil filler tube leaking at block |
| 62630 | 2011 | Gillig | 02/12/19 | Oil leak, engine compartment, rear main seal leaking |
| 62630 | 2011 | Gillig | 02/12/19 | A/C bolt, engine compartment, cracked (replaced by mechanic) |
| 62641 | 2012 | Gillig | 02/28/19 | ABS light, dash, ABS light on |
| 62641 | 2012 | Gillig | 02/28/19 | Check engine light, dash, check engine light on |
| 62641 | 2012 | Gillig | 02/28/19 | Oil leaks, engine compartment, multiple oil leaks / engine dirty |
| 62641 | 2012 | Gillig | 02/28/19 | Coolant pipe bracket, engine compartment, broken |
| 62641 | 2012 | Gillig | 02/28/19 | Slack adjuster, C/S rear, won't take adjustment |
| 62641 | 2012 | Gillig | 02/28/19 | Flooring, around hatch, coming up / trip hazard |
| 62641 | 2012 | Gillig | 02/28/19 | Seat, C/S rear, corner broken (sharp edges) |
| 62644 | 2012 | Gillig | 02/07/19 | Oil leak, engine compartment, rear main seal leaking |
| 62644 | 2012 | Gillig | 02/07/19 | Radius rod, S/S rear lower, worn |
| 62644 | 2012 | Gillig | 02/07/19 | Oil leak, engine compartment, alternator gasket leaking |
| 62646 | 2012 | Gillig | 02/28/19 | King pins, both, worn |
| 62646 | 2012 | Gillig | 02/28/19 | Courtesy lights, by rear doors, inop |
| 62651 | 2012 | Gillig | 02/11/19 | Radius rod, C/S rear lower, worn |
| 62651 | 2012 | Gillig | 02/11/19 | ABS light, dash, ABS light on |
| 62651 | 2012 | Gillig | 02/11/19 | Traction control light, dash, traction control light on |
| 62651 | 2012 | Gillig | 02/11/19 | Emergency exit window, S/S #3, cracked |
| 63139 | 2007 | Gillig | 01/29/19 | Oil leaks, engine compartment, multiple oil leaks / engine dirty |
| 63139 | 2007 | Gillig | 01/29/19 | Air leak, under bus, air dryer gasket leaking |
| 63139 | 2007 | Gillig | 01/29/19 | ABS light, dash, ABS light on |
| 63140 | 2007 | Gillig | 02/21/19 | ABS light, dash, ABS light on |
| 63140 | 2007 | Gillig | 02/21/19 | Check engine light, dash, check engine light on |
| 63140 | 2007 | Gillig | 02/21/19 | Strobe light, engine door, inop |
| 63140 | 2007 | Gillig | 02/21/19 | Oil leaks, engine compartment, multiple oil leaks / engine dirty |
| 63144 | 2007 | Gillig | 02/28/19 | Oil leaks, engine compartment, multiple oil leaks / engine dirty |
| 63144 | 2007 | Gillig | 02/28/19 | Check engine light, dash, check engine light on |
| 63144 | 2007 | Gillig | 02/28/19 | ABS light, dash, ABS light on |
| 63144 | 2007 | Gillig | 02/28/19 | Traction control light, dash, traction control light on |
| 63144 | 2007 | Gillig | 02/28/19 | Dome lamp, S/S #5, inop |
| 63144 | 2007 | Gillig | 02/28/19 | Driver's lamp, driver's compartment, inop |
| 63144 | 2007 | Gillig | 02/28/19 | Wheelchair lift, front, very slow |
| 63146 | 2007 | Gillig | 02/14/19 | A/C belt, engine compartment, cracked (replaced by mechanic) |
| 63146 | 2007 | Gillig | 02/14/19 | Step well lights, front & rear, all inop (replaced by mechanic) |

| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 63146 | 2007 | Gillig | 02/14/19 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63146 | 2007 | Gillig | 02/14/19 | Oil leak, engine compartment, oil filler tube leaking at block |
| 63146 | 2007 | Gillig | 02/14/19 | Ground strap, engine compartment, broken |
| 63146 | 2007 | Gillig | 02/14/19 | Oil leak, S/S rear, shock absorber leaking (replaced by mechanic) |
| 63146 | 2007 | Gillig | 02/14/19 | Dome lamp, S/S #1, inop (replaced by mechanic) |
| 63150 | 2007 | Gillig | 02/28/19 | Route sign, rear, scrambled |
| 63150 | 2007 | Gillig | 02/28/19 | Wheelchair lift, front, inop |
| 63150 | 2007 | Gillig | 02/28/19 | ABS light, dash, ABS light on |
| 63150 | 2007 | Gillig | 02/28/19 | Strobe light, engine door, inop |
| 63160 | 2008 | Gillig | 02/28/19 | Radius rod, S/S rear lower, worn |
| 63160 | 2008 | Gillig | 02/28/19 | Dome lamps, C/S #3 #4 & #5, inop |
| 63161 | 2008 | Gillig | 01/13/19 | Oil leaks, engine compartment, multiple oil leaks / engine dirty |
| 63161 | 2008 | Gillig | 01/13/19 | Dome lamp, C/S #5 lamp, inop |
| 63161 | 2008 | Gillig | 01/13/19 | Flooring, around hatch, coming up / trip hazard |
| 63162 | 2008 | Gillig | 01/17/19 | Oil leak, engine compartment, oil pressure switch leaking |
| 63162 | 2008 | Gillig | 01/17/19 | Dome lamps, C/S, all inop |
| 63162 | 2008 | Gillig | 01/17/19 | Dome lamps, S/S #1 & #4, inop |
| 63168 | 2008 | Gillig | 02/17/19 | Oil leak, engine compartment, alternator seal leaking |
| 63168 | 2008 | Gillig | 02/17/19 | Oil leak, engine compartment, timing chain cover leaking |
| 63168 | 2008 | Gillig | 02/17/19 | Dome lamp, C/S #4, inop |
| 63168 | 2008 | Gillig | 02/17/19 | Stop request sign, front, inop |
| 63188 | 2009 | Gillig | 02/17/19 | Oil leak, engine compartment, oil cooler leaking |
| 63188 | 2009 | Gillig | 02/17/19 | Oil leak, engine compartment, rear main seal leaking |
| 63188 | 2009 | Gillig | 02/17/19 | A/C belt, engine compartment, cracked (replaced by mechanic) |
| 63188 | 2009 | Gillig | 02/17/19 | Dome lamps, C/S, all inop |
| 63192 | 2010 | Gillig | 02/28/19 | Dome lamps, C/S #3 #4 & #5, inop |
| 63192 | 2010 | Gillig | 02/28/19 | Flooring, by floor hatch, cracked (coming up) / trip hazard |
| 63192 | 2010 | Gillig | 02/28/19 | Dome lamp, S/S #1 lamp, inop |
| 63192 | 2010 | Gillig | 02/28/19 | Shock bushing, C/S rear, worn |
| 63192 | 2010 | Gillig | 02/28/19 | Heater control knob, dash, missing |
| 63195 | 2009 | Gillig | 02/28/19 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63195 | 2009 | Gillig | 02/28/19 | Oil leak, engine compartment, gasket leaking between air compressor & hydraulic pump |
| 63195 | 2009 | Gillig | 02/28/19 | Egress window, S/S #3, hard to open & latch won't lock |
| 63195 | 2009 | Gillig | 02/28/19 | Dome lamp, S/S #5, inop |
| 63196 | 2010 | Gillig | 02/24/19 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63196 | 2010 | Gillig | 02/24/19 | Oil leak, engine compartment, gasket leaking between air compressor & hydraulic pump |
| 63196 | 2010 | Gillig | 02/24/19 | Oil leak, engine compartment, rear main seal leaking |
| 63196 | 2010 | Gillig | 02/24/19 | Oil leak, steering, gear box leaking |
| 63200 | 2010 | Gillig | 02/28/19 | Flooring, by floor hatch, piece missing & coming up / trip hazard |
| 63205 | 2010 | Gillig | 02/06/19 | A/C belt, engine compartment, cracked |

| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 63205 | 2010 | Gillig | 02/06/19 | Alternator belt, engine compartment, cracked |
| 63205 | 2010 | Gillig | 02/06/19 | Oil leaks, engine compartment, multiple oil leaks / engine dirty |
| 63205 | 2010 | Gillig | 02/06/19 | Oil leak, engine compartment, alternator end plate leaking |
| 63205 | 2010 | Gillig | 02/06/19 | Flooring, around hatch, coming up / trip hazard |
| 63206 | 2010 | Gillig | 02/27/19 | Oil leak, engine compartment, crankcase breather box leaking |
| 63206 | 2010 | Gillig | 02/27/19 | Flooring, around hatch, coming up / trip hazard |
| 63208 | 2010 | Gillig | 01/27/19 | A/C belt, engine compartment, cracked |
| 63208 | 2010 | Gillig | 01/27/19 | Oil leak, engine compartment, alternator end plate leaking |
| 63208 | 2010 | Gillig | 01/27/19 | Courtesy lights, rear doors, inop |
| 63208 | 2010 | Gillig | 01/27/19 | Oil leak, engine compartment, oil cooler line leaking |
| 63208 | 2010 | Gillig | 01/27/19 | ABS light, dash, ABS light on |
| 63208 | 2010 | Gillig | 01/27/19 | Wheelchair ramp, front, inop |
| 63211 | 2010 | Gillig | 02/28/19 | ABS light, dash, ABS light on |
| 63211 | 2010 | Gillig | 02/28/19 | Oil leaks, engine compartment, multiple oil leaks / engine dirty |
| 63211 | 2010 | Gillig | 02/28/19 | Dome lamp, C/S #4, inop |
| 63214 | 2010 | Gillig | 10/12/18 | Wheelchair ramp, front, inop |
| 63214 | 2010 | Gillig | 10/12/18 | Low hydraulic fluid light, dash, how hdraulic fluid light on |
| 63217 | 2010 | Gillig | 02/27/19 | Lamps, interior & exterior front door, inop |
| 63217 | 2010 | Gillig | 02/27/19 | King pins, both, worn |
| 63217 | 2010 | Gillig | 02/27/19 | Oil leak, engine compartment, oil filler tube leaking |
| 63217 | 2010 | Gillig | 02/27/19 | Oil leak, engine compartment, rear main seal leaking |

Note in the table above that several significant defects were found even when the last PMI occurred within a week of our inspection.

The average number of Class "A" defects per bus increased during this current audit when compared to the annual average number of Class "A" defects per bus for the audits conducted in 2014-18 and the audit results for the previous audit conducted February 9-11, 2019. <u>This substantial increase in Class "A" defects requires immediate attention by the County and Transdev to reverse the trend.</u>



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean.

Structural Integrity
TRC did not observe any structural defects during this audit.

**PMI Schedule Adherence**

TRC examined the PMI records of the thirty (30) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. ***Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects****. A review of inspector's qualifications and training is recommended.*

**SUMMARY OF RECOMMENDATIONS**

The number of defects identified in this audit increased sharply from the last audit and is higher than all annual averages previously recorded. One hundred & fourteen (114) Class "A" safety-related defects were found during this current audit, or 3.80 average Class "A" defects per bus compared to 3.00 average Class "A" defects per bus last audit. TRC cautioned that the improvements shown after the November 15, 2018 meeting would be sustainable only if a proper plan was put in place. Further corrective action and intervention by the County is again recommended.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- **TRC recommends that the County establish a maximum defects-per-bus goal to hold Transdev accountable.**

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC recommends that buses that have been out of service for an extended period of time be repaired immediately or disposed of to get them 'off the books'.

- TRC recommends a review of the number of buses that are unavailable for inspection during each audit. The current number of unavailable buses is unacceptable to maintain operations and meet daily pull-out.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). In addition, maintenance must reinforce the importance of identifying and repairing simple defects. The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue or lack of attention.

**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

# Prince George's County

## Fleet Maintenance Audit

**Inspection #75**
**Twenty-seven (27) Buses**

Conducted February 9 - 11, 2019

**TRANSIT RESOURCE CENTER**

**5840 Red Bug Lake Road**
**Suite 165**
**Winter Springs, FL 32708**
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February 13, 2019

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Twenty-seven (27) Buses
# Conducted February 9 – 11, 2019

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# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Twenty-seven (27) Buses
# Conducted February 9 - 11, 2019

## EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted February 9 – 11, 2019 by TRC for Prince George's County. Thirty-seven (37) buses were scheduled for the fleet inspection and maintenance record review. In total, twenty-seven (27) buses were inspected. Ten (10) buses were not available for inspection due to the following reasons: Bus 62624/accident, Bus 62639/engine, Bus 62652/engine, Bus 63092/wheelchair & A/C, Bus 63148/accident, Bus 63162/engine, Bus 63168/king pins, Bus 63189/accident, Bus 63198/engine, and Bus 63214/transmission. As with previous audits, TRC is concerned about the high number of buses not available for inspection. In this case, 27% of buses selected were not available for the various reasons listed above.

The results of this current audit are as follows:

| | |
|---|---|
| Total Defects | 92 |
| Average Defects per Bus | 3.41 |
| Total Class "A" Safety-Related Defects | 81 |
| Average Class "A" Safety-Related Defects per Bus | 3.00 |

The Audit Trend Comparison table found on Page 6 shows the audit results annual averages for years 2014-18, the audit results for the previous audit conducted December 15 – 17, 2018, and results for this current audit. Results from this current audit show an increase in both average number of defects per bus and average number of Class "A" defects per bus compared to the audit results from the previous audit and the annual averages.

TRC voiced serious concerns about the deteriorating condition of the fleet. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. TRC previously reported a noticeable improvement in the condition of the fleet during subsequent audits, but cautioned that it was too early to tell if the improvement was sustainable. The results of this audit showed a marked deterioration in the condition of the fleet, bringing into questions Transdev's corrective actions and improvement plan.

As with previous audits, the "engine compartment" category remains the most significant area of concern. This single category accounted for more than 40% of all defects found. TRC continues to be concerned about the lack of progress in addressing engine compartment leaks and related defects.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

# Audit Report

## BUSES INSPECTED

Twenty-seven (27) buses received a physical inspection during this audit. Table 1 below identifies these 27 buses.

**Table 1**
**Buses Inspected**

| PHYSICAL INSPECTION | MODEL YEAR | VEHICLE MAKE | MOST RECENT PM |
|---|---|---|---|
| 62620 | 2011 | Gillig | 01/11/19 |
| 62621 | 2011 | Gillig | 01/15/19 |
| 62625 | 2011 | Gillig | 01/27/19 |
| 62627 | 2011 | Gillig | 01/27/19 |
| 62632 | 2011 | Gillig | 01/25/19 |
| 62634 | 2011 | Gillig | 12/28/18 |
| 62635 | 2011 | Gillig | 01/25/19 |
| 62636 | 2011 | Gillig | 01/03/19 |
| 62642 | 2012 | Gillig | 01/12/19 |
| 62645 | 2012 | Gillig | 01/14/19 |
| 62647 | 2012 | Gillig | 12/26/18 |
| 62648 | 2012 | Gillig | 01/29/19 |
| 63145 | 2007 | Gillig | 09/26/18 |
| 63147 | 2007 | Gillig | 01/28/19 |
| 63151 | 2007 | Gillig | 12/26/18 |
| 63159 | 2008 | Gillig | 11/19/18 |
| 63160 | 2008 | Gillig | 01/04/19 |
| 63163 | 2008 | Gillig | 01/23/19 |
| 63169 | 2008 | Gillig | 01/30/19 |
| 63188 | 2009 | Gillig | 01/29/19 |
| 63191 | 2009 | Gillig | 01/23/19 |
| 63194 | 2009 | Gillig | 01/18/19 |
| 63197 | 2010 | Gillig | 02/06/19 |
| 63201 | 2010 | Gillig | 01/17/19 |
| 63202 | 2010 | Gillig | 01/18/19 |
| 63204 | 2010 | Gillig | 12/24/18 |
| 63209 | 2010 | Gillig | 11/25/18 |

Table 2 which follows identifies the ten buses that were not available for inspection. *TRC continues to be concerned about the high number of buses not available for inspection. Twenty-seven percent (27%) of buses selected for this audit were not available for inspection.*

**Table 2**
**Buses Not Available for Inspection**

| BUSES NOT INSPECTED | MODEL YEAR | VEHICLE MAKE | REASON |
|---|---|---|---|
| 62624* | 2011 | Gillig | Accident |
| 62639* | 2012 | Gillig | Engine |
| 62652 | 2012 | Gillig | Engine |
| 63092* | 2006 | Gillig | Wheelchair & A/C |
| 63148 | 2007 | Gillig | Accident |
| 63162 | 2008 | Gillig | Engine |
| 63168 | 2008 | Gillig | King Pins |
| 63189* | 2009 | Gillig | Accident |
| 63198 | 2010 | Gillig | Engine |
| 63214 | 2010 | Gillig | Transmission |

*Note: Bus has been unavailable for inspections for 3 months or longer

## EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Jim Wilson, Sylvester Fikes, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

### Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering

17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

**Class A** – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

**Maintenance Record Review**

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the twenty-seven (27) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the twenty-seven (27) buses to determine if and when defects defined during the PMI process were repaired.

2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

## FINDINGS

### Overall Fleet Condition

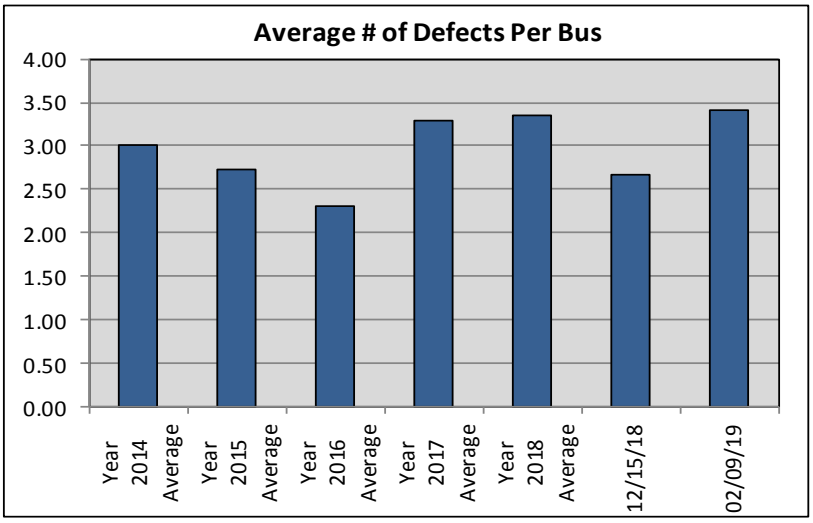
Ninety-two (92) defects were found during this current audit, or 3.41 average defects per bus. This is a significant increase over the previous audit and is also higher than all other annual averages. TRC encourages the County to demand immediate action from Transdev to reverse this trend.

The Audit Trend Comparison table which follows shows the annual average number of defects per audit and the annual average number of defects per bus for the audits conducted in years 2014-18 and the audit results for the previous audit conducted in December 2018 and this current audit. Table 3 also shows the annual average number of Class "A" defects per audit and the annual average number of Class "A" defects per bus for years 2014-18 and the audit results for the previous audit and this current audit.

**Table 3**
**Audit Trend Comparison**

| Date | Average Defects Per Audit | Average Defects per Bus | Average Class "A" Defects Per Audit | Average Class "A" Defects per Bus |
|---|---|---|---|---|
| Year 2014 | 126 | 3.00 | 62 | 1.48 |
| Year 2015 | 98 | 2.72 | 74 | 2.06 |
| Year 2016 | 74 | 2.31 | 59 | 1.84 |
| Year 2017 | 105 | 3.28 | 88 | 2.75 |
| Year 2018 | 97 | 3.34 | 85 | 2.93 |
| Dec. 15 – 17, 2018 | 80 | 2.63 | 66 | 2.20 |
| Feb. 9 – 11, 2019 | 92 | 3.41 | 81 | 3.00 |

As shown in the table above and the chart which follows, the average number of defects per bus increased this current audit. The sharp increase is cause for concern, and the County must work with Transdev to develop a corrective action plan or enforce the agreement reached on November 15, 2018. As previously mentioned, TRC recommends that the County establish a realistic defect goal for Transdev to meet during these audits. Short term actions have proven ineffective in achieving lasting improvement.



**Defects Findings**

Defects were found in the Accessibility Features, Air System/Brake System, Climate Control, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Structure/Chassis/Fuel Tank, Suspension/Steering, Tires, and Transmission categories. The Engine Compartment remains as the primary concern, comprising over 40% of the total defects. **Engine compartment defects represent a critical fire risk.** The Suspension/Steering category increased from nine to 13 defects, possibly reversing an improving trend in this category. In addition, the "Lights" category saw a three-fold increase from previous audits and annual averages. This is concerning because it may represent lack of attention and care by the maintenance personnel to repair simple items.

The Summary of Defects by Category table below compares key performance indicators from this current audit to the average annual results and the previous audit conducted in December 2018. A critical area of concern for this current audit continues to be in the Engine Compartment which is highlighted in Table 4 below.

**Table 4**
**Summary of Defect by Category**

| Summary of Defects by Category | Year 2014 Avg | Year 2015 Avg | Year 2016 Avg | Year 2017 Avg | Year 2018 Avg | Insp #74 Dec 2018 | Insp #75 Feb 2019 |
|---|---|---|---|---|---|---|---|
| Accessibility Features | 7 | 2 | 3 | 3 | 2 | 1 | 3 |
| Air System/Brake System | 15 | 8 | 7 | 7 | 4 | 2 | 1 |
| Climate Control | 2 | 0 | 0 | 1 | 0 | 0 | 2 |
| Destination Signs | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Differential | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| Driver's Controls | 5 | 2 | 1 | 2 | 1 | 1 | 3 |
| Electrical System | 2 | 1 | 1 | 1 | 0 | 0 | 0 |
| Engine Compartment | 36 | 27 | 24 | 34 | 44 | 44 | 37 |
| Exhaust | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exterior Body Condition | 15 | 18 | 12 | 12 | 13 | 14 | 9 |
| Interior Condition | 13 | 13 | 4 | 10 | 2 | 3 | 2 |
| Lights | 7 | 6 | 5 | 6 | 5 | 5 | 15 |
| Passenger Controls | 1 | 1 | 1 | 2 | 1 | 0 | 0 |
| Safety Equipment | 7 | 4 | 1 | 1 | 0 | 0 | 0 |
| Structure/Chassis/ Fuel Tank | 2 | 1 | 1 | 2 | 0 | 0 | 1 |
| Suspension/Steering | 10 | 10 | 10 | 19 | 22 | 9 | 13 |
| Tires | 3 | 1 | 3 | 2 | 2 | 0 | 2 |
| Transmission | 2 | 2 | 2 | 1 | 2 | 1 | 4 |
| **Total Defects** | **126** | **98** | **74** | **105** | **97** | **80** | **92** |
| **Average Defects Per Bus** | **3.00** | **2.72** | **2.31** | **3.28** | **3.34** | **2.67** | **3.41** |

**PMI Paperwork Review Findings**

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

For example, despite recent PM inspections that would have captured burned out light bulbs, multiple lights were found to be inoperable. Table 5 below lists the defects found in the "Lights" category. It is possible that the lights burned out after the PMI was completed, but more likely the lights were not repaired either due to parts shortages or lack of attention to detail. These minor defects (yet still a Class A defect) represent the lack of attention from the maintenance department that may lead to substantial safety lapses.

**Table 5**

| Bus # | Last PMI | Class A "Lights" Defects |
|---|---|---|
| 62627 | 01/27/19 | Dome light, S/S #3, inop |
| 62632 | 01/25/19 | Turn signal light, S/S rear, inop |
| 62632 | 01/25/19 | Turn signal foot switch, C/S, sticking |
| 62648 | 01/29/19 | Step well lights, front, inop |
| 63147 | 01/28/19 | Step well lamp, by #2 door, inop |
| 63151 | 12/26/18 | Marker lamp, S/S rear, inop |
| 63151 | 12/26/18 | Step well lamp, by #2 door, inop |
| 63159 | 11/19/18 | Dome lamps, C/S #2, #3, #4, #5, inop |
| 63160 | 01/04/19 | Dome lamps, C/S #4 & #5, inop |
| 63163 | 01/23/19 | Dome lamps, S/S #1 & C/S #3, #5, inop |
| 63169 | 01/30/19 | Courtesy lamp assembly, by #3 door, missing |
| 63188 | 01/29/19 | Dome lamps, C/S, all inop |
| 63191 | 01/23/19 | Dome lamps, C/S #1, #, #4, #5, inop |
| 63194 | 01/18/19 | Dome lamp, C/S #2, inop |
| 63201 | 01/17/19 | Marker lamp, front roof, inop |

**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defects Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **Year-to-Year Defects Summary:** includes a year-to-year summary of defect totals and a year-to-year summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects

- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

**Class A –** Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

**Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Eighty-one (81) Class "A" safety-related defects were found during this inspection, for an average of 3.00 Class "A" safety-related defects per bus compared to 2.20 average Class "A" safety-related defects the previous audit and 2.93 average Class "A" defects per bus for the Year 2018. The 81 Class "A" defects found during this current audit are listed in Table 6 which follows.

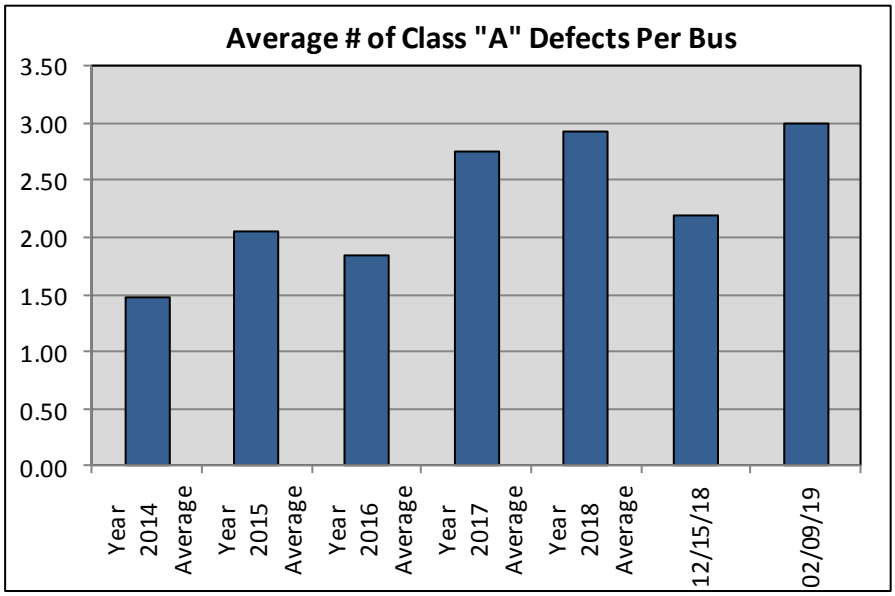
**Table 6**

| Bus # | Year | Make | Last PMI | Class "A" Defects |
|---|---|---|---|---|
| 62620 | 2011 | Gillig | 01/11/19 | A/C belt, engine compartment, cracked |
| 62620 | 2011 | Gillig | 01/11/19 | Coolant leak, engine compartment, pre heater leaking |
| 62621 | 2011 | Gillig | 01/15/19 | Oil leak, engine compartment, alternator seal leaking |
| 62621 | 2011 | Gillig | 01/15/19 | Oil leak, transmission, both drain plugs leaking |
| 62621 | 2011 | Gillig | 01/15/19 | Oil leaks, engine compartment, multiple oil leaks |
| 62625 | 2011 | Gillig | 01/27/19 | Wheelchair ramp, front, slow moving |
| 62625 | 2011 | Gillig | 01/27/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62627 | 2011 | Gillig | 01/27/19 | Fuel leak, under bus, fuel tank leaking |
| 62627 | 2011 | Gillig | 01/27/19 | Dome light, S/S #3, inop |
| 62632 | 2011 | Gillig | 01/25/19 | Turn signal light, S/S rear, inop |
| 62632 | 2011 | Gillig | 01/25/19 | Turn signal foot switch, C/S, sticking |
| 62634 | 2011 | Gillig | 12/28/18 | King pins, both, worn |
| 62634 | 2011 | Gillig | 12/28/18 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62634 | 2011 | Gillig | 12/28/18 | Oil leak, C/S front, shock absorber leaking |
| 62635 | 2011 | Gillig | 01/25/19 | Coolant leak, engine compartment, coolant pipe hose leaking |
| 62636 | 2011 | Gillig | 01/03/19 | Oil leak, engine compartment, rear main seal leaking |
| 62636 | 2011 | Gillig | 01/03/19 | Oil leak, engine compartment, timing cover leaking |
| 62636 | 2011 | Gillig | 01/03/19 | Radius rod, C/S rear lower, worn |
| 62636 | 2011 | Gillig | 01/03/19 | Coolant leak, engine compartment, pre heater leaking |
| 62642 | 2012 | Gillig | 01/12/19 | Oil leak, engine compartment, alternator seal leaking front & rear |

| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 62642 | 2012 | Gillig | 01/12/19 | Alternator belt, engine compartment, cracked |
| 62642 | 2012 | Gillig | 01/12/19 | A/C belt, engine compartment, cracked |
| 62642 | 2012 | Gillig | 01/12/19 | Brake shoes, front, worn to wear line |
| 62647 | 2012 | Gillig | 12/26/18 | Oil leak, engine compartment, alternator seal leaking |
| 62647 | 2012 | Gillig | 12/26/18 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 62647 | 2012 | Gillig | 12/26/18 | Tires, S/S rear, both worn (replaced by mechanic) |
| 62647 | 2012 | Gillig | 12/26/18 | Tire, C/S inner, flat (replaced by mechanic) |
| 62648 | 2012 | Gillig | 01/29/19 | Oil leak, engine compartment, oil leak between air compressor & hydraulic pump |
| 62648 | 2012 | Gillig | 01/29/19 | Step well lights, front, inop |
| 62648 | 2012 | Gillig | 01/29/19 | Window release handles, S/S #1 & #2, hard to release |
| 63145 | 2007 | Gillig | 09/26/18 | Sway bar link bushing, S/S front, coming out |
| 63145 | 2007 | Gillig | 09/26/18 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63145 | 2007 | Gillig | 09/26/18 | Radius rod, rear upper, worn |
| 63145 | 2007 | Gillig | 09/26/18 | Radius rod, C/S rear lower, worn |
| 63147 | 2007 | Gillig | 01/28/19 | Oil leak, C/S rear front, shock absorber leaking |
| 63147 | 2007 | Gillig | 01/28/19 | Radius rods, both front lower, worn |
| 63147 | 2007 | Gillig | 01/28/19 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63147 | 2007 | Gillig | 01/28/19 | Step well lamp, by #2 door, inop |
| 63151 | 2007 | Gillig | 12/26/18 | Radius rod, S/S rear lower, worn |
| 63151 | 2007 | Gillig | 12/26/18 | Oil leak, C/S rear front suspension, shock absorber leaking |
| 63151 | 2007 | Gillig | 12/26/18 | Oil leak, engine compartment, oil leak between air compressor & hydraulic pump |
| 63151 | 2007 | Gillig | 12/26/18 | Marker lamp, S/S rear, inop |
| 63151 | 2007 | Gillig | 12/26/18 | Step well lamp, by #2 door, inop |
| 63159 | 2008 | Gillig | 11/19/18 | Dome lamps, C/S #2, #3, #4, #5, inop |
| 63159 | 2008 | Gillig | 11/19/18 | Auxiliary fan, driver's area, inop |
| 63160 | 2008 | Gillig | 01/04/19 | Wheelchair ramp, front, inop |
| 63160 | 2008 | Gillig | 01/04/19 | Radius rods, S/S rear upper & lower, both worn |
| 63160 | 2008 | Gillig | 01/04/19 | Coolant leak, engine compartment, leak at surge tank |
| 63160 | 2008 | Gillig | 01/04/19 | Oil leak, engine compartment, alternator seal leaking |
| 63160 | 2008 | Gillig | 01/04/19 | Dome lamps, C/S #4 & #5, inop |
| 63160 | 2008 | Gillig | 01/04/19 | Blower motor, driver's area, no high speed |
| 63163 | 2008 | Gillig | 01/23/19 | Dome lamps, S/S #1 & C/S #3, #5, inop |
| 63169 | 2008 | Gillig | 01/30/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63169 | 2008 | Gillig | 01/30/19 | A/C belt, engine compartment, missing |
| 63169 | 2008 | Gillig | 01/30/19 | Courtesy lamp assembly, by #3 door, missing |
| 63188 | 2009 | Gillig | 01/29/19 | Dome lamps, C/S, all inop |
| 63191 | 2009 | Gillig | 01/23/19 | Coolant leak, front, front heater core leaking |
| 63191 | 2009 | Gillig | 01/23/19 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63191 | 2009 | Gillig | 01/23/19 | Oil leak, engine compartment, oil filler tube leaking @ block |
| 63191 | 2009 | Gillig | 01/23/19 | Coolant pipe bracket, on transmission, missing |
| 63191 | 2009 | Gillig | 01/23/19 | Dome lamps, C/S #1, #, #4, #5, inop |
| 63194 | 2009 | Gillig | 01/18/19 | Oil leak, engine compartment, oil leak between air compressor & steering pump |

| Table 6 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 63194 | 2009 | Gillig | 01/18/19 | Coolant leak, @ front heater core, coolant shutoff valve leaking |
| 63194 | 2009 | Gillig | 01/18/19 | Dome lamp, C/S #2, inop |
| 63197 | 2010 | Gillig | 02/06/19 | Check engine light, dashboard, on (steady) |
| 63197 | 2010 | Gillig | 02/06/19 | Oil leaks, engine compartment, multiple oil leaks |
| 63201 | 2010 | Gillig | 01/17/19 | A/C belt, engine compartment, cracked |
| 63201 | 2010 | Gillig | 01/17/19 | Alternator belt, engine compartment, cracked |
| 63201 | 2010 | Gillig | 01/17/19 | Oil leak, steering, gear box leaking |
| 63201 | 2010 | Gillig | 01/17/19 | Radius rod, SS rear lower, worn |
| 63201 | 2010 | Gillig | 01/17/19 | Oil leak, engine compartment, oil filler tube leaking @ block |
| 63201 | 2010 | Gillig | 01/17/19 | Marker lamp, front roof, inop |
| 63202 | 2010 | Gillig | 01/18/19 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63202 | 2010 | Gillig | 01/18/19 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63202 | 2010 | Gillig | 01/18/19 | Coolant pipe bracket, engine compartment, broken |
| 63204 | 2010 | Gillig | 12/24/18 | Wheelchair ramp, front, sticks at times / noisy |
| 63204 | 2010 | Gillig | 12/24/18 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63209 | 2010 | Gillig | 11/25/18 | Alternator belt, engine compartment, cracked |
| 63209 | 2010 | Gillig | 11/25/18 | Oil leak, engine compartment, alternator body leaking |
| 63209 | 2010 | Gillig | 11/25/18 | Coolant leak, engine compartment, coolant filter leaking |
| 63209 | 2010 | Gillig | 11/25/18 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |

The average number of Class "A" defects per bus increased during this current audit when compared to the annual average number of Class "A" defects per bus for the audits conducted in 2014-18 and the audit results for the previous audit conducted in December 2018. <u>This substantial increase in Class "A" defects requires immediate attention by the County and Transdev to reverse the trend.</u>



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity
TRC did not observe any structural defects during this audit.

**PMI Schedule Adherence**

TRC examined the PMI records of the twenty-seven (27) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects (see "Lights" example above). A review of inspector's qualifications and training is recommended.*

**SUMMARY OF RECOMMENDATIONS**

The number of defects identified in this audit increased sharply from the last audit and is higher than all annual averages previously recorded. Eighty-one (81) Class "A" safety-related defects were found during this current audit, or 3.00 average Class "A" defects per bus compared to 2.20 average Class "A" defects per bus last audit and 2.93 average Class "A" defects per bus for Year 2018. TRC cautioned that the improvements shown after the November 15, 2018 meeting would be sustainable only if a proper plan was put in place. Further corrective action and intervention by the County is again recommended.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that the County establish a maximum defects-per-bus goal to hold Transdev accountable.

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC recommends that buses that have been out of service for an extended period of time be repaired immediately or disposed of to get them 'off the books'.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). In addition, maintenance must reinforce the importance of identifying and repairing simple defects. The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue or lack of attention.

**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

# Prince George's County

## Fleet Maintenance Audit

**Inspection #74**
**Thirty (30 Buses)**

Conducted December 15 - 17, 2018

**TRANSIT RESOURCE CENTER**

**5840 Red Bug Lake Road**
**Suite 165**
**Winter Springs, FL 32708**
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December 19, 2018

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty (30) Buses
# Conducted December 15 – 17, 2018

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# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty (30) Buses
# Conducted December 15 - 17, 2018

## EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted December 15 - 17, 2018 by TRC for Prince George's County. Forty-eight (48) buses were scheduled for the fleet inspection and maintenance record review. In total, thirty (30) buses were inspected; fourteen (14) buses were not available for inspection due to the following reasons: Bus 62624/accident, Bus 62632/air compressor, Bus 62639/at Cummins, Bus 63092/wheelchair (electrical), Bus 63145/flooring, Bus 63160/blow by, Bus 63162/blow by, 63163/air compressor, Bus 63189/accident, Bus 63191/at Cummins, Bus 63194/accident, Bus 63198/injectors, Bus 63201/flooring, and Bus 63214/HT module. As with previous audits, TRC is concerned about the high number of buses not available for inspection, in this case nearly 30% of buses selected were not available for the various reasons listed above. Four (4) buses were not inspected due to lack of inspection time.

The results of this current audit are as follows:

| | |
|---|---|
| Total Defects | 80 |
| Average Defects per Bus | 2.67 |
| Total Class "A" Safety-Related Defects | 66 |
| Average Class "A" Safety-Related Defects per Bus | 2.20 |

The Audit Trend Comparison table, which can be found on Page 6, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the audit results for all audits conducted to date in Year 2018. Results from this audit show a slight increase in both Class "A" and Class "B" defects, but still below the recent audit results. The long-term trend is not yet known.

Over the past several months, TRC voiced serious concerns about the deteriorating condition of the fleet and the lack of progress shown by Transdev. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. Transdev committed to repairing all defects found within three weeks of their reporting. The result of this audit continues to show an improvement from the August-November performance. Although the results for this week show a slight increase over the previous inspection, TRC is encouraged to find possible stabilizing of the fleet condition. TRC cautions that it is still too early to determine if this is a sustainable pattern.

Despite overall improvement, the "engine compartment" category continues to be an area of significant concern. This single category accounted for more than half (55%) of all defects found. TRC continues to be concerned about the lack of progress in addressing engine compartment leaks and related defects.

Positive observations from this audit include the following:

- TRC is encouraged to see the condition of the fleet beginning to stabilize and in better condition than the long term average;
- Steering/Suspension defects reduced significantly:
- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

# Audit Report

## BUSES INSPECTED

Thirty (30) buses received a physical inspection during this audit. Table 1 below identifies these 30 buses.

**Table 1**
**Buses Inspected**

| PHYSICAL INSPECTION | MODEL YEAR | VEHICLE MAKE | MOST RECENT PM |
|---|---|---|---|
| 62622 | 2011 | Gillig | 10/25/18 |
| 62623 | 2012 | Gillig | 11/16/18 |
| 62626 | 2011 | Gillig | 09/18/18 |
| 62628 | 2011 | Gillig | 11/23/18 |
| 62631 | 2011 | Gillig | 10/05/18 |
| 62633 | 2011 | Gillig | 11/23/18 |
| 62637 | 2011 | Gillig | 10/21/18 |
| 62638 | 2011 | Gillig | 09/19/18 |
| 62640 | 2012 | Gillig | 11/23/18 |
| 62643 | 2012 | Gillig | 10/21/18 |
| 62646 | 2012 | Gillig | 10/28/18 |
| 62649 | 2012 | Gillig | 11/07/18 |
| 62650 | 2012 | Gillig | 10/19/18 |
| 63142 | 2007 | Gillig | 07/06/18 |
| 63143 | 2007 | Gillig | 11/07/18 |
| 63149 | 2007 | Gillig | 11/30/18 |
| 63161 | 2008 | Gillig | 11/27/18 |
| 63164 | 2008 | Gillig | 09/27/18 |
| 63165 | 2008 | Gillig | 11/20/18 |
| 63166 | 2008 | Gillig | 11/14/18 |
| 63167 | 2008 | Gillig | 11/09/18 |
| 63190 | 2009 | Gillig | 11/27/18 |
| 63193 | 2009 | Gillig | 10/17/18 |
| 63203 | 2010 | Gillig | 11/26/18 |
| 63205 | 2010 | Gillig | 11/19/18 |
| 63206 | 2010 | Gillig | 11/29/18 |
| 63207 | 2010 | Gillig | 10/26/18 |
| 63213 | 2010 | Gillig | 10/11/18 |
| 63215 | 2010 | Gillig | 07/30/18 |
| 63216 | 2010 | Gillig | 11/30/18 |

Table 2 which follows identifies the fourteen buses that were not available for inspection. *TRC is concerned about the high number of buses not available for inspection. Twenty nine percent (29%) of buses selected for this audit were not available for inspection.*

| Table 2<br>Buses Not Available for Inspection | | | |
|---|---|---|---|
| **BUSES NOT INSPECTED** | **MODEL YEAR** | **VEHICLE MAKE** | **REASON** |
| 62624* | 2011 | Gillig | Accident |
| 62632 | 2011 | Gillig | Air Compressor |
| 62639 | 2012 | Gillig | At Cummins |
| 63092* | 2006 | Gillig | Wheelchair (electrical) |
| 63145 | 2007 | Gillig | Flooring |
| 63160 | 2008 | Gillig | Blow By |
| 63162 | 2008 | Gillig | Blow By |
| 63163 | 2008 | Gillig | Air Compressor |
| 63189* | 2009 | Gillig | Accident |
| 63191 | 2009 | Gillig | At Cummins |
| 63194* | 2009 | Gillig | Accident |
| 63198 | 2010 | Gillig | Injectors |
| 63201 | 2010 | Gillig | Flooring |
| 63214 | 2010 | Gillig | HT Module |

*Note: Buses not available for two months or longer

## EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

### Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls

14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

**Class A** – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

**Maintenance Record Review**

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty (30) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty (30) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

## FINDINGS

### Overall Fleet Condition

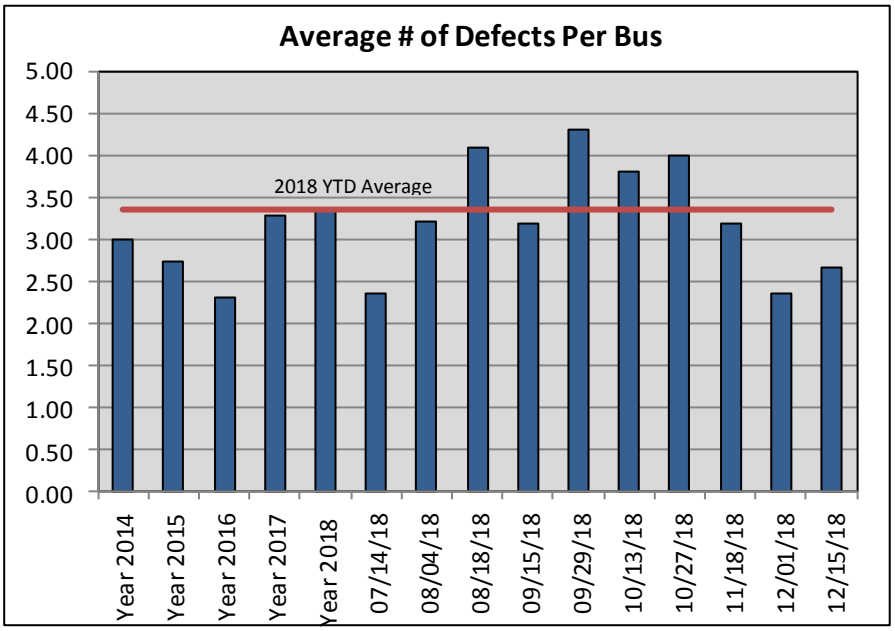
Eighty (80) defects were found during this current audit, or 2.67 average defects per bus. While this shows a slight increase from the previous audit, it does represent a decrease from the 2018 long term average. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted in Year 2018. Table 3 also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted in Year 2018.

**Table 3**
**Audit Trend Comparison**

| Date | Average Defects Per Audit | Average Defects per Bus | Average Class "A" Defects Per Audit | Average Class "A" Defects per Bus |
|---|---|---|---|---|
| Year 2014 | 126 | 3.00 | 62 | 1.48 |
| Year 2015 | 98 | 2.72 | 74 | 2.06 |
| Year 2016 | 74 | 2.31 | 59 | 1.84 |
| Year 2017 | 105 | 3.28 | 88 | 2.75 |
| July 14–16,2018 | 59 | 2.36 | 54 | 2.16 |
| Aug. 4–6, 2018 | 103 | 3.22 | 88 | 2.75 |
| Aug. 18–20, 2018 | 98 | 4.08 | 81 | 3.38 |
| Sept. 15-17, 2018 | 105 | 3.18 | 90 | 2.73 |
| Sept. 29–Oct. 1, 2018 | 133 | 4.29 | 125 | 4.03 |
| Oct. 13 – 15, 2018 | 129 | 3.79 | 120 | 3.53 |
| Oct. 27 – 29, 2018 | 140 | 4.00 | 128 | 3.66 |
| Nov. 18, 2018 | 51* | 3.19 | 44* | 2.75 |
| Dec. 1 – 3, 2018 | 75 | 2.34 | 55 | 1.72 |
| **Dec. 15 – 17, 2018** | **80** | **2.67** | **66** | **2.20** |

*Note: Due to low sample size, the November 18, 2018 figures do not represent comparable values.

As can be seen in the table above and the chart which follows, the average number of defects per bus increased during this current audit when compared to the previous audit. TRC notes that Transdev seems engaged in properly maintaining the bus fleet. Following the November 15, 2018 meeting when Transdev committed to repairing buses within a three-week period, this audit appears to confirm Transdev's commitment. Although encouraged by the present results, TRC notes that the sustainability of this trend is still unknown and will only be known after several additional audits. TRC recognizes that achieving zero defects is the ultimate goal; however, it is not realistic. To this end, TRC recommends that the County determine a realistic defect goal for Transdev to meet during these audits.




**Defects Findings**

Defects were found in the Accessibility Features, Air System/Brake System, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Suspension/Steering, and Transmission categories. The Engine Compartment category comprised 55% of the total defects, with the Engine Compartment category showing a total of 44 defects compared to 35 engine compartment defects the previous audit. **Engine compartment defects represent a critical fire risk, and steering/suspension defects represent a critical accident risk. TRC does not yet see a sustained decrease in engine compartment.**

The Year-to-Year Summary of Defects by Category Table (which is attached as Appendix C) compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted in Year 2018. A critical area of concern for this current audit continues to be in the Engine Compartment which is highlighted in the Year-to-Year Summary of Defects by Category Table (Appendix C).

**PMI Paperwork Review Findings**

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defects Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **Year-to-Year Defects Summary:** includes a year-to-year summary of defect totals and a year-to-year summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

**Class A –** Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

**Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Sixty-six (66) Class "A" safety-related defects were found during this inspection, for an average of 2.20 Class "A" safety-related defects per bus compared to an average of 1.72 Class "A" safety-related defects the previous audit, and a 2018 average of 2.93 Class "A" defects per bus. The 66 Class "A" defects found during this current audit are listed in Table 5 which follows.

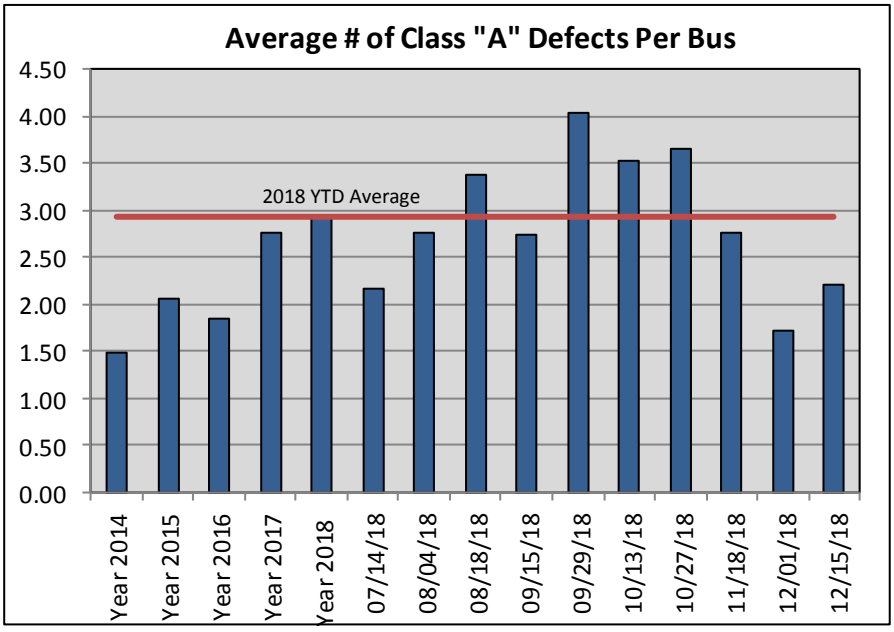
**Table 5**

| Bus # | Year | Make | Last PMI | Class "A" Defects |
|---|---|---|---|---|
| 62623 | 2012 | Gillig | 11/16/18 | Flooring, around floor hatch, coming up / trip hazard |
| 62623 | 2012 | Gillig | 11/16/18 | Oil leak, steering, leak @ gear box |
| 62623 | 2012 | Gillig | 11/16/18 | Dome lamp, S/S #2 & #3, inop |
| 62626 | 2011 | Gillig | 09/18/18 | Brake shoes, S/S rear, worn below wear line |
| 62628 | 2011 | Gillig | 11/23/18 | Oil leak, engine compartment, oil pan leaking |

| Table 5 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 62628 | 2011 | Gillig | 11/23/18 | Oil leak, engine compartment, oil cooler leaking |
| 62628 | 2011 | Gillig | 11/23/18 | Oil leak, engine compartment, rear main seal leaking |
| 62631 | 2011 | Gillig | 10/05/18 | Breather tube, engine compartment, broken off |
| 62633 | 2011 | Gillig | 11/23/18 | Oil leak, engine compartment, oil cooler leaking |
| 62633 | 2011 | Gillig | 11/23/18 | Oil leak, engine compartment, oil filler tube leaking at block |
| 62637 | 2011 | Gillig | 10/21/18 | Drag link, at pitman arm, worn |
| 62637 | 2011 | Gillig | 10/21/18 | Oil leak, engine compartment, oil cooler leaking |
| 62637 | 2011 | Gillig | 10/21/18 | Oil leak, engine compartment, steering pump to air compressor gasket leaking |
| 62638 | 2011 | Gillig | 09/19/18 | Oil leak, engine compartment, alternator seal leaking |
| 62638 | 2011 | Gillig | 09/19/18 | Oil leak, engine compartment, timing cover leaking |
| 62640 | 2012 | Gillig | 11/23/18 | Oil leak, engine compartment, timing cover leaking |
| 62640 | 2012 | Gillig | 11/23/18 | Oil leak, engine compartment, oil pressure switch leaking |
| 62640 | 2012 | Gillig | 11/23/18 | Oil leak, engine compartment, rear main seal leaking |
| 62643 | 2012 | Gillig | 10/21/18 | Oil leaks, engine compartment, multiple oil leaks |
| 62646 | 2012 | Gillig | 10/28/18 | Radius rods, rear lower, both worn |
| 62646 | 2012 | Gillig | 10/28/18 | Flooring, around floor hatch, coming up / trip hazard |
| 62649 | 2012 | Gillig | 11/07/18 | Oil leak, engine compartment, timing cover seal leaking |
| 62649 | 2012 | Gillig | 11/07/18 | Oil leak, engine compartment, air compressor leaking |
| 62650 | 2012 | Gillig | 10/19/18 | Oil leak, engine compartment, oil cooler leaking |
| 62650 | 2012 | Gillig | 10/19/18 | Oil leak, engine compartment, timing cover leaking |
| 62650 | 2012 | Gillig | 10/19/18 | Oil leak, engine compartment, air compressor & steering pumping gasket leaking |
| 63142 | 2007 | Gillig | 07/06/18 | Radius rod, C/S rear upper, worn |
| 63142 | 2007 | Gillig | 07/06/18 | Windshield washer, front, inop |
| 63143 | 2007 | Gillig | 11/07/18 | Courtesy lights, by #3 & #4 doors, inop |
| 63149 | 2007 | Gillig | 11/30/18 | Radius rod, C/S rear upper, worn |
| 63161 | 2008 | Gillig | 11/27/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63164 | 2008 | Gillig | 09/27/18 | A/C belt, engine compartment, cracked |
| 63164 | 2008 | Gillig | 09/27/18 | Dome lamps, C/S #3 #4 #5 & S/S #1 #2, inop |
| 63164 | 2008 | Gillig | 09/27/18 | Oil leak, engine compartment, timing cover leaking |
| 63164 | 2008 | Gillig | 09/27/18 | Oil leak, engine compartment, alternator front seal leaking |
| 63165 | 2008 | Gillig | 11/20/18 | Oil leaks, C/S of engine, multiple oil leaks |
| 63166 | 2008 | Gillig | 11/14/18 | Oil leak, engine compartment, alternator seal leaking |
| 63166 | 2008 | Gillig | 11/14/18 | Dome lamps, C/S #3 #4 #5, inop |
| 63167 | 2008 | Gillig | 11/09/18 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63190 | 2009 | Gillig | 11/27/18 | Kneel alarm, front, inop |
| 63190 | 2009 | Gillig | 11/27/18 | Breather tube, engine compartment, broken off |
| 63190 | 2009 | Gillig | 11/27/18 | Oil leak, engine compartment, hydraulic fan motor wet with oil |
| 63190 | 2009 | Gillig | 11/27/18 | Oil leak, engine compartment, oil filler tube at block leaking |
| 63193 | 2009 | Gillig | 10/17/18 | Oil leak, engine compartment, oil filler tube leaking |
| 63193 | 2009 | Gillig | 10/17/18 | Dome lamps, S/S #1 & S/S #3 #4 #5, inop (replaced by mechanic) |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, alternator seal & gasket leaking |

| Table 5 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, oil cooler leaking |
| 63206 | 2010 | Gillig | 11/29/18 | Oil leak, engine compartment, oil cooler leaking |
| 63206 | 2010 | Gillig | 11/29/18 | Oil leak, engine compartment, oil pan leaking |
| 63206 | 2010 | Gillig | 11/29/18 | Oil leak, engine compartment, air compressor gasket leaking |
| 63206 | 2010 | Gillig | 11/29/18 | Oil leak, engine compartment, breather tube leaking |
| 63207 | 2010 | Gillig | 10/26/18 | Drag link, at pitman arm, worn |
| 63207 | 2010 | Gillig | 10/26/18 | Coolant pipe bracket, transmission, broken |
| 63207 | 2010 | Gillig | 10/26/18 | Oil leak, engine compartment, oil filler tube leaking |
| 63207 | 2010 | Gillig | 10/26/18 | Oil leak, engine compartment, rear main seal leaking |
| 63207 | 2010 | Gillig | 10/26/18 | Oil pressure gauge, engine compartment, no reading |
| 63213 | 2010 | Gillig | 10/11/18 | Oil leak, engine compartment, oil line leaking behind alternator |
| 63213 | 2010 | Gillig | 10/11/18 | Oil leaks, engine compartment, multiple oil leaks (engine dirty) |
| 63213 | 2010 | Gillig | 10/11/18 | Flooring, around floor hatch, coming up / trip hazard |
| 63215 | 2010 | Gillig | 07/30/18 | Drag link, at pitman arm, worn |
| 63215 | 2010 | Gillig | 07/30/18 | Radius rods, rear lower, both worn |
| 63215 | 2010 | Gillig | 07/30/18 | Oil leak, engine compartment, oil filler tube leaking at block |
| 63216 | 2010 | Gillig | 11/30/18 | Drag link, at pitman arm, worn |
| 63216 | 2010 | Gillig | 11/30/18 | Brake shoes, front, worn to wear line |
| 63216 | 2010 | Gillig | 11/30/18 | Oil leak, engine compartment, oil filer tube leaking at block |
| 63216 | 2010 | Gillig | 11/30/18 | Oil leak, engine compartment, timing cover leaking |

The average number of Class "A" defects per bus increased during this current audit, but falls below the 2018 average.



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition. However, defects relating to the exterior condition of buses increased during this audit.
Structural Integrity
TRC did not observe any structural defects during this audit.

**PMI Schedule Adherence**

TRC examined the PMI records of the thirty (30) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**SUMMARY OF RECOMMENDATIONS**

Sixty-six (66) Class "A" safety-related defects were found during this current audit, or 2.20 average Class "A" defects per bus compared to or 1.72 average Class "A" defects per bus last audit. The average number of Class "A" defects per bus increased during this current audit when compared the previous audit, but is an improvement over previous 2018 results. As noted earlier, TRC observed that Transdev has made positive changes and seems to be following the commitment made during the November 15, 2018 meeting with the County. However, future inspections are necessary to properly verify the sustainability and long-term impact of the corrective actions in place.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that the County establish a maximum defects-per-bus goal to hold Transdev accountable.

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC recommends that more attention be paid to the exterior body condition of the buses. There has been an increase in exterior body damage defects (scrapes, dings, dents, damaged bumpers, etc.) during the past several

audits. These defects include minor accidents, suggesting additional driver training may be necessary.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue.

**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

## APPENDIX C - Year-To Year Summary of Defects by Category Table

| Summary of Defects by Category | Year 2014 Avg | Year 2015 Avg | Year 2016 Avg | Year 2017 Avg | Insp #65 2018 | Insp #66 2018 | Insp #67 2018 | Insp #68 2018 | Insp #69 2018 | Insp #70 2018 | Insp #71 2018 | Insp #72 2018 | Insp #73 2018 | Insp #74 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Accessibility Features | 7 | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 1 | 0 | 2 | 1 |
| Air System/Brake System | 15 | 8 | 7 | 7 | 2 | 3 | 7 | 8 | 4 | 7 | 2 | 0 | 1 | 2 |
| Climate Control | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Destination Signs | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Differential | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Driver's Controls | 5 | 2 | 1 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| Electrical System | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Engine Compartment | 36 | 27 | 24 | 34 | 18 | 34 | 29 | 50 | 69 | 60 | 73 | 31* | 35 | 44 |
| Exhaust | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exterior Body Condition | 15 | 18 | 12 | 12 | 8 | 18 | 18 | 14 | 9 | 11 | 12 | 7* | 16 | 14 |
| Interior Condition | 13 | 13 | 4 | 10 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 0 | 3 | 3 |
| Lights | 7 | 6 | 5 | 6 | 2 | 3 | 10 | 1 | 4 | 8 | 13 | 1* | 2 | 5 |
| Passenger Controls | 1 | 1 | 1 | 2 | 0 | 2 | 2 | 0 | 1 | 4 | 0 | 0 | 0 | 0 |
| Safety Equipment | 7 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Structure/Chassis/ Fuel Tank | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Suspension/Steering | 10 | 10 | 10 | 19 | 21 | 28 | 26 | 19 | 28 | 28 | 35 | 10* | 13 | 9 |
| Tires | 3 | 1 | 3 | 2 | 1 | 4 | 0 | 3 | 2 | 4 | 1 | 0 | 0 | 0 |
| Transmission | 2 | 2 | 2 | 1 | 0 | 4 | 0 | 3 | 12 | 2 | 0 | 2* | 0 | 1 |
| **Total Defects** | **126** | **98** | **74** | **105** | **59** | **103** | **98** | **105** | **133** | **129** | **140** | **51*** | **75** | **80** |
| **Average Defects Per Bus** | **3.00** | **2.72** | **2.31** | **3.28** | **2.36** | **3.22** | **4.08** | **3.18** | **4.29** | **3.79** | **4.00** | **3.19** | **2.34** | **2.67** |

*Note: Due to low sample size for Inspection #72 above, the figures for this inspection do not represent comparable values.

# Prince George's County

***REVISED REPORT***

## Fleet Maintenance Audit

**Inspection #73**
**Thirty-two (32 Buses)**

Conducted December 1 - 3, 2018

**TRANSIT RESOURCE CENTER**

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December 6, 2018

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty-two (32) Buses
# Conducted December 1 - 3, 2018

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# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Thirty-two (32) Buses
# Conducted December 1 - 3, 2018

## EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted December 1 - 3, 2018 by TRC for Prince George's County. Fifty-four (54) buses were scheduled for the fleet inspection and maintenance record review. In total, thirty two (32) buses were inspected; thirteen (13) buses were not available for inspection due to the following reasons: Bus 62623/at Cummins, Bus 62624/accident, Bus 62626/air compressor, Bus 62633/excess smoke, Bus 62638/at Cummins, Bus 62639/at Cummins, Bus 62649/suspension, Bus 63092/wheelchair (electrical), Bus 63142/radiator, Bus 63159/brakes, Bus 63189/accident, Bus 63194/accident, and Bus 63215/engine; and ten (10) buses were not inspected due to lack of inspection time.

The results of this current audit are as follows:

| | |
|---|---|
| Total Defects | 75 |
| Average Defects per Bus | 2.34 |
| Total Class "A" Safety-Related Defects | 55 |
| Average Class "A" Safety-Related Defects per Bus | 1.72 |

The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the audit results for all audits conducted to date in Year 2018. Results from this audit show a decrease in both Class "A" and Class "B" defects. It is unknown yet if this is a sustainable trend.

Over the past month, TRC voiced serious concerns about the deteriorating condition of the fleet and the lack of progress shown by Transdev. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. Transdev committed to repairing all defects found within three weeks of their reporting. The result of this audit shows a clear improvement from previous performance. TRC is encouraged by the results of this audit but finds that this single data point is insufficient to determine if this will be a lasting and sustainable turnaround.

The "engine compartment" and "steering/suspension" categories showed significant improvement, but they continue to account for the majority (64%) of all defects found.

Positive observations from this audit include the following:

- TRC observed a significant improvement in the condition of the fleet;
- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;

- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

# Audit Report

## BUSES INSPECTED

Thirty-two (32) buses received a physical inspection during this audit. Table 1 below identifies these 32 buses.

**Table 1**
**Buses Inspected**

| PHYSICAL INSPECTION | MODEL YEAR | VEHICLE MAKE | MOST RECENT PM |
|---|---|---|---|
| 62617 | 2011 | Gillig | 10/22/18 |
| 62618 | 2012 | Gillig | 10/19/18 |
| 62619 | 2011 | Gillig | 11/08/18 |
| 62629 | 2011 | Gillig | 10/17/18 |
| 62630 | 2011 | Gillig | 11/27/18 |
| 62641 | 2012 | Gillig | 11/15/18 |
| 62644 | 2012 | Gillig | 06/20/18 |
| 62646 | 2012 | Gillig | 10/04/18 |
| 62651 | 2012 | Gillig | 11/07/18 |
| 62652 | 2012 | Gillig | 11/27/18 |
| 63139 | 2007 | Gillig | 10/31/18 |
| 63140 | 2007 | Gillig | 11/23/18 |
| 63141 | 2007 | Gillig | 11/09/18 |
| 63144 | 2007 | Gillig | 10/26/18 |
| 63146 | 2007 | Gillig | 11/17/18 |
| 63150 | 2007 | Gillig | 11/30/18 |
| 63160 | 2008 | Gillig | 11/19/18 |
| 63161 | 2008 | Gillig | 11/27/18 |
| 63188 | 2009 | Gillig | 11/09/18 |
| 63192 | 2010 | Gillig | 11/30/18 |
| 63195 | 2009 | Gillig | 11/13/18 |
| 63196 | 2010 | Gillig | 11/27/18 |
| 63199 | 2010 | Gillig | 10/26/18 |
| 63200 | 2010 | Gillig | 11/12/18 |
| 63204 | 2010 | Gillig | 11/04/18 |
| 63205 | 2010 | Gillig | 11/19/18 |
| 63206 | 2010 | Gillig | 11/29/18 |
| 63208 | 2010 | Gillig | 07/30/18 |
| 63210 | 2010 | Gillig | 11/30/18 |
| 63211 | 2010 | Gillig | 11/09/18 |

| Table 1<br>Buses Inspected | | | |
|---|---|---|---|
| **PHYSICAL INSPECTION** | **MODEL YEAR** | **VEHICLE MAKE** | **MOST RECENT PM** |
| 63212 | 2010 | Gillig | 11/17/18 |
| 63217 | 2010 | Gillig | 10/19/18 |

Table 2 which follows identifies the thirteen buses that were not available for inspection. *The number of buses not available for inspection is 24% and has been increasing the past few audits and is cause for concern.*

| Table 2<br>Buses Not Available for Inspection | | | |
|---|---|---|---|
| **BUSES NOT INSPECTED** | **MODEL YEAR** | **VEHICLE MAKE** | **REASON** |
| 62623 | 2012 | Gillig | At Cummins |
| 62624* | 2011 | Gillig | Accident |
| 62626 | 2011 | Gillig | Air Compressor |
| 62633 | 2011 | Gillig | Excess Smoke |
| 62638 | 2011 | Gillig | At Cummins |
| 62639 | 2012 | Gillig | At Cummins |
| 62649 | 2012 | Gillig | Suspension |
| 63092* | 2006 | Gillig | Wheelchair / Electrical |
| 63142 | 2007 | Gillig | Radiator |
| 63159 | 2008 | Gillig | Brakes |
| 63189* | 2009 | Gillig | Accident |
| 63194* | 2009 | Gillig | Accident |
| 63215 | 2010 | Gillig | Engine |

*Note: Buses not available for two months or longer

## EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of four bus inspectors to perform the maintenance audit on December 1, 2018. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, and Alusine Kanu. An additional inspector, Anthony Greenfield, was added to the original team of four inspectors to assist in performing the inspections on December 2, 2018. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

### Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs

5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

**Class A** – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

**Maintenance Record Review**

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals

To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty-two (32) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs

To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty-two (32) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

## FINDINGS

### Overall Fleet Condition

Seventy-five (75) defects were found during this current audit, or 2.34 average defects per bus. This is a significant decrease from previous audits. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Table 3 also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018.

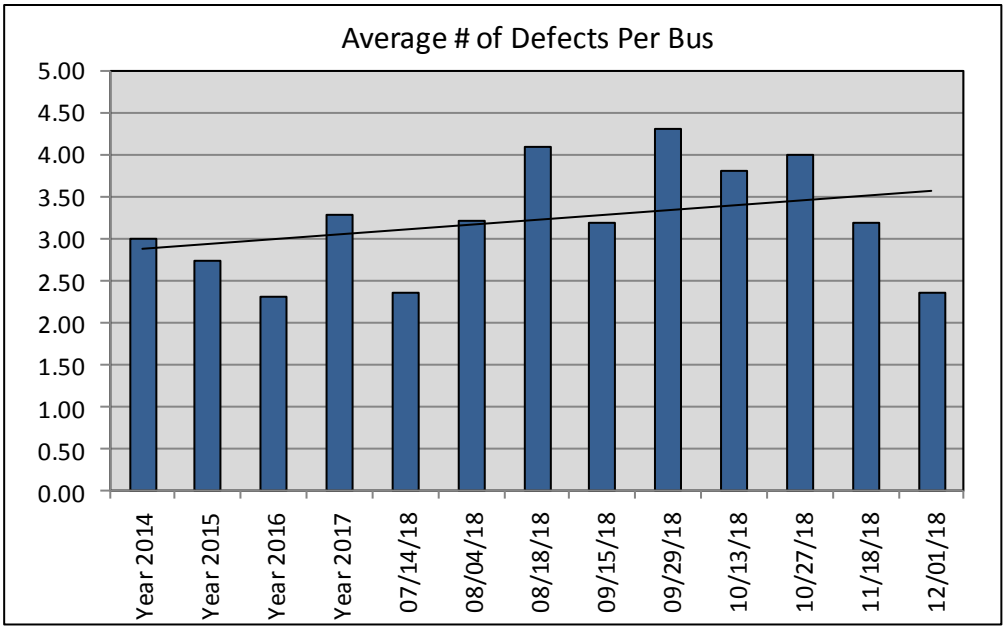
**Table 3**
**Audit Trend Comparison**

| Date | Average Defects Per Audit | Average Defects per Bus | Average Class "A" Defects Per Audit | Average Class "A" Defects per Bus |
|---|---|---|---|---|
| Year 2014 | 126 | 3.00 | 62 | 1.48 |
| Year 2015 | 98 | 2.72 | 74 | 2.06 |
| Year 2016 | 74 | 2.31 | 59 | 1.84 |
| Year 2017 | 105 | 3.28 | 88 | 2.75 |
| July 14–16,2018 | 59 | 2.36 | 54 | 2.16 |
| Aug. 4–6, 2018 | 103 | 3.22 | 88 | 2.75 |
| Aug. 18–20, 2018 | 98 | 4.08 | 81 | 3.38 |
| Sept. 15-17, 2018 | 105 | 3.18 | 90 | 2.73 |
| Sept. 29–Oct. 1, 2018 | 133 | 4.29 | 125 | 4.03 |
| Oct. 13 – 15, 2018 | 129 | 3.79 | 120 | 3.53 |
| Oct. 27 – 29, 2018 | 140 | 4.00 | 128 | 3.66 |
| Nov. 18, 2018 | 51* | 3.19 | 44* | 2.75 |
| **Dec. 1 – 3, 2018** | **75** | **2.34** | **55** | **1.72** |

*Note: Due to low sample size, the November 18, 2018 figures do not represent comparable values.

As can be seen in the table above and the chart which follows, the average number of defects per bus decreased during this current audit. TRC notes that this is a positive sign that Transdev is engaged in properly maintaining the bus fleet.

Following the November 15, 2018 meeting when Transdev committed to repairing buses within a three-week period, this audit appears to confirm Transdev's commitment. Although encouraged by the present results, TRC notes that the sustainability of this trend is still unknown and will only be known after several additional audits.




**Defects Findings**

Defects were found in the Accessibility Features, Air System/Brake System, Destination Signs, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, and Suspension categories. The Engine Compartment and Suspension/Steering categories comprised 64% of the total defects, with the Engine Compartment category showing a total of 35 defects and Suspension/Steering category defects showing a total of 13 defects. **Engine compartment defects represent a critical fire risk, and steering/suspension defects represent a critical accident risk. TRC recognizes that the County and the vendor have taken noticeable steps to reducing defects in these categories.**

The Year-to-Year Summary of Defects by Category Table (which is attached as Appendix C) compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Critical areas of concern for this current audit continue to be in the Engine Compartment and Suspension/Steering categories which are highlighted in the Year-to-Year Summary of Defects by Category Table (Appendix C).

**PMI Paperwork Review Findings**

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are*

*not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

**Class A –** Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

**Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Fifty-five (55) Class "A" safety-related defects were found during this inspection, for an average of 1.72 Class "A" safety-related defects per bus compared to an average of 2.75 Class "A" safety-related defects the previous audit. Along with total defects, Class A defects reduced significantly in this audit. TRC notes that the decrease in Class "A" defects is significant and may be the result of Transdev's renewed commitment to maintenance. TRC will continue to monitor the condition of the fleet

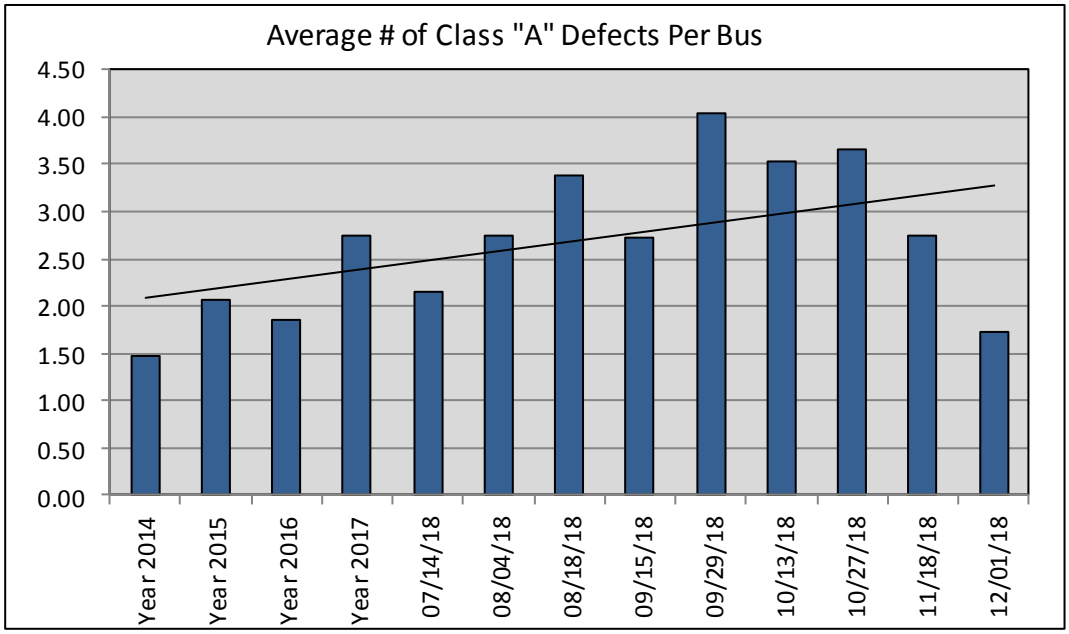
to determine if this is a long term and sustainable trend. The 55 Class "A" defects found during this current audit are listed in Table 5 which follows.

**Table 5**

| Bus # | Year | Make | Last PMI | Class "A" Defects |
|---|---|---|---|---|
| 62618 | 2012 | Gillig | 10/19/18 | Radiator, engine compartment, dirty |
| 62619 | 2011 | Gillig | 11/08/18 | Oil leak, engine compartment, rear main seal leaking |
| 62629 | 2011 | Gillig | 10/17/18 | Oil leak, engine compartment, reservoir / all lines wet with oil |
| 62630 | 2011 | Gillig | 11/27/18 | A/C belt, engine compartment, cracked |
| 62630 | 2011 | Gillig | 11/27/18 | Oil leak, engine compartment, rear main seal leaking |
| 62641 | 2012 | Gillig | 11/15/18 | Radius rod, C/S rear lower, worn |
| 62641 | 2012 | Gillig | 11/15/18 | Oil leak, engine compartment, valve cover leaking |
| 62641 | 2012 | Gillig | 11/15/18 | Oil leak, engine compartment, rear main seal leaking |
| 62646 | 2012 | Gillig | 10/04/18 | Oil leak, engine compartment, rear main seal leaking |
| 62646 | 2012 | Gillig | 10/04/18 | Radius rods, both rear lower, worn |
| 62646 | 2012 | Gillig | 10/04/18 | Flooring, around floor hatch, torn & coming up / trip hazard |
| 62651 | 2012 | Gillig | 11/07/18 | Oil leaks, engine compartment, multiple oil leaks |
| 62652 | 2012 | Gillig | 11/27/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63140 | 2007 | Gillig | 11/23/18 | Shock absorber, S/S front, loose |
| 63141 | 2007 | Gillig | 11/09/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63144 | 2007 | Gillig | 10/26/18 | Wheelchair lift, front, inop |
| 63146 | 2007 | Gillig | 11/17/18 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63150 | 2007 | Gillig | 11/30/18 | Coolant leak, engine compartment, pre heater leaking |
| 63150 | 2007 | Gillig | 11/30/18 | Windshield washer, front, inop |
| 63161 | 2008 | Gillig | 11/27/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63161 | 2008 | Gillig | 11/27/18 | Radius rod, S/S rear lower, worn |
| 63188 | 2009 | Gillig | 11/09/18 | Oil leak, engine compartment, oil cooler leaking |
| 63188 | 2009 | Gillig | 11/09/18 | Oil leak, engine compartment, rear main seal leaking |
| 63188 | 2009 | Gillig | 11/09/18 | Oil leak, engine compartment, timing cover leaking |
| 63192 | 2010 | Gillig | 11/30/18 | Radius rod, C/S rear lower, worn |
| 63195 | 2009 | Gillig | 11/13/18 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63196 | 2010 | Gillig | 11/27/18 | Radius rod, S/S rear lower, worn |
| 63196 | 2010 | Gillig | 11/27/18 | Oil leak, engine compartment, rear main seal leaking |
| 63196 | 2010 | Gillig | 11/27/18 | Oil leak, engine compartment, leaking around fuel rail |
| 63199 | 2010 | Gillig | 10/26/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63200 | 2010 | Gillig | 11/12/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63204 | 2010 | Gillig | 11/04/18 | Oil leak, engine compartment, crank shaft seal leaking |
| 63204 | 2010 | Gillig | 11/04/18 | Oil leak, engine compartment, oil cooler leaking |
| 63204 | 2010 | Gillig | 11/04/18 | Oil leak, engine compartment, rear main seal leaking |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, alternator front seal & end plate gasket leaking |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, oil pan leaking |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, timing cover leaking |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, oil cooler leaking |
| 63205 | 2010 | Gillig | 11/19/18 | Oil leak, engine compartment, steering pump leaking |
| 63205 | 2010 | Gillig | 11/19/18 | King pins, both front, worn |
| 63205 | 2010 | Gillig | 11/19/18 | Drag link, at pitman arm, worn |
| 63206 | 2010 | Gillig | 11/29/18 | Drag link, at pitman arm, worn |

| Table 5 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 63206 | 2010 | Gillig | 11/29/18 | Oil leak, engine compartment, oil cooler leaking |
| 63206 | 2010 | Gillig | 11/29/18 | Oil leak, engine compartment, leaking around fuel rail |
| 63208 | 2010 | Gillig | 07/30/18 | Oil leak, engine compartment, steering pump leaking |
| 63208 | 2010 | Gillig | 07/30/18 | Oil leak, engine compartment, oil filter leaking |
| 63210 | 2010 | Gillig | 11/30/18 | Wheelchair lift ramp, front, inop (repaired by mechanic) |
| 63210 | 2010 | Gillig | 11/30/18 | Marker & tail lights, rear, all inop (repaired by mechanic) |
| 63210 | 2010 | Gillig | 11/30/18 | Dome lights, C/S #3 #4 #5 & S/S #3 #4 #5, inop (repaired by mechanic) |
| 63210 | 2010 | Gillig | 11/30/18 | Oil leaks, engine compartment, multiple oil leaks |
| 63211 | 2010 | Gillig | 11/09/18 | Oil leak, engine compartment, line to oil pressure switch leaking |
| 63211 | 2010 | Gillig | 11/09/18 | Oil leak, engine compartment, air compressor oil line leaking |
| 63211 | 2010 | Gillig | 11/09/18 | Oil leak, engine compartment, pump leaking |
| 63211 | 2010 | Gillig | 11/09/18 | Oil leak, engine compartment, oil filter leaking |
| 63217 | 2010 | Gillig | 10/19/18 | Oil leaks, engine compartment, multiple oil leaks |

The average number of Class "A" defects per bus decreased during this current audit, but it is not known yet if this is a sustainable trend.




Comfort and Convenience

During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition. However, defects relating to the exterior condition of buses increased during this audit.

Structural Integrity

TRC did not observe any structural defects during this audit.

**PMI Schedule Adherence**

TRC examined the PMI records of the thirty-two (32) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**SUMMARY OF RECOMMENDATIONS**

Fifty-five (55) Class "A" safety-related defects were found during this current audit, or 1.72 average Class "A" defects per bus compared to or 2.75 average Class "A" defects per bus last audit. The average number of Class "A" defects per bus decreased during this current audit and the previous audit which is a positive sign. As noted earlier, TRC observed that Transdev has made positive changes and seems to be following the commitment made during the November 15, 2018 meeting with the County. However, future inspections are necessary to properly verify the sustainability and long-term impact of the corrective actions in place.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The average number of Class "A" defects per bus in this category decreased to .41 from .62 during the last audit. TRC will monitor to ensure this trend is maintained.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue.

**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

## APPENDIX C - Year-To Year Summary of Defects by Category Table

| Summary of Defects by Category | Year 2014 Avg | Year 2015 Avg | Year 2016 Avg | Year 2017 Avg | Insp #65 2018 | Insp #66 2018 | Insp #67 2018 | Insp #68 2018 | Insp #69 2018 | Insp #70 2018 | Insp #71 2018 | Insp #72 2018 | Insp #73 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Accessibility Features | 7 | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 1 | 0 | 2 |
| Air System/Brake System | 15 | 8 | 7 | 7 | 2 | 3 | 7 | 8 | 4 | 7 | 2 | 0 | 1 |
| Climate Control | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Destination Signs | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Differential | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Driver's Controls | 5 | 2 | 1 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Electrical System | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Engine Compartment | 36 | 27 | 24 | 34 | 18 | 34 | 29 | 50 | 69 | 60 | 73 | 31* | 35 |
| Exhaust | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exterior Body Condition | 15 | 18 | 12 | 12 | 8 | 18 | 18 | 14 | 9 | 11 | 12 | 7* | 16 |
| Interior Condition | 13 | 13 | 4 | 10 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 0 | 3 |
| Lights | 7 | 6 | 5 | 6 | 2 | 3 | 10 | 1 | 4 | 8 | 13 | 1* | 2 |
| Passenger Controls | 1 | 1 | 1 | 2 | 0 | 2 | 2 | 0 | 1 | 4 | 0 | 0 | 0 |
| Safety Equipment | 7 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Structure/Chassis/ Fuel Tank | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Suspension/Steering | 10 | 10 | 10 | 19 | 21 | 28 | 26 | 19 | 28 | 28 | 35 | 10* | 13 |
| Tires | 3 | 1 | 3 | 2 | 1 | 4 | 0 | 3 | 2 | 4 | 1 | 0 | 0 |
| Transmission | 2 | 2 | 2 | 1 | 0 | 4 | 0 | 3 | 12 | 2 | 0 | 2* | 0 |
| **Total Defects** | **126** | **98** | **74** | **105** | **59** | **103** | **98** | **105** | **133** | **129** | **140** | **51*** | **75** |
| **Average Defects Per Bus** | **3.00** | **2.72** | **2.31** | **3.28** | **2.36** | **3.22** | **4.08** | **3.18** | **4.29** | **3.79** | **4.00** | **3.19** | **2.34** |

*Note: Due to low sample size for Inspection #72 above, the figures for this inspection do not represent comparable values.

# Prince George's County

## Fleet Maintenance Audit

**Inspection #72**
**Sixteen (16) Buses**

Conducted November 18, 2018

**TRANSIT RESOURCE CENTER**

**5840 Red Bug Lake Road**
**Suite 165**
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November 21, 2018

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Sixteen (16) Buses
# Conducted November 18, 2018

## TABLE OF CONTENTS

# PRINCE GEORGE'S COUNTY
# VEHICLE MAINTENANCE AUDIT
# Sixteen (16) Buses
# Conducted November 18, 2018

## EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted on November 18, 2018 by TRC for Prince George's County. Due to County snowplow truck inspections, the team was limited to a single day of inspections. Forty-six (46) buses were scheduled for the fleet inspection and maintenance record review; however, thirteen (13) buses were not available for inspection due to the following reasons: Bus 62622/suspension, Bus 62624/accident, Bus 62639/engine, Bus 63092/wheelchair lift & A/C, Bus 63145/accident, Bus 63159/engine, Bus 63189/accident, Bus 63194/accident, Bus 63205/electrical, Bus 63206/brakes, Bus 63211/at Cummins, Bus 63214/overheat, and Bus 63215/transmission. The remaining 17 buses could not be inspected due to lack of time as a result of the County snowplow inspections. The number of buses not available for inspection has been increasing the past several audits and is cause for concern.

Due to the low number of buses inspected, the results of this audit have a high degree of uncertainty.

The results of this current audit are as follows:

| | |
|---|---|
| Total Defects (note: only 16 buses inspected this audit) | 51 |
| Average Defects per Bus | 3.19 |
| Total Class "A" Safety-Related Defects | 44 |
| Average Class "A" Safety-Related Defects per Bus | 2.75 |

The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the audit results for all audits conducted to date in Year 2018. Results from this audit show a slight decrease in both Class "A" and Class "B" defects. It is unknown yet if this is a sustainable trend.

Although both categories showed an improvement, engine compartment and steering/suspension defects continue to account for over 80% of the total defects found.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

# Audit Report

## BUSES INSPECTED

Due to County snowplow inspections, this audit was limited in time to a single day of inspections. Therefore, only sixteen (16) buses received a physical inspection. Two days and over 30 buses are inspected during a normal audit. Table 1 below identifies these 16 buses.

**Table 1**
**Buses Inspected**

| PHYSICAL INSPECTION | MODEL YEAR | VEHICLE MAKE |
|---|---|---|
| 62627 | 2011 | Gillig |
| 62634 | 2011 | Gillig |
| 62635 | 2011 | Gillig |
| 62636 | 2011 | Gillig |
| 62642 | 2012 | Gillig |
| 62645 | 2012 | Gillig |
| 62647 | 2012 | Gillig |
| 62648 | 2012 | Gillig |
| 62652 | 2012 | Gillig |
| 63163 | 2008 | Gillig |
| 63168 | 2008 | Gillig |
| 63188 | 2009 | Gillig |
| 63197 | 2010 | Gillig |
| 63202 | 2010 | Gillig |
| 63204 | 2010 | Gillig |
| 63209 | 2010 | Gillig |

Table 2 which follows identifies the thirteen buses that were not available for inspection. *The number of buses not available for inspection is over 28% and has been increasing the past few audits and is cause for concern.*

**Table 2**
**Buses Not Available for Inspection**

| BUSES NOT INSPECTED | MODEL YEAR | VEHICLE MAKE | REASON |
|---|---|---|---|
| 62622 | 2011 | Gillig | Suspension |
| 62624 | 2011 | Gillig | Accident |
| 62639 | 2012 | Gillig | Engine |
| 63092 | 2006 | Gillig | Wheelchair Lift & A/C |
| 63145 | 2007 | Gillig | Accident |
| 63159 | 2008 | Gillig | Engine |
| 63189 | 2009 | Gillig | Accident |
| 63194 | 2009 | Gillig | Accident |

| Table 2<br>Buses Not Available for Inspection | | | |
|---|---|---|---|
| **BUSES NOT INSPECTED** | **MODEL YEAR** | **VEHICLE MAKE** | **REASON** |
| 63205 | 2010 | Gillig | Electrical |
| 63206 | 2010 | Gillig | Brakes |
| 63211 | 2010 | Gillig | At Cummins |
| 63214 | 2010 | Gillig | Overheat |
| 63215 | 2010 | Gillig | Transmission |

## EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of four bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

### Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

**Class A** – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

**Maintenance Record Review**

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals

To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the sixteen (16) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs

To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the sixteen (16) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

**FINDINGS**

**Overall Fleet Condition**

Fifty-one (51) defects were found during this current audit, or 3.19 average defects per bus. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Table 3 also shows the average number of

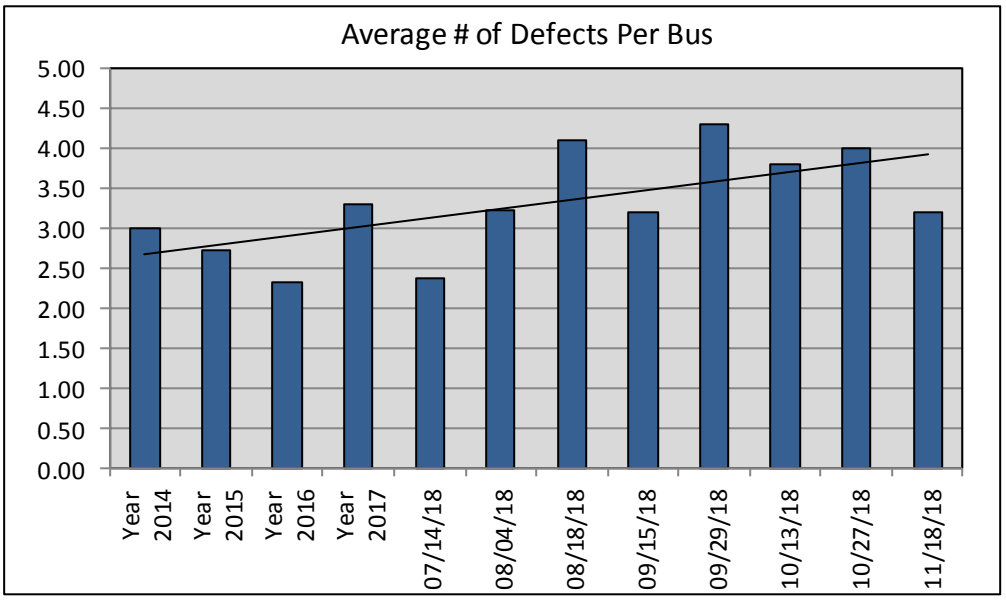
Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018.

**Table 3**
**Audit Trend Comparison**

| Date | Average Defects Per Audit | Average Defects per Bus | Average Class "A" Defects Per Audit | Average Class "A" Defects per Bus |
|---|---|---|---|---|
| Year 2014 | 126 | 3.00 | 62 | 1.48 |
| Year 2015 | 98 | 2.72 | 74 | 2.06 |
| Year 2016 | 74 | 2.31 | 59 | 1.84 |
| Year 2017 | 105 | 3.28 | 88 | 2.75 |
| July 14–16,2018 | 59 | 2.36 | 54 | 2.16 |
| Aug. 4–6, 2018 | 103 | 3.22 | 88 | 2.75 |
| Aug. 18–20, 2018 | 98 | 4.08 | 81 | 3.38 |
| Sept. 15-17, 2018 | 105 | 3.18 | 90 | 2.73 |
| Sept. 29–Oct. 1, 2018 | 133 | 4.29 | 125 | 4.03 |
| Oct. 13 – 15, 2018 | 129 | 3.79 | 120 | 3.53 |
| Oct. 27 – 29, 2018 | 140 | 4.00 | 128 | 3.66 |
| **Nov. 18, 2018** | **51*** | **3.19** | **44*** | **2.75** |

*Note: Due to low sample size, these figures do not represent comparable values.

The average number of defects per bus decreased during this current audit, but as can be seen by the trend line in the chart below, results are still above the long-term average.



**Defects Findings**

Defects were found in the Engine Compartment, Exterior Body Condition, Lights, Suspension/Steering, and Transmission categories. The Engine Compartment category and the Suspension/Steering category comprised over 80% of the total defects, with the Engine Compartment category showing a total of 31 defects and Suspension/Steering category defects showing a total of 10 defects. **Engine Compartment defects represent a critical fire risk, and steering/suspension defects represent a critical accident risk. TRC recommends immediate corrective action to reduce defects in these categories.**

Table 4 which follows compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Critical areas of concern are highlighted in Table 4 below.

**Table 4**

| Summary of Defects by Category | Year 2014 Avg | Year 2015 Avg | Year 2016 Avg | Year 2017 Avg | Insp #65 2018 | Insp #66 2018 | Insp #67 2018 | Insp #68 2018 | Insp #69 2018 | Insp #70 2018 | Insp #71 2018 | Insp #72 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Accessibility Features | 7 | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 1 | 0 | |
| Air System/Brake System | 15 | 8 | 7 | 7 | 2 | 3 | 7 | 8 | 4 | 7 | 2 | 0 | |
| Climate Control | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | |
| Destination Signs | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Differential | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | |
| Driver's Controls | 5 | 2 | 1 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | |
| Electrical System | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | |
| Engine Compartment | 36 | 27 | 24 | 34 | 18 | 34 | 29 | 50 | 69 | 60 | 73 | 31* | ⇦ |
| Exhaust | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Exterior Body Condition | 15 | 18 | 12 | 12 | 8 | 18 | 18 | 14 | 9 | 11 | 12 | 7* | |
| Interior Condition | 13 | 13 | 4 | 10 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 0 | |
| Lights | 7 | 6 | 5 | 6 | 2 | 3 | 10 | 1 | 4 | 8 | 13 | 1* | |
| Passenger Controls | 1 | 1 | 1 | 2 | 0 | 2 | 2 | 0 | 1 | 4 | 0 | 0 | |
| Safety Equipment | 7 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Structure/Chassis/ Fuel Tank | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Suspension/Steering | 10 | 10 | 10 | 19 | 21 | 28 | 26 | 19 | 28 | 28 | 35 | 10* | ⇦ |
| Tires | 3 | 1 | 3 | 2 | 1 | 4 | 0 | 3 | 2 | 4 | 1 | 0 | |
| Transmission | 2 | 2 | 2 | 1 | 0 | 4 | 0 | 3 | 12 | 2 | 0 | 2* | |
| **Total Defects** | **126** | **98** | **74** | **105** | **59** | **103** | **98** | **105** | **133** | **129** | **140** | **51*** | |
| **Average Defects Per Bus** | **3.00** | **2.72** | **2.31** | **3.28** | **2.36** | **3.22** | **4.08** | **3.18** | **4.29** | **3.79** | **4.00** | **3.19** | |

*Note: Due to low sample size, these figures do not represent comparable values.

**PMI Paperwork Review Findings**

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

**Class A –** Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

**Class B** – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

**Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

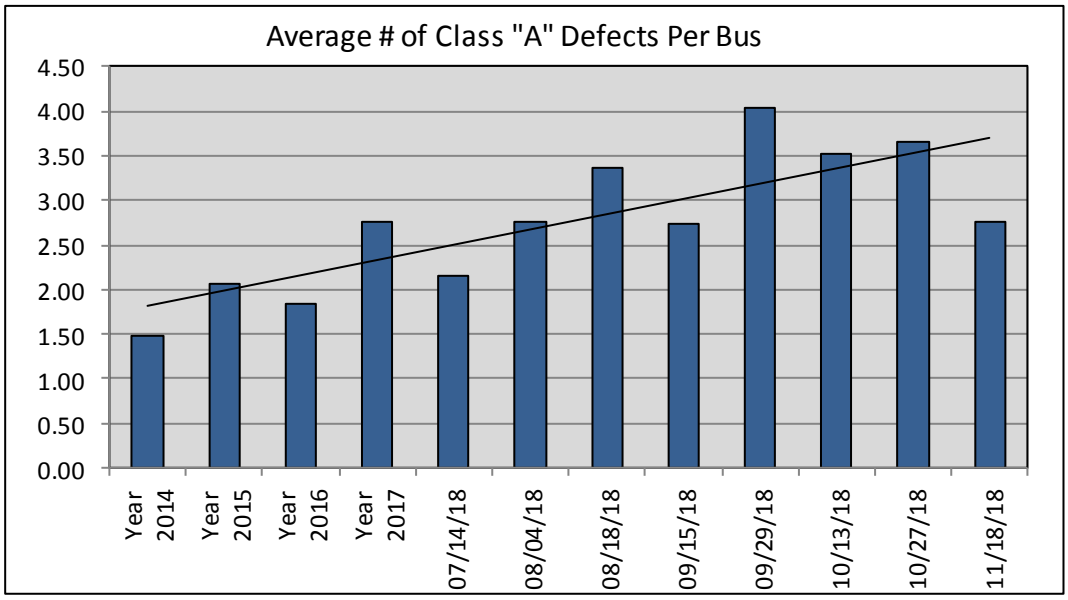
Safety

Forty-four (44) Class "A" safety-related defects were found during this inspection, for an average of 2.75 Class "A" safety-related defects per bus compared to an average of 3.66 Class "A" safety-related defects the previous audit. The 44 Class "A" defects found during this current audit are listed in Table 5 which follows.

| Table 5 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 62627 | 2011 | Gillig | 10-Oct-18 | Marker light, S/S rear roof, inop |
| 62627 | 2011 | Gillig | 10-Oct-18 | Radius rod, S/S rear lower, worn |
| 62627 | 2011 | Gillig | 10-Oct-18 | Oil leak, engine compartment, oil cooler leaking |
| 62627 | 2011 | Gillig | 10-Oct-18 | Oil leak, engine compartment, timing chain cover leaking |
| 62627 | 2011 | Gillig | 10-Oct-18 | Oil leak, transmission, dip stick tube fitting leaking on transmission pan |
| 62627 | 2011 | Gillig | 10-Oct-18 | Oil leak, transmission, transmission pan drain plug leaking |
| 62634 | 2011 | Gillig | 12-Oct-18 | Oil leak, engine compartment, alternator oil feed line leaking |
| 62634 | 2011 | Gillig | 12-Oct-18 | Radius rods, both rear lower, worn |
| 62634 | 2011 | Gillig | 12-Oct-18 | Oil leaks, engine compartment, multiple oil leaks |
| 62635 | 2011 | Gillig | 26-Sep-18 | Oil leak, engine compartment, alternator front seal leaking |
| 62635 | 2011 | Gillig | 26-Sep-18 | Oil leak, engine compartment, oil pan leaking |
| 62635 | 2011 | Gillig | 26-Sep-18 | Radius rods, both rear lower, worn |
| 62635 | 2011 | Gillig | 26-Sep-18 | Oil leak, engine compartment, oil leaking above air compressor |
| 62636 | 2011 | Gillig | 8-Oct-18 | Oil leak, engine compartment, alternator front seal leaking |
| 62636 | 2011 | Gillig | 8-Oct-18 | Coolant leak, engine compartment, radiator leaking |
| 62636 | 2011 | Gillig | 8-Oct-18 | Oil leak, engine compartment, rear main seal leaking |
| 62636 | 2011 | Gillig | 8-Oct-18 | Oil leak, engine compartment, timing chain cover leaking |
| 62636 | 2011 | Gillig | 8-Oct-18 | Oil leak, engine compartment, drain tube from turbo leaking |
| 62642 | 2012 | Gillig | 13-Nov-18 | Alternator belt, engine compartment, cracked |
| 62642 | 2012 | Gillig | 13-Nov-18 | Radius rod, S/S rear lower, worn |
| 62645 | 2012 | Gillig | 2-Nov-18 | Oil leak, engine compartment, alternator front seal leaking |
| 62645 | 2012 | Gillig | 2-Nov-18 | Radius rod, both rear lower, worn |
| 62645 | 2012 | Gillig | 2-Nov-18 | Coolant leak, engine compartment, coolant leak from Pro Heater |
| 62647 | 2012 | Gillig | 7-Nov-18 | Oil leak, engine compartment, rear main seal leaking |
| 62647 | 2012 | Gillig | 7-Nov-18 | Oil leak, engine compartment, oil pressure switch leaking |
| 62647 | 2012 | Gillig | 7-Nov-18 | Oil leak, engine compartment, oil filler tube leaking @ block |
| 62648 | 2012 | Gillig | 24-Oct-18 | Drag link, at pitman arm, worn |
| 62648 | 2012 | Gillig | 24-Oct-18 | Oil leak, engine compartment, oil filler tube leaking |
| 62648 | 2012 | Gillig | | Oil leak, engine compartment, oil leaking between air compressor & steering pump |
| 62652 | 2012 | Gillig | 14-Oct-18 | Oil leaks, C/S of engine, multiple oil leaks |
| 63163 | 2008 | Gillig | 14-Nov-18 | Oil leak, engine compartment, hydraulic fan motor leaking |
| 63163 | 2008 | Gillig | 14-Nov-18 | Radius rod, C/S upper rear, worn |
| 63163 | 2008 | Gillig | 14-Nov-18 | Radius rod, S/S rear lower, worn |
| 63188 | 2009 | Gillig | 9-Nov-18 | Oil leaks, engine compartment, multiple oil leaks |
| 63197 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, oil filler tube leaking @ block |
| 63197 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, oil cooler leaking |

| Table 5 | | | | |
|---|---|---|---|---|
| **Bus #** | **Year** | **Make** | **Last PMI** | **Class "A" Defects** |
| 63197 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, reservoir line fitting leaking |
| 63202 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, A/C compressor front seal leaking |
| 63202 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, alternator front seal leaking |
| 63202 | 2010 | Gillig | 14-Nov-18 | A/C belt, engine compartment, cracked |
| 63202 | 2010 | Gillig | 14-Nov-18 | Radius rods, all rear, worn |
| 63202 | 2010 | Gillig | 14-Nov-18 | Oil leaks, C/S of engine, multiple oil leaks |
| 63209 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, alternator front seal leaking |
| 63209 | 2010 | Gillig | 14-Nov-18 | Oil leak, engine compartment, breather tube leaking |

The average number of Class "A" defects per bus decreased during this current audit, but it is not known yet if this is a sustainable trend.




Comfort and Convenience

During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity

TRC did not observe any structural defects during this audit.

**PMI Schedule Adherence**

TRC examined the PMI records of the sixteen (16) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

**SUMMARY OF RECOMMENDATIONS**

Forty-four (44) Class "A" safety-related defects were found during this current audit, or 2.75 average Class "A" defects compared to or 3.66 average Class "A" defects per bus last audit. The average number of Class "A" defects per bus decreased during this current audit which is a positive sign. As previously noted, due to a conflict with snowplow inspections, this audit was time-constrained which permitted the inspection of only sixteen (16) buses. The decreased number of inspections leads to a high degree of uncertainty in the results. Future inspections are necessary to properly verify the efficacy of the corrective actions in place.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The average number of Class "A" defects per bus in this category decreased to .62 from 1.00 during the last audit. TRC will monitor to ensure this trend is maintained.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue.

**APPENDIX A: Electronic copy of EXCEL spreadsheet reports**

**APPENDIX B:**

## Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open