



# Metropolitan Transit Commission



April 26, 2023



# METROPOLITAN TRANSIT COMMISSION

Wednesday, April 26, 2023

5:30pm

Charlotte-Mecklenburg Government Center

Conference Room 267 - WebEx

## AGENDA

- I. Call to Order ..... Mayor Vi Lyles
  - Attendance (Roll Call)
- II. Approval of the March 22, 2023 Summary (p.5-64) ..... Mayor Vi Lyles
- III. Public Comments
- IV. NCDOT State Safety Oversight Presentation ..... Jason Orthner
- V. MTC March Meeting Action Follow-Up (p.66-417) ..... Brent Cagle
  - Legal – Patrick Baker (p.68-70)
  - City Council – Ed Driggs (p.72-77)
  - City Manager – Marcus Jones (p.78-80)
  - Scope of Work – (p.82-85)
- VI. Interim Chief Executive Officer’s Report (p.419-429) ..... Brent Cagle
- VII. Informational Items
  - Service Level Update (p.431-438) ..... Jason Lawrence
  - Silver Line LPA and Amity Garden Station Update (p.440-447) ..... Andy Mock
  - Title 6 – Fare Capping Analysis (p.449-471) ..... Arlanda Rouse
- VIII. Action Items
  - FY2024 Proposed Operating & Debt Services Budget (p.480-489) ..... Brent Cagle
  - FY2024-28 Capital Investment Plan (p.473-482) ..... Chad Howell
- IX. Report from the Chair of the Transit Service Advisory Committee (TSAC) ..... Jarrett Hurms
- X. Report from the Chair of the Citizens Transit Advisory Group (CTAG) ..... Edward Tillman
- XI. Adjourn



**METROPOLITAN TRANSIT COMMISSION  
MEETING SUMMARY  
March 22, 2023**

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**Presiding:** Mayor Vi Lyles, City of Charlotte

**Present:**

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| County Commissioner Leigh Altman (BOCC)        | Anthony Roberts (Town Manager, Huntersville) |
| Marcus Jones (City Manager, City of Charlotte) | Mayor Brad Simmons (Town of Mint Hill)       |
| Mayor Woody Washam (Town of Cornelius)         | Brian Welch (Town Manager, Mint Hill)        |
| Andrew Grant (Town Manager, Cornelius)         | Mayor Jack Edwards (Town of Pineville)       |
| Mayor Rusty Knox (Town of Davidson)            | Bill Thunberg (Town of Mooresville)          |
| Mayor Melinda Bales (Town of Huntersville)     | Mayor Walker Reid III (City of Gastonia)     |

**Interim CATS Chief Executive Officer:** Brent Cagle

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**I. Call to Order**

The hybrid regular meeting of Metropolitan Transit Commission was called to order at 5:30pm by MTC Chairwoman Mayor Vi Lyles, City of Charlotte.

**II. Review of Meeting Summary**

The Special meeting summary of January 31, 2023 was approved.

**III. MTC Chairwoman Opening Discussion**

**MAYOR LYLES (City of Charlotte):** First what I'd like to do is take a couple of minutes as Chair to talk about our agenda for the night. This morning I said that I concurred with our former Chair and Commissioner Leigh Altman that a comprehensive review of the maintenance and safety of CATS was required. I also said that we need a deeper dive into the Management Partners review of CATS. Tonight, I think this is when we begin this process.

If we are going to do this review, we need to create a scope of services based on the Management Partners review as well as on the maintenance and safety issues that we have. I believe that anything that we move going forward needs to be approved by the MTC and contract that will be done by the City of Charlotte. The next step that I believe is important is to have a candid conversation in this room with members that are often sitting here every month hearing these reports and hearing the reaction to the scrutiny of the items that we've been having and really cannot ignore.

What I'd like to do today is to really rearrange our agenda so that we can receive a report from our Interim CATS CEO, any reports that we'd like to hear from our city manager, and then open it up for a discussion because I know that everyone has thoughts and ideas about what we can and should do and how we should act. But at the end of the day the next step is to make sure that we're moving forward with the issues that we have to incorporate to make sure that CATS has the ability to operate reliably and safely in this community.

Transportation services are essential to the way that we live, work, and play, and without those services being there, this community will suffer, individuals in this community, our residents will suffer, and so we have to take the real effort to have a forward look to say how do we do this. So I'm going to begin this process by asking our Interim CEO to give us a report regarding the May 21, 2022 derailment, and I want us to recognize that this is going to be

a discussion for everyone, including the members of our committees that have helped advise us, including those partners that are nonvoting members, that we also have a report not only on maintenance and safety, but we have a report that walks us through the Management Partners' recommendations step by step.

I have said that I think it's time for us to consider how do we structure this. I think one of our primary efforts around MTC and the City of Charlotte has got to be examined and looked at in a way that perhaps gets us ready to have an authority that runs this operation so that there is clarity of purpose and authority.

**COMMISSIONER ALTMAN (Mecklenburg County):** Madam Chair, I have a point of order.

**MAYOR LYLES (City of Charlotte):** Yes.

**COMMISSIONER ALTMAN (Mecklenburg County):** I was advised by the county attorney at the beginning of the meeting that in order to take an action that is not already on the agenda there would need to be a unanimous vote at the beginning of the meeting. And as I do have an action item in the form of voting to appoint an outside transit expert to evaluate these issues, I would like to put that forward.

**MAYOR LYLES (City of Charlotte):** I agree that we ought to have that and that is an appropriate action. I'd like to have a discussion here from our community leaders as well as members in this room on what we should be trying to accomplish and do. We need a scope of services if we're going to have something. And that scope of services, because MTC is a policy board, should include the conversations that we have and set out as our determinations for that kind of review and scope. I hope that we can do that, and we can have your motion after we hear from the report and that we could gather our thoughts around each of these issues.

**COMMISSIONER ALTMAN (Mecklenburg County):** I defer to the MTC attorney. He advised me that we had to queue up the ability to even vote later at the beginning of the meeting.

**CATS ATTORNEY BRAD THOMAS:** Yes. Our MTC Rules of Procedure provide for that if we don't have an item on the agenda but we wish to take action on that item for tonight's meeting, that in order to make it an action item we will need to take a vote and that vote will be unanimous in order for it to appear as an action item then for our discussion. As long as that is done before a discussion happens, we can do that.

**MAYOR LYLES (City of Charlotte):** We can do that before the discussion after we have our staff reports. I think the other thing that I really would like to see is that we have out of our membership of 7, four. And those that are on -- well, five and six. I really would like to see Matthews participate in this discussion and any other folks that have an opportunity to think about it. I agree that we can have the discussion, but I want us to make sure in some way we include in that discussion the opportunity for others to be able to participate either by email or comments, however we need to do that, so that we don't miss anyone.

**IV. Interim Chief Executive Officer's Report** – Based on pages 27-32 in the MTC Agenda Packet for March 22<sup>nd</sup>, 2023 meeting.

- Management Partners' Update presented by Marcus Jones (City Manager, City of Charlotte, Liz Babson, Assistant City Manager, City of Charlotte & Brent Cagle, Interim Chief Executive Officer, Charlotte Area Transit System) based on pages 34-39 in the MTC Agenda Packet for March 22<sup>nd</sup>, 2023

**Discussion:**

**CITY MANAGER MARCUS JONES (Charlotte):** I do want to talk a little bit about how we came about the Management Partners report and a lot of words that have been shared today in terms of responsibility and accountability. I will tell you, as the City Manager of the City of Charlotte, what we call Team Charlotte, we have about 8000 employees. We have offices that have as few as a dozen employees and some departments, like police where we have almost 2000 employees.

We have departments that are regional in nature, like Charlotte Water as well as the aviation department, and we have a strong record of operations with CMPD or fire or solid waste services or CDOT, but sometimes our departments need an outside assessment and sometimes there are issues. Those issues, whether it's in communication or operations or leadership, and we welcome those reviews.

Last year, as CATS was going through many challenges, we did a couple of things. One, we created an internal team which Liz Babson as Assistant City Manager really spear-headed it, and we also had Brent Cagle, an ACM, as well as Jason Snyder and Sarah Hazel, trying to see some of the things that were happening with CATS and some of the deficiencies that we were seeing.

Then we actually brought in, or I called in, the external review of Management Partners. What Brent will talk to you tonight about, as well as Liz, is some of the things that were found in that report, including questions about leadership, management, and culture. I will tell you that since that report has been released, I would call the C Suite of CATS, is totally different. In other words, the CEO and CFO and the COO are no longer a part of CATS. Some of those issues are personnel, which we don't discuss, but what I will tell you is it's an opportunity to take a look at the Management Partners report and see how we can build on this.

Brent and I are committed to making sure that there is also an outside assessment as relates to assets that are a part of CATS, and what I do know is that Brent is willing, able, and ready to communicate with what is happening and really build that trust. I just wanted to try to focus this on how we got here with the Management Partners report and some of the information that we had that we're trying to build on now, so I'll turned it over to you, Liz.

**ASSISTANT CITY MANAGER LIZ BABSON (Charlotte):** Happy to be here this evening with you, Madam Mayor, Madam Chair, and MTC members. As City Manager Marcus Jones just mentioned, we engaged Management Partners back last year, and that was really following a July 16th memo that he wrote to City Council and the Mayor acknowledging that we were seeing some operational challenges in CATS at that time. It was resulting from many of the things that we're seeing across the country in the way of labor shortages, employee morale. There were some safety concerns many of us were familiar with and hearing about in the media, and all of these were really impacting our reliability of service and our ability to provide that reliable service to the community.

The memo laid out a number of things you see here on the screen, some short-term improvements but also identified some longer-term needs. And again, it's important to understand that all of these things work together in a comprehensive way to really help assess the operation of the organization of CATS as a department. The manager committee to

immediately evaluating current practices looking for opportunities to ensure a safe environment for our bus operators and CATS employees, Brent will talk a little bit more about that as he goes through the work that he's done in the first 90 days in his role as the interim CATS CEO. Last year City Council adopted a really aggressive compensation plan that was designed to increase retention and recruitment, and we're seeing some vacancy trends starting to shift across the organization and within CATS at this time as a result of those changes.

Then finally, as we've talked about, we engagement Management Partners as an outside agency to really come in and take a look and do an organizational review and assessment of CATS. This was a high level review. I'll talk about over the next couple of slides some of that information and the way in which we collected information in working with the consultant.

Again, that review would assess organizational structure and leadership, it would look specifically at procurement and contract oversight, employee morale, contract relationship with our current contract provider for bus operations, and service provision and bus reliability. Counsel and MTC received that assessment late last year. Again, it was a high-level road map that really identified ways in which we could start to look at improving the organization, but it also serves as a long-term action plan for us.

We talk a little bit about the process that they went through, Management Partners, to collect and assess the current operations within CATS. They conducted a number of interviews with city employees and also with our contractor serving the bus operations, RATP Dev Management. They reviewed tons of documents, including budgets, audit performance reviews, strategic plans, customer service satisfaction reviews. They also surveyed all of the City of Charlotte CATS employees and conducted a limited review of other transit agencies across the country.

Again, this was a high level overview but just the start of a much more comprehensive process that we're going to undertake, and you'll hear some about some of the work that Brent is doing today as we speak, and then you'll hear more some of the next steps and the actions that we want to take. Out of that Management Partners assessment was a road map with objectives, and those are the ones you see listed on the screen, was a collaborative team with shared mission and values, an organizational culture that encourages transparency and staff retention, clear expectations and accountability throughout the organization, clarified roles and responsibilities related to this contract and services because there was confusion within the organization about how that occurred, and then a governance structure that's accountable and transparent to the community that it serves.

**INTERIM CATS CEO CAGLE:** Good evening, members of the MTC. I always want to start off with some of the things that I think we've done well, some of the things that I learned that I'm proud of or encouraged by early successes. One thing when I first started, the first two to three weeks, I spent a lot of time out in the field across all units, across all shifts talking to employees, and I was really encouraged by those conversations. They shared with me challenges and they shared with me concerns, things that they see around the workplace that we can work on, that we can get better on, but one thing that they all said is they have a strong sense of pride working for CATS. That's good. They're proud of the work they do. They want to provide excellent services to the community, to all of our citizens, and they understand how important CATS is to the entire region and keeping people moving across the region for mobility. I think that's good. They are committed to working together to make CATS great, to make it a great organization, and that's the foundation. Every great organization really starts with employees.



The other thing I will say is we have started to stabilize bus and rail operations. In January our missed trips were less than 1%. Our February numbers, they started to creep up a little bit. They're in the 1 to 2% range, but again, that is a significant improvement from where we were in the summer of 2022 when we were seeing 8 to 9% missed trips monthly. We've stabilized that.

Rail operations remains consistent with 20-minute headways and 15-minute peak hour headways. And because I think we all know where this presentation is headed, I will go ahead and add in here the issues that we have related to operating restrictions have not changed the schedule for rail. The rail schedule remains the same, even with the operating restrictions, 20-minute headways plus 15-minute peak hour headways Monday through Friday, two hours beginning of the day, two hours into the day. Then we also flex for special events to 15-minute headways, things like Charlotte FC or other large events Uptown. That schedule has remained. It is unimpacted by the operating restrictions.

Now, the question might be -- and I ask this question because I'm simple sometimes, I don't get it -- I said if the trains are going 35 miles an hour when they used to go around 40 to 45, how can that be. The answer to that, without trying to get into the details, is if you were to get on the Blue Line today and ride from one end to the other -- because that car, that train that you're on is traveling slightly slower than it was before -- it would take longer. The total amount of time increase is between 2 to 5 minutes depending on some variables, like how long each car dwells at each station.

When you look at it on short, and not a lot of people actually ride end to end on a routine basis, but if you look at it, station to station, then it can vary from no change to a little bit more, depending on how far apart each station it is. But the headways have remained unchanged and the total travel time end to end has increased in the 2-to-5-minute range on the Blue Line. Okay, so now we've cleared the air on that one.

I will also say I think that it was very good news that the new collective bargaining agreement is in place for our bus operators. It is in place and an operator strike was avoided, and the bus operators were able to or are able in their new collective bargaining agreement to enjoy enhanced pay and benefits associated with that agreement.

The bus operations contract will be issued this month. It is in its final prep stages, and we will be issuing that contract for RFP this month. The current bus operations contract with RATP Dev expires in February of 2024, so we will be issuing the RFP, seeking proposals, and then making determinations, and if it's a different contractor than it is today, working with the current contractor and the new contractor to create a transition plan so that it is seamless, and our customers are not impacted by the changeover in the provider. And then we're focusing on daily operations. It's always our first priority to be safe and reliable in service.

The last point I'll make here, and Mr. Howell is going to talk about this in the next presentation, our budget is stable and we're meeting our financial targets. Chad Howell is finalizing the collaborative budget. I'm intentional to put that in there because one of the things that Management Partners talked about was a lack of understanding amongst internal CATS staff about how budget decisions were made. And what that really means is if you were in a division and you have needs every year and you put those requests forward to the financial, to the CFO, as part of the budget process, they frequently were not informed as to how those decisions would be made, whether or not they were funded or not. They found out on July 1st when the budget was approved. That's not a great way to run a budget process. If I've been with CATS 110 days I think, Chad has been with CATS 108 days. He took on a pretty large challenge, but he's really been trying to change that culture and create a collaborative budgeting process.

The other thing, and you'll see more of this, is our focus, I think it's important in the budget to really define what your priorities are. For me, my priorities are employees, for retention and recruitment and career development and training with our employees; safety and security and focus on training for our operators, especially de-escalation and customer service training; and additional security resources. We know we need additional security resources to support our operators. We also know the best way to keep our operators safe is for them to have the tools and the ability to de-escalate, and so we need to invest heavier in those de-escalation trainings. And then asset preservation, additional investments in rail and bus fleets and facilities.

Continued Work, Better Communication: We can always be better in how we communicate. We need to break down silence and create a shared mission and vision across the entire organization and as I said before, provide better communications around the budget process. Secondly, we must start to spend on asset management. We need to continue to have an aggressive bus replacement program. A fair amount of our bus fleet is over the specified FTA useful life of 12 years. Approximately 30% of our fleet is over that age, and that's around 100 buses. Our fleet is around 300 buses. About 1/3 of it is over the 12-year useful life, about 100 buses.

More concerning to me is that of those hundred there are a fair amount of those, 60 or 70%, that are over 15 years of age. That is concerning. When we order buses it takes 18 to 24 months to receive buses so we know now we are behind, and to get out of that we're going to have to be very aggressive, not just in the current year but probably for 3 to 5 years as we buy so we can lower the average age of our fleet and bring our fleet back into a better cycle for age of the fleet.

The other thing that we see is we must immediately implement rail fleet major maintenance programs and enter into service agreements to ensure the fleet is properly maintained. We need to conduct a full facility assessment, conduct a major facility rehabilitation on CATS buildings, and prioritize the immediate hiring of an asset manager for CATS. CATS has a Transit Asset Management Plan. When we completed that plan, it was always our intention to hire an asset manager. Unfortunately, that position has remained unfilled or unfunded. That will be a priority for this budget year immediately, before actually the beginning of next year. We will put it in the next year's budget, but we will be looking to fill that position immediately.

We need to have a five-year financial plan to meet our upcoming operation needs. We're projecting increasing operating expenditures over the next five years to address the aging bus fleet, to address deferred maintenance, and we still have additional safety and security program needs that must be funded, and we need to develop enhanced employee training programs and focus on employee retention and recruitment. We know that we have some challenges. The good news is we are financially stable. We have the resources to address these deferred maintenance items and to enable us to grow our operating budget to meet our current needs.

Over the next 30 days we're issuing the bus RFP, the bus operations provider RFP. We're submitting the budget to the MTC and City Council for consideration. On April 10th at the council business meeting, we will have several RCAs, Request for Council Actions, but one of those will be to amend a contract with Siemens to enhance and expedite necessary rail car maintenance and to purchase from Siemens a piece of equipment which is called a dolly. And think about a dolly like you would a furniture dolly, a set of wheels that you can use to roll things around.

In rail, a Light Rail dolly is a set of wheels that you place the vehicle on when you need to remove the permanent vehicle wheels, and those are referred to as a truck, and the truck is in effect the wheel set. There are three trucks per vehicle, and so when you remove those for maintenance you need a set of dollies to place the vehicle on. We will be asking Council to consider the amended contract for the maintenance but also the purchase of six dolly sets, which allows us to work with Siemens to expedite the maintenance.

I'll pause there and say the maintenance that we're talking about, obviously the community has been talking about this, so the maintenance we're talking about is the truck overhaul maintenance.

The truck overhaul maintenance contract, we entered into the contract about two years ago. There's one year of Siemens to prepare for, to set up their shop in the way that's necessary to actually do the truck maintenance for our vehicles. The first two vehicle trucks went to Siemens about 12 months ago, and the first one of those was received back to Charlotte, to CATS, about three weeks ago, and the second is on its way back.

Now, when the trucks are received, the first one and the second one after it, we will have to do acceptance testing. And I want to point out that the maintenance on these trucks is very specialized, and so as when they do acceptance testing it's possible -- the first set of trucks has not been accepted yet -- it's possible that other issues will arise as they're doing acceptance testing and you have to make additional repairs there on-site, not sending the trucks back to California but on-site before they're able to be accepted and put back into the fleet.

The first two trucks are out on their way back. The contract we have was for half of the fleet, 20 vehicles. And because we were going to be sending the trucks one set at a time, the projected completion date for half the fleet was July 2025. That's a long time. Given the situation we are in today, we have been working with NCDOT and with Siemens to expedite that.

What that means is, now that we have additional dolly sets, we will send more trucks at a time to Siemens for them to complete the repairs. They are working on a new schedule. We're buying six sets of dollies. We have one set. We will have seven, and we are working with a different transit agency, a separate transit agency, to borrow an additional set, and we should be able to send eight sets of trucks at one time that we can greatly increase the speed of the repairs, and we are extending the contract for the entire fleet. The original contract, half the fleet July 2025 based on the assumption that one truck set at a time would go to Siemens. The amended contract is eight truck sets at a time, entire fleet, and we are awaiting a new schedule, but given that we are sending eight times more trucks at a time we expect a greatly expedited schedule. As soon as we have that we will report that out.

I expect the schedule to be greatly reduced. In fact, I believe that it will take many months to do this work. It is very detailed work. All of the work has to be done in California, but we do expect a much better schedule as far as speed because we are sending more trucks at a time.

Let me pause there and say that is where we're at, but all of this is predicated around the notice that we received from NCDOT.

North Carolina Department of Transportation has oversight responsibility for safety matters when it comes to rail and Light Rail. They are the designated agency by the FTA. When I became aware of this was on February 6th North Carolina Department of Transportation sent CATS, sent me, a notice that they were concerned that we had not properly addressed the bearings in the trucks. Each truck has a main axle bearing, and that axle bearing failed on May 21, 2022, when we had the vehicle derailment that evening.

After the derailment occurred, we immediately notified NCDOT, as is the regulation, and we began working with Siemens to do a root cause analysis to understand exactly what

happened and why. As the root cause analysis was completed there were many factors, contributing factors, that led to the situation.

A couple of those factors would have been operator and communications center actions. There is some indication that the operator in the communications center, they did not know exactly what the issue was with the railcar, but they knew it was not operating quite as they would expect normal, but that did not lead them to immediately requesting that the railcar be taken out of service.

It remained in service, and ultimately the final contributing factor, or the other contributing factor, was the failure of the main axle bearing. The axle bearing, it was found the seal -- it's a sealed bearing -- water entered, the seal broke, water entered into the bearing and that created corrosion. Corrosion over time led the bearing to heat the axle. The axle overheated and seized, or stopped turning, and therefore the wheel stopped turning, and that is on the middle truck set of the vehicle that derailed.

Now, at the time, the vehicle was in revenue service. The vehicle came to a stop and the 24 passengers were safely unloaded and taken onto their destinations, and one passenger called for a medical evaluation but was released on scene with no treatment. Everyone was okay. So that was the evening; after that, we started working with NCDOT notifying them and the FTA and working with Siemens to do the root cause analysis. As Siemens did the root cause analysis, they determined that there was a flaw with the bearing, that the real fix for the bearing was to do the truck overhaul. The way that we resolve the issue with the bearing is to complete the truck overhaul as quickly as possible.

It was also determined that CATS is overdue on the recommended maintenance schedule of the truck overhaul. Trucks should be overhauled at 300,000-mile intervals or five years, whichever the first of each, and for CATS we will get to the 300,000 mile interval first always. We have a significant number of vehicles. Let's just say, most if not all of the vehicles are overdue either for their 300,000-mile overhaul or their 600,000 mile overhaul. We also determined that, and NCDOT was concerned that they asked us to provide them a corrective action plan, which we did. We went back and forth with NCDOT as we created the corrective action plan, but ultimately our corrective action plan was agreed to on March 2nd, and all of the things that I've described to you -- expediting the contract and those things -- are part of the corrective action plan and feed into the corrective action plan, as well as the speed restriction on the Blue Line.

Under normal operations, the Blue Line on average has an average travel speed of about 40 to 45 miles an hour. It has maximum speeds of about 55 miles an hour, but those are very short periods along very specific areas of the line. The speed restriction is 35 miles an hour maximum speed across the entire line, so that is the first restriction. Each of these restrictions sort of plays into the other.

The second restriction is that we will take eight rail vehicles out of service, or blue tag them is what we call it. We will tag eight vehicles out of service, and generally speaking those will be the highest mileage vehicles and they are out of service. Now, that also coincides with sending eight vehicle sets of trucks to Siemens at a time, because as we're sending those trucks those vehicles come out of service awaiting the trucks to come back.

The last piece to this is -- and again, it goes together with the others -- while we do not need to reduce, right, we could maintain the 20-minute headways plus 15 on peaks, given the other parameters we have -- service, increasing service -- we cannot increase service until we have the fleet repaired.

All of this is coming together. As it's been noted, I became aware of this situation on 2/6 when the NCDOT provided me the letter, sent the letter, and then leading into 2/17 and the

subsequent letter from DOT, started to understand and realize that we needed, CATS needed, a different approach and that the lack of the overdue maintenance is really the fundamental issue here that has to be addressed, and CATS, once we get it addressed, we will never find ourselves in this situation again. It must be addressed immediately, and ongoing we cannot find ourselves in this situation again.

**MAYOR LYLES (City of Charlotte):** As I said, these are difficult things to hear when we have sat around this table for a long time listening to each other and talking about issues that weren't related to this kind of report that Brent just gave to us. It is going to take us the time and the effort to get this done, but we will get it done. This is a commitment that we have to have if we're going to have a system that operates this way.

I wanted to take a moment and just say that this is the time I think it's a great opportunity for us to have further questions, deeper dive into any of this that we choose to, and I'm going to ask that everyone be present, so I'd really like to have our advisory group chair and vice chairs participate in this discussion because you have long-term experience with us and we want to know what's going on. And so when we talk about this glad to have them, Mr. Tillman and Mr. Hurms, around the table with us. I'm glad to recommend that. Please join us. Then I think that we really want to start an open discussion. We want the questions, and we also would like to have at the end of this conversation an idea of what the scope of efforts that we have to make to make this complete for both Management Partners as well as safety and maintenance.

If you are watching is online, all of the documents that have been referenced are on the website that you can look at. You've got a number of reports that are a part of this.

**V. Transit Services Advisory Committee (TSAC)'s Comments**

**Jarrett Hurms (Co-Chairman):** Thank you, Madam Mayor, and I would also like to thank Interim CEO Brent Cagle for stepping into this role because I know you have a lot to do.

I'll kind of start off and kind of tee up for our discussion for a lot of our voting members is that many of us on the TSAC committee were very thrown off by this. I know for me, I will just be honest, I was very pissed. And this is also coming from the heels of we recently had a safety presentation which we had talked about a lot of things, including what makes the preventable versus unpreventable collision, and a lot of our stats which were very much appreciated. However, the one big thing that was missing is the existence of a derailment. As you can probably imagine coming on the heels of that presentation, hearing this news had many of us taken aback by this. There is very much a loss of public trust because of this and there is going to be a lot of work. I do appreciate you presenting the work that's going to have to be done.

Over the past year as I have been on TSAC, I have made quite a few comments, either comments or questions in regards to the maintenance of our vehicles, both rail and bus, because while maintenance -- I've said it many times -- maintenance is not sexy. Trust me, I understand. But it's imperative and really one of the most important things for the providing of an effective transit system, especially one as large as CATS. Already, that in itself is one of the most egregious as far as the loss of trust.

Obviously, much of this needs to be done now and have a voice to be able to expedite things which I have seen, which is good, but other things that do need to be considered, including things such as to be able to better work with safety teams of all of our government agencies such as FTA, NCDOT, and things like that, such as I know we are doing the 35 mile an hour speed limit. But based on many of the documents that I've shown that they have suggested -- and originally the idea was not received as well -- so better communication, better

adherence to what the safety professionals for government agencies say is very important, and as well as there definitely needs to be an overhaul and a real consideration for our rail operations center, because during the event that happened in May 2022 there was the evidence that the derail operator has expressed concerns and much of it was seen as kind of a, "Well, no, you need to look here or just turn it on or off again," which is totally unacceptable.

Again, I am not criticizing the actual operator of the vehicle, because what they were doing did seem like the right thing but definitely a close look at the operation of your rail operations center is extremely vital amongst a number of other things.

I will just also state that obviously what is happening on the rail needs to be done, we all know this, and also as well as the processing when it comes to avoiding deferred maintenance in the future for both our rail and our buses as well. I was a regular rider of the #9 and #18 bus, I will say our fleet is very much aging. There is a lifespan for the original fleet so there definitely needs to be a very aggressive approach from not just now replacing the already old buses but also in the future with making sure that this does not happen again, because there are many riders or potential riders who are worried about the bus as well.

**Krissy Oechslin (TSAC Chairwoman):** Thank you, Madam Chair. I think the point I'd like to raise is, so I've been chair of TSAC since 2020, so I was sitting in this same chair in February 2020 when a motion was brought I think before MTC to fund the midlife overhauls that are being discussed now three years later that still haven't been done. You can go back and look in the minutes. They're on the MTC website.

I know COVID obviously happened in that time, and it's easy to say, like, everything went to hell because of COVID, but why have we not talked about that since then? You know, three years later those overhauls weren't done. It doesn't seem like anyone remembered that those didn't get done. Why wasn't that brought up, like, all the time instead of just "Oh, yeah, we have to do that," and there was a derailment that might/maybe could have been prevented if those overhauls had been done.

I kind of want to reflect on the comment from our public speaker, and also I listened to Mayor Lyles on "Charlotte Talks" today. I know it's important to go forward with things being fixed, and looking forward is how we fix things, but I think that to gain trust you have to look back and fix the things that happened and have some sort of accountability. If those overhauls were supposed to be done three years ago there needs to be, like: Why didn't they happen; was the money budgeted; if it was and didn't get spent, like, what happened to it? If it wasn't budgeted when was that decision made; why has it been that the midlife overhauls, why haven't they been brought up like every month, you know? It wasn't a secret that they needed to be done three years ago. Why is it three years before we talked about it again?

I just think that going forward it's important to fix things, but that also requires looking back and making sure people are held accountable for decisions that were made.

**Discussion:**

**MAYOR LYLES (City of Charlotte):** I wanted to say to you that I agree with you. We have to look back at the process, but a lot of this is what I talked about with culture. If you don't have people that are willing to speak up and people that feel that perhaps they are not in an appropriate place to speak up, and I've said the most important thing in an organization is to have your truth teller with you. And I don't think that we had that in CATS, and I don't know why. There's no way that I can go back, and I guess what I should have said -- and I'm not the most articulate mayor, but believe me, my heart is in the right place. My head may not follow me, but what I'm trying to say is that if you have employees that don't feel comfortable, we can

probably go back, but it's going to be how do we make sure that they feel comfortable enough to say, "I want to step up and say this is some way to improve this, this is why I didn't do or didn't say what I wanted to say," and incorporate that in the respect for the people that we have that work for us.

I agree with you, and I don't believe it is about money. Money doesn't cause this level of concern. Even if it did, that would have been a part of what I would say the culture is, and now I'm going to stop and let them Mr. Cagle give you the real answers of this.

**INTERIM CATS CEO CAGLE:** I guess what I would say is I will agree with the mayor. I think you did a good job. This is not a money issue. CATS has financial reserves. We still have, quote/unquote, COVID funds of the different sorts. These repairs are expensive capital maintenance and they are expensive, but this is not a money issue, this is a culture issue. What I will say is I agree with you accountability is absolutely key. What I have to determine and what I am determining now is where do I need to hold the people accountable versus where are the people who were afraid to speak up. And I need the folks who were afraid to speak up to understand we need that. We need people, I need people. No one in CATS should ever worry about coming to my office and letting me know there's an issue. I said that in the town halls. I'll doing new town halls to reiterate that because one set of town halls isn't enough. But I've seen that, right? We're going to get better, but I have already seen employees who call me. I give employees my cell phone number, because if they have an issue I need to know about it or come to the office or I go to them in the town halls. Culture doesn't change overnight, but it will change quickly because a culture of silence, there are a lot of people who have been waiting for this, waiting for doing this. I have to decide, and I am working through this, where are the folks that I need to hold accountable and where are the folks that I need to be listening to as they start to emerge and want to help CATS be great. Both are appropriate and I will be looking at both.

**MAYOR LYLES (City of Charlotte):** I think that, as I said, this is something that we're committed to, this organization. Every member of this group understands this. We sent out all of this packet of information. You should have it and have it available to you to talk about these things and being available in a way that's substantive and not just a report, and that's one of our commitments.

**INTERIM CATS CEO CAGLE:** One thing I would like to clarify just as we go through this, and I think there has been confusion, and believe me, this is complicated and so I think it's understandable. You mentioned what we refer to as the midlife overhaul, and so I do want to be clear. For rail vehicles, transit agencies frequently do what's called a midlife overhaul, and it is exactly what it sounds like. At the middle of the life, 15 years in, they send the car, the entire car, back to the manufacturer and they rebuild it from the ground up, and that includes mechanical maintenance. It also includes a passenger conveniences, new seats, new audio-video systems, Wi-Fi on board, all of those things that weren't available 15 years ago that the transit agency wants to include now, and so it's a full rebuild, it's a midlife overhaul. If you went to Siemens, it says show me the big book of manufacturer recommended maintenance, show me midlife overhaul. It doesn't exist. That's a transit agency term for a complete refresh or rebuild of the rail vehicle. Now, components that are included in midlife overhauls, they absolutely could show you the OEM manufacturer-recommended maintenance. Truck maintenance, truck overhaul, is a manufacturer recommended maintenance that should be completed at 300,000 miles, every 300,000 miles as I mentioned.

I hope that helps us not confuse. We need to do the midlife overhaul. It has been planned for for several years. It has not been started. Right now, it's estimated at \$40-50M but we need to put that out for proposals, and that is important, \$40-50M for half of the fleet. Our fleet consists of kind of two eras of cars, the original cars and then the cars that were bought with the Blue Line extension. We have 42 vehicles, Light Rail vehicles. Twenty of them are original and need a midlife overhaul, 22 are from the Blue Line extension and they're not quite to midlife overhaul. But by the time we get done with the first set of vehicles they will need midlife overhaul.

What we're talking about specifically with the bearing issue is about the truck overhauls, and so while we know we need to do the midlife overhaul, right now, frankly, we are prioritizing the truck overhaul to fix the division bearing. I did not mention before, but I will now, the estimated cost for the fleet for truck overhaul is approximately \$30M, and again, that action will be going to Council on April 10th, but that \$30M all in for the fleet is completely separate and apart from the midlife overhaul.

**MS. OECHSLIN:** But would the midlife overhaul have rebuilt the trucks?

**INTERIM CATS CEO CAGLE:** It would; it would have. Two years ago, when we said we would start, when CATS said they would start the midlife overhaul, it's sort of a – I don't know how to explain it. Even back then we needed to do the truck overhaul, and I don't know if the thinking was because the truck overhaul is included in the midlife overhaul. I can't say what that thinking was, but they are separate things. A midlife overhaul would include a truck overhaul, but it takes much more time. The first vehicle, when we send the first vehicle out for midlife overhaul it could take 18 to 24 months for just one vehicle because it's so extensive.

**MS. OECHSLIN:** Right, but I mean the end result, though, is that if the midlife overhauls had be done in a timely manner it would have gotten the truck overhauls and it would have ultimately taken less money and time instead of doing them separately?

**INTERIM CATS CEO CAGLE:** No, I don't think that's correct. The truck overhauls need to be done regardless of the midlife overhaul, and we should have been doing those and planning for the midlife overhaul so that they were coordinated together, not that we find ourselves where we have to put all efforts to the truck, but they would be separate and independent. You would need to do them regardless because the truck overhaul is routine every three years. Each rail car at CATS travels about 100,000 miles a year normal schedules, normal routines. Every three years we're doing truck overhauls. Doing a midlife would not have prevented us from doing a truck overhaul. We would still need to be doing that, we just should have planned better to coordinate those and do them in conjunction.

**MAYOR LYLES (City of Charlotte):** And implemented it as well instead of just planning. There should have been implementation.

## **VI. Citizens Transit Advisory Group (CTAG) Chairman's Comments**

**Edward Tillman (Co-Chairman – City of Charlotte):** Thank you very much, Madam Chair and MTC members. The first thing I'd like to say is I believe to some degree what we are now being made aware of in some ways stems from somewhat of an adversarial relationship that previous leadership had with the, I'll say, public in some respects as well as the media and trying to avoid additional negative press or attention. I've certainly in many meetings heard and felt a



very specific tone in how things were being portrayed at CATS and trying to downplay those things, and I certainly feel that may have played a significant role in how we got here.

But moving forward, because we cannot change what's already occurred, the trust that the community has with CATS was low already and this is not helping at all, and it's going to cost us more than what we have already spent and what we are going to have to spend to change our credibility. And potentially there's got to be an adjustment to that and in some ways going further than we expect to go and being a trustful and verified system. And I'm not too big on creating checkboxes or creating new processes, but potentially a checks and balances system is necessary so that one individual, two individuals, whatever the case may be, don't have the ability to downplay or, say, hide or mislead what the truth is about what is going on.

Similar to what we have and most communities have regarding police actions involving shootings or things that seem out of the norm, there may be need to consider something to the same effect when there is an action that involves some sort of incident regarding bus riders, bus drivers, the rail riders and drivers, so that anything that has to be reported to the NCDOT also gets sent to outside entities so that they are made aware and we are not coming behind our own leadership who should be sharing this so that we can get better at making sure someone else sees this, and we are all working in the light of day instead of hiding it until some other time where we can move beyond it or change the narrative in some manner.

It is very disturbing where we are, but we can move forward, but there will need to be some re-creation of trust within the community to say we are opening the doors to all of this. Mr. Cagle talked about the budget, the internal partners, we need to do the same when it comes to all aspects that are truly public information and necessary for the public to be made aware of because otherwise, we're creating a system, a regional system, that one of the biggest populaces will refuse to consistently go to. It will continue to be the choice of last resort or the choice of the poor instead of the choice of everyone looking to be agreeable to be efficient, to be more of a community.

Those are my thoughts as we sit here and sort of play armchair quarterback and see what has occurred over the last 10 to 12 months.

## **VII. Public Comments**

**1) MARK MOORE:** Thank you all for being here again tonight. Thank you, Mayor Lyles; thank you, Mr. Cagle, for being here. We've talked a lot about trust tonight, which is very on topic with what I was coming to talk about. Now, I do want to start off just by saying, Mr. Cagle and everyone else who has started with CATS fairly recently, I do appreciate the work that you've done. Obviously, you've done a lot of work to build trust with drivers recently and to be here and actually be present and have these conversations, and I do appreciate that.

The Light Rail concept you just mentioned aside, we were talking a lot about the cuts that happened back in August that were essentially presented originally as temporary cuts that were only cuts to provide reliability over the process of hiring more drivers. Now, I also attended the recent TSAC meeting where it became somewhat clear that a lot of the initial hiring numbers that are given to RATP Dev were hiring for the current reduced service and that there was no current plan on how to restore the service that was cut in August that was originally presented as to be temporary.

Now, I understand there's a lot of factors that go into this. I'm not trying to -- but this affects trust. We're talking about ridership trust and whether people feel like they can trust CATS to do what they need to do to be able to come back and get the ridership and things like that. But especially it affects trust because we are currently at a time where we are effectively depending on, one, the State to trust us to put the tax on. I'd like to be able to do plans like

Envision My Ride or the Silver Line or anything that will be happening going forward, and where people have to vote for that tax. Effectively you are asking the public to have this vote where they pretty much would have to approve it in order for any of these plans to go into place. I think we have to kind of recognize that it is hard to expect people to trust CATS to successfully pull that off, when we cannot pull off what we were doing before that is far below what would be projected with any of the plans we're trying to do.

It's sort of the analogy I think of like a parent talking to their kid, like a kid saying, "Mom, can I get a new dog, like, I promise I will take really good care of it? Here's the plan of everything I'm going to do to take care of it," and you look at the kid and you see the cat next to him that's dead and you're like, "You're going to have to do some more work for me to trust you with a dog." And I think to an extent, even though I know the work is being done, I think that's sort of where we're at right now. And I think the big place to start rebuilding that trust would be to at least kind of have a clear plan, like this is what we are working on to achieve, at the very least just like the original frequencies on all major lines. Like, I know it's not going to happen overnight, but it's also the type of thing that's never going to happen if it's just – there has to be a plan, and I think that's what I personally as a rider, a daily rider, would like to see more of. Thank you.

**Discussion:**

**MAYOR LYLES (City of Charlotte):** Thank you very much, Mr. Moore. I greatly appreciate your voice and your message to us. We're going to continue to work at it, and plans are great, but action is a lot better. I think you're going to continue to see this effort where we're talking about maintenance and safety to get to a place that we can do something a little bit more realistic for what the riders expect and experience. Thank you.

**VIII. Informational Items**

**A. Ridership Update** – No presentation given. Informational memo was available for the MTC to review.

**B. Battery Electric Bus (BEB) Mid-Pilot Program Update** – No presentation given. Information memo was available for the MTC to review.

**C. Security Contract and Programs** – No presentation given. Information memo was available for the MTC to review

**D. Preliminary Budget Update**

**Chad Howell**

**Thurman (Chad) Howell – Interim CATS Chief Finance Officer** – shared a presentation with Preliminary Budget updates; based on pages 41-57 in the MTC Agenda Packet for March 22<sup>nd</sup>, 2023 meeting.

**Discussion:**

**MAYOR KNOX (Town of Davidson):** I've just got one quick question. The \$27M for buses and the \$10M for projects and equipment purchases, is that in excess of our \$130M reserves? I notice it comes from reserve but is that in excess to or part of?

**INTERIM CATS CFO HOWELL:** Yes, sir, it is. It is in excess of the \$130M requirement across our two separate funds.

**INTERIM CATS CEO CAGLE:** One thing I will say, yes, it is in excess of the \$130M. We will never go below that but we also still, as I mentioned before, have some COVID cash so to speak.

**MR. HURMS:** So just a question, and so one is going back to the question of amenities. What was the dollar figures you said per year for that one?

**INTERIM CATS CFO HOWELL:** Yes, sir, prior to tonight, so '23 back, we budgeted according to our books -- about \$1.4M has been budgeted in prior year-to-date, so that's a budget number. And then going forward each year would be an additional half a million dollars annually added to that. Of course, we'll be spending it down as we go.

**MR. HURMS:** I will say that is very good news because as we've heard from our last MTC meeting we have a number of areas, both within Charlotte as well as areas of Cornelius and other areas where they have created certain infrastructure to be able to have certain amenities and shelters and everything that just haven't been built, so I think that is a good thing that that additional money is put in there. I think the next step is making sure that those are actually implemented. That's good.

My next question is in regards to the hiring and personnel portion. So obviously, as far as our current hiring as far as from a bus operator perspective, a lot that hiring is for the current ridership levels, but I would like to know as far as dollar figures, as far as potential hiring, as far as our pre-August 2022 levels of service, because part of being able to help bring some of that service back, even if it is a bit of a faucet, trickling faucet, method is being able to be aggressive within those hiring practices and making sure that we're hiring not just for the levels that we presently have but also for the levels that we used to have, as well as potential hiring for potential growth or within certain particular key lines or lines that may kind of cover very long stretches of the area.

**INTERIM CATS CEO CAGLE:** Couple things. I think you did a great job explaining it, Chad, but I'm going to add something in here and then probably come back to more of this sentiment. The slide that showed the breakdown between personal services and other O&M. This is a little bit of an optical illusion. The numbers are correct, but there's two different philosophies about how to budget for personnel. One would be to budget every full-time equivalent position available at 100%, and the other is to budget for what you believe your staffing is going to be over the year. Every organization has vacancies. We call it sort of salary savings, right? When you budget as if you were 100% occupied or filled, you end up putting more money into personal services that you will not spend because literally there is no one there to pay.

It's a philosophy that's not wrong or right, but as we looked at it, we were shortchanging ourselves on O&M by overstating personnel, personal services. We changed that. You can see, the total budget grows. It looks like all of a sudden personal services is going down, like are we cutting positions. We are not. We are not at all. What we are doing is recognizing the salary savings that we have.

Now, to the position question, and let me answer it, when we talk about bus operators you do not see bus operators in personal services because they are contracted with RATP Dev. They said they are employees but not City of Charlotte employees. They're contractors or they're contracted. They do carry vacancies right now. It is a high amount of vacancies. We are having conversations with them on how we can stem the tide, how we can start to turn the tide,

but I will say, one of the first things we need to do is stop the losses, right, stop losing people. We are very focused on retention and then we're turning our focus to recruitment, but today we need to retain every employee, whether it's bus operators, rail operators, everyone. We need to stop losing employees. We're really hitting hard retention. Then we will start to roll out the strategies on recruitment, but I am very worried about it.

Today when we talk about service levels, when we're able to provide service there's kind of two key ingredients there: staff and equipment. When it comes to bus, we have the staff to provide the service we are providing today. Anything beyond that and we will start to suffer on reliability. We do not have the personnel to start to move up from the schedule we have today, but we are showing that we can provide the schedule we have today reliably.

On Light Rail same end result, but equipment is the issue. We are committed to reliable, safe service but the service we provide today is really where we need to be so we can continue being reliable into the future, but as those things change we certainly will discuss more with the MTC, both demand, ridership demand, and how we see that recovering and changing, and then what our strategies can be as we start to be in a better position to address this.

**MR. HURMS:** Thank you, Mr. Cagle. That does clear up some to a certain degree because I would say some of those came from our last TSAC meeting. From the perspective of safety and reliability, I would say these changes would be important for now, but also thinking of the future I would say it's important if we were to add the service and everything there, if we were to add frequency, that would create a potential problem. Obviously, there is no debate there because safety is first.

From a bus operator's perspective obviously yes, retention is important, and I would definitely strongly encourage that you continue with ensuring that you are able to keep the people we currently have and be able to really have a very hard evaluation on retention efforts, making sure of that, and being able to really strategize on what is going right, what's not going right; what is kind of creating some of the potential issues and then be able to kind of really take those as lessons for the future.

I was more saying that to just making sure that understanding that there are many public riders who do wish some of that to come back, but I would say we do recognize that retention is very important so I would definitely strongly encourage to keep going with that but also being very hard on retention and making sure of that and then having continued conversation on the eventual hiring of it.

**MAYOR LYLES (City of Charlotte):** I do want to say that I just got a book called "Next," and it's like next what's going to happen in workforce. It's written by a professor at Yale. I would recommend it because I think this is going to get harder and harder and harder over the next several years to actually be at a place where people are definitely changing, and this book has actually done a lot of data management around that and where people are and what they're doing.

Then the second thing that I say about the budget, I'm really glad that we're doing this at this level of information, and what I think for me, as we're going through this process of change and openness in crisis, I really think that one of the things that has resonated with me is the connection between our budget and our policymaking. City Council does budget, MTC does policymaking. That can't be. If you're going to implement the policies you have to have financing to back them up, and I really would hope that as we're going through this list, kind of think through that and see how we either decide to keep it or what are the opportunities for improvements in that communication.

I think that that's something that I am very concerned about, because as we're establishing these metrics of that how we're going to do equipment changes and people, a lot of that comes under budget. But if you have a policy to grow your system and to get back where we want it to be, then that is a decision that doesn't always translate into a budget cost or something like that.

Then I think the other thing that I think is really important is to watch our debt service, because you want to have the right amount of reserves but you don't want to have too much. I think you guys have done a great job allocating funding to the needs that we have to make this work better. I want to say good job on the budget and let's just keep working to build out the right system that we can have.

**MAYOR BALES (Town of Huntersville):** One of the things that you and I have had conversations around when we're talking budget and policy is the potential opportunity to have some joint meetings to make sure that we are on the same page. That would be one of my recommendations.

**MAYOR LYLES (City of Charlotte):** I would agree. And I think we might have to figure that out as a committee meeting maybe, but you know how that goes, but we'll just keep working at it.

**COMMISSIONER ALTMAN (Mecklenburg County):** This is a really interesting point you just made, and I will call upon our attorney again because I was trying to get this down to a single sentence to explain to residents, and I was asking our attorney earlier this week to drill down the exact difference between the jurisdiction between the MTC and City Council. What I understood our conversation to leave me with is that basically the two boards have concurrent authority over policy, it's just that City Council has the additional authority to enter into contracts for CATS and to buy land, which the MTC does not have those two rights.

Can you clarify for me, because I thought we did have concurrent policy jurisdiction, is there ever a time when we vote on a policy that the City Council wouldn't, or vice versa, just for my edification.

**CATS LEGAL COUNSEL BRAD THOMAS:** I think there is a lot of overlap. For instance, when CATS brings transit plans to the MTC, such as the Silver Line or other long-term transit plans, those things are voted on by MTC and they're also voted on the part of a City plan as well, so definitely there is overlap in a lot of those areas.

**COMMISSIONER ALTMAN (Mecklenburg County):** Has there ever been a time that one voted for something and the other didn't, to your knowledge?

**CATS LEGAL COUNSEL BRAD THOMAS:** Not to my knowledge.

**COMMISSIONER ALTMAN (Mecklenburg County):** It's been sort of a concurrent thing with both policies, with both boards?

**CATS LEGAL COUNSEL BRAD THOMAS:** Yes.

**MAYOR LYLES (City of Charlotte):** From my experience it has been a negotiation. It hasn't been that we agree, it's just that we negotiate where we want to get to be. That may not

be a bad thing, but if we're going to talk about speed and change let's get some idea of what we're doing and how long it takes, and just pay attention to it and see if there are any opportunities. Maybe a joint meeting is the opportunity to say this is the way we want to do it, or there may be some smaller things that we do, like well, why do we have to put that on the consent agenda for something that the City has to approve. I think that when I look at it, it's really one of those opportunities to have this board actually engaged in finance and connecting these things together.

**IX. Action Item (Added by MTC on March 22<sup>nd</sup>, 2023)**

**Train Derailment Operations Investigation**

**Commissioner Leigh Altman**

**Discussion:**

**COMMISSIONER ALTMAN (Mecklenburg County):** I'd like to begin by recognizing that Mr. Cagle was trying to explain events and actions which almost entirely predate him, and I recognize the difficult position that puts you in and I appreciate your willingness to step in, truly. I have some comments to make. I have questions peppered throughout, if I may burden you to keep a running tally of my questions and at the end if you could respond. Thank you.

In the last day I've heard a couple of issues raised that I would like to address. One, the need for a transit authority and a big presentation tonight about Management Partners and their comments regarding our government structure. The need for a transit authority is a great conversation to have. In fact, I'll be meeting with area mayors about this on Friday. But the need for a transit authority has nothing to do with CATS' failure to perform the required maintenance on these trains and the fact that no one sounded an alarm. The need for a transit authority has nothing to do with CATS' failure to disclose the derailment. The need for a transit authority does not help us address how we will ensure these trains are safe and how we will hold accountable those who fail to do their job.

I've also heard it raised the governing structure of CATS is in some shape or form an apparent explanation for how these failures occurred, but there is no ambiguity that CATS is a public enterprise of the City of Charlotte. There is no ambiguity that CATS' CEO directly reports to the city manager or his ACM. It cannot be said that anyone at CATS was unclear who they should report to and that this is the reason that all of these lapses occurred.

Last, whatever problems of the governance structure -- and they do exist -- getting it changed will be a heavy lift requiring the General Assembly approval, and we cannot afford to wait around for that. I hope we don't confuse those issues in these discussions. The need of a transit authority in addressing the governance structure are very important, but they are at best distantly related to our topic tonight.

I say this as someone who was the former lead attorney for the State of Georgia's Consumer Protective Agency for five years. I am very uncomfortable that prior to tonight, and it was here at my table, the only notice that I had about NCDOT's letters to CATS was because a reporter put them in my hand. I otherwise would have had no information that all of this occurred because CATS failed to adhere to a maintenance schedule for the trains and that this was the cause of the derailment.

It is very hard to start rebuilding trust when, as I sit here today, I would only have known about that extent of the problem before today because a reporter gave me the document. That is just unacceptable. Ongoing safety issues and failing to maintain trains, please understand -- I'm sorry, when I wrote this, I didn't have the document. It was here at the dais when I sat here tonight so there. The fact that we can only have this conversation because someone outside of government provided proof is not acceptable.

On the questions of remediation, Mr. Cagle, the derailment happened in May. What steps did CATS take in June and July and August and September and October and November and December and January to remediate this problem? I was unclear from your comments, you said that two trucks have already been sent out for remediation, but I don't know that its repairs were made as a result of the derailment. When I'm done, I hope you'll address that.

I have heard it said on the radio today that remediation has been initiated, but I hope that's not the heat strips, which are merely diagnostic tools. They are not remediation, so I would like clarity around that.

On the most important issue of whether the trains are safe, yesterday it was stated by the Interim CEO in a memo to all of us that we have a corrective action plan in place to address the maintenance issues associated with the Light Rail vehicles, we continue to operate a safe and reliable transit system, and CATS believes the Blue Line is operating safely. However, I've got a May 2nd memo from NCDOT saying CATS is currently operating Light Rail vehicles which have surpassed the manufacturer recommended axle overhaul thresholds. It says CATS has not conducted any form of risk assessment or hazard analysis to quantify the risks or to identify additional risks that the condition of the deferred maintenance may be causing, nor has CATS examined or presented information on potential other contributing factors and/or mitigations that may exacerbate or reduce hazard risk.

As I sit here today, not having any sort of technical expertise myself, I have a very hard time reconciling what NCDOT said earlier this month and what I am reading as of yesterday. I would like to help restore clarity for me and credibility and trust for Timothy Abbott, who is DOT's safety enforcement and oversight manager, to come to the MTC or at least write to the MTC and explain why the trains are safe notwithstanding these aspects that I just read to you from his March 2nd letter.

In addition, we now have today I think the first time I've ever seen this here at my table a memo to the Interim CEO from DOT dated March 21st stating that CATS has failed to conduct bridge structure inspections, which I presume are bridges where CATS travels over, and there are numerous apparent citations related to a failure to inspect bridges, which I think is news to everybody in the room.

Of course, you've heard the CEO reference that 30% of the bus fleet is operating over its 12-year useful life. I am glad to hear the Mayor of Charlotte and the Interim CEO support -- I heard it on the radio today from the Mayor and it's contained in the CEO's memo from yesterday -- support to select a third-party transit consultant to perform an operational investigation. I hope that's not Management Partners. That's not what I'm seeking. I'm seeking a true fresh pair of eyes, a true third-party person who is a stranger to all these people and these events and who will bring total independence.

I heard someone today lament they approved of my calling for this, but they lamented why do we need to hire another consultant to investigate. I'll tell you. I have made some assertions in the last few days and tonight based upon the records and documents that I have, but I have incomplete information. CATS and its leadership have made assertions in response about safety and what has happened to get us here, but at this point we don't know anything for a fact. I am seeking an outside entity to interview the CATS technicians who were involved, to interview CATS executive staff who had roles in this, to interview people in the city manager's office who oversaw CATS. NCDOT can no doubt shed light, as can manufacturer Siemens, as to what was said and when. We need someone to pull the records and the emails and the documents to substantiate what has actually occurred. We need an entity that is familiar with the transit regulatory framework and best practices for transit organizations to give us context for any actual conclusions upon which we can all finally rely.

I now at this time make that motion. Well, I'll wait to make the motion until we can hear from the remainder of the board, but I would like to reserve some time to do that and thank you.

**INTERIM CATS CEO CAGLE:** Okay, let me start from the end. Yes, we had not gotten into the discussion of other things that we found. In an environment where we are encouraging employees, recommending to employees, asking employees to come forward and break the culture of silence, we should expect that there will be other things found.

One of the things that was brought forward by an employee in light of all of this was that CATS had failed in 2021 to conduct bridge inspections. That is an inspection requirement, it's a federal requirement, to inspect bridges once every two years. An employee brought that forward. We immediately looked into it to understand it. We have immediately secured a contractor to conduct the maintenance in 2023. We have a schedule -- not the maintenance, the inspection. We have a schedule. STD is the contractor there, an on-call contractor to the City, and they are qualified to do this work and they are immediately starting. They actually started yesterday.

The first crew started yesterday. They will add two additional crews on Monday morning, and they will complete the bridge inspections, the initial inspections, in the next 2-and-a-half to 3 months, and then they will work with us to finalize the reports, but while they are going they will be reporting to us anything that they find so that we can immediately start to address those things as they're going and not wait for a final report.

The reason you have a letter is we self-reported to FTA and NCDOT upon discovery, and we worked with them to inform them of what our actions would be. Yes, I had not gone in there. That is why that letter is in your packet, all of your packets tonight, and it was certainly something to talk about.

I will tell you; we believe that our parking garages are out of date for their inspections as well. We have already contacted a consultant, W.S.D., to immediately conduct parking garage inspections. There will be other things that we will find that we need to correct. I think that that is going to be true. We will bring those forward to you as we know what they are and as we know what our course of action is and as we work with NCDOT if necessary, on these items.

**COMMISSIONER ALTMAN (Mecklenburg County):** I'm sorry, how many bridges?

**INTERIM CATS CEO CAGLE:** Well, we will call them bridges. It's 37 elevated structures, which is a bridge or an elevated platform or other elevated structures, and 6 parking decks.

**COMMISSIONER ALTMAN (Mecklenburg County):** And how quickly will it take CATS to establish whether our residents are in jeopardy to cross over these places?

**INTERIM CATS CEO CAGLE:** During the last inspection all bridges, all elevated structures were deemed good and fair condition. There was one urgent need identified with a retaining wall, and that was fixed on-site as the inspector was conducting the inspection.

**COMMISSIONER ALTMAN (Mecklenburg County):** I apologize, I'm confused. You said there were 37 plus the parking decks. You're telling me all of them have now been inspected?

**INTERIM CATS CEO CAGLE:** No, during the last inspection –



**COMMISSIONER ALTMAN (Mecklenburg County):** When was that?

**INTERIM CATS CEO CAGLE:** It was 2019. All of the bridges/elevated structures were deemed fair and good condition with the exception of one retaining wall, which was fixed on-site because it was identified as urgent or necessary for the repairs.

**COMMISSIONER ALTMAN (Mecklenburg County):** And when should they have been inspected?

**INTERIM CATS CEO CAGLE:** In 2021.

**COMMISSIONER ALTMAN (Mecklenburg County):** Okay. We're two years passed for that 37 –

**INTERIM CATS CEO CAGLE:** Correct, we have missed one cycle. It is 2023 and we did not inspect them in 2021, which is when they should have been inspected. The March 2nd memo was sent back as a confirmation that NCDOT had agreed that our corrective action plans were adequate. That was on March 2nd.

**COMMISSIONER ALTMAN (Mecklenburg County):** I don't have the technical expertise that you do, but I read from the March 2nd letter. We all heard what I said, and none of that sounds like – I mean, should I go back and read the highlighted portions again?

**INTERIM CATS CEO CAGLE:** On March 2nd NCDOT accepted our corrective action plans. Those corrective action plans do not fix the issue with the bearing. At least sending them to Siemens can do that, but they do put into place mitigating measures. The other thing I will say to the question of is the system safe, as we have worked through this with the FTA and NCDOT, at no time have they suggested that we needed to suspend service on the system.

If we believed we were not operating safely we would not operate, but we know that this issue needs to be corrected as fast as possible, and while it exists, we need to have mitigating measures, and one of the mitigating measures that was recommended by Siemens and accepted by NCDOT are the heat strips. The failure of the bearing is not something that happens quickly. A bearing doesn't go from completely okay to perfectly functional to catastrophic failure or unfunctional quickly. It takes time. The seal breaks, water enters, corrosion starts, heat builds.

As we worked with NCDOT and Siemens, right after the accident, after the derailment, on the 21st, we notified NCDOT and CATS began a root cause analysis with Siemens. One of the things that they recommended were the heat strips. The heat tabs, quite frankly what they are strips that are applied to the axles of the vehicle, and they register temperature in 10 degree increments. What Siemens said is anything below 150 degrees should be indicative that you are not at risk of catastrophic failure. But if you get a register above 150 degrees you need to inspect that vehicle to determine if the bearing is starting to fail because, in an abundance of caution, we set our inspection protocols to be 130 degrees or above.

When we do a visual inspection of the heat strips, if they have registered 130 degrees or greater, that vehicle is immediately removed from service and further evaluations of the axle and the bearing are completed, as well as each week every vehicle that is in service, the heat strips will be inspected at least once per week, and all vehicles that are removed from service and then placed back into service will always have a visual inspection of the heat tabs before

returning to service. And again, if the heat tabs register at 130 degrees or greater, they will not be returned to service until further testing is done to determine that the bearing is working properly or until the truck assembly is sent to California to Siemens for repair or overhaul.

**COMMISSIONER ALTMAN (Mecklenburg County):** Well, on that score what I would say to you is, perhaps I'm the only one in the room, but I won't feel comfortable that these trains are safe until I hear it from DOT based upon very strong language that I see in this March 2nd letter. That may just be me, but if you will, please continue, particularly with the chronology from remediation efforts from the time of the derailment to January.

**INTERIM CATS CEO CAGLE:** Again, the derailment on the 21st occurred. Immediate notification to DOT, FTA, root cause analysis began, heat strips applied, inspections began, brings us to the root cause analysis being conducted and starting to wrap up, starting to be complete. It was completed in December I believe, but I will get a final; I will need to confirm that. At the time, the root cause analysis identified the maintenance, but the bearing is the issue, everything we've talked about with the bearing and the seal allowing water to enter the bearing, and it identified the midlife overhaul as a way to fix that.

**COMMISSIONER ALTMAN (Mecklenburg County):** If I'm understanding you, sir, CATS took from May when the derailment happened until December to diagnose the problem and no remediation happened in that period, is that correct?

**INTERIM CATS CEO CAGLE:** Separate from the root cause analysis two vehicle trucks were already sent to Siemens for truck overhaul.

**COMMISSIONER ALTMAN (Mecklenburg County):** And were those sent because of the derailment?

**INTERIM CATS CEO CAGLE:** They were sent because of the need to do the maintenance, and so no, they were sent before.

**COMMISSIONER ALTMAN (Mecklenburg County):** Okay. Two trucks were there but not because of the derailment and no trucks were – what I'm hearing is that no remediation –

**INTERIM CATS CEO CAGLE:** No trucks could have been sent.

**COMMISSIONER ALTMAN (Mecklenburg County):** -- because of what caused this derailment happened from May to January or December, is that right?

**INTERIM CATS CEO CAGLE:** There was additional training for the operators and the control room to better understand the warning signs of this situation, because as you mentioned or someone mentioned, that was not properly identified that day. The heat strips were applied working with Siemens to understand that that was a mitigating measure, and a root cause analysis was conducted, and I believe that the root cause analysis was completed in December. As we worked with NCDOT it became clear that we needed to work with them to have additional mitigating measures.

You are correct in the first corrective action plan that we submitted after their 2/6 letter. Their 2/6 letter did not specify a specific speed restriction. It said you should consider a

speed restriction. Our first corrective action plan did not include a speed restriction. On 2/17 they came back and were specific that we needed to consider a 35 mile an hour speed restriction. Now, there were some other things that they asked us to do, like, to determine if by utilizing the speed restriction would that create other safety issues. We were aware of no other safety issues that could be created by reducing speed. We immediately did that on 2/18. We implemented on 2/17 and we had it, for lack of a better term, hardwired into our system on 2/18.

**COMMISSIONER ALTMAN (Mecklenburg County):** I think my confusion was arising by your use of the term mitigating measures, and now I think I understand. There're two kinds of mitigating measures, those that reduce risk like the heat strips which say hey, this thing is about to get too hot, and those things which actually remedy the problem, meaning fix the defect. What I'm hearing from you is that CATS took mitigating measures in the form of risk reduction with the heat strips in this period of time, but it didn't begin actually remediating the defect. It hasn't actually begun remediating the defect because you haven't sent any of these trains yet to California, is that right?

**INTERIM CATS CEO CAGLE:** No, that is not correct. Two truck sets were sent. One has been received back and the other will be received back we believe next week. It's on route back.

**COMMISSIONER ALTMAN (Mecklenburg County):** But were those sent because of the derailment?

**INTERIM CATS CEO CAGLE:** No, but they were overhauled, which removes the faulty bearing from the truck. There are two truck sets -- neither have been received or accepted yet; one has been received but not accepted, the other has not been received -- that have had the faulty bearing removed and replaced.

The other truck sets can't be sent at this time or over the last eight months because CATS did not have the dollies to remove the truck sets. Now, I don't disagree with you that that's an issue, but that is an issue that we are immediately resolving by buying six additional sets of dollies and requesting a loaner set from a different transit agency.

I understand what you're saying. We have sent two truck sets to California, to Sacramento to Siemens, and they are being received back. We could not send any additional sets to California because we didn't have the dollies. Now, should someone has asked the question then? All I can tell you is I definitely asked the question after learning of it, and we are moving immediately to buy additional dollies so that we can expedite it. But you are correct, mitigating measures are intended to reduce risk as we operate.

Again, as we have worked with NCDOT there has been no recommendation or suggestion to suspend operation, but we do need a corrective action plan to reduce risk, continue to operate, and we need to expedite, which we are doing, the repair of the vehicles.

**COMMISSIONER ALTMAN (Mecklenburg County):** Thank you.

**MAYOR BALES (Town of Huntersville):** I have a couple of questions. At what point did CATS notify NCDOT of the derailment?

**INTERIM CATS CEO CAGLE:** They followed the regulations. I believe the regulations are within two hours. I will give you a final answer. They notified them in the specified period. I think there is a requirement to verbally notify them within two hours and then there are other requirements in writing and such, but I can get you that information, but we followed the regulations.

**MAYOR BALES (Town of Huntersville):** One of the things that struck me is the derailment happened on May 21st and our MTC meeting was May 25th, within a few days, and nothing previous. That's shocking to me. One of the questions that I have in regards to the Light Rail car itself, has it been pulled, were the bearings replaced, or is it still in operation I guess is my question.

**INTERIM CATS CEO CAGLE:** That particular Light Rail car?

**MAYOR BALES (Town of Huntersville):** Yes.

**INTERIM CATS CEO CAGLE:** I will need to double-check. I don't believe so, but if it were back in service -- so because it had a catastrophic failure of the bearing the only way to put that truck into service again would be a full truck overhaul. I do not believe that that was one of the ones sent to California because of the timing, but I will double-check the status of that truck.

The other thing to note, and I know this gets really confusing, Light Rail vehicle, three trucks, the trucks can and are moved between vehicles, but that particular truck, that was a center truck. There are three trucks. Each end is the A and the B, and then the C truck which is the center. That was a center truck, and so that center truck could not be returned to service until full overhaul.

**MAYOR BALES (Town of Huntersville):** It's very clear that maintenance is overdue. Have you been able to get to the root cause of why maintenance had continually been deferred?

**INTERIM CATS CEO CAGLE:** I have heard many reasons, none that have satisfied me.

**MAYOR BALES:** Now, I've only been serving on the MTC for a little more than a year, and I came into this role optimistic that collectively as a region we could move public transportation forward. And Commissioner Altman, I hear what you said when you talked about there being two things here. I have been a huge advocate for your authority, as we've talked about that for over a year now, but the trust that has been broken with our residents, with our families, I consider those that we represent, they are our families. We've got to find a way to fix that trust.

Mr. Cagle, I don't envy the position that you're in, but I want to thank you for taking those necessary steps in being transparent with us because that's not an easy thing to do, especially with all the cameras, etc., here tonight. But it's a start, or it's an inch forward. I hope that we get to the bottom of a lot this, because it's not just maintenance on rail and on buses, but now I'm also hearing on bridge inspections and on parking garages.

This is truly the whole organization. I would like to think that those that are working within CATS will step up and will be transparent and will feel comfortable having the hard conversations and bringing out of the darkness and into the light the issues that we need to address to protect all of our families.

**MAYOR SIMMONS (Town of Mint Hill):** The number eight keeps coming up, that we're removing eight and sending eight at this time, and everything I read talks about expediting all of this. Where did that number eight come from? Is that the maximum number that we can send and still operate? Is that a number that somebody decided that's all the cars we can afford to buy; where did that number come from?

**INTERIM CATS CEO CAGLE:** As we work through with NCDOT that is correct, sir, we were trying to balance the fleet needed to run the system, to run the schedule, plus the spares needed, with the number we could send out. It also has to do with how quickly we could get dollies. And we could get the one spare set from the other transit agency and Siemens is able to send us six new dollies almost immediately. Actually Siemens, we are going to Council on April 10th, but I had a long conversation with Siemens executives and said look, we can't wait five weeks for you to build these things, please start now. They have already started based on a notice to proceed that we issued. It's both operational needs and the availability of dollies or new dollies at a quick speed.

**MAYOR SIMMONS (Town of Mint Hill):** I also believe I heard you say that we are awaiting Siemens to give us a date as far as when this scheduling could be done. I would hope that on our end at this point in time, with the past performance that we've already seen, that we would get with Siemens and request the date that we'd like to have these things done, and instead of us working around Siemens' schedule I think it's time we be proactive and we start working around our own schedule and setting our own schedules in going through this.

**INTERIM CATS CEO CAGLE:** Yes, sir, I agree. We have gone to California to sit down with their executives to say this schedule is not adequate, so we have requested but we've strongly requested, and we have done our part to remove barriers by not being able to send enough equipment. I will tell you, and again, we are having the conversations. Sometimes I am hesitant to put out information that I don't have a 100 percent on. I believe, based on a conversation today with Siemens, that their path forward will be to complete the truck overhauls, all fleet, by January of 2025. Now, I will confirm that, and I'm saying here I hate to put that information out, but it is important for us to know we are doing everything to push Siemens to move that forward.

Thinking about that, July 2025 half the fleet, January 2025 all of the fleet. And as each of those vehicles/trucks goes out and we receive them, we will go from 100% needing it to 20%, those numbers will get better and better in our favor with the repairs as we go, and we will be working directly with NCDOT to keep them informed of that and the status. But right now, our tentative schedule looks like January of 2025 for the whole fleet.

**MAYOR SIMMONS (Town of Mint Hill):** The only other thing I have to add is I understand part of this is culture. I'll buy into that. I absolutely do buy into that. But many, many times throughout this evening we've talked about this contractor, this contractor, this needs to be done, this needs to be done, so these are funds that are moving around all the time, and those should show up in the accounting process as well. It doesn't require for somebody to come into your office and tell you that we've got a problem here. And I understand that you weren't in that office, so please don't think I'm pointing any fingers, but there has to be some checks and balances in place that hey, all of a sudden, we approve the money in I think it was 2019 or 2020 suggested earlier, but that money never got spent. It's not all culture.

We've got some other problems in the wheels here, and it's not all culture and it's not all the fact that the employees aren't willing to come forward and talk about it. We've got some other problems that need to be addressed as well. I hope we'll address those at the same time.

As far as Commissioner Altman, when she gets ready to make her motion here shortly, she's not going to have any trouble getting a second on that motion because I do believe that we need to have some outside eyes looking at this with people that have not dealt with this situation before, they're not involved with this situation currently, they can take a fresh look at it. With that I say thank you.

**MAYOR KNOX (Town of Davidson):** We've had a lot of buzzwords tonight. We've heard trust and accountability and transparency and leadership. The first word that comes to mind for me is systemwide failure when it comes to preventative maintenance. My wife and I were on that Blue Line two weeks ago, and it appalls me to know that I find out a week later that we had a derailment almost a year ago and I'm riding on that rail. That concerns me.

But deferred maintenance and preventative maintenance is just an outright failure. If you have the budget to do it and you don't do it, there's a problem. There's no point in putting blame on our CEO, our COO, our CFO that are no longer here. Blame doesn't fix anything. We have to look at moving forward. I don't know how we're going to correct this. But I will tell you the preventative maintenance end should just be a no-brainer, and I thank you, Brent, for what measures are being taken at this time.

Now, I may be the senior person on this board. I've been sitting here for six years now. I am fortunate to be a mayor with 140 employees in my town. I am only responsible for two of those jobs, and that's my town manager and my town attorney. Everybody else answers to somebody else. But I, like you, go in the field. I am with my police officers at shift change. I go to the range with them. I hang out at the fire stations, eat lunch with my firefighters. I go to public works. I've worked construction before so I know their families, I know their kids, I know what's going on, so to that end I appreciate your leadership for getting out in the field because at the end of the day when someone has a problem in the Town of Davidson, they know that they can confide in me and come to me. And it's not going to go any further than that because they have a superior that they can report it to, and I will urge them to do that. To that end, thank you for doing that.

Accountability, Krissy you brought that word up. The buck stops with you right now, so you've got to be accountable for this and you've got to be accountable for previous failures, so I appreciate the measures that you're taking thus far.

Transparency, Leigh, you said it. You just saw this tonight for the first time. A lack of transparency historically is not a good track record, and we can do better than this. And lastly trust. It's not a matter of just trusting this board, it's a matter of the folks that are out there in TV land that are going to see this at the 11 o'clock news tonight having trust in us that we are going to provide a good, safe, secure product for them to engage in and utilize when it comes to public transportation. And the message that is being emulated tonight is far from that.

The onus of trust is not just on you as our Interim CEO, it's on all of us as well as representatives and stewards of our community. We're going to have to glean what we can from any information we get and carry it to the public and say give us a second chance because it's a black eye right now and we don't need to have a black eye, we need to be moving forward. With that I'll defer to whoever's next.

**MAYOR EDWARDS (Town of Pineville):** It's very disturbing because I read all of this a couple of days ago when Leigh sent it out. If this were the private sector that I came out of,

heads would have already been rolling. There's got to be people in management positions that knew everything that was going on, and it was neglected for whatever reason. When budgets are approved, oh, my God, I just can't believe it. I want to thank Leigh Altman for staying on this, and it's an important issue.

Mr. Cagle, you inherited a hornet's nest as they would say, and you have done a yeoman's job I feel in bringing a lot of this to light. I don't put any of this on you at all. You have answered the questions, and ones you couldn't answer you said I'll find out and I'll get you an answer. I appreciate your honesty and your straightforwardness. But it's just disturbing that we have put passengers at risk. Even though that wasn't a total derailment, it's putting passengers at risk and continues today, and you need to get to the bottom of who, why, and where, and why people didn't come forward knowing that this stuff was not being done. That's all I have to say. Thank you very much, everybody.

**TOWN MANAGER GRANT (Cornelius):** Mayor Washam had to step aside to another meeting.

**MAYOR LYLES (City of Charlotte):** Mr. Grant, we certainly would like to hear from him. Please, if you guys have thought through this, send us an email or any comments that you have. We really want this to be a group that has had the opportunity to discuss it. I mean, we've talked about this significantly, wanting every member to have an opportunity to ask these questions, and if you need to schedule something with Brent that's fine as well. We appreciate that.

We also have several other folks that ordinarily join us, and I believe I'll start with Mr. Thunberg from Mooresville. Mr. Thunberg, do you have any comments or suggestions as a result of this presentation and the conversations that you've heard so far?

**MR. THUNBERG (Town of Mooresville Representative):** Thank you, Madam Chair, and I appreciate you asking. I think this goes along with what Rusty said, I think I heard earlier in the presentation, I think I heard essentially that Mr. Cagle said that the buck stops here, and I believe him. Having listened to some of the other comments here, I think the accountability portion starts at the next meeting when he brings forward the schedules, those maintenance schedules, and shows us what's planned and what has been done and is transparent with regards to the specifics of those things. I'm sure that he's anxious to be able to do that because certainly it shows the action and the way things have been moving forward.

I think Krissy Oechsli and Ms. Altman deserve our thanks for staying on top of this and being proactive with regards to trying to point out some of these deficiencies, and so I'm not going to belabor the past but I'm going to go ahead and look to the future. I think we ought to continually check with Krissy and Leigh to see how we're doing.

**MAYOR REID (City of Gastonia):** Not to be redundant on the question that has been asked, I've had a follow-up from the question that has been asked so I don't want to rehash what has already been said, but I am concerned about what has taken place but I'm even more concerned about the solutions to address the problems. Thank you, Mayor.

**MAYOR LYLES (City of Charlotte):** As a result of this, I think one of the things that we're doing tonight is to be able to speak up and to do that with all of the media, as Mayor Bales said, and to have this honest conversation and to have it in a way that is respectful of each other has been a tremendous effort for each of you and really, really appreciated, but we're not done yet,

and I mean that in both the long term as well as the things that we have to finish up tonight. There are going to be additional items that we need to do.

I do want to say that we are in a situation where we are trying to send out information in advance. I think we sent out packets two or three days ago, I can't remember. Look for more of those kinds of opportunities to communicate because we only meet once a month, and sometimes that can be six weeks because of holidays. We are going to continuously try to use packages of information to go out in a way to make sure that everybody has an opportunity to review the materials of the meeting.

The next thing that I would like to say is that Commissioner Altman has suggested to put a motion on the floor. I would like for us to have that motion now and then have any discussion as it's being made. I think that you got a second from Mayor Simmons, so Ms. Altman?

**COMMISSIONER ALTMAN (Mecklenburg County):** Thank you. I'm fine to go forward with my motion if Mr. Attorney, we don't need to now vote to allow us to add the action item on the agenda that was already published. Are we good to go with my making the motion?

**CATS LEGAL COUNSEL BRAD THOMAS:** Well, to stick with the Rules of Procedure yes, we need a unanimous vote to put it on as an action item.

**COMMISSIONER ALTMAN (Mecklenburg County):** I move to put on the agenda an action item related to contracting with the third-party entity to investigate these measures.

**MAYOR LYLES (City of Charlotte):** Wouldn't it be best to put the motion that she wants to have on the agenda so that people know what it is?

**COMMISSIONER ALTMAN (Mecklenburg County):** I can articulate the exact motion.

**MAYOR LYLES (City of Charlotte):** Yes, I think that's what I was getting at.

**COMMISSIONER ALTMAN (Mecklenburg County):** Okay, I can read what the motion will be and then we have to vote to add it. Because MTC's legal counsel has advised me that the MTC does not have its own budget nor contracting authority to hire a consultant, and because the expense must flow through the City, my motion will be to move that the MTC adopt a resolution requesting that a third-party transit consultant perform an operational investigation to establish facts related to the train derailment specifically, the bridge impairment, the failure to order buses in a timely manner, and any other issues related to the bus and rail operations, safety, security, and asset maintenance. I further request that the resolution provide that an RFP for this work go out on an expedited basis and the consultant report back to the MTC on an expedited basis.

**MAYOR SIMMONS (Town of Mint Hill) and MAYOR BALES (Town of Huntersville):** Second.

**MAYOR KNOX (Town of Davidson):** A motion to add that to the agenda, correct?

**CATS LEGAL COUNSEL BRAD THOMAS:** Right, an action item. (Motion carried unanimously.)



**MAYOR LYLES (City of Charlotte):** With that, we will now move to a discussion of that resolution since it's now been placed on the agenda. I won't ask you to read it again, but we can go ahead. Is there any discussion regarding the motion? (No further discussion.)

One of the things that I want to ask: Is there any reaction to this, anything that people would like to have a question about? (No response.)

The thing that I want to make sure that I'm correct in this, the City Council would have to approve from the CATS budget, so what we're doing is a resolution that will require an action of the City Council, am I right, Brad? I'm making sure.

**CATS LEGAL COUNSEL BRAD THOMAS:** Yes, that's correct.

**MAYOR LYLES (City of Charlotte):** And in that situation, one of the things that I would hope that we do is actually provide the minutes of this meeting to all of the City Council members so that they can hear what was being discussed and acknowledge that, because I think if we're going to go out and look for a consultant we want the consultant to be razor-sharp in what we want them to accomplish, and I think this meeting has been very helpful in defining a number of those ideas, concepts, concerns, you know, how do we deal with things like this when it happens in an organization.

I hope that what we will see is that the City Council would have the opportunity to develop a list of folks that might do this work as well as the scope of the work, based upon the conversations tonight, and be able to bring that back or send it out to the MTC members so that we are all aligned so that we make this work. If we're going to expedite things, we need to make sure that we are aligned and providing that information between both of the organizations.

**COMMISSIONER ALTMAN (Mecklenburg County):** May I be heard on that?

**MAYOR LYLES (City of Charlotte):** Yes.

**COMMISSIONER ALTMAN (Mecklenburg County):** Of course, the City has different procedures, and I'm not familiar with many of them. I know that in the County the manager has authority to send out an RFP that she doesn't always have to go to the full board in order to submit an RFP, and I'm wondering is that not the case with the City, only because I am trying to expedite this. I think this board certainly has the right to want to have this. I would like for us to be able to move forward without having to do more, but my question to you, sir, would be do all of your RFPs have to go to City Council for approval.

**CITY MANAGER MARCUS JONES (Charlotte):** I'm not exactly sure how this will work. I'd like to rely back on legal help to see how this should be handled.

**CATS LEGAL COUNSEL BRAD THOMAS:** My understanding of it would be it would depend on the value, and so I think it is possible for that to move forward without an actual Council approval, but it would depend on the value.

**COMMISSIONER ALTMAN (Mecklenburg County):** Okay, then I respectfully submit that if we can find out what the value is and that if we can move forward without having to go through more machinations to expedite this, that that would be in the best interest of the safety of our residents.

**MAYOR LYLES (City of Charlotte):** We are going to now vote on the action to have an outside transit consultant expedited with the scope of services to review the areas of safety and maintenance and all things transit that we have discussed tonight. All in favor of that motion please raise your hands. (A unanimous show of hands.)

Thank you for the open discussion. I know it is late, and those of you THAT want to stay feel free to do so, but we do have to have a couple other items on our agenda tonight and let me go back to those. Now we need to address the issues around our budget, or the budget that we would submit to the Charlotte City Council for approval.

**Resolution:** A motion to add to the MTC Agenda dated March 22<sup>nd</sup>, 2023 and approve an action item that the MTC adopt a resolution requesting that a third-party transit consultant perform an operational investigation to establish facts related to the train derailment specifically, the bridge impairment, the failure to order buses in a timely manner, and any other issues related to the bus and rail operations, safety, security, and asset maintenance. And further request that the resolution provide that a RFP for this work go out on an expedited basis and the consultant report back to the MTC on an expedited basis was made by **Commissioner Leigh Altman (Mecklenburg Board of County Commissioners)**; seconded by **Mayor Brad Simmons (Town of Mint Hill)**. Motion carried unanimously.

X. **MTC Commissioners' Business** - None

XI. **Other Business** – None

XII. **Adjourn**

The meeting was adjourned at 8:12 p.m. by Mayor Vi Lyles, City of Charlotte – MTC Chairwoman.

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NEXT MTC MEETING: WEDNESDAY, APRIL 26<sup>TH</sup>, 2023; STARTS AT 5:30 P.M.



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

J. ERIC BOYETTE  
SECRETARY

February 6, 2023

Mr. Brent Cagle  
Interim Chief Executive Officer, Charlotte Area Transit System  
Assistant City Manager, City of Charlotte  
600 E. 4th Street, CMGC - 7<sup>th</sup> Floor  
Charlotte, NC 28202

**Subject: Unacceptable Hazardous Conditions – Corrective Action Plans Required**

Mr. Cagle:

The North Carolina Department of Transportation (NCDOT) State Safety Oversight (SSO) Program has identified two (2) Unacceptable Hazardous Conditions (UHC) within the Charlotte Area Transit System's (CATS) rail operations. The UHCs were identified during NCDOT's ongoing review of CATS' final Accident Investigation Report, 22-0521-01 and a subsequent accident review meeting held with CATS' Safety and Rail Car Maintenance (RCM) personnel on February 1, 2023.

On Saturday, May 21, 2022, at approximately 11:10hrs the leading axle of the center truck (C-truck) of LRV 201 derailed south of Old Pineville Grade Crossing and came to rest next to Traction Power Substation 7. At the time of the incident LRV 201 was operating out of the A-cab and serving as the lead car of Train 5 (LRVs 201/114) which was traveling northbound on Track 1. Measurements taken at the scene indicate that the train traveled a total of 1,260 ft. from the point of derailment to the train's final point of rest (measured to the C-truck's resting point). A total of 490 railroad ties had damaged clips as a result of this derailment. LRV 114 sustained no damage during the derailment. A total of twenty-four passengers were offloaded safely with one passenger requesting medical evaluation on-scene. No passengers or employees were injured or transported from the scene. LRV 201 was re-railed and successfully removed from the alignment without incident.

As part of its ongoing review of the circumstances and conditions leading up to and following the derailment of CATS' Light Rail Vehicle (LRV) 201, NCDOT identified the following two (2) UHCs:

1. Delayed maintenance of the Siemens S70 LRVs directly contributed to the derailment of LRV 201 on May 21, 2022. Although CATS is working with its contractors to address needed overhauls of the safety critical axles for this LRV (and the other LRVs in this fleet), the overhaul completion date is currently scheduled for some time in calendar year 2026. CATS is currently operating LRVs, in revenue service, which have surpassed the manufacturer's recommended axle overhaul thresholds. NCDOT identifies the planned fleet overhaul completion date as an unacceptable hazardous condition.

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RAIL DIVISION  
1556 MAIL SERVICE CENTER  
RALEIGH, NC 27699-1556

*Telephone:* (919) 707-4100  
*Fax:* (919) 707-4154  
*Customer Service:* 1-877-368-4968

*Website:* [www.ncdot.gov](http://www.ncdot.gov)  
[www.ncbytrain.org](http://www.ncbytrain.org)

*Location:*  
862 CAPITAL BLVD  
RALEIGH, NC 27603

2. Current risk mitigations, implemented by CATS' RCM personnel, following the May 21, 2022, derailment, includes the installation and monitoring of temperature strips on the LRV axles. However, this safety risk mitigation, alone, is reactive to unpredictable and potentially catastrophic LRV axle failures and does not reduce the associated safety risk to an acceptable level. Additionally, the procedure for inspecting axle temperature strips requires a written procedure and must be adhered to; contrary to noncompliance found by NCDOT. As such, NCDOT identifies the limited mitigation, missing documentation, and inconsistent compliance to be an unacceptable hazardous condition.

To address the UHCs, NCDOT offers the following measures to comply with minimum safety standards.

Pertaining to UHCs, NCDOT's State Safety Oversight Program Standard (SSOPS),

Section 4.2.4 – Safety Risk Resolutions, states the following:

*“UHCs must be mitigated in the most expedient manner possible before normal service may resume. Interim corrective action(s) may be required to mitigate the hazard to an acceptable level while the permanent resolution is developed”.*

Section 9.0 – Corrective Action Plans (CAPs), states the following

*“In the course of performing on-site safety reviews, investigations, annual safety reviews, or any other means by which NCDOT becomes aware of an unacceptable hazard, it will be brought to the immediate attention of the RTA so action can be taken to prepare and implement a CAP as appropriate. The timeframe for the CAP shall be specified in the written notification from NCDOT.”*

For CATS' safety risk assessment process, CATS' Agency Safety Plan (ASP), Section 2.3.4 – Hazard Risk Assessment, defines an unacceptable risk as requiring the following:

*“Unacceptable: The hazard must be mitigated in the most expedient manner possible before normal service may resume. Interim corrective action may be required to mitigate the hazard to an acceptable level while the permanent resolution is in development.”*

In accordance with the requirements of NCDOT's SSOPS and 49 CFR Part 674, please be advised that NCDOT hereby directs CATS to develop a CAP, for each of the UHCs included herein, and submit both to NCDOT for review and approval **within ten (10) calendar days** from the date of this letter. The CAPs shall include proposed actions to expeditiously reduce the current level of safety risk associated with the UHCs, a timeframe for CAP implementation, and the assignment of responsible staff or personnel.

During NCDOT's review of the UHCs listed above, NCDOT also reviewed CATS' standard operating procedures and response plans which CATS has established to address known unsafe conditions or circumstances effecting its operations. In its response to known conditions, CATS routinely implements speed restrictions, for LRV's operating on the mainline and/or within facility yards. Some of these circumstances include inclement weather, maintenance crews working in or near the track alignment, and LRV displays of electronic fault codes (depending on severity).

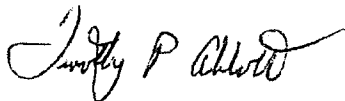
With this in mind, NCDOT proposes CATS consider implementing a systemwide LRV speed restriction on the Blue Line light rail system until the affected LRVs have been overhauled, per the LRV manufacturer's recommendations. A speed restriction would provide the following benefits to reduce safety risk:

- 1) Provides LRV operators with additional time to react and respond to vehicle performance abnormalities.
- 2) Reduces the level of speed-related wear and tear on the LRV axle components.

NCDOT also directs CATS to provide a written analysis/response to NCDOT's consideration of a speed restriction, as suggested above, when submitting the required CATS corrective action plans to NCDOT for review and approval.

NCDOT greatly appreciates your continued cooperation and support of the SSO Program. If you have any questions, please contact me at 919-707-4149.

Regards,



Timothy P. Abbott  
Safety Enforcement and Oversight Manager  
SSO Program Manager  
Rail Division  
North Carolina Department of Transportation

Cc: Chad Hagans, CATS  
David Moskowitz, CATS  
Jason Orthner, NCDOT  
Jahmal Pullen, NCDOT  
Jason Sergent, NCDOT Contractor  
Don Pike, NCDOT Contractor  
Jerrad Jones, NCDOT Contractor  
Jason Jackson, NCDOT Contractor



February 15, 2023

Timothy P. Abbott  
Safety Enforcement and Oversight Manager  
SSO Program Manager  
Rail Division  
North Carolina Department of Transportation  
1553 Mail Service Center  
Raleigh, NC 27699-1566

**Subject: CATS Response to Letter of Unacceptable Hazardous Condition (UHC)**

Dear Mr. Abbott,

In response to your letter of Unacceptable Hazardous Condition (UHC) dated February 6, 2023, please see our responses below.

- Item #1: CATS Rail Operations plan for fleet maintenance included timelines for the Truck overhaul and the mid-life overhaul since 2014. In 2020, CARE ACTS funds were set aside to begin the Truck overhaul based on the manufacturer's recommendation of 10 years or 600,000 miles. During this time, a few things occurred; there was staff turnover in procurement and the finance office, procurement was removed from under Finance and placed as their own department, and the funding for the Truck overhaul was moved from the Capital Budget to the Operating Budget along with funds that were earmarked for vehicle preventive maintenance. In addition to supply chain issues and staffing challenges by our vendor due to the pandemic, starting this program as planned would be challenging. Due to the aforementioned items coupled with other exigent circumstances the start of the truck overhaul was delayed until FY 2023. CATS identified the importance of this issue and had planned to address this issue through the 600K truck overhaul program that should be completed by end of 2025 instead of waiting for the Mid-life overhaul of the 100 and 200 series light rail vehicles which is not scheduled to begin until 2026.

To address this delay, and to expedite these overhauls, CATS shifted Truck overhaul funding from the Operating Budget to the Capital Budget and will program \$50 million dollars for this project. This programs funding for the project through its expected completion in FY 2026. The project has already started with one set of axles already returned from Siemens with the second set due in March 2023. CATS acknowledges the concerns noted by NCDOT and will work with Siemens on what can be done to accelerate the turnaround time so the project can be completed sooner rather than later. CATS has also identified those axles which will be a priority to be completed; those axles with the highest mileage or have temperature readings more than 130 degrees will be sent for overhaul first.

- Item #2: Siemens OEM recommends removing a vehicle from service with a temperature reading of 150 degrees or higher. Readings should be completed monthly. In an abundance of caution, CATS has set the temperature threshold to 130 degrees for when a train is taken out of service. Also, center truck temperature strips are checked during the daily preventive

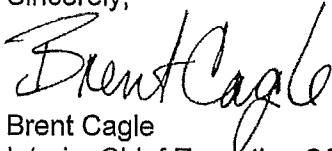


maintenance (PM) inspection and noted on the daily check form to help identify a train that may have a wheel bearing increasing in temperature as the gradual increase in temperature should be noticed by rail car maintenance personnel. The Corrective Action Plan (CAP) that CATS will put into place regarding the reading of temperature strips daily is as follows:

- CAP: The work plan will be reviewed and revised as necessary to ensure the process of tracking on a spreadsheet monthly temperature reading for each light rail vehicle in addition to visually inspecting daily each C-truck temperature strip and noting that reading on the daily inspection form as part of the daily PM check. Rail Car Maintenance staff will be reinstructed on the work plan and the importance of daily inspection of the C-truck temperature strip. Vehicles that have a reading of 130 degrees or higher will be removed from service.
  - Responsible Person: Gary Lee
  - Completion Date: March 17, 2023
- Item #3: Regarding the recommendation of initiating a speed restriction of no more than 45 mph on the Blue Line until the Truck overhaul is completed, CATS is requesting a two-week extension. To provide a written analysis/report to this request, CATS needs to draft a variety of schedules, assess schedule impact, identify the number of resources needed to operate at that speed, and run test trains to verify the head ways and new schedule if it is decided to implement the overall speed restriction. Please note that we have been working in concordance Siemens on this issue since the start. Recently we requested their thoughts on the temperature reading and recommended speed restriction. Please see their responses below:
    - The daily inspections for the (C-truck) bearing housing temperature are an appropriate measure to check if the bearing housing is close to or exceeds 130 degrees Fahrenheit. 130 degrees Fahrenheit is an appropriate bearing temperature to remain under.
    - The maximum speed of 55 vs 45 mph will not significantly impact bearing temperature since 55 mph is only maintained for a short period of time.

Our transit agency is committed to the safety of its operation and will continue to monitor this situation and work with Siemens on an expedited schedule to overhaul the axles and ensure appropriate funds are available to complete this project. We appreciate the cooperative and supportive relationship with NCDOT. For additional information, please contact the General Manager of Safety and Security, David Moskowitz at (704) 336-7661.

Sincerely,



Brent Cagle  
Interim Chief Executive Officer, Charlotte Area Transit System  
Director of Public Transit, City of Charlotte

cc: Mr. Jahmal Pullen, Engineering Coordination and Safety Manager  
David Moskowitz, CATS General Manager of Safety and Security  
Allen C. Smith III, CATS Deputy Director of Transit – Chief Operating Officer  
Thurman C. Howell, CATS Deputy Director – Chief Financial Officer  
Chad Hagans, CATS Safety Manager – Rail  
Donald Pike, NCDOT Contractor  
Jerrad Jones, NCDOT Contractor



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

J. ERIC BOYETTE  
SECRETARY

February 17, 2023

Mr. Brent Cagle  
Interim Chief Executive Officer, Charlotte Area Transit System  
Assistant City Manager, City of Charlotte  
600 E. 4th Street, CMGC - 7th Floor  
Charlotte, NC 28202

**Subject: NCDOT's Review of the Charlotte Area Transit System's (CATS) Response to NCDOT's Unacceptable Hazardous Conditions Letter**

Mr. Cagle:

The North Carolina Department of Transportation (NCDOT) State Safety Oversight (SSO) Program has reviewed your response, dated February 15, 2023, to NCDOT's Unacceptable Hazardous Conditions (UHC) letter dated February 6, 2023. NCDOT responds as follows.

**UHC #1:** *Delayed maintenance of the Siemens S70 LRVs directly contributed to the derailment of LRV 201 on May 21, 2022. Although CATS is working with its contractors to address needed overhauls of the safety critical axles for this LRV (and the other LRVs in this fleet), the overhaul completion date is currently scheduled for some time in calendar year 2026. CATS is currently operating LRVs, in revenue service, which have surpassed the manufacture's recommended axle overhaul thresholds. NCDOT identifies the planned fleet overhaul completion date as an unacceptable hazardous condition.*

In stating UHC#1, NCDOT directed CATS to develop a correction action plan (CAP) to be submitted for NCDOT's review and approval. Instead, CATS has provided an explanation of the delayed maintenance, including both fiscal year details, and unspecified calendar years for planned completion of the overdue LRV overhauls. CATS' letter stated:

*"In addition to supply chain issues and staffing challenges by our vendor due to the pandemic, starting this program as planned would be challenging. Due to the aforementioned items coupled with other exigent circumstances the start of the truck overhaul was delayed until FY 2023. CATS identified the importance of this issue and had planned to address this issue through the 600K truck overhaul program that should be completed by end of 2025 instead of waiting for the Mid-life overhaul of the 100 and 200 series light rail vehicles which is not scheduled to begin until 2026".*

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Customer Service: 1-877-368-4968  
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[www.ncbytrain.org](http://www.ncbytrain.org)

Location:  
862 CAPITAL BLVD  
RALEIGH, NC 27603



Additionally, information was provided regarding CATS' actions to appropriate the needed funding for the overhaul project and stated:

*"To address this delay, and to expedite these overhauls, CATS shifted Truck overhaul funding from the Operating Budget to the Capital Budget and will program \$50 million dollars for this project. This programs funding for the project through its expected completion in FY 2026. The project has already started with one set of axles already returned from Siemens with the second set due in March 2023".*

CATS' response to UHC #1 also indicates that CATS has implemented a plan to prioritize the required vehicle overhauls stating:

*"CATS has also identified those axles which will be a priority to be completed; those axles with the highest mileage or have temperature readings more than 130 degrees will be sent for overhaul first".*

**NCDOT RESPONSE:**

**CATS' plan as stated, is unclear, insufficient and is not an acceptable CAP in response to UHC#1.**

CATS states the prioritization for overhaul will be based on vehicle mileage "or" axle temperature readings above 130 degrees. NCDOT notes that CATS' response does not address the possibility of both criteria being met (i.e., axles having the highest mileage AND having temperature readings more than 130 degrees). If CATS is basing its overhaul prioritization on the measures of mileage and temperature, this combined condition would present the highest priority for overhaul.

NCDOT further notes that mileage and temperature alone should not be CATS' only measures for determining overhaul priority. Numerous other factors including mechanical wear and tear and physical condition must also be considered and included in CATS' determination of overhaul priority.

Following NCDOT's review of CATS' February axle temperature readings, NCDOT determined more than 33% of the installed axle bearing temperature strips, on revenue service vehicles, have reached 130 degrees or higher, during the past year. Although a small number of the axles have been overhauled or replaced, this percentage represents 1/3 of the CATS total light rail vehicle fleet axles. All of which are operating in revenue service today.

CATS' has not adequately identified how it will prioritize truck and axle overhauls; it has not provided a specific schedule to NCDOT identifying which trucks and axles will be overhauled and in what order; it has not conducted any form of risk assessment or hazard analysis as required by CATS' Agency Safety Plan and NCDOT's Program Standard to quantify the risks presented by UHC#1 or to identify additional risks that the condition of deferred maintenance may be causing; nor has CATS examined and presented information on potential other contributing factors and/or mitigations that may exacerbate or reduce hazard risk.

NCDOT again directs CATS to provide a detailed plan for the prioritization of vehicle overhauls. Per NCDOT's original UHC letter, CATS is directed to provide a CAP for UHC #1, to include the overhaul prioritization details, for NCDOT's review and approval. This CAP is currently overdue and must be submitted by CATS, to NCDOT **within five (5) business days** following receipt of this letter.

**UHC #2:** *Current risk mitigations, implemented by CATS' RCM personnel, following the May 21, 2022, derailment, includes the installation and monitoring of temperature strips on the LRV axles. However, this safety risk mitigation, alone, is reactive to unpredictable and potentially catastrophic LRV axle failures and does not reduce the associated safety risk to an acceptable level. Additionally, the procedure for inspecting axle temperature strips requires a written procedure and must be adhered to; contrary to noncompliance found by NCDOT. As such, NCDOT identifies the limited mitigation, missing documentation, and inconsistent compliance to be an unacceptable hazardous condition.*

In stating UHC#2, NCDOT directed CATS to develop a CAP to be submitted to NCDOT for review and approval. CATS responded with the following:

*CAP: The work plan will be reviewed and revised as necessary to ensure the process of tracking on a spreadsheet monthly temperature reading for each light rail vehicle in addition to visually inspecting daily each C-truck temperature strip and noting that reading on the daily inspection form as part of the daily PM check. Rail Car Maintenance staff will be reinstructed on the work plan and the importance of daily inspection of the C-truck temperature strip. Vehicles that have a reading of 130 degrees or higher will be removed from service.*

- *Responsible Person: Gary Lee*
- *Completion Date: March 17, 2023*

Following its review of the proposed CAP, NCDOT directs CATS to revise the CAP to state the following approved plan content:

“The work plan will be revised to ensure the process of tracking, on a spreadsheet, the daily temperature reading for **each** light rail vehicle axle bearing temperature strip for all light rail vehicles deemed available for revenue service on a daily basis. In addition to visually inspecting each axle bearing temperature strip daily and noting the reading on a spreadsheet, CATS will assign a staff member to submit the spreadsheet to NCDOT on a daily basis until further notice. Additionally, staff will be reinstructed on the revised work plan and the importance of daily inspection of all axle bearing temperature strips for vehicles deemed available for revenue service on a daily basis. Vehicles that have a reading of 130 degrees or higher will be removed from service and a comprehensive rail car maintenance inspection will be completed, per current inspection procedures, specific to this axle condition. Inspection results will be reviewed and approved by a Rail Car Maintenance Manager, before the vehicle can be released to revenue service operations and must be submitted to NCDOT for review and ongoing monitoring”.

- Responsible Person: to be determined by CATS
- Completion Date: February 23, 2023

Regarding the spreadsheet to be used for tracking the above data, NCDOT directs CATS to modify its current spreadsheet to track the temperature strips by axle (and then by vehicle) in order to track the axles by installation date, axle mileage, and axle overhaul history effectively and specifically. Tracking the vehicle mileage, alone, does not necessarily document each axle's true mileage.

CATS must submit the revised CAP, to NCDOT **within five (5) business days** following receipt of this letter.

**Consideration of System-Wide Speed Restriction:**

In your response, CATS requested a time extension of two weeks to provide a written analysis/report consistent with NCDOT's below request:

*With this in mind, NCDOT requires CATS consider implementing a system wide LRV speed restriction on the Blue Line light rail system until a time when the affected LRVs have been overhauled, per the LRV manufacture's recommendations. A speed restriction would provide the following benefits to reduce safety risk:*

1. *Provides LRV operators with additional time to react and respond to vehicle performance abnormalities.*
2. *Reduces the level of speed-related wear and tear on the LRV axle components.*

CATS stated the time extension will be needed for CATS to include the following considerations in its analysis:

*To provide a written analysis/report to this request, CATS needs to draft a variety of schedules, assess schedule impact, identify the number of resources needed to operate at that speed, and run test trains to verify the head ways and new schedule if it is decided to implement the overall speed restriction. Please note that we have been working in concordance Siemens on this issue since the start. Recently we requested their thoughts on the temperature reading and recommended speed restriction. Please see their responses below:*

- o The daily inspections for the (C-truck) bearing housing temperature are an appropriate measure to check if the bearing housing is close to or exceeds 130 degrees Fahrenheit. 130 degrees Fahrenheit is an appropriate bearing temperature to remain under.*
- o The maximum speed of 55 vs 45 mph will not significantly impact bearing temperature since 55 mph is only maintained for a short period of time.*

NCDOT hereby approves a **ten (10) calendar day** extension to further facilitate CATS' completion of an analysis/report for implementing a system-wide speed restriction.

However, NCDOT wishes to be clear, that the analysis/report expected, shall illustrate CATS' findings related to safety and maintenance and not service impacts, as your response indicates is the current plan. In its truest form, a safety risk mitigation addresses safety-related issues first.

As listed in the original letter from NCDOT, the focus must be given to the two (2) potential benefits associated with implementing a speed restriction (employee response time and wear/tear on axles). As such, CATS is directed to determine a best-case scenario for a maximum speed allowance to provide the greatest level of these two benefits. From NCDOT's perspective, if your manufacturer has determined that a speed reduction, from 55 mph to 45 mph, would have little impact, then it seems to reason, that a lower speed restriction may realize the benefits listed (i.e., 35mph or lower).

Brent Cagle, CATS  
February 17, 2023  
Page 5 of 6

**NCDOT Directive:**

Per the NCDOT's State Safety Oversight Program Standard, Section 7.1, CATS is required to mitigate UHCs before normal service may resume and to mitigate undesirable hazards unless a documented decision to manage the hazard is made by executive management and forwarded to NCDOT for review and approval/disapproval.

Today, NCDOT does not approve CATS' current risk mitigation plan, as stated in your response letter. Based on current plans to complete overdue vehicle maintenance overhauls by year 2026 or 2027, it is prudent to implement both short-term and long-term risk mitigation strategies.

**In an abundance of caution, NCDOT hereby directs CATS to implement a Blue Line light rail system-wide speed restriction of no more than a maximum speed of 35 miles per hour. As CATS' Accountable Executive, you shall implement this speed restriction, no later than 8:00am on Tuesday, February 21, 2023, and notify NCDOT when the speed restriction has been implemented.** NCDOT's directive to implement this speed restriction, by the date specified, does not relieve CATS of its responsibility to complete its Management of Change process, as outlined in CATS' Agency Safety Plan, Section 3.5:

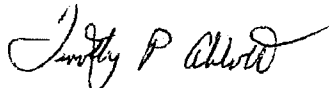
*CATS established policies or procedures intended to reduce safety risk shall not be changed until formal review by CATS Safety & Security, Quality Assurance and Operations staff meet and agree on the change to ensure no additional hazard or safety risk is introduced. The formal review will be documented using either the Hazard Analysis Form or Safety Analysis Form signed by appropriate management personnel, or by having the Rail Safety Manager co-sign the bulletin or notice indicating Safety was involved in the review and accepts the change.*

In the event that CATS identifies a safety hazard, specific to implementing NCDOT's speed restriction, by the due date, CATS shall request a meeting with NCDOT to discuss the matter further. Ultimately, CATS is responsible for implementing NCDOT's directive in a safe and timely manner.

Following your submittal of a speed restriction analysis/report, providing additional information from your staff, CATS' engineering personnel, and any other sources deemed appropriate, NCDOT will further evaluate the current directive of a maximum revenue service speed restriction of 35 mph.

NCDOT greatly appreciates your continued cooperation and support of the SSO Program. If you have any questions, please contact me at 919-707-4149.

Regards,



Timothy P. Abbott  
Safety Enforcement and Oversight Manager  
SSO Program Manager  
Rail Division  
North Carolina Department of Transportation

Brent Cagle, CATS  
February 17, 2023  
Page 6 of 6

Cc: David Moskowitz, CATS  
Chad Hagans, CATS  
Jason Orthner, NCDOT  
Jahmal Pullen, NCDOT  
Jason Sergent, NCDOT Contractor  
Don Pike, NCDOT Contractor  
Jerrad Jones, NCDOT Contractor



February 23, 2023

Timothy P. Abbott  
Safety Enforcement and Oversight Manager  
SSO Program Manager  
Rail Division  
North Carolina Department of Transportation  
1553 Mail Service Center  
Raleigh, NC 27699-1566

**Subject: CATS Response to Letter of Unacceptable Hazardous Condition (UHC) Dated February 17, 2023**

Dear Mr. Abbott,

CATS continues to maintain its commitment to operating the safest and most effective transit system in the City of Charlotte. CATS plans to maintain the current service levels of the NCDOT directed 35mph and will not consider service level changes until a majority of the truck overhaul program is completed. In response to your letter of Unacceptable Hazardous Condition (UHC) dated February 17, 2023, please see responses from the Charlotte Area Transit System (CATS) below. Note that each item is addressed in the NCDOT UHC letter with a summary of information prior to listing the specific correction actions.

- Item #1: In response to NCDOT's comment and concern the CATS's plan for addressing this issue and ensuring the truck overhaul is conducted as expeditiously as possible, the following steps have been implemented which describes the steps CATS is currently taking and plans to take to address these concerns as noted in the three CAPS below:
  - CATS-Rail Car Maintenance (RCM) will Blue tag a minimum of eight Siemens S70 series 100 and 200 vehicles with the highest mileage (see CAP #1 below) until such time they may be needed for revenue service due to other vehicles out of service for repair, damage, preventive maintenance, temperature strip readings of 130 degrees or higher, or any other reason to ensure CATS can make revenue services with the fewest needed trains. Of the identified eight LRVs blue tagged, CATS will temporarily use the lowest risk vehicle to substitute for a vehicle pulled out of service for immediate maintenance or repairs. The eight vehicles that have been blue tagged will be identified on the spreadsheets submitted to NCDOT.
    - CATS has committed to blue tag out of service a minimum of eight trains daily if not more dependent on vehicle availability
    - RCM will try at every opportunity to utilize the lowest miles vehicles available for revenue service requirements
  - A schedule of truck overhaul will be provided to NCDOT for review and monitoring (see CAP #2 below) that will include, at a minimum, the vehicle number, mileage, the date the truck was sent to Siemens and the projected date the vehicle will be returned to service



- In order to increase the number of trucks being sent to Siemens to be overhauled, CATS will make every effort dependent on availability to purchase additional dollies. The dollies are brackets that sit on the tracks and are used in place of the trucks to allow the train car body to safely be stored until trucks are reattached to the train. All trains with dollies are blue tagged and never put into service.
  - CATS will request from Siemens a scheduled timeline on delivery and cost of S70 LRV Truck Dollies from Siemens
  - CATS has already spoken with City Procurement and Finance to begin the process to purchase three additional truck sets
  - Understanding the purchase of additional truck sets is a long lead item, it may take up to 18 months to acquire
  - CATS is also contacting other properties to see borrow dollies
- Any truck inspected that “displays a temperature reading at or above 130 degrees Fahrenheit” will be removed from service immediately. The vehicle will not be returned to service until a proper inspection per current guidelines and protocols is completed and the vehicle is deemed safe to return to service. All temperature strips will be replaced with new strips.
- All vehicles deemed “out of service” for any reason must have all truck temperature strips inspected and documented before being returned to service. All temperature strips will be replaced with new strips.
- Management will try to provide financial incentives to “RCM” employees to work scheduled/mandatory overtime weekly not to exceed the (60) hours to maintain the high inspection rates that will be required of vehicles daily
- Management will work with Siemens (the OEM) to try and expediate the current 600K overhaul schedule to be completed prior to 07/2025
- CATS will be adding the requirement of bearing replacement to the 300K overhaul contract of the 300 series vehicles
- Management will work with Siemens to expediate a contractual mechanism to begin the “midlife” overhaul of the 100 and 200 series vehicles (see CAP #3 below)
  - Item #1 - CAP #1: Review the available vehicles for service and blue tag a minimum of eight Siemens S70 100 and 200 series vehicles with the highest mileage until such time they may be needed for revenue service due to other vehicles out of service for repair, damage, preventive maintenance, temperature strip readings of 130 degrees or higher, or any other reason to ensure CATS can make revenue services with the fewest needed trains. A minimum of eight trains will always be blue tagged out of service.
    - Responsible Person: Gary Lee
    - Completion Date: February 24, 2023
  - Item #1 - CAP #2: Provide NCDOT with a truck overhaul schedule that provides, at a minimum, the vehicle number, mileage, the date the truck was sent to Siemens and the projected date the vehicle will be returned to service (see sample spreadsheet below). The priority for trucks to be sent to Siemens will start with mileage. However, if a truck is deemed unsafe due to wear and tear, has any noted defect, or has constant high temperature readings, that truck will be prioritized for overhaul. Since this is obviously a fluid situation, updates to the overhaul schedule will be shared with NCDOT for review and monitoring.
    - Responsible Person: Gary Lee
    - Completion Date: March 3, 2023

- Item #1 - CAP #3: Work with City Procurement, CATS Finance and Siemens to purchase additional Dollies so more trucks can be overhauled than currently allowed with existing CATS resources. Work on updating current contracts or entering into new contracts with Siemens to complete all truck overhauls on CATS 100, 200 and 300 series vehicles including the “midlife” overhaul project. In addition, explore the possibility and enter into long term fleet maintenance contracts, as applicable, with Siemens to ensure all preventive and recommended maintenance is provided at the appropriate intervals and time for the remaining life of the vehicle.
      - Responsible Person: Finance and Procurement
      - Completion Date: December 31, 2025
- Item #2: In response to NCDOT’s CAP request included in the UHC letter, to revise the proposed CAP to include a daily reading of all axle bearing temperature strips and provide NCDOT with a spreadsheet with a daily report of all temperature readings, CATS has determined that due to limited resources and manpower, we would not be able meet this directive for the following reasons:
  - Current RCM staffing is 24 employees short. They currently have 26 employees and 23 available to perform this work.
  - At 35 mph maximum operating speed, current maximum number of revenue trains operating on the Blue Line are 10 two car consist trains (20 Siemens S70 Light Rail Vehicles) with 6 spares for a total of 26 LRVs used for revenue service.
  - Each train has three trucks with four temperature strips on each truck for a total of 12 temperature strips on each train.
    - That equates to 312 temperature strips that would need to be inspected each day (26 X 12 = 312)
  - A review of the daily inspection process identified the following timeline
    - Approximately 14 minutes to inspect 12 temperature strips
    - Total of approximately 47 minutes (by an experienced Rail Car Technician) to complete the daily inspection and complete the required paperwork per LRV
    - Additional time needs to be added to this process for supervisors to review the paperwork and determine if a train needs to be removed from service due to any number of issues, including the recorded temperature strip
  - With the NCDOT requirement of a daily report, staff would then have to sort through 312 temperature readings, enter that information from both yards, by hand, into an Excel spreadsheet and prepare the report for daily submission
    - All this additional time would mean Preventive Maintenance (PM), repairs, and all other shop work would drastically be reduced putting CATS in a position of possibly not having enough trains to make service
  - In addition, CATS has two pull-in times. The second pull-in time occurs around 0150hrs in the morning. The pull-out time for revenue service is approximately 0350hrs. This gives RCM approximately two hours to complete daily inspections, preventive maintenance, repairs, and any other work needed to be done on approximately 10 to 12 trains.
  - All this work is done between two yards so any data collection will have to be collected and combined to create one comprehensive report
  - Because of the manpower constraints and the discussions with Siemens indicating any issues with the wheel bearing would be a progressive process, CATS acknowledges the request for the CAP for review and approval, however CATS will not be able to implement the suggested CAP by the requested date as stated in the letter without



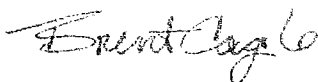
additional time to address the implementation processes. Additionally, CATS proposes below an alternate Corrective Action Plan (CAP) for NCDOT to review and consider based on existing staffing resources in RCM. Changing the CAP from daily to weekly will provide for maximum practical axle temperature monitoring without creating serious challenges, based on limited staffing, and address NCDOT's concern regarding the current monthly inspection frequency:

- Item #2 - CAP #1: The work plan will be revised as necessary to ensure the process of tracking, on a spreadsheet, the temperature reading for ten revenue service light rail trains (20 light rail vehicles) and three spare trains (6 light rail vehicles). ALL revenue service vehicles and spares will have ALL temperature strips read on the agreed upon frequency with NCDOT. If required daily, this equates to a reading of 312 strips daily (26 LRVs X 12 temp strips =312). If agreed to adjust frequency to readings of weekly, CATS can implement the following plan:
  - 26 LRVs are available for revenue service and as spares equates to 312 temperature strips to be read weekly with an average of 52 temperature strips read daily over 6 days (312 temp strips/ 6 days = 52).
  - CATS will assign a staff member to submit the spreadsheet to NCDOT on a weekly basis by 12 noon each Wednesday until further notice.
  - Rail Car Maintenance staff will be reinstructed on the revised work plan and the importance of daily inspection of all axle bearing temperature strips for the nine identified vehicles going into revenue service that day.
  - Vehicles that have a reading of 130 degrees or higher will be removed from service and a comprehensive rail car maintenance inspection will be completed, per current inspection procedures, specific to the axle condition.
  - Once the inspection of the affected axle is completed, all temperature strips will be replaced. Inspection results will be reviewed and approved by a Rail Car Maintenance Supervisor and/or the Manager of Rail Car Maintenance prior to the vehicle returning to revenue service operations.
  - In addition to a vehicle being removed for a temperature strip reading of 130 degrees or higher, ANY train that is removed from service for any other maintenance reason will be inspected prior to revenue service release.
  - A report of vehicles removed and returned to revenue service after passing the inspection will be submitted to NCDOT weekly for review and ongoing monitoring.
  - Responsible Person: Gary Lee
  - Completion Date: March 8, 2023
    - City work week is from Saturday to Friday
    - Need to identify administrative resources and train them on how to enter and report data for submission to NCDOT on a daily basis
    - Need to notify and give time to RCM staff to adjust schedules for mandatory overtime of four hours a day
    - Need time to train all shifts on revised work plan due to currently staggered schedules throughout the week

- The suggested CAP above will be supported by the following committed resources:
  - By requiring the daily frequency, CATS will be required to schedule four RCM technicians with mandatory overtime for four hours a day to ensure ample resources are dedicated to daily inspections to ensure all axle bearing temperature strips are read and recorded. If the proposed CAP is accepted, CATS would only have to schedule two RCM technicians with mandatory overtime a few days a week as opposed to daily mandatory overtime. This will be on a rotating basis to limit the potential of Hours of Service (HOS) violations. CATS will notify NCDOT of HOS violations as described in the current ASP, if applicable.
  - Administrative resources will be identified and assigned to RCM to support the recording of the temperature strips and generate the daily spreadsheet to be submitted to NCDOT. This will also be mandatory overtime if ample resources cannot be identified.
  - The commitment to pay mandatory overtime is expected and supported for up to two years.
  - As truck overhauls are completed and a majority of the trucks have been replaced, CATS will coordinate with NCDOT as to the closing of the above CAP
  
- Item #3: In response to NCDOT's directive to reduce maximum operating speed to 35 miles per hour on the Blue Line and provide a formal hazard analysis on the speed restriction, CATS provided NCDOT, on February 21, 2023, the Hazard Analysis regarding any identifiable safety hazards for CATS operating at a maximum speed of 35 miles per hour. An email was sent to NCDOT on February 18, 2023, stating CATS initiated the 35mph speed restriction on the afternoon of February 17, 2023, to demonstrate to NCDOT the importance safety is to CATS and to be responsive to NCDOT's concerns after an informal, preliminary hazard analysis did not immediately identify any safety hazards.

The Charlotte Area Transit System is committed to the safety of its operation, equipment, personnel and will continue to monitor this situation and work with Siemens to expedite the schedule to overhaul the axles and ensure appropriate funds are available to complete this project. To emphasize this commitment, members of the senior leadership team are planning to fly out to Sacramento, CA next week to meet in person with Siemens Senior Management to emphasize the importance of completing the truck overhaul project as quickly and safely as possible and to discuss long term contracts to ensure maintenance of the vehicles are done as recommended for the remainder of the vehicle's life. We appreciate the cooperative and supportive relationship with NCDOT and look forward to resolving and alleviating any concerns you may have regarding this issue. For additional information, please contact the General Manager of Safety and Security, David Moskowitz at (704) 336-7661.

Sincerely,



Brent Cagle.  
Interim Chief Executive Officer, Charlotte Area Transit System  
Director of Public Transit, City of Charlotte

cc: Mr. Jahmal Pullen, Engineering Coordination and Safety Manager  
 David Moskowitz, CATS General Manager of Safety and Security  
 Allen C. Smith III, CATS Deputy Director of Transit – Chief Operating Officer  
 Thurman C. Howell, CATS Deputy Director – Chief Financial Officer  
 Chad Hagans, CATS Safety Manager – Rail  
 Donald Pike, NCDOT Contractor  
 Jerrad Jones, NCDOT Contractor

SAMPLE SCHEDULE SPREADSHEET

| LRV    | Status Code | Status Reason      | Current Reading Date | Miles   | Equipment Status Explanation                            | Ship date  | Overhaul Duration in Days | Projected Ship Date | Conditonal Acceptance Date |
|--------|-------------|--------------------|----------------------|---------|---|------------|---------------------------|---------------------|----------------------------|
| LRV115 | 1           |                    | 2/18/23              | 790,463 | Please use for service everyday                         | 4/11/2023  | 56                        | 6/6/2023            |                            |
| LRV106 | 1R          | B-Car Minor Defect | 2/18/23              | 771,065 | Couple B only (Coupler switch)                          | 6/6/2023   | 56                        | 8/1/2023            |                            |
| LRV111 | 1           |                    | 2/18/23              | 764,602 | 2-18 & 2-19 Safety Event Train Only / Please use        | 5/6/2021   | 56                        |                     |                            |
| LRV116 | 2           | Testing RCM        | 2/14/23              | 739,728 | 2 RT Test Runs For 7017 Drive Car A Faults              | 8/1/2023   | 56                        | 9/26/2023           |                            |
| LRV112 | 2           | Unscheduled Maint  | 1/18/23              | 716,948 | MVB Faults  | 9/26/2023  | 56                        | 11/21/2023          |                            |
| LRV109 | 1           |                    | 2/18/23              | 714,786 |   | 11/21/2023 | 56                        | 1/16/2024           |                            |
| LRV114 | 2           | Unscheduled Maint  | 2/6/23               | 712,421 | 7017: Drive Car A Fault                                 | 1/16/2024  | 56                        | 3/12/2024           |                            |
| LRV102 | 2           | Awaiting Parts     | 2/8/23               | 710,551 | Pantograph Damaged                                      | 3/12/2024  | 56                        | 5/7/2024            |                            |
| LRV110 | 1R          | A-Car Minor Defect | 2/18/23              | 689,473 | Couple-A(Cab Speaker)                                   | 5/7/2024   | 56                        | 7/2/2024            |                            |
| LRV108 | 1           |                    | 2/18/23              | 675,804 | 2-18 & 2-19 Safety Event Train Only                     | 7/2/2024   | 56                        | 8/27/2024           |                            |
| LRV107 | 2           | Testing RCM        | 9/6/22               | 670,450 | New Truck Vibration                                     | 7/27/2022  | 56                        |                     |                            |
| LRV105 | 2           | Awaiting Parts     | 1/4/20               | 657,440 | APS /Trucks/ Accident Repair                            | 6/25/2022  | 56                        |                     |                            |
| LRV104 | 1R          | A-Car Minor Defect | 2/18/23              | 643,961 | 2-19 1st PM Pull-in TrKs 7S 15K / Couple-A(Cab Speaker) | 8/27/2024  | 56                        | 10/22/2024          |                            |
| LRV204 | 2           | Testing RCM        | 2/15/23              | 635,760 | 1 RT Test Run For 7138- BCU- C Faults                   | 10/22/2024 | 56                        | 12/17/2024          |                            |
| LRV101 | 2           | Awaiting Parts     | 3/28/20              | 626,767 | APS/ C-Truck EHU / (4) PEIs / CCTV / VCU                | 12/17/2024 | 56                        | 2/11/2025           |                            |



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

J. ERIC BOYETTE  
SECRETARY

**March 2, 2023**

Mr. Brent Cagle  
Interim Chief Executive Officer, Charlotte Area Transit System  
Assistant City Manager, City of Charlotte  
600 E. 4th Street, CMGC - 7th Floor  
Charlotte, NC 28202

**Subject: NCDOT Approval of the Charlotte Area Transit System's (CATS) Corrective Action Plans (CAPs) to address NCDOT's Unacceptable Hazardous Conditions (UHC) Letter and Speed Restriction Directive**

Mr. Cagle:

The North Carolina Department of Transportation (NCDOT) State Safety Oversight (SSO) Program has reviewed your February 23, 2023, submittal of proposed CAPs to further mitigate the safety risks associated with NCDOT's identified UHCs on February 6, 2023. Your submittal also includes assurances that CATS will continue to abide by NCDOT's directive to restrict Blue Line light rail vehicle (LRV) maximum speed to 35 mph until further notice, as imposed by NCDOT on February 17, 2023. NCDOT responds as follows.

For the purpose of summarizing NCDOT's oversight activities regarding the accident investigation and reviewing deferred maintenance, as well as CATS' follow-up actions, the following timeline is provided:

**May 21, 2022:**

- CATS LRV 201 center truck derailed.
- NCDOT directed CATS to investigate the accident, submit a preliminary accident investigation report within 72 hours, and provide monthly accident investigation updates until the final accident report was submitted to NCDOT for review and approval.

**Jun-Dec 2022:**

- NCDOT reviewed CATS' required monthly accident investigation status updates submitted by CATS.

**Dec 7, 2022:**

- NCDOT directed CATS to send an email to manufacture and obtain a status update of the axle analysis findings report.
- CATS sent email to manufacturer-requesting status update for axle analysis.

*Mailing Address:*  
NC DEPARTMENT OF TRANSPORTATION  
RAIL DIVISION  
1556 MAIL SERVICE CENTER  
RALEIGH, NC 27699-1556

*Telephone:* (919) 707-4100  
*Fax:* (919) 707-4154  
*Customer Service:* 1-877-368-4968

*Website:* [www.ncdot.gov](http://www.ncdot.gov)  
[www.ncbytrain.org](http://www.ncbytrain.org)

*Location:*  
862 CAPITAL BLVD  
RALEIGH, NC 27603

**Dec 19, 2022:**

- During the monthly NCDOT/CAT CEO Rail Safety Meeting, NCDOT facilitated a lengthy discussion regarding root cause of May 21, 2022, derailment and requested a status update of email response from manufacturer. During this meeting, CATS explained that they had received two (2) preliminary analysis reports from the manufacturer and would include them in the final accident investigation report. CATS went on to explain that the reports indicated that the locked axle seal allowed water intrusion into the bearing and caused the grease to dissipate, which caused the axle to lock.

**Jan 23, 2023:**

- During the monthly NCDOT/CATS CEO Rail Safety Meeting, NCDOT, again inquired about the status of the final accident investigation report. NCDOT also asked if CATS had reached out to other transit systems to determine if they too had experienced similar axle locking event. CATS responded that another transit system had experienced this issue with the same series rail cars.

**Jan 25, 2023:**

- CATS submitted final accident investigation report to NCDOT.

**Feb 1, 2023:**

- NCDOT facilitated an on-site meeting at CATS, per NCDOT's request. This meeting included NCDOT staff and contractors, as well as CATS' Rail Car Maintenance (RCM) and Safety and Security (S&S) staff. The purpose of the meeting was to discuss 1) RCM response to accident, 2) Discuss RCM's scheduled maintenance plans vs. OEM, and 3) Conduct a shop walk-through and inspection of LRV axles/trucks.

**Feb 6, 2023:**

- NCDOT sent accident investigation report SSO Comment Tracking Sheet to CATS for completion of final report revisions and resubmittal.

**Feb 6, 2023:**

- NCDOT sent UHC Letter to CATS' CEO - Unacceptable Hazardous Conditions-CAPs Required

**Feb 13, 2023:**

- CATS facilitated a requested meeting with NCDOT to discuss UHC Letter and NCDOT's safety concerns.

**Feb 15, 2023:**

- CATS' Interim CEO submitted response letter to NCDOT for Unacceptable Hazardous Conditions-CAPs Required letter:

**Feb 17, 2023:**

- CATS provided response to NCDOT SSO Comment Tracking Sheet for final accident investigation report.
- Following its review of CATS' response to NCDOT's UHC Letter, NCDOT sent a rebuttal letter to CATS' CEO – and included a Directive for a system-wide speed restriction for Blue Line light rail service (35mph):
- CATS implemented speed restriction, verbally to all Blue Line light rail operators, via ROCC two-way radio announcement.

**Feb 18, 2023:**

- CATS submitted “draft” revised Final Accident Investigation Report to NCDOT for review and comment:

**Feb 21, 2023:**

- CATS submitted Hazard Analysis Report (for speed restriction) to NCDOT for review and comment.

**Feb 23, 2023:**

- CATS submitted its response to NCDOT's rebuttal letter and proposed revised CAPs and included an assurance that CATS will continue to comply with NCDOT's Directive for the speed restriction until directed otherwise.

**Feb 27, 2023:**

- During the monthly NCDOT/CATS CEO Rail Safety Meeting, CATS' CEO explained that his team was traveling to manufacturer's headquarters to discuss additional potential actions that may be available to accelerate the LRV overhaul program.

**Feb 28, 2023:**

- CATS submitted the 2<sup>nd</sup> revised final accident investigation report to NCDOT for review and approval.

Following its review of CATS' CEO letter, dated February 27, 2023, including revised CAPs, NCDOT responds as follows:

CATS' February 27, 2023, letter states that *“CATS plans to maintain the current service levels of the NCDOT directed 35mph and will not consider service level changes until a majority of the truck overhaul program is completed”*.

**NCDOT response:** NCDOT concurs that service levels at CATS shall not increase until all deferred maintenance of safety-critical axles, for LRVs scheduled for service, has been completed. This may require CATS to decrease service levels, based on results of ongoing axle temperature monitoring and the potential need for additional risk mitigation actions. Additionally, NCDOT's system-wide speed restriction for the Blue Line light rail system will remain in effect until further notice.

CATS' February 27, 2023, letter includes four (4) CAPs and NCDOT wishes to acknowledge the increased level of information and response provided.

Regarding the submitted new and revised CAPs, NCDOT's below response includes:

- The original stated CAP requested.
- NCDOT's rebuttal comments for CATS' response (received on February 15, 2023)
- CATS' new or revised proposed CAP (submitted on February 23, 2023)
- NCDOT's approval and comments for each CAP.

NCDOT, UHC 1-CAP 1:

*As stated, Delayed maintenance of the Siemens S70 LRVs directly contributed to the derailment of LRV 201 on May 21, 2022. Although CATS is working with its contractors to address needed overhauls of the safety critical axles for this LRV (and the other LRVs in this fleet), the overhaul completion date is currently scheduled for some time in calendar year 2026. CATS is currently operating LRVs, in revenue service, which have surpassed the manufacture's recommended axle overhaul thresholds. NCDOT identifies the planned fleet overhaul completion date as an unacceptable hazardous condition.*

NCDOT Rebuttal for UHC 1-CAP-1 Response from CATS:

CATS' has not adequately identified how it will prioritize truck and axle overhauls; it has not provided a specific schedule to NCDOT identifying which trucks and axles will be overhauled and in what order; it has not conducted any form of risk assessment or hazard analysis as required by CATS' Agency Safety Plan and NCDOT's Program Standard to quantify the risks presented by UHC#1 or to identify additional risks that the condition of deferred maintenance may be causing; nor has CATS examined and presented information on potential other contributing factors and/or mitigations that may exacerbate or reduce hazard risk. NCDOT again directs CATS to provide a detailed plan for the prioritization of vehicle overhauls. Per NCDOT's original UHC letter, CATS is directed to provide a CAP for UHC #1, to include the overhaul prioritization details, for NCDOT's review and approval.

CATS, UHC 1-Revised CAP 1:

*Review the available vehicles for service and blue tag a minimum of eight Siemens S70 100 and 200 series vehicles with the highest mileage until such time they may be needed for revenue service due to other vehicles out of service for repair, damage, preventive maintenance, temperature strip readings of 130 degrees or higher, or any other reason to ensure CATS can make revenue services with the fewest needed trains. A minimum of eight trains will always be blue tagged out of service.*

- *Responsible Person: Gary Lee*
- *Completion Date: February 24, 2023*

NCDOT Response:

NCDOT concurs with removing the highest mileage S70 100 and 200 series vehicles from service immediately. Without exception, NCDOT will not permit CATS to operate these vehicles until the past due maintenance overhauls are completed. If necessary, CATS will need to reduce service levels. As such, NCDOT hereby approves this CAP, with changes stated herein, and directs CATS to remove a minimum of eight (8) highest mileage LRVs and submit a list of these vehicles to NCDOT for review and monitoring of required maintenance work. CAP ID: 23-02-06-UHC-1-01-BlueTags

**CATS, UHC 1-New CAP 2:**

*Provide NCDOT with a truck overhaul schedule that provides, at a minimum, the vehicle number, mileage, the date the truck was sent to Siemens and the projected date the vehicle will be returned to service (see sample spreadsheet below). The priority for trucks to be sent to Siemens will start with mileage. However, if a truck is deemed unsafe due to wear and tear, has any noted defect, or has constant high temperature readings, that truck will be prioritized for overhaul. Since this is obviously a fluid situation, updates to the overhaul schedule will be shared with NCDOT for review and monitoring.*

- *Responsible Person: Gary Lee*
- *Completion Date: March 3, 2023*

**NCDOT Response:**

NCDOT hereby approves this CAP, with the addition of notifying NCDOT, each time the overhaul schedule is modified and provide rationale for schedule changes and indicate staff level person approving each schedule change. CAP ID: 23-02-06-UHC-1-02-Overhaul Schedule

**CATS, UHC 1-New CAP 3:**

*Work with City Procurement, CATS Finance and Siemens to purchase additional Dollies so more trucks can be overhauled than currently allowed with existing CATS resources. Work on updating current contracts or entering into new contracts with Siemens to complete all truck overhauls on CATS 100, 200 and 300 series vehicles including the "midlife" overhaul project. In addition, explore the possibility and enter into long term fleet maintenance contracts, as applicable, with Siemens to ensure all preventive and recommended maintenance is provided at the appropriate intervals and time for the remaining life of the vehicle.*

- *Responsible Person: Finance and Procurement*
- *Completion Date: December 31, 2025*

**NCDOT Response:**

NCDOT hereby approves this CAP and requests status updates, via email, immediately following CATS' completion of actions resulting in the attainment of additional resources. CAP ID: 23-02-06-UHC-1-03-Procurement

**NCDOT, UHC 2-CAP 1:**

*As stated, current risk mitigations, implemented by CATS' RCM personnel, following the May 21, 2022, derailment, includes the installation and monitoring of temperature strips on the LRV axles. However, this safety risk mitigation, alone, is reactive to unpredictable and potentially catastrophic LRV axle failures and does not reduce the associated safety risk to an acceptable level. Additionally, the procedure for inspecting axle temperature strips requires a written procedure and must be adhered to; contrary to noncompliance found by NCDOT. As such, NCDOT identifies the limited mitigation, missing documentation, and inconsistent compliance to be an unacceptable hazardous condition.*

**NCDOT Rebuttal for UHC 2-CAP-1 Response from CATS:**

Following its review of the proposed CAP, NCDOT directs CATS to revise the CAP to state the following approved plan content:

The work plan will be revised to ensure the process of tracking, on a spreadsheet, the daily temperature reading for **each** light rail vehicle axle bearing temperature strip for all light rail vehicles deemed available for revenue service on a daily basis. In addition to visually inspecting each axle bearing temperature strip daily and noting the reading on a spreadsheet,



CATS will assign a staff member to submit the spreadsheet to NCDOT on a daily basis until further notice. Additionally, staff will be reinstructed on the revised work plan and the importance of daily inspection of all axle bearing temperature strips for vehicles deemed available for revenue service on a daily basis. Vehicles that have a reading of 130 degrees or higher will be removed from service and a comprehensive rail car maintenance inspection will be completed, per current inspection procedures, specific to this axle condition. Inspection results will be reviewed and approved by a Rail Car Maintenance Manager, before the vehicle can be released to revenue service operations and must be submitted to NCDOT for review and ongoing monitoring”.

**CATS, UHC 2-Revised CAP 1:**

*The work plan will be revised as necessary to ensure the process of tracking, on a spreadsheet, the temperature reading for ten revenue service light rail trains (20 light rail vehicles) and three spare trains (6 light rail vehicles). ALL revenue service vehicles and spares will have ALL temperature strips read on the agreed upon frequency with NCDOT. If required daily, this equates to a reading of 312 strips daily (26 LRVs X 12 temp. strips = 312). If agreed to adjust frequency to readings of weekly, CATS can implement the following plan:*

- *26 LRVs are available for revenue service and as spares equates to 312 temperature strips to be read weekly with an average of 52 temperature strips read daily over 6 days (312 temperature strips/ 6 days = 52).*
- *CATS will assign a staff member to submit the spreadsheet to NCDOT on a weekly basis by 12 noon each Wednesday until further notice.*
- *Rail Car Maintenance staff will be reinstructed on the revised work plan and the importance of daily inspection of all axle bearing temperature strips for the nine identified vehicles going into revenue service that day.*
- *Vehicles that have a reading of 130 degrees or higher will be removed from service and a comprehensive rail car maintenance inspection will be completed, per current inspection procedures, specific to the axle condition.*
- *Once the inspection of the affected axle is completed, all temperature strips will be replaced. Inspection results will be reviewed and approved by a Rail Car Maintenance Supervisor and/or the Manager of Rail Car Maintenance prior to the vehicle returning to revenue service operations.*
- *In addition to a vehicle being removed for a temperature strip reading of 130 degrees or higher, ANY train that is removed from service for any other maintenance reason will be inspected prior to revenue service release.*
- *A report of vehicles removed and returned to revenue service after passing the inspection will be submitted to NCDOT weekly for review and ongoing monitoring.*
  - *Responsible Person: Gary Lee*
  - *Completion Date: March 8, 2023*

**NCDOT Response:**

NCDOT hereby approves this CAP, as proposed for weekly report submittals, for all axle temperature strip readings each week. Regarding the spreadsheet to be used for tracking the above data, NCDOT directs CATS to modify its current spreadsheet to also track the temperature strips, by axle (and then by vehicle) in order to track the axles by installation date, axle mileage, and axle overhaul history effectively and

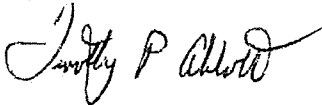
Brent Cagle, CATS  
March 2, 2023  
Page 7 of 7

specifically. Tracking the vehicle mileage, alone, does not necessarily document each axle's true mileage. NCDOT will work with CATS to establish an approved format for the reporting spreadsheet. **CAP ID: 23-02-06-UHC-2-01-Temp Readings**

As required by NCDOT's SSO Program Standard (SSOPS), Section 9-Corrective Action Plans (CAPs), CATS is required to submit the four (4) approved CAPs (to include additional requirements stated by NCDOT herein), via the designated Rail.Safety web application, for NCDOT's review and monitoring. The CAPs must be submitted within **five (5) calendar days** from the date of this letter. NCDOT will monitor and verify CATS' CAP activities through to verification and closure for each CAP submitted.

NCDOT greatly appreciates your continued cooperation and support of the SSO Program. If you have any questions, please contact me at 919-707-4149.

Regards,



Timothy P. Abbott  
Safety Enforcement and Oversight Manager  
SSO Program Manager  
Rail Division  
North Carolina Department of Transportation

Cc: David Moskowitz, CATS  
Chad Hagans, CATS  
Jason Orthner, NCDOT  
Jahmal Pullen, NCDOT  
Jason Sergent, NCDOT Contractor  
Don Pike, NCDOT Contractor  
Jerrad Jones, NCDOT Contractor



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

J. ERIC BOYETTE  
SECRETARY

**FINDINGS OF NONCOMPLIANCE**

**To:** Mr. Brent Cagle  
Interim Chief Executive Officer, Charlotte Area Transit System  
Assistant City Manager, City of Charlotte  
600 E. 4th Street, CMGC - 7th Floor  
Charlotte, NC 28202

**Date:** March 21, 2023

**Number:** FNC-2023-03-21

**Subject:** Findings of Noncompliance with North Carolina Department of Transportation (NCDOT) State Safety Oversight Program Standard (SSOPS), Section 1.5.10 and Charlotte Area Transit System's (CATS) Bridge Maintenance Plan, Section 2.1.

During the week of March 6-10, CATS' Interim CEO became aware of past due bridge structure inspections. This information was communicated to the Federal Transit Administration's Region IV office on March 8, 2023. However, CATS did not inform NCDOT of the overdue inspections, nor the contact made by a Federal agency, until March 16, 2023. As such, CATS was noncompliant with the State Safety Oversight Program Standard (SSOPS), Section 1.5.10 which states:

*NCDOT requires all RTAs under its jurisdiction to notify and share the results of contacts made by federal agencies, such as FTA, the National Transportation Safety Board (NTSB), and FRA, in regard to the rail operations and safety programs of the RTA.*

Additionally, CATS' Bridge Maintenance Plan, Section 2.1 requires that CATS complete bridge structure inspections every two years. However, CATS has not completed these inspections since 2019. As such, CATS is noncompliant with its inspection requirements, as required in section 2.1 of the plan:

*All CATS bridges, except underwater structures, will be inspected at least every two years in accordance with the National Federal Standard for Bridge Inspection. This includes fracture critical bridges. Underwater structures will be inspected every six years.*

Mailing Address:  
NC DEPARTMENT OF TRANSPORTATION  
RAIL DIVISION  
1556 MAIL SERVICE CENTER  
RALEIGH, NC 27699-1556

Telephone: (919) 707-4100  
Fax: (919) 707-4154  
Customer Service: 1-877-368-4968  
Website: [www.ncdot.gov](http://www.ncdot.gov)  
[www.ncbytrain.org](http://www.ncbytrain.org)

Location:  
862 CAPITAL BLVD  
RALEIGH, NC 27603

**NCDOT hereby finds that:**

- CATS is NONCOMPLIANT with NCDOT's communication requirements for the CATS results of contacts made by Federal agencies.
- CATS is NONCOMPLIANT with the requirements of its Bridge Maintenance Plan.

In response to the above Findings of Noncompliance, CATS is required to submit Corrective Action Plans (CAPs) to NCDOT for review and approval for the following:

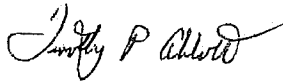
1. Establish a policy and procedure to promptly notify NCDOT of the results of contacts made by federal agencies.
2. CATS shall establish a policy and procedure to track the status of asset management components, as listed in its own Transit Asset Management (TAM) Plan and provide a monthly status report to NCDOT. The monthly report shall be submitted to NCDOT by the 20<sup>th</sup> of each month, using the format included below.
3. Effective April 1, 2023, CATS shall prepare and submit a monthly bridge inspection schedule to NCDOT until all bridge structures have been inspected and all identified safety-related bridge structure deficiencies have been mitigated.

Per SSOPS, Section, 1.5.2.3: Third Level of Enforcement and Escalation, NCDOT wishes to remind you that future occurrences of noncompliance for proper reporting to NCDOT and monitoring of assets may result in NCDOT's enforcement and escalation to include the delay, suspension, or cancelling of rail service and potentially include ramifications related to the RTA's State and Federal funding programs.

NCDOT appreciates CATS' continued support of NCDOT's SSO Program and directs CATS to submit the aforementioned CAPs **within ten (10) calendars days** following receipt of this letter.

If you have any questions, please contact me at 919-707-4149.

Regards,



Timothy P. Abbott  
Safety Enforcement and Oversight Manager  
SSO Program Manager  
Rail Division  
North Carolina Department of Transportation

Cc: David Moskowitz, CATS  
Chad Hagans, CATS  
Jahmal Pullen, NCDOT  
Jason Sergent, NCDOT Contractor  
Don Pike, NCDOT Contractor  
Jerrad Jones, NCDOT Contractor

### Monthly Asset Management Status Report

| Asset  | # Planned Inspections   | # Actual Inspections | Plan Reference Document | Priority 1 - Operational / Safety Related Issues Identified | Priority 1 - Operational / Safety Related Issues Open | Planned Date to Complete Priority 1 - Open Items |
|--|---|----------------------|-------------------------|---|---|--|
| <b>Rolling Stock</b>                             |   |                      |                         |   |   |  |
| Light Rail Vehicles                              |   |                      |                         |   |   |  |
| Streetcars                                       |   |                      |                         |   |   |  |
| <b>Equipment</b>                                 |   |                      |                         |   |   |  |
| Non-Revenue Track Vehicles                       |   |                      |                         |   |   |  |
| Emergency Response Equipment                     |   |                      |                         |   |   |  |
| <b>Infrastructure</b>                            |   |                      |                         |   |   |  |
| Signal Systems                                   |   |                      |                         |   |   |  |
| Power Substations                                |   |                      |                         |   |   |  |
| Guideway (OCS) System                            |   |                      |                         |   |   |  |
| Grade Crossings                                  |   |                      |                         |   |   |  |
| Turnouts and Crossovers                          |   |                      |                         |   |   |  |
| Bridges  |   |                      |                         |   |   |  |
| Walls and drainage systems                       |   |                      |                         |   |   |  |
| Yards and Lighting                               |   |                      |                         |   |   |  |
| Technology / IT Infrastructure                   |   |                      |                         |   |   |  |
| <b>Facilities</b>                                |   |                      |                         |   |   |  |
| Passenger Facilities (stations)                  |   |                      |                         |   |   |  |
| Parking Facilities                               |   |                      |                         |   |   |  |
| Maintenance Facilities                           |   |                      |                         |   |   |  |
| <b>State of Good Repair (SGR) Status</b>         | <b>Explain Condition Assessment Ratings below 3.0 and Mitigation Plans</b><br><i>(Per, Transit Asset Management (TAM) Plan)</i>   |                      |                         |   |   |  |
| Rolling Stock (i.e., CATS I & II 600k overhauls) |   |                      |                         |   |   |  |
| Equipment  |   |                      |                         |   |   |  |
| Infrastructure                                   |   |                      |                         |   |   |  |
| Facilities                                       |   |                      |                         |   |   |  |
| <b>Funding/Budgeting</b>                         | <b>Explain the Status of Current Funding Available, Source of Funding, and Shortfalls to Address Assessment Ratings below 3.0</b> |                      |                         |   |   |  |
|  |   |                      |                         |   |   |  |

TO: Members of the Metropolitan Transit Commission

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FROM: Brent Cagle, Interim Chief Executive Officer | Charlotte Area Transit System  
Jason Lawrence, Director of Planning | Charlotte Area Transit System

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SUBJECT: Ridership Update

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DATE: March 22, 2023

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### **Background**

The Charlotte Area Transit System (CATS) reports transit ridership to various organizations and agencies including the Metropolitan Transit Commission (MTC) and the National Transit Database (NTD). There are three sources of ridership data that CATS utilizes for reporting and analysis needs: farebox, automatic passenger counts (APC) and sampling. The MTC report is a combination of farebox (bus) and APC (rail). For NTD, a sampling method is used for reporting bus ridership at a system level and APC for rail ridership. The APC dataset is used primarily for planning and analysis.

### **Ridership Sources**

The collection of ridership data from sampling, farebox and APC are generally consistent across mid to large size transit agencies. Detailed below are descriptions of those sources as well as key difference and applications:

#### Farebox

- Details fare type and payment method for bus service
- Used for bus ridership reporting to the MTC
- Provides transfer data between bus routes
- Only available as a daily dataset by route

#### Automatic Passenger Counts

- Provides boardings (on) and alightings (off) at the stop/station level
- Federal Transit Administration (FTA) certified method for NTD LYNX Blue Line and CityLYNX Gold Line ridership reporting.
- Used for rail ridership reporting to the MTC
- Largest dataset available and most useful for planning analysis
- Provide data for all bus/rail trips

#### Sampling

- FTA certified method for NTD bus ridership reporting
- Commonly used method for NTD reporting at mid to large sized transit agencies
- Due to the sample size, ridership totals are only valid at the annual and system level

### **Ridership Reporting**

During a review of the November and December 2022 farebox ridership data, an unexpected decline in ridership was discovered when compared to the year prior. CATS, in coordination with the farebox vendor, was able to recover the data. However, when comparing the farebox and APC bus ridership data over the past few years, the gap between the two sources has increased. To further illustrate that gap, CATS has included November 2022-February 2023 APC and farebox ridership reports with the March 2023 MTC agenda packet. Going forward, CATS will start an evaluation of our current ridership collection methods and reporting.

TO: Members of the Metropolitan Transit Commission

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FROM: Brent Cagle, Interim Chief Executive Officer | Charlotte Area Transit System  
Catherine Kummer, Sustainability, Resiliency and Governmental Affairs Officer | Charlotte Area Transit System

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SUBJECT: Battery Electric Bus Mid-Pilot Program Update

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DATE: March 22, 2023

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### **Background**

The Charlotte Area Transit System (CATS) launched its Battery Electric Bus (BEB) Pilot Program on Earth Day, April 22, 2022. This pilot program is intended to test 18 BEB vehicles from two different bus manufacturers (Gillig and New Flyer) and two different charging infrastructure manufacturers (ABB and Siemens). The pilot program is allowing CATS to collect data and assess vehicle performance while operating across the transit system in preparation for further transition to zero carbon sources.

CATS was awarded \$3,723,712 through the FY2020 Low or No Emissions (Low No) Grant and that award went toward the purchase expense for the 18 BEBs, accompanying charging infrastructure and additional workforce development training. CATS intends to apply for the upcoming Low No Grant for additional buses, infrastructure, and workforce development. However, please note that CATS has planned and budgeted to purchase an additional 15 BEBs and 12 hybrid electric diesel buses this year. The new hybrid electric diesel buses can run full electric for a brief period which will be utilized when operating at the new Charlotte Transportation Center (CTC).

Over the last 10 months, CATS has received all 18 BEB vehicles and has installed all accompanying charging infrastructure. There are currently 15 BEB vehicles operating in revenue service with the remaining three anticipated for revenue service in April, at which point we will have the full BEB fleet in operation. As last shared with the MTC in January 2022, this 18-month pilot is in partnership with eTransEnergy, a subsidiary of Duke Energy, and is set to conclude this fall.

### **Key Mid-Pilot Takeaways**

- **Range:** To date, we have experienced up to 150 miles of range. This amount of range means our current BEBs will work for 70% of our current routes. We anticipate battery capacity (range) to expand as the technology evolves.
- **Shakeout Period:** We have experienced various operational items. For example, one BEB experienced an overheating of components resulting in increased downtime for that BEB as the manufacturer corrected the issue.
- **Zero Tailpipe Emissions:** These BEBs provide a zero-tailpipe emission option, supporting our climate goals.
- **Total Cost of Ownership (TCO):** Early industry modeling forecasts a lower TCO with BEB technologies understanding the initial investment is greater.
- **Infrastructure Space Limitations:** Space and charging infrastructure are limited at our two bus facilities. The complexities of charging over night to avoid peak energy and demand costs are new and something we are still learning to manage.
- **Zero Emission Fleet (ZEF) Transition Plan:** At this time, we have a limited understanding in what a full transition to these technologies would entail. However, this plan will support us in gaining that understanding and is being done with consultant STV currently.

### **Key Dates**

**October** – BEB Pilot Program and ZEF Transition Plan to be completed.

TO: Members of the Metropolitan Transit Commission

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FROM: Brent Cagle, Interim Chief Executive Officer | Charlotte Area Transit System  
David Moskowitz, General Manager of Safety & Security | Charlotte Area Transit System

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SUBJECT: Security Contract and Programs

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DATE: March 22, 2023

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### **Background**

The Charlotte Area Transit System (CATS) contracts with private security companies to provide security services for its transit facilities and fleet. As the primary security force, CATS will receive additional support from the Charlotte-Mecklenburg Police Department (CMPD) where needed when contracted security services are unable to respond or need additional assistance beyond their resources. Contracted private security is a cost-effective solution to ensuring a safe and secure environment at CATS' properties for approximately half the annual cost of utilizing sworn CMPD officers.

### **Key Contract Takeaways for April Charlotte City Council Vote**

- The contract scope allows for additional future security services to be provided for expanding security needs, future transit line expansions and special events, and allows for a more visible uniform presence on the trains and at stations.
- Providing security services through two contracts:
- Police, armed guards, guards with tasers and dispatchers
  - Unarmed guards
  - Both companies will work with each other and ensure all staff are supported by the resources, requirements, rules, regulations, and laws to ensure proper police and security services are available to support the needs of CATS and the community.
- These contracts will provide a shift in the policing and security posture that we currently have. There will be a more visible presence throughout the transit system of uniformed guards.
- The unarmed guard contract will almost double the number of guards currently available to protect facilities and patrol the Blue and Gold Lines in FY'24.
  - Our focus is customer service, uniform presence for deterrence and removing disruptive individuals from the system.
  - Another focus is helping those citizens in crisis by directing them to community resources. CATS has partnered with a few local agencies to address these incidents. Agencies such as Roof Above, CMPD, Mecklenburg County and others.
- Company police, armed guards and dispatchers will provide the policing aspect of the security services, focusing on deterring criminal behavior through a visible uniform presence and enforcement of local, state, and federal laws in addition to the CATS Riders' Rules of Conduct.
- Increased budget will cover the increase in the number of security personnel being contracted in addition to the increase in costs associated with this type of service.
  - There is a nationwide challenge with hiring and retaining police and security personnel.
  - Costs have increased to provide these services and to pay individuals to be part of this industry in today's environment.

### **CATS Current Training and Programs around Safety and Security**





Agenda Item V Attachments:

1. Letter from Patrick Baker, City Attorney
2. Letter from Edmond Driggs, Charlotte City Council and Letter from Marcus Jones, Charlotte City Manager
3. Scope of Work and MTC Questions



Item 1: Letter from Patrick Baker



**CHARLOTTE.**

To: Members of the Metropolitan Transit Commission  
From: Patrick Baker, City Attorney & Brad Thomas, Senior Assistant City Attorney Supervisor  
Date: April 21, 2023  
Re: Metropolitan Transit Commission - Governance & Authority

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The Charlotte Area Transit System (“CATS”) is a department of the City and is governed by City Council. Certain functions of CATS, such as long-range planning and the development of capital and operating programs, and budgets are subject to review, recommendation, and/or approval by the Metropolitan Transit Commission (the “MTC”). The MTC is a public body created pursuant to a Transit Governance Interlocal Agreement (the “Interlocal Agreement”) and is subject to the same basic legal regulations as most local government bodies such as open meetings and public records laws. As a public body, the MTC acts as a single unit rather than as individual members. Under the authority and direction of the City Council, the City Attorney’s office serves as a legal resource to the MTC through Senior Assistant City Attorney Brad Thomas and other attorneys assigned to CATS. The remainder of this memo briefly summarizes the purpose and authority of the MTC.

**Background**

North Carolina statutes allow local governments to perform governmental functions through a joint public body. The MTC’s purpose and authority are defined by the Interlocal Agreement, which is a contract that establishes the rights and responsibilities of the eight parties – the City of Charlotte, Mecklenburg County, and the six Mecklenburg County Towns<sup>1</sup>. The MTC was developed in response to the “2025 Integrated Transit/Land-Use Plan for Charlotte Mecklenburg – July 1998” (the “2025 Integrated Plan”). The 2025 Integrated Plan and other factors led the County Commission to propose a referendum on a one-half percent local sales tax, which was approved by voters on November 3, 1998.

**Purpose**

The purpose of the Interlocal Agreement and the MTC is to “provide the relationships and mechanisms that will guide the planning, financing, and implementation of an effective, efficient, responsive, and accountable integrated regional transit system.” The Interlocal Agreement also notes that the creation of the MTC was intended to memorialize the following “guiding principles” from the 2025 Integrated Plan:

- Provide for coordinated transit operations on a county-wide basis.
- Retain for the elected bodies the responsibility of approving long-range transit plans and the capital and operating programs that support these plans.
- Ensure that public involvement is a component.
- Assure that Town interests are represented.
- Be flexible and expandable so jurisdictions outside Mecklenburg County could become part of the system.

**Authority**

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<sup>1</sup> NCDOT is permitted a member representative with one vote.

Generally, the MTC's authority is advisory, long-term, and primarily focused around developing and maintaining regional communication/cooperation. However, there are exceptions to this general rule.

The MTC has specific authority in CATS program and budget planning. The MTC must approve CATS' "Five-year capital program and two-year operating program" before those programs may be approved by City Council. Section VII of the Interlocal Agreement includes a detailed description of this program and budget development and approval process including a procedure for resolving potential disputes between the MTC and City Council over the proposed terms.

The MTC also has the specific authority in the selection and removal of CATS CEO, who the Interlocal Agreement calls the "Chief Transit Official." Section VI.A of the Interlocal Agreement states that the "chief transit official shall be a City of Charlotte employee appointed by the City Manager with the concurrence of the Mecklenburg County Manager and a MTC member representative (not a Charlotte or Mecklenburg County representative) selected by the MTC." The chief transit official is subject to review and evaluation by the same group. Finally, the same section notes that the City Manager may independently remove CATS CEO or that "if a majority of the total voting membership of the MTC approves a vote of 'no confidence,' the City Manager shall remove or reassign the chief transit official."

### **Committees**

The MTC has two standing advisory committees, which provide an opportunity for regional public engagement. The Citizens Transit Advisory Group ("CTAG") was created by the Interlocal Agreement. The Transit Services Advisory Committee ("TSAC") was created pursuant to the MTC's power to "establish and appoint other standing and/or *ad hoc* advisory committees as it deems appropriate," which is outlined in Section V of the Interlocal Agreement. CTAG and TSAC are both composed of citizen members appointed by the officials who serve on the MTC. CTAG and TSAC both hold regular meetings and interface with CATS Staff and the MTC. CTAG is charged with advising on the Transit Program and budget, proposed transit alignments, and technology plans. TSAC is responsible for serving as a forum for citizen suggestions and complaints regarding transit, reviewing performance standards for the system, and exploring emerging issues in transit. CTAG and TSAC have other, sometimes overlapping, responsibilities such as reviewing and commenting on proposed policies for the transit system.

In total, the MTC's responsibilities (defined in Section IV.D of the Interlocal Agreement) are:

- Review and recommend long-range public transportation plans.
- Work with all affected local Metropolitan Planning Organizations to develop the long-range transportation plan (including public transportation).
- Establish priorities for two-year operating and five-year capital programs.
- Review and recommend two-year transit operating programs and second-year program adjustments.
- Review and recommend five-year capital programs.
- Conduct public involvement programs to provide community input on proposed five-year capital and two-year operating programs.

The MTC has several important roles including facilitating regional coordination and cooperation and developing and approving operating and capital programs. However, control over the day-to-day management of CATS operations is not provided to the MTC by the Interlocal Agreement or any other authority, as such authority lies with the City of Charlotte.



Item 2: Letter from Edmond Driggs and Letter from Marcus Jones



# CATS Oversight and Remediation Report

Charlotte City Council Transportation, Planning and Development  
Committee

April 3, 2023

In recent weeks, several operational and reporting failures have come to light at CATS that raise questions about the system's management and dependability. These failures are of particular concern not only because they raise serious questions about CATS as a transportation utility, but also because they undermine public confidence in our light rail service.

In response to the issues at CATS, the City Manager issued a statement last week in advance of a media briefing hosted by him, CATS interim CEO Brent Cagle and City Council Transportation, Planning and Development Committee Chair Ed Driggs. The memo, which is reprinted in full below, includes five strategic actions the Manager proposes to take to get CATS on a stable course for the future.

The purpose of this memorandum is to review the CATS issues that have come to light as well as the current situation with respect to each of the issues, and then offer suggestions for next steps to be taken by management and City Council.

## Issue 1: Derailment

On May 21, 2022, one of three wheel assemblies on a CATS Blue Line Train overheated and seized up, causing the wheel to lose its natural position on the track. The train came to a stop, and the passengers got off. There were no injuries, and there has been no recurrence of a train failing in this manner while in service. The technical term to describe this event is "derailment", which, particularly in the wake of the Norfolk Southern tragedy that occurred after the

CATS incident last year, has led to some alarming media reports and apprehension about rail service.

**Current Status:**

CATS reported the event to NCDOT State Safety Oversight (SSO) and followed all regulatory requirements in documenting and investigating the root cause of the incident. CATS also worked with Siemens to investigate the root cause of the bearing failure, and CATS continues to monitor the axle bearings on the light rail vehicles. CATS has submitted Corrective Action Plans (CAPs) to NCDOT SSO, which they accepted on March 2, 2023. All CATS light rail vehicles in use are inspected weekly to identify any possible signs of a recurrence of the failure and heat strips have been applied to all wheel assemblies. Until CATS and Siemens can complete necessary work on the wheel assemblies, the CATS Blue Line will continue to operate at a reduced maximum speed of 35 m.p.h. . This operating restriction has not resulted in a reduction of the service level and when riding from terminus-to-terminus of the Blue Line adds between 2-4 minutes in trip time.

**Next Steps:**

Review and publish the incident reports and related documents, determine if further investigation and disclosure is needed related to the incident

## **Issue 2: Lynx Blue Line maintenance not timely**

During the investigation of the May 21, 2022, incident, it was determined that CATS had failed to complete the 300,000- and 600,000-mile overhauls of the wheel assemblies for the LRVs. This deferred maintenance was determined to be a contributing factor in the May 21, 2022 derailment.

**Current Status:**

CATS is working with Siemens to accelerate the maintenance program. The first step is to request the purchase of additional dollies and to amend the current maintenance contract with Siemens to include the entire LRV fleet and the accelerated work schedule.

#### Next Steps:

Request for Council Action (RCA) on April 10 to review/approve the purchase an additional six sets of dollies. In addition, on April 10 or April 24 (depending on Siemens) an RCA for review/approval of an amendment to the current service agreement with Siemens to include all LRVs and expedite the maintenance schedule.

### Issue 3: Missed bridge and parking deck inspections

During the week of March 6-10, an Operations Division employee disclosed to Mr. Cagle that the Operations Division had not completed required inspections of bridges and elevated structures associated with the Blue Line in 2021. Mr. Cagle reported this situation to the FTA and NCDOT SSO and instructed staff to immediately secure a bridge inspection contractor to complete the inspections.

#### Current Status:

Inspections started on March 20, 2023, with an estimated schedule of 90 days to complete inspections for the 37 elevated structures. The inspection contractor is providing weekly reports of their findings so that CATS can take appropriate action, if needed.

#### Next Steps:

CATS is sharing the weekly reports with NCDOT SSO and will publish the final inspection report when completed (note that the final inspection report is estimated to be completed in the next 6 months).

### Issue 4: Communication failures

City Council and the MTC did not learn of the issues noted above until the past two weeks.

#### Current Status:

The three most senior executives at CATS, those responsible for knowing and sharing what is going on within the organization, have left the employ of the City. Since taking office in December last year, CATS interim CEO Brent Cagle has been conducting extensive interviews with CATS staff to gain an understanding of the culture that led to poor performance at CATS and the lack of communication with elected officials and the public. It should be noted that these interviews and other steps Mr. Cagle has taken in the course of taking over at CATS are the reason the previously unreported issues have now come to light.

#### Next Steps:

Formalize notification and communication procedures, promote the existing City hotline, share interview summaries with Council and the public, implement Manager's strategy below.

### Issue 5: NCDOT conflicts

NCDOT correspondence criticizes CATS and reflects a conflict between the two organizations.

#### Current Status:

Controversial CATS managers have departed, CATS has stepped up engagement with NCDOT. CATS Corrective Action Plan was accepted by NCDOT SSO March 2, 2023.

#### Next Steps:

Disclose documents that are critical of CATS, engage with NCDOT to improve cooperation.

## Issue 6: CATS financial condition

Conducting the necessary maintenance and repairs to CATS trains as well as the urgent need to modernize the bus fleet will place large financial demands on CATS.

### Current Status:

No known issues, debt rating remains AA, with sufficient financial capacity for repairs and bus fleet renewal.

### Next Steps:

Verify financial condition and capacity.

The issues listed above and actions proposed to address them represent a near-term assessment of what will be needed to right the ship at CATS. As the Manager notes in his memo, the longer-term plan is to recruit new people, deploy more resources and implement new policies so that the system will be on a par with the best transportation utilities in the country in the future.

# 3/30/23 CITY MANAGER MEMO ON CATS ACTIONS

Mayor & Council,

I have committed to develop a path forward for CATS that includes oversight, and accountability, and specific actions to ensure that we identify, understand, and address the shortcomings that led to the current state of CATS. Some of these items have been discussed previously but I wanted to layout next steps in one document.

I am encouraged by the progress we have made over the past several months and I believe that CATS is on a better path forward. I am committed to identifying the issues that led us to this point, making the necessary changes to ensure that CATS becomes the nation's leading transit agency and working to restore the public's trust in our organization.

1. **I am requesting the Federal Transit Agency conduct an off-cycle review of CATS.**

Every three years, the FTA conducts a regular review of CATS – as it does with other transit agencies. The most recent FTA review took place in 2022 but in discussions with the team it was brought to my attention that the regional FTA Administrator suggested the FTA may conduct an off-cycle review.

I have asked Mr. Cagle to request the FTA begin this review with a particular focus on the May 2022 event and whether protocol was followed. Included in the focus will be CATS budgetary and maintenance processes. I am also requesting that the FTA expedite this review. The city and CATS will support the FTA, in any way we can, to ensure the review moves quickly.

2. **I am referring the oversight of a comprehensive review of CATS to the Transportation, Planning & Development Committee. I am recommending a council work group be established to take a deeper dive into CATS, and report back to the TP&D Committee and City Council.**

This review will build upon the Management Partners Review of CATS culture, leadership, budget, operations, maintenance, and governance. In addition, I am committed to regular updates at the Transportation, Planning & Development Committee. I will be heavily involved and visible with this review like my role several years ago as staff resource to the Safe Communities Committee during the development of the SAFE Charlotte plan. That was a very successful model and one that I believe we can recreate with similar positive results.

**3. Effective immediately I am suspending the CATS CEO search for at least 6 months.**

This will give interim Mr. Cagle and staff time to focus on identifying and addressing some of the “foundational” issues within CATS. As I anticipated when I appointed Mr. Cagle to the interim role, his experience and leadership have served CATS and the city well. I believe Mr. Cagle and his team has CATS on the right path and I want to focus our attention on staying on that path while creating assurances for staff that the leadership team will be in place for a while as this work continues.

I also want to ensure that when we do hire a permanent CEO, that person and the CATS organization are in the best possible position to succeed long term.

**4. I am working with city leadership to create resources for CATS immediately which includes additional personnel support.**

The leadership changes at the top of the CATS organization have provided an opportunity to reset CATS and as the city, we need to continue to provide CATS with the resources necessary to continue to make progress on identifying and addressing issues, including a focus on creating a better culture.

The city has a very strong operating track record including Charlotte Douglas International Airport, Charlotte Department of Transportation, Charlotte Water, Solid Waste Services, General Services, Charlotte Fire Department and Charlotte-Mecklenburg Police Department. That organizational expertise is being leveraged to help address CATS issues. For example, Chad Howell has stepped in from Charlotte Water as interim CATS CFO and is performing exceptionally well.

One of the critical identified roles for CATS is asset management. Our General Services Department has a deep team of experts in this area, and we will be fully dedicating staff from the General Services Department to CATS to assist in asset management. This will be temporary until CATS hires asset management personnel.

We will also pursue other leaders from outside the city to step into roles within CATS to close gaps, bring best practices and further reset the organizational culture as we work on long-term plans for the organization.

5. **I will be reviewing how the City Manager's Office is structured related to oversight of portfolios/departments to ensure that we have appropriate oversight, communication, and accountability.**

I have had conversations with my Assistant City Managers (ACMs) to understand how they worked with previous CATS leadership and how information was shared. What is clear is that there was regular communication with CATS leadership, but that information was not always readily shared and was not always accurate. It is also clear that CATS leadership felt at times that they were more accountable to the MTC than the city. I do believe part of that is due to a complicated governance structure; however, CATS governance is not the entire issue. I may need to make changes to the structure of the City Manager's Office to ensure we are operating to the best of our abilities.

**Mr. Cagle also shared two updates that I want to make sure you are aware of.**

1. Former COO Allen Smith submitted his retirement paperwork to the city this week. As you know Mr. Smith had been suspended without pay as the city followed its disciplinary review process. Prior to that process being completed, Mr. Smith submitted his retirement paperwork. His employment with the city will cease at the end of this month.
2. CATS will be working with the DiJulius Group to do internal and external work around culture, customer experience and leadership training. This work will be built by CATS staff and be customized for CATS. This work will directly address some of the issues identified in the Management Partners review. The DiJulius Group is the organization that worked with Charlotte-Mecklenburg Police Department to develop its nationally recognized CMPD Serves program.

I shared these updates during an embargoed media briefing earlier today with Councilman Ed Driggs and CATS Interim CEO Brent Cagle.

I also publicly corrected my previous statement related to when I was first informed about the May 2022 event. Again, it was not my intent to misinform anyone and the conversation I had with Mr. Cagle last month was the first time I recalled being informed of the incident – it was the first time I had any discussions with CATS leaders about the incident. It was an honest mistake, but I want to reiterate my apology to all of you, the MTC, the media and the public.

Marcus D. Jones  
City Manager





## Item 4: Scope of Work and MTC Questions

## CATS Operational Investigation/Review

### MTC Request for Third-party operational investigation

03/22/23 by the MTC vote as follows:

*an operational investigation to establish facts related to the train derailment, the failure to inspect bridges, the failure to order buses in a timely matter, and any other recent issues related to bus and rail operations, safety, security, and asset maintenance. The RFP is go out on an expedited basis and the consultant is to report back to the MTC on expedited basis.*

The following questions/request for information were noted during the meeting and other questions were added in a follow up request to MTC members.

- TSAC
  - Why haven't we been talking about these midlife overhauls every month at TSAC since 2020 when it was first talked about?
  - At whose direction did these slides start being included in the MTC agenda packet? And why did they start being included?
  - Who prepared these slides for the August agenda and subsequent agendas?
  - Why was there no presentation to explain what these slides include/don't include/any other information that might help MTC members better understand and interpret these slides, at the August meeting or any subsequent MTC meetings?
  - Was the May 2022 derailment counted as a "preventable safety incident" and/or a "system reliability incident" on p. 34 of the presentation?
  - The train car in the derailment had been in the maintenance yard, what's the criteria for allowing it to go back into revenue service and what steps were missed?
  - Was the train car to continue to go south towards I-485 and if so why was that call made?
  - Is there special training/meetings with our rail operators regarding this incident? If so, when?
  - What's the metrics on number of train cars that currently have reported issues including but not limited to: not driving right? Weird sounds?
- CTAG
  - Leadership downplaying this is a serious problem. Potentially a checks and balances system is needed?
- County Commissioner Leigh Altman
  - What did CATS doing in the following months to remediate the derailment issue in May of 2021? I would like clarity on what the remediation was, and I hope that it was not just the diagnostic heat strips.
  - I would like DOT oversight and safety person to come to MTC.
  - How quickly will it take CATS to figure out if our residents are in jeopardy to cross over these bridges?
  - There are 37 plus parking decks and you're telling me all of them have not been inspected? When was the last inspection?
  - When should they have been inspected? So, we are two years past?

- So, if I am understanding you, CATS took from May to December to diagnose that problem and no remediation happened?
- Were the trucks sent to Siemens for overhaul because of the derailment?
- Two trucks were at Siemens, but not because of the derailment? What I am hearing is that no remediation because of what caused this derailment happened from May to December, is that right?
- What I am hearing from you is that CATS took mitigating methods for prevention but none for the remediation?
- Were the two trucks sent to California because of the derailment?
- The framework for the scope of work as established on 03/22/23 by the MTC: *a third-party transit consultant to perform an operational investigation to establish facts related to the train derailment, the bridge impairment, the failure to order buses in a timely manner, and any other recent issues related to bus and rail operations, safety, security, and asset maintenance. The RFP is go out on an expedited basis and the consultant is to report back to the MTC on expedited basis.*
- The outside entity should interview the CATS technicians who have knowledge about these events, CATS executive staff who had roles in this, people in the City Manager's Office who oversee CATS, NC DOT who can shed light, Siemens about who said what and when, and pull the records and emails and documents to substantiate.
- New to add are facts leading up to staffing failures in rail controller operations as identified by NC DOT's 1/31/23 surprise visit.
- There are whistleblower emails that are coming in from current/former employees. Those need to be assessed for the new information they contain and followed up with appropriately by the third-party investigator.
- All bullet points under my name related to remediation can be deleted. Mr. Cagle stated on 3/22/23 that mitigation of risk has begun in the form of heat strips to identify when components of a train have become too hot to safely operate. However, he said repair of the actual problem has not yet begun because the trucks have not yet been sent to California for repair while he awaits the dollies needed to transport them.
- Mayor Bales - Huntersville
  - At what point did CATS notify NCDOT of the derailment?
  - This derailment happened May 21 and our MTC meeting was May 25 and we heard nothing, that is shocking to me.
  - Has the light rail car in the derailment been pulled? Is it still in operation?
  - Have you been able to get to the root cause as to why maintenance was continually deferred?
- Mayor Edwards
  - Who, why and where allowed this (derailment) to happen?
  - Why did no one come forward?
  - Emailed comment: Well stated Rusty , the past we can't change let's move with open minds to go forward and solve the challenges , the challenges are still being discovered . My view is concern for where the money had been used . I also have full confidence in

our current director and the direction he has taken . Good news or bad he can just make all aware and together we will find solid footing .

- Mayor Reid
  - What are the solutions to address the problems?
- Mayor Knox
  - Emailed comment: I am in listening mode currently. I think collectively we have a bank of important questions, many included with comments from others. I am putting my full confidence behind our interim CEO. This has become his inherited problem to resolve. Can we learn from past mistakes? Absolutely. Can we resolve the plethora of deficits and missteps? Yes. Can we insure the public that they are safe and should feel confident utilizing CATS product? I believe so. Can we restore trust amongst ourselves, the public, our constituents? That will be our job in the coming months.
- Mayor Higdon
  - Pardon my late entry into this conversation. I have been out of town on business over the last few weeks, however I have spoken to several of you regarding the derailment and later developments via phone. From what I have gathered and in the simplest of terms, it appears that scheduled maintenance wasn't conducted as recommended due to budgetary concerns, and this led to a bearing failure and the subsequent derailment. I think making sure a "what went wrong" analysis is conducted and ensuring corrective actions are put in place is fully within the purview and responsibilities of the MTC. I support a third-party investigation, be it the FTA or other organization. Like Mayor Knox, I am listening as responses come in to our many questions. The answers we receive will help inform our next steps. As others have also stated, I have full faith and confidence in our interim CEO, and believe under his leadership we can make sure this unfortunate occurrence doesn't happen again.



Additional Information:

1. May 21, 2022, Incident Report and Associated Investigation Materials
2. FTA 2022 Triennial Review
3. Requested Scope of Work for Transpro Survey

Item 1: May 21, 2022, Incident Report and Associated Investigation Materials



# Report



February 28, 2023

Mr. Tim Abbott  
Safety Enforcement and Oversight Manager  
SSO Program Manager  
Rail Division  
North Carolina Department of Transportation  
1553 Mail Service Center  
Raleigh, NC 27699-1566

Dear Mr. Abbott,

Please see the attached revised final report with comment sheet for incident number 22-0521-01.

Please feel free to contact me by email or by phone if you have any questions or need more information.

Regards,

David Moskowitz  
General Manager  
Office of Safety & Security  
Charlotte Area Transit System  
704-336-7661  
David.Moskowitz@charlottenc.gov

cc: Jahmal Pullen, NCDOT  
Donald Pike, NCDOT Contractor  
Jerrad Jones, NCDOT Contractor  
Deltrin Harris, CATS  
Chad Hagans, CATS



Office of Safety & Security  
3145 South Tryon Street  
Charlotte, North Carolina 28217  
Telephone: (704) 336-7661

# NCDOT-SSO COMMENT TRACKING SHEET

| <b>RTA: CATS</b>  |  | <b>Document: CATS Final Accident Report: 22-0521-01</b>   |   |
|---|--|---|---|
| <b>Report Reviewers:</b><br>T. Abbott, J. Pullen, and D. Pike |  | <b>Review Dates:</b><br>1/31/23 - 2/6/23  | <b>RTA Response Date:</b><br>2/28/23  |
| <b>Item #</b>   | <b>Report Section or PDF Page #</b>                                      | <b>NCDOT Requires final report revisions to Address the Following Issues and Concerns</b>   | <b>RTA Response (include revised report section/page #)</b>   |
| 1   | <b>Sequence of Events</b><br><b>Timeline:</b><br>06:46am<br>(pdf-page 3) | Was issue reported to ROCC and is documented in SPEAR?  | No, this was not reported to the ROCC and not documented in SPEAR as specified by Contributing Factor 3 on page 20. This was a conversation between outgoing operator and the incoming operator. The knowledge of this information was obtained from the employee interview.  |
| 2   | <b>Sequence of Events</b><br><b>Timeline:</b><br>10:59am<br>(pdf-page 3) | Was issue reported to ROCC and is documented in SPEAR?  | No, this was not reported at the time to the ROCC, as specified by Contributing Factor 3 on page 20.<br><br>This information was obtained from the vehicle download.<br><br>As this was not reported to the ROCC at the time, as specified by Contributing Factor 3 on page 20, this was not documented in SPEAR.   |
| 3   | <b>Sequence of Events</b><br><b>Timeline:</b><br>11:11am<br>(pdf-page 3) | Seen by whom? Is this during event or post-event video review by investigator(s)?   | Noted during post-incident review of video by investigators.<br><br>Revised in re-submission.   |
| 4   | <b>Sequence of Events</b><br><b>Timeline:</b><br>11:12am<br>(pdf-page 3) | Is this the <u>first</u> notification to the ROCC, regarding the operator's LRV propulsion concern?<br><br>Add explanation of ROCC procedures for response to LRV troubleshooting calls from operators. Is this a formalized procedure (i.e., ROCC Operating Manual)? | Yes, as specified in the timeline entry for 11:12hrs by "Train 5 operator contacts the ROCC and states he is having trouble moving the train." (page 12, sequence of events)<br><br>Rail Controllers utilize the S70 Quick Reference Troubleshooting guide which is a standalone document as well as an attachment to the CATS ROCC Procedures Manual. (see attached) |

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| 5 | <b>Sequence of Events</b><br><b>Timeline:</b><br><b>11:14am</b><br><b>(pdf-page 3)</b> | <p>Is this the proper response from ROCC (based on written procedures available in the ROCC)?</p>   | <p>The ROCC hadn't received a report of any fault codes from the operator to direct them specific troubleshooting methods. However, the report of "still shaking bad" and the inability to move the train should have prompted the controller to instruct the operator to stop the train and complete an inspection. (Refer to the attached safety blitz records)</p>  |
| 6 | <b>Sequence of Events</b><br><b>Timeline:</b><br><b>11:27am</b><br><b>(pdf-page 4)</b> | <p>RCM does not complete walk-around before attempting to move train. Is this due to RCM's perception that operator does not know what he/she is doing or is there another explanation?</p> <p>Is there a written procedure which requires RCM personnel to conduct a walk-around before trying to diagnose LRV trouble? If so, where is this procedure documented?<br/> Finding and re-instruction missing</p> | <p>No explanation for the failure other than RCM failed to do a ground walk-around as stated in the report.</p> <p>No, there is not a written procedure.</p> <p>CAP – RCM will be responsible for conducting a ground walk-around inspection when responding to scenes of trains with reported propulsion issues. All appropriate documents will be reviewed and revised.</p>  |
| 7 | <b>General Details</b><br><b>(pdf-page 4)</b>  | <p>Operator was speeding at 56mph in a 55mph zone.</p> <p>Report does not include speed graph.</p>  | <p>The Event Recorder download shows the train peaked around 56 mph which coincides with the timing of the train going downhill. The downloads indicate that the overspeed was not maintained for more than 2-3 seconds.</p> <p>Report will be revised to include the above information. (pg. 12 of revised report)</p> <p>A screen print of the Event Recorder Download will be attached to the revised final report.</p> |
| 8 | <b>Photo:</b><br><b>(pdf-page 8)</b>   | <p>Add report details for the following:</p> <p>Assessment and decision process which led to installing temperature strips.</p> <p>When were they installed?</p> <p>When was the monitoring procedure developed, formalized and implemented?</p>  | <p>Report revised. This update is on Page 21, Recommendations and Corrective Actions section.</p>  |

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|    |  | When the daily inspection form was revised in June 2022, did RCM provide employee training? Are there training rosters? Include copy of RCM personnel training on this new inspection procedure.   |   |
| 9  | <b>Notification (pdf-page 9)</b>   | NTSB reportable (if yes, date/time reported): Yes, 5/21/22 – <u>unable to retrieve notification email to determine exact time of call.</u><br><br>Has CATS developed a procedure to ensure that notification documents are preserved and available upon request? | CAP: S&S03 will be revised to show that the manager who notifies NTSB will be responsible for preserving the notification document by placing it into the incident folder on the CATS shared drive.   |
| 10 | <b>Interview Summary Findings (pdf-page 10)</b>                                      | Note here, that it was the <u>operator</u> who decided that the train should not be moved. This is a safety challenge-according to operator. Was ROCC going to just keep trying other means to correct propulsion problem?                                       | Based on radio. The Controller was attempting to troubleshoot using the limited information that was received from the Operator. The Controller is no longer employed by CATS; therefore, we cannot follow up with the Controller.  |
| 11 | <b>Root Cause Analysis, Probable Cause(s) and Contributing Factors (pdf-page 10)</b> | Root cause is poor maintenance which led to the wheel bearing failure (based on the Martin Analysis Report). CATS S&S staff needs additional training on root cause analysis.  | The available information provided by the consultants and RCM led to the conclusion that the root cause was the failure of the bearing that caused the wheel to stop proper movement, leading to the derailment.<br><br>The report submitted included raw data from vendor chosen by Siemens to perform the failure analysis. The final failure analysis report has not been received from Siemens.<br><br>Deferred maintenance possibly contributed to the failure of the bearing and is properly listed as a contributing factor.<br><br>Regarding NCDOT's comment about additional training, CATS S&S staff continue to identify and take training to strengthen their skills. A perfect example of this is several members of the CATS S&S staff was scheduled months ago to attend ASQ Root Cause Analysis |

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|    |   |   | training during the week of Feb 20, 2023.   |
| 12 | <b>Contributing Factors (pdf-page 11)</b> | <p>Revised report must clarify that LRV 201 was due for axle overhaul at 10 years, per OEM recommendations, and the vehicle has been operating for 12 years without overhaul being completed.</p> <p>Revised report must explain the efforts completed by CATS (RCM) and action dates to secure the funding needed to complete overhaul work. This would shed light on why the work has been delayed.<br/>Finding and CAPs missing</p>  | <p>Report was revised to include information related to the CATS I/II truck overhaul program. (Pg 20 contributing factors)</p> <p>CAP is being addressed through the NCDOT UHC Letter.</p>  |
| 13 | <b>Contributing Factors (pdf-page 11)</b> | <p>Report indicates the following, as a contributing factor, but nothing included in recommendations or re-instruction of RCM employees:</p> <p><i>“Failure of RCM personnel to perform a proper ground walk-around upon arrival on scene prior to entering the LRV and attempting to troubleshoot and move Train 5”.</i></p> <p>Did RCM violate any written procedure by not conducting a walk-around upon arrival at train location?</p>  | No, written policy. Refer to CAP identified in item #6.   |
| 14 | <b>Contributing Factors (pdf-page 11)</b> | <p>Revise report and add explanation for ROCC being under-staffed. NCDOT believed that 2 or 3 Rail Controllers are assigned to work each daily shift.</p> <p><i>“Between approximately 1106hrs and 1159hrs there was a single rail controller in the ROCC responsible for Blue and Gold Line operations, yard operations, and answering phone calls. The limited staffing in the ROCC.....”</i></p> <p>Absolutely ZERO recommended follow-up actions or corrective action plans for this and now, a very seasoned Rail Controller is no longer with the agency.</p> | <p>Report will be revised with information that was previously submitted to NCDOT stating Rail Controller staffing challenges resulted in instances as in this case where controllers were manning the ROCC alone.</p> <p>Currently, there are 3 Chief Rail Controllers and 5 Rail Controllers bring the total to 8 controllers. All Chief Controllers are operating in the capacity of rail controller at this time. Rail Management worked with HR to fill the 7 open rail controller positions; 3 are currently in training and 4 will start in April. The current</p> |

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|    |   |  | staffing level allows for 2 controllers to be on each shift.   |
| 15 | <b>Conclusion:</b><br>(pdf-page 11)     | <p>CATS must consider that its “conclusion” is actually the “Root Cause” for this event.</p> <p><i>“The Office of Safety &amp; Security finds that this incident was preventable. <u>The specific failure of the wheel bearing assemblies directly caused the wheel to seize which resulted in a buildup of slag which led to wheel climb that ultimately caused the derailment. This could have likely been prevented had the involved wheelset undergone its overhaul</u>”.</i></p>  | CATS was surmising its root cause in the conclusion of the report. The operator CAP was related the individual needing to properly report train conditions to the ROCC.                                      |
| 16 | <b>Conclusion:</b><br>(pdf-pages 12/13) | <p>NCDOT disagrees with the following report statements, as its clear how the ROCC would have responded at 6:46am (“Aux off/on and try to move train”).</p> <p><i>“Had the train been reported faulty by the initial operator and removed from service, the derailment could also have been prevented as the train would have returned to the yard before the wheel fully seized causing the buildup of slag that resulted in the wheel climb and the derailment”.</i></p> <p><i>“Had the relief operator reported the issues he was experiencing with propulsion prior to completing the initial northbound and subsequent southbound trips, the train could have been removed from service and returned to the yard prior to the wheel bearing assembly fully failing, which caused the wheel to seize, which caused the slag to build up, leading to wheel climb and ultimately derailing the train”.</i></p> | Review of the audio clearly demonstrates that the Operator never told the ROCC what faults appeared on the train. The Controller responded with the minimal information that was received from the Operator. |
| 17 | <b>Conclusion:</b><br>(pdf-pages 12/13) | Two (2) contributing factors listed as 1 and ZERO recommendations or corrective actions listed in report.  | CATS concurs and will separate the (2) items. (pg 21, Conclusion)  |

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|    |  | <p><i>“Additional damage to infrastructure could have been prevented had the ROCC not insisted that the operator attempt to move the train after the operator indicated he did not feel safe doing so. Additional damage to the infrastructure could also have been prevented had the responding RCM personnel conducted a full ground walk-around of the train prior to entering the train and initiating troubleshooting steps that included attempting to move the train”.</i></p>   | <p>CATS identified that RCM should have conducted a walk-around inspection, and our written policy needs to be reviewed and updated. Please see CAP discussed in items #6 and #13.</p> |
| 18 | <p><b>Recommendations and Corrective Action:</b><br/>(pdf-pages 12/13)</p> | <p>CATS must explain what actions will be taken (besides temperature strips) to reduce safety risk. Operating these trains, for the next two years, without overhauls is not acceptable.</p> <p><i>“The CATS I &amp; II 600K overhaul is currently in progress which will include a complete overhaul of all trucks for the CATS I &amp; II fleets. This project is projected to be complete in 2026”.</i></p> <p>CATS must develop a plan to accelerate the completion date (i.e., 8-week turn-around, for overhauls, is not aggressive enough and vendor should be able to improve upon this plan). Request an explanation for CATS not implementing red-tag program and remove the affected cars from service until overhauls are completed.</p> | <p>Please refer to CATS’ response to the UHC letter issued by NCDOT.</p>   |
| 19 | <p><b>Recommendations and Corrective Action:</b><br/>(pdf-pages 12/13)</p> | <p>Same comment as above. The temperature strips are reactive and does not reduce the probability of catastrophic bearing failure to an acceptable level (on its own)</p> <p><i>“RCM has installed temperature strips on center truck axles across the entire fleet. These strips are used to indicate any temperature rise on the center truck axle which is an indication of potential bearing failure. Center truck</i></p>  | <p>Please refer to CATS’ response to the UHC letter issued by NCDOT.</p>   |



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|    |   | visual inspections have also been incorporated into the fleet's daily inspections to monitor the temperature strips for potential failures. <u>This practice has allowed RCM to identify and replace other axles in the current fleet, prior to them reaching a point of failure</u> ". |   |
| 20 | <b>Overall Property Damage Repair and/or Resume Revenue Service Estimate: (pdf-page 13)</b> | CATS must revise report to indicate a reasonably accurate damage estimate:<br><br>"The estimated damage is in excess of \$130,00".  | CATS report will be updated to give an increased damage estimate.<br><br>Pgs. 13 & 23, estimated damages  |
| 21 | <b>Report Attachment: Lessons Learned- Post Accident Review Committee</b>                   | This is the first time reviewing this type of report. How is this reporting triggered?<br><br>Request copy of all Post-Accident Review Committee meeting minutes and charter.<br><br>Where is this report referenced as part of CATS' operating /event follow-up procedures? S&S03?     | Per CATS S&S03 Section 8.8.12, Post-Accident Review Committee for Major and Critical accidents can be called by the Manager of Safety to share information concerning remedial measures.<br><br>For this particular accident, the Training & Instruction department was able to assist by drafting the CATS Lessons Learned document that was included in this report submission.<br><br>There is no formal report required to be generated following the gatherings of this committee. These are used as data gathering/sharing sessions to discuss details involving the major accident. Information and data discussed is including in final report that is submitted to NCDOT. As we continue to grow our skillsets, this information will be part of our overall RCA process such that teams when needed will gather all relevant and available data about the incident such that we can methodically determine possible causal factors and identify root cause. |
| 22 | <b>Report Attachment: Lessons Learned- Post Accident Review Committee</b>                   | The chart includes columns to indicate "future processes" and "Action Items". Most of the action items are not included in the final report, under the section for  | The revised report will reflect items identified in the lessons learned document that address only this incident.<br><br>(pg 23, Findings/Recommendations)  |

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|    | <u>Chart</u>                                      | <p>“<u>recommendations and corrective actions</u>”. Why not?</p> <p>Note: Some are related to a parallel event (signal overrun during single tracking because of derailment). Why included in this report? Should be separate.</p>  |   |
| 23 | <b>Report Attachment: Martin Analysis Reports</b> | <p>Siemens Report dated 12/12/2022. When did CATS receive this report? Who made the decision to NOT send copy to NCDOT until January 2023?</p>  | <p>CATS received the first report summary from Martin Analysis on 12-16-2022. This is a draft report. Siemens engineers are still reviewing the information that was provided to NCDOT and will provide a final report. In an effort provide received information to NCDOT, these documents were submitted as a part of the incident report, which was submitted in January 2023.</p>   |
| 24 | <b>Report Attachment: Martin Analysis Reports</b> | <p>Final accident report does not address recommendations from the Martin Failure Analysis Report (i.e., housing seals and relubrication intervals, etc.). Why not?</p>   | <p>CATS is unable to perform these operations. These tasks are completed during the truck overhaul process at Siemens’ supplier facility. There is no remediation to lubricate sealed bearings.</p>   |
| 25 | <b>Report Attachment: Martin Analysis Reports</b> | <p>The photos which were included in the Martin Analysis’ report were taken on 11/2/22, but the axles were shipped to them on what date last summer?</p> <p>We need to understand the process here.</p> <ul style="list-style-type: none"> <li>- Date components shipped to contractor/</li> <li>- Date received by contractor?</li> <li>- Written agreement/contract for expectations of work completion and expected timeframes?</li> </ul> <p>As a reference note, NCDOT requested and RCM sent email to vendor-asking for status update-due to State asking questions, on 12/7/22. That is a month after photos were taken at the lab. The 2<sup>nd</sup> report, from Martin, is dated 12/16/22 and photos also taken 11/3/22.</p> | <p>The wheel axle set was sent to Siemens for evaluation and repair.</p> <p>Siemens communicates with their vendor Martin Analysis (contracted to perform the bearing evaluation). Upon completion of the assessment, Martin Labs submitted the evaluation results to Siemens.</p> <p>Siemens then performs an engineering analysis evaluation of results and sends it to CATS. This analysis is still being evaluated by Siemens engineers and we are still waiting on the final written report to be provided by Siemens.</p> <p>The center truck was sent 6-29-22 to Siemens. Siemens had to disassemble equipment to be sent for evaluation. That information is not available at this time but can be requested.</p> |

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|  |  |  | <p>Date shipped:</p> <ul style="list-style-type: none"><li>• 6-29-2022</li></ul> <p>Date axle bearing #1 report received</p> <ul style="list-style-type: none"><li>• 12-16-2022</li></ul> <p>Date axle bearing #2 report received</p> <ul style="list-style-type: none"><li>• 12-18-2022</li></ul> <p>The evaluation was performed by Martin labs, contracted by Siemens. RCM received the reports and submitted to S&amp;S upon receiving.</p> <p>We can only provide information on what was requested from Siemens. CATS' communications are directly with the repair vendor Siemens. Siemens communicates with their vendor Martin Analysis, and we receive report when sent by Siemens.</p> |
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Document Control Number (SPEAR): 172,073  
Incident #: 22-0521-01  
Incident: Train 5 Derailment South of Old Pineville Grade Crossing  
Event Type: Derailment  
Incident Hazard/Level Rating: 2C  
Date & Time of Incident: May 21, 2022, at 1110hrs  
Date & Time Initially Reported to SSO: May 21, 2022, at 1339hrs  
Date & Time Preliminary Report Submitted to SSO: May 24, 2022, at 0933hrs  
Lead Investigator: Matt Quales, Safety Coordinator - Rail  
Date REVISED Final Incident Report Submitted to SSO: February 28, 2023

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**Incident Summary Statement:**

On Saturday, May 21, 2022, at approximately 11:10hrs the leading axle of the center truck (C-truck) of LRV 201 derailed south of Old Pineville Grade Crossing and came to rest next to Traction Power Substation 7. At the time of the incident LRV 201 was operating out of the A-cab and serving as the lead car of Train 5 (LRVs 201/114) which was traveling northbound on Track 1. Measurements taken at the scene indicate that the train traveled a total of 1260ft from the point of derailment to the train's final point of rest (measured to the C-truck's resting point). A total of 490 railroad ties had damaged clips as a result of this derailment. LRV 114 sustained no damage during the derailment.

A total of twenty-four passengers were offloaded safely with one passenger requesting medical evaluation on-scene. No passengers were injured or transported from the scene. LRV 201 was re-railed and successfully removed from the alignment without incident.

Track repairs were completed and LRV 114 was moved southbound to Old Pineville Access Grade Crossing to be used as a test train. The test train successfully passed through the repaired section of track without incident and Track 1 was released back to revenue service.

The operator of Train 5 was transported for post-incident testing per CATS policy.

**Incident Narrative:**

**Fatalities (agency employees and civilians): 0**

**Injuries (agency employees and civilians): 0**

**Number of persons transported for medical treatment: 0**

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**Sequence of Events (leading up to, during, and following the incident occurring). Includes summary of audio/video review by investigation team (on-board and stationary recording devices):**

**06:46hrs** – Operator swap at New Bern. Outgoing operator reports to incoming operator that LRV 201 is having intermittent propulsion issues while departing stations.

**10:59hrs** – Train 5 departs I-485 Station. 7153 Hydraulic Suspension fault appears and immediately clears.

**11:11hrs** – As seen by LRV video during post-incident review, Train 5 crosses Old Pineville Access Grade Crossing. As Train 5 begins to enter a curve north of Old Pineville Access Grade Crossing, the C-truck is seen derailing due to noticeable kickout of the C-truck skirt. Train 5 begins to slow and comes to a point of initial rest.

**11:12hrs** – Train 5 operator contacts the ROCC and states he is having trouble moving the train. The ROCC asks for clarification and the operator states that the train is “shaking real bad”. The ROCC instructs Train 5 to proceed to Scaleybark Station and make sure to leave the doors open (once the train has arrived at Scaleybark to begin the troubleshooting process).

**11:14hrs** – The ROCC informs Train 5 that RCM will be meeting Train 5 at Scaleybark for further troubleshooting. Train 5 copies and states that the train is still shaking bad and that he cannot move the train. The ROCC instructs the operator to pull the master controller to a neutral position for a few seconds before moving it back forward again. The ROCC begins setting up a replacement train.

**11:15hrs** – Train 5 reports that he has followed all the ROCC’s instructions and that after traveling a short distance he does not feel like he can make it to Scaleybark and stops the train again. The ROCC instructs Train 5 to key down and aux off and to turn his portable radio on. RCM checks enroute to scene.

**11:18hrs** –The ROCC requests update from Train 5. Train 5 states that he is auxed off and currently waiting two minutes before auxing up.

**11:19hrs** – Train 5 auxed on and waiting for propulsion self-test to clear.

**11:20hrs** – Train 5 reports propulsion self-test cleared and that Train 5 attempted to move but is “wobbling back and forth on the tracks really bad.” The ROCC instructs Train 5 to hold position and wait for RCM.

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**11:21hrs** – The ROCC asks for confirmation that the 7153 fault is still present. Train 5 reports that the fault illuminated on the TOD and came out of LRV 117 (LRV 201's former designation was 117).

**11:23hrs** – RCM requests updated location for Train 5 and begins to respond south of Old Pineville Grade Crossing.

**11:27hrs** – RCM requests authorization to board Train 5.

**11:28hrs** – RCM attempts to move Train 5.

**11:30hrs** – RCM exits the train, conducts a walk around and then reports that Train 5 is derailed and requests the rerailed team for LRV 201 due to center truck derailment.

**Rail transit vehicle(s) involved (type, vehicle number, consist type):** Siemens S70 - CATS II LRV 201/ Siemens S70 - CATS I LRV 114 – 2-car consist

**Number of vehicles towed from scene or taken out of service:** 2 – LRVs 201/114 removed from service.

**Posted speed vs. actual speed of vehicles involved at the time incident occurred (speed estimated, verified, or unknown):** Posted Speed in that section of track is 55mph. The Event Recorder download shows the train peaked around 56 mph at the time of derailment which coincides with the timing of the train going downhill. The downloads indicate that the overspeed was not maintained for more than 2-3 seconds.

**Number of passengers onboard consist at time of incident:** 24

**Number of passengers in non-rail vehicles:** N/A

**Number of rail vehicles derailed:** 1

**Number of other vehicle(s) involved and type (car, truck, semi, etc.):** 0

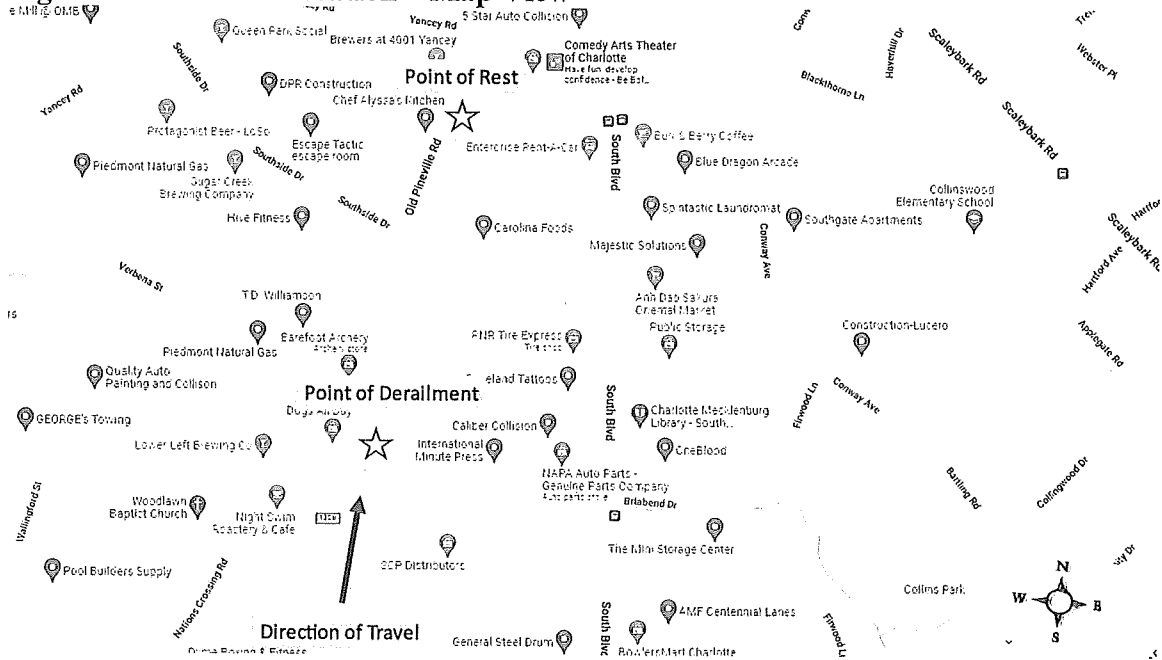
**Property damage estimate to revenue vehicles:** Estimated damage exceeds \$300,000 to center truck of LRV 201.

**Property damage estimate to track, signals, right-of-way, or other agency owned infrastructures:** \$26,950.00 to replace 490 railroad tie clips.

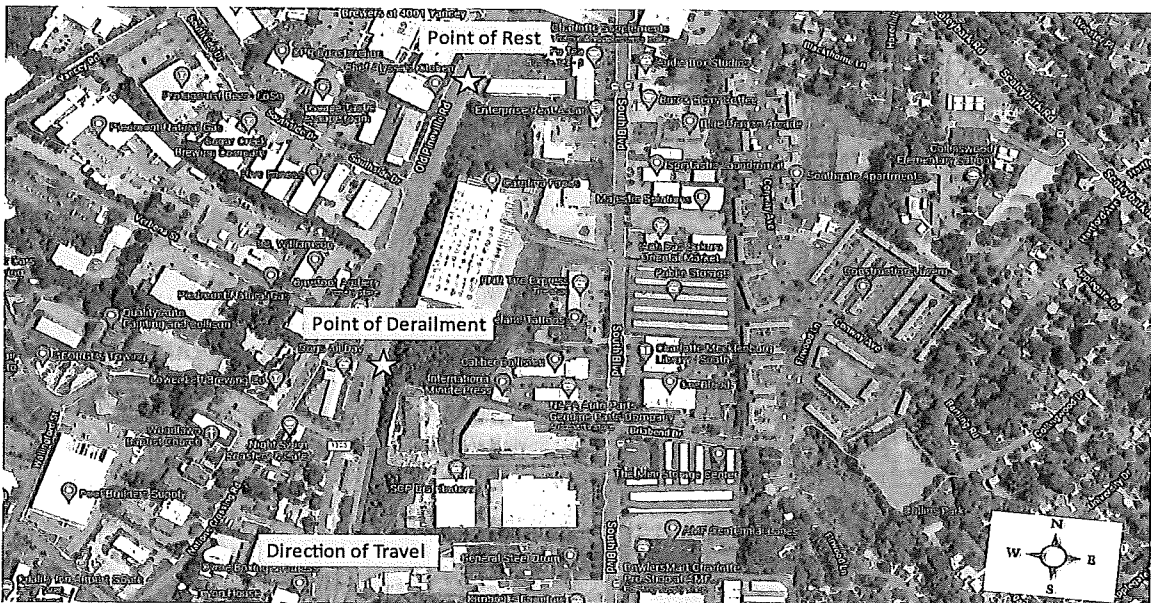
**Property damage estimate to other, non-agency, property:** N/A

Summary set of photographs, diagrams, and drawing related to the event (e.g., location, damage to rail and non-rail vehicles and property, etc.):

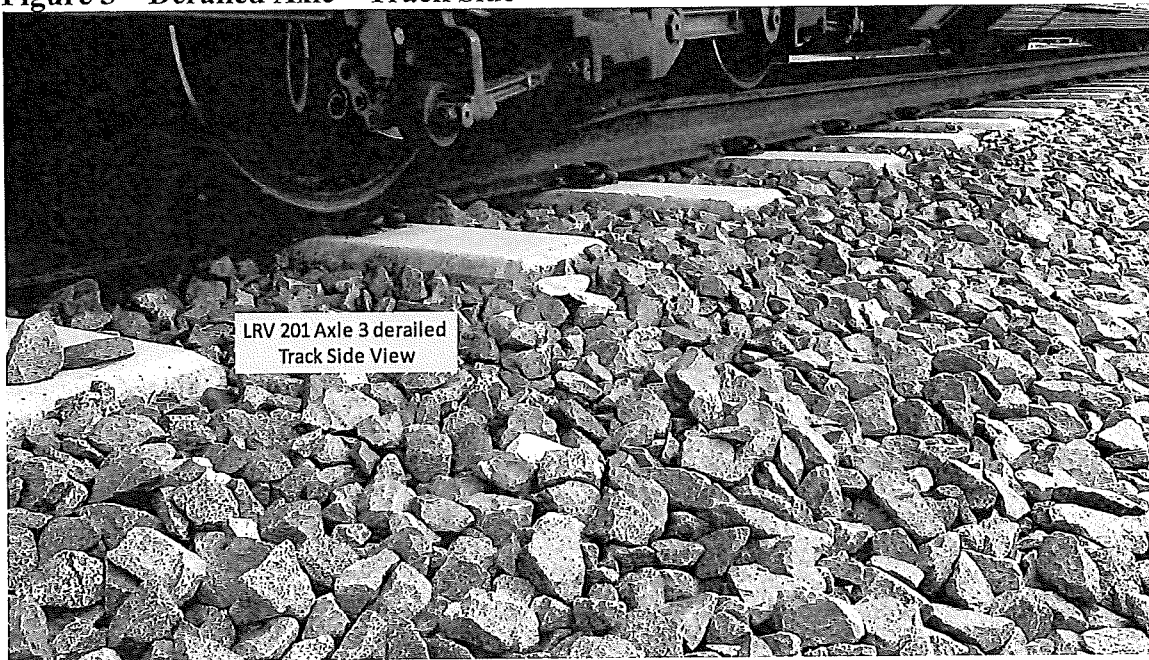
**Figure 1 – Incident Location – Map View**



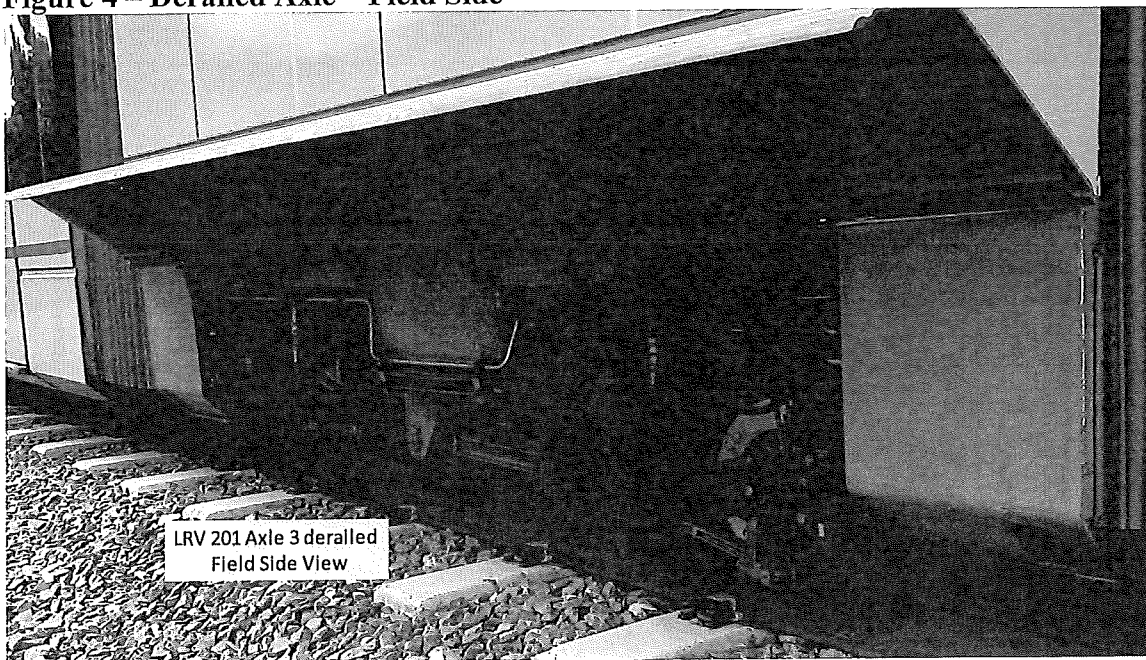
**Figure 2 – Incident Location – Satellite View**



**Figure 3 – Derailed Axle – Track Side**

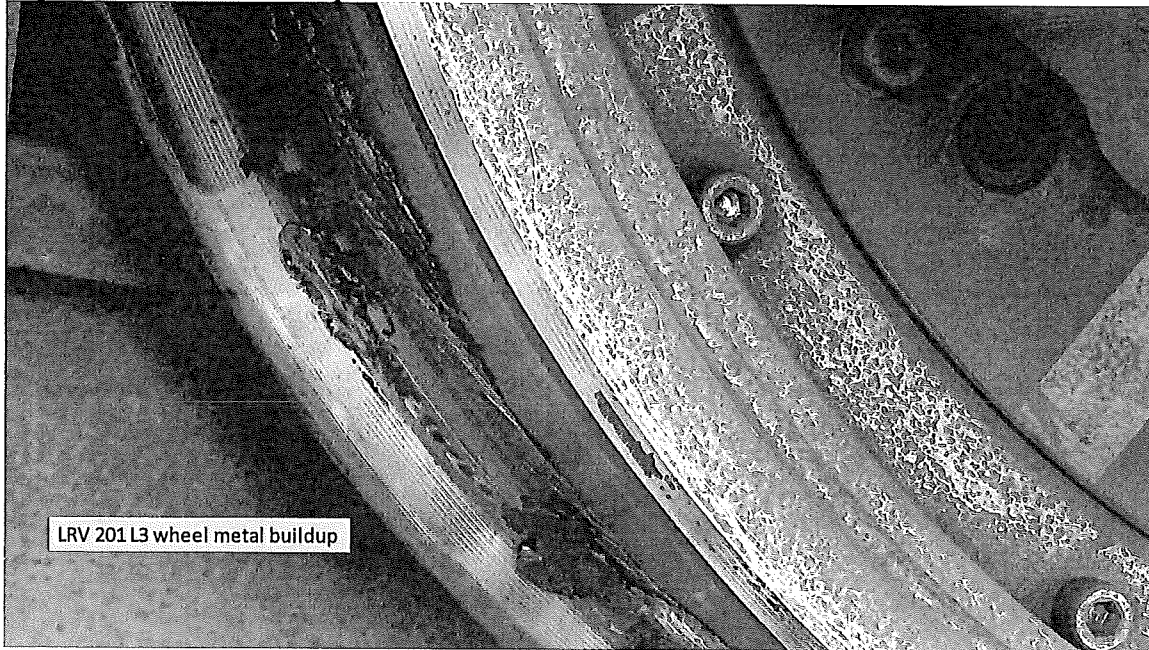


**Figure 4 – Derailed Axle – Field Side**





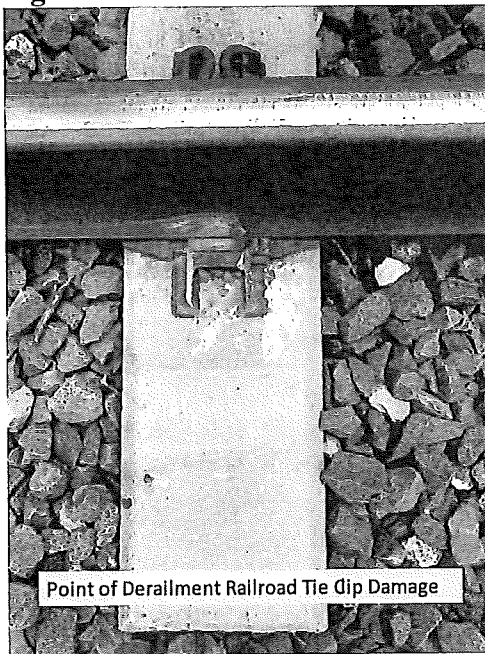
**Figure 5 – Metal Buildup on Derailed Wheel**



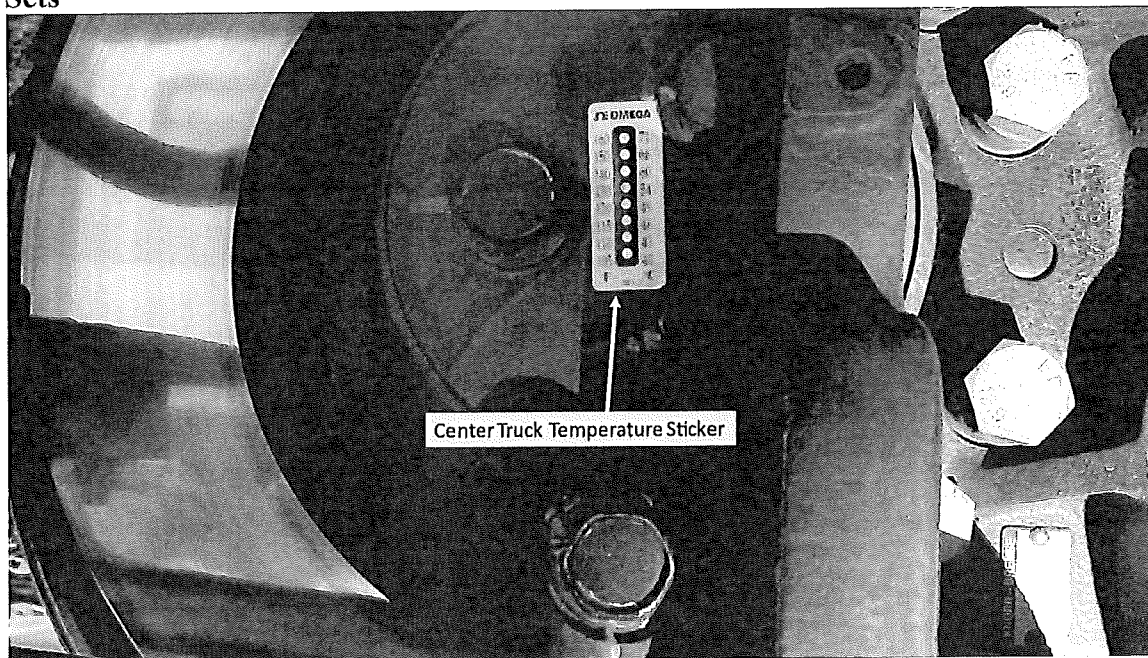
**Figure 6 – Metal Buildup on Derailed Wheel**



**Figure 7 – Point of Derailment – Tie Damage**



**Figure 8 – Example of Axle Temperature Sticker that has been applied to Wheel Sets**



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**Attachments that include all related reports (e.g., police, operator, witness statements, etc.):**

Rail Transportation Supervisors Report  
Operator Statement  
Employee Interview Summary  
Operator Reinstruction Records  
Event Recorder Download Summary  
Lessons Learned Document  
Safety Blitz Records (5 samples)  
Vendor Failure Analysis Reports  
S70 Quick Reference Troubleshooting Guide

**Drug and/or alcohol tests performed and for which employees (by job title and direct/indirect involvement in incident) and under who's authority was testing performed (meets FTA threshold or agency policy):** Operator of Train 5 was transported for post-incident policy in accordance with CATS Policy.

**NTD reportable (if yes, date/time reported, or monthly reporting scheduled):** Yes  
June 2, 2022 - #3675677

**NTSB reportable (if yes, date/time reported):** Yes, 5/21/22 – unable to retrieve notification email to determine exact time of call.

**FRA reportable (if yes, date/time reported):** No

**FTA reportable (if yes, date/time reported):** Yes, 5/21/22 at 1339hrs

**NCDOT reportable (if yes, date/time reported):** Yes, 5/21/22 at 1339hrs

**Lead Investigator:**

Matt Quales  
Safety Coordinator – Rail  
C: 980.579.7175  
E: matthew.quales@charlottenc.gov

**Citation(s) written by Law Enforcement or other authority (and to whom):** N/A

**Physical Characteristics of the Scene (including weather, outdoor ambient temperature, road and visibility conditions, etc.):** 82°F with partly cloudy skies, south southwesterly winds at 8mph and 10mi visibility.

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**Interview Summary Findings:** Operator of Train 5 stated in the post-incident interview that he relieved the incident train at New Bern station and that the previous operator of the incident train informed him that there was an issue with sluggish propulsion without associated faults.

The operator of the incident train stated he noticed intermittent propulsion issues when the train was departing stations from full stop with no associated faults. The operator completed a trip from New Bern to UNCC without any other obvious issues, then completed a trip southbound to I-485, still experiencing intermittent propulsion issues on station departure, but no other obvious issues.

On the trip back northbound the operator stated that a 7153 Hydraulic Suspension fault came across the Train Operator's Display (TOD) but immediately went away. This fault occurred prior to reaching Sharon Road West Station. The operator stated he noticed the fault return just after crossing Old Pineville Access Grade Crossing. It was at this time that the operator stated he felt the train begin to wobble and the wheels felt as though there were flat spots in them. The operator stated that he immediately brought the train to a stop and informed the ROCC of the issues he was having.

The operator stated that the ROCC instructed him to move the train to Scaleybark Station. The operator stated that he did not want to move the train and did not feel that attempting to move the train was safe. The operator stated that he was instructed by the ROCC to aux off and on, allow the train to reset, and then attempt to move the train towards Scaleybark. The operator complied with these instructions and then reported to the ROCC that the problem was persisting and that he did not feel as though he could safely operate the train to Scaleybark. The operator stated he was instructed to hold his position and wait for Rail Car Maintenance to arrive.

**Root Cause Analysis, Probable Cause(s) and Contributing Factors:**

The root cause of this incident was failure of a wheel bearing assembly in the center truck of LRV 201. A failure analysis was conducted on behalf of Siemens by Martin Failure Analysis which found that Bearing Assembly 1 contained a small amount of water that separated from the grease, indicating possible wheel seal abnormality (the wheel seal was not provided and examined).<sup>1</sup> The bearing track surfaces displayed spalling indicating a lack of proper lubrication and the presence of higher amounts of water present.<sup>2</sup>

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<sup>1</sup> Martin Failure Analysis – Page 1, Paragraph 2

<sup>2</sup> Martin Failure Analysis – Page 1, Paragraph 3

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The following contributing factors to the derailment and damage were identified:

- Deferred maintenance regarding the 600K overhaul of the CATS I and II vehicles which includes an overhaul of all truck sets. The Original Equipment Manufacturer (OEM) recommends that the Siemens trucks be overhauled at ten years and/or 600,000-mile intervals. LRV201 was placed into revenue service in July 2010. The failed axle had operated for twelve (12) years and had operated 569,567 miles. Rail Operations/RCM prepared and planned for the maintenance to occur per the OEM recommendations. The overdue OEM maintenance issues are a result of supply chain issues and staffing cause by COVID and decisions made at the procurement/finance level.
- Failure of the initial operator of Train 5 to properly report the perceived issue with propulsion to the ROCC during the relief at New Bern Station. The issue discussed between the operators could have been the failure of the L3 wheel to properly rotate.
- Failure of the relief operator to properly report the ongoing issues with propulsion (L3 wheel failure), and the appearance of the 7153 fault upon departing I-485 Station to the ROCC.
- Damage incurred to the track and LRV 201 by the ROCC instructing an operator that was describing the train as “shaking real bad” to continue on to the next station, even after the operator reported via radio that he did not feel that the train would reach the next station.
- Failure of RCM personnel to perform a proper ground walk-around upon arrival on scene prior to entering the LRV and attempting to troubleshoot and move Train 5.
- Between approximately 1106hrs and 1159hrs there was a single rail controller in the ROCC responsible for Blue and Gold Line operations, yard operations, and answering phone calls. The limited staffing in the ROCC meant that one controller was trying to manage a stranded (derailed) train, they were trying maintain safe operations of the remaining Blue and the Gold Lines in addition to the incident scene, the yards, and various phone calls until relief arrived.

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**Conclusion:**

The Office of Safety & Security finds that this incident was preventable. The specific failure of the wheel bearing assemblies directly caused the wheel to seize which resulted in a buildup of slag which led to wheel climb that ultimately caused the derailment. This could have likely been prevented had the involved wheelset undergone its overhaul.

Had the train been reported faulty by the initial operator and removed from service, the derailment could also have been prevented as the train would have returned to the yard before the wheel fully seized causing the buildup of slag that resulted in the wheel climb and the derailment.

Had the relief operator reported the issues he was experiencing with propulsion prior to completing the initial northbound and subsequent southbound trips, the train could have been removed from service and returned to the yard prior to the wheel bearing assembly fully failing, which caused the wheel to seize, which caused the slag to build up, leading to wheel climb and ultimately derailing the train.

Additional damage to infrastructure could have been prevented had the ROCC not insisted that the operator attempt to move the train after the operator indicated he did not feel safe doing so.

Additional damage to the infrastructure could also have been prevented had the responding RCM personnel conducted a full ground walk-around of the train prior to entering the train and initiating troubleshooting steps that included attempting to move the train.

**Recommendations and Corrective Actions:**

The following are corrective actions taken by Rail Operations post incident:

- The CATS I & II 600K overhaul is currently in progress which will include a complete overhaul of all trucks for the CATS I & II fleet. This project is projected to be complete in 2026.
- CATS initiated a temperature monitoring process where temperature strips were installed on center truck axles across the entire fleet in June 2022 (Pictured in Figure 8). These strips are used to indicate any temperature rise on the center truck axle which is an indication of potential bearing failure. If the temperature strips indicate a temperature of 130 degrees F, CATS will take that vehicle out of service to perform a thorough inspection on that truck. Center truck visual

inspections have also been incorporated into the fleet’s daily inspections to monitor the temperature strips for potential failures. This temperature monitoring practice was recommended to CATS by Siemens in response to a SKF power truck bearing failure that occurred in 2020. CATS adopted this practice for the center truck bearings following this derailment. This practice has allowed RCM to identify and replace other axles in our current fleet prior to them reaching a point of failure.

- A lessons learned meeting was conducted by the Post Accident Review Committee, which was comprised of Rail Operations, Rail Car Maintenance, Maintenance of Way, Quality Assurance and Safety and Security. Review of this incident resulted in a Lessons Learned document (see attached Lessons Learned document) that was distributed to all Rail Operations staff discussing the findings of the incident and areas for improvement.
  - A safety blitz was completed by Rail Operations management and supervisors who briefed operations staff on the findings of the incident and reviewed the lessons learned document. These briefings emphasized the importance of reporting faults and abnormalities with equipment as well as taking the time to stop and inspect any potential or unusual occurrences of equipment (see attached Sample Safety Blitz Records).
  - Rail Control staff was instructed on listening for “trigger words” from employees that may lead them to have trains stop for inspections instead of continuing to operate when there are potential issues with the equipment being operated (see attached Sample Safety Blitz Records).
- The rail controller that was involved with this incident is no longer employed with CATS.

| <b>Findings</b>   | <b>Recommendation</b>  | <b>Responsible Person</b> | <b>Target Date</b> |
|---|--|---------------------------|--------------------|
| The operator failed to report defective conditions of train prior to the derailment occurring | Re-instruct operator on Rail Rulebook Sections 4.13 Defective Operating and 4.2.2 Report Unusual Circumstances | Tina Hall                 | Completed 6/5/22   |



Office of Safety and Security



|  |  |                    |  |
|--|--|--------------------|--|
| <p>CAP ID# 22-0521-01-01:<br/>Rail Car Maintenance did not perform a ground walkaround inspection upon arriving to the incident scene.</p> | <p>Review and revise the RCM handbook to include language requiring RCM employee to conduct a ground walkaround inspection on LRVs under certain circumstances.</p>  | <p>Gary Lee</p>    | <p>4/30/23</p>                         |
| <p>CAP ID# 22-0521-01-02:<br/>S&amp;S was not able to find NTSB notification email.</p>  | <p>Update S&amp;S03 to include language stating that the manager who notifies NTSB will be responsible for preserving the notification document by placing it into the incident folder on the K drive.</p> | <p>Chad Hagans</p> | <p>4/30/23</p>                         |
| <p>ROCC did not acknowledge “trigger words” provided by the train operator that would help identify serious issues with the Train.</p>     | <p>Conduct safety blitz to instruct Rail Controllers on acknowledging “trigger words” and have them stop train movements for inspections by operators in these incidents</p>                               | <p>Tina Hall</p>   | <p>Completed August/September 2022</p> |
| <p>Outgoing Operator and relief operator did not report “sluggish” operation of train in the hours leading up to the derailment.</p>       | <p>Conduct safety blitz to instruct Operators to report abnormal conditions of trains as they occur to the ROCC.</p>   | <p>Tina Hall</p>   | <p>Completed August/September 2022</p> |





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**Overall Property Damage Repair and/or Resume Revenue Service Estimate:**

The estimated damage is in excess of \$330,000.

**Closing:**

For additional information or questions please contact either:

David Moskowitz  
General Manager of Safety and Security  
P: 704.336.7661  
E: david.moskowitz@charlottenc.gov

Chad Hagans  
Rail Safety Manager  
P: 704.432.5071  
E: chad.hagans@charlottenc.gov

Incident and Accident Report - Supervisors

Select type

|                                     |                                  |  |  |                                     |   |                                   |
|-------------------------------------|----------------------------------|--|--|-------------------------------------|---|-----------------------------------|
| Date and Time of Collision/Incident | 5/21/2022 11:38 AM               | Time Call was Received   | Enter Time                                 | Time Arrived on Scene               | 1143  |                                   |
| Operator/ Employee Name             | Unique Cohen                     | Employee ID  | 98385                                      | Supervisor #                        | 30  |                                   |
| Location                            | Old Pineville GC MP#-BLS 3.48-1  | Direction of Travel  | North                                      | Track                               | Track 1   |                                   |
| Drug and Alcohol Test Completed?    | Yes                              | Time of Drug/Alcohol Testing<br><i>(Must complete within two hours of Incident/Accident)</i> | 1330                                       | Weather                             | Sunny   |                                   |
| Type of Incident                    |                                  |  |  | Spear Incident Number               | 172,073   |                                   |
| Collision <input type="checkbox"/>  | Hazmat <input type="checkbox"/>  | Smoke/Fire <input type="checkbox"/>  | Employee Injury <input type="checkbox"/>   | Derailment <input type="checkbox"/> | Crossing Gate Damage <input type="checkbox"/>   | Robbery <input type="checkbox"/>  |
| Vandalism <input type="checkbox"/>  | Assault <input type="checkbox"/> | Projectile <input type="checkbox"/>  | Civil Disturbance <input type="checkbox"/> | Trespasser <input type="checkbox"/> | Sick/Injured Passenger <input type="checkbox"/> | Fatality <input type="checkbox"/> |
| Other:                              | Enter Text                       |  |  |                                     |   |                                   |

Summary:

On the date and time above Operator train 5 (114-201) R-157 Unique Cohen reported a 7153 code and his train was shaking badly to ROCC controller R-59 Terry Creech. R-59 then advised R-157 to aux off and aux back on to see if it would clear the fault. R-157 then reported to the ROCC that his train was still shaking badly and still unable to proceed safely. R-59 then contacted Rail Car Maintenance to report to the scene. RCM arrived on scene at 1127 and boarded LRV 201. At 1130 RCM lead R-340 Rolando Bermeo advised the ROCC that the C truck of LRV 201 has derailed and requested the derailment team. At 1130 R-340 left the scene to retrieve the rerailing equipment. Rail Operations Supervisor R-30 Doug Estep arrived on scene at 11:43 to find RCM and MOW track accessing the scene on and around MP#-BLS 3.48-1. At 1152 I began to unload passengers 11(201) and 13(114). When unloading LRV 114 at 1155 a pregnant passenger asked for medical attention because she felt her blood pressure was acting up. At 1201 Charlotte Fire Department Engine 43 arrived on scene to check on the passenger and cleared her in good health. At 1225 Safety and Security S-111 Matthew Quales arrived on scene and R-30 transferred Incident Command over to S-111. R-30 left the scene at around 1245 to transport operators to the DT facility. At 1336 Safety and Security S-114 Sylvester Fullmore arrived on scene. At 1358 Safety and Security S107 Chad Hagans released the incident scene to RCM and MOW for the re-railing process. Rail Operations Supervisor R22 Christian Pena arrived on scene at 1428. At 1931 S107 advised the ROCC that LRV 201 has been successfully re-railed and ready for a bump test. At 1942 S107 advised that LRV 201 had a locked axel and needed to be uncoupled. At 1942 R22 successfully uncoupled the 201 from the 114. At 1955 R22 performed a successful bump test on the 201 and operated the 201 back to the south yard and arrived on 4SA at 2120. At 2135 R22 boarded LRV 114 to perform a test run over the affected area. They had a successful test run and at 2142 S111 released track 1 back to revenue service. At 2150 all personnel and equipment clear of alignment.

Spear #-172,073

Timeline Of Events:

- 11:12 R157 reported 7153 fault, Train shaking bad
- 11:15 R157 advised Tr 5 could not move safely, unable to continue
- 11:20 Train 5 Auxed off/on, Advised train 5 still unable to proceed safely
- 11:27 R172 PO SYNYL New Train 5(304-317) NB in service at New Bern
- 11:27 RCM R344/340 on scene, Boarded LRV 201
- 11:30 RCM R340 advised the 201 C Truck derailed, Request Derail Team
- 11:31 R340 cleared scene to get derail equipment
- 11:38 Bus Bridge requested between Archdale and New Bern stations
- 11:41 R408 on scene
- 11:43 R30 on scene
- 11:46 R426 Pinned Gates Myers & Chapman; S. Blvd North
- 11:50 R408 reports track 1 damaged
- 11:51 R301,344,340 on scene

11:52 R30 offloaded passengers, 24 total  
 11:55 R30 advised 1 pregnant female passenger request MEDIC  
 12:01 CFD Engine 43 on scene  
 12:25 S111 on scene and R-30 transferred Incident command Rail ops 5  
 12:29 S100 on scene.  
 12:36 R30 advised unable to single track on track 2  
 12:45 R30 left the scene with R157 for DT  
 12:50 S111 Walking SB track 1 from incident site to south of Woodlawn  
 13:36 S114 Arrived on scene  
 13:58 S107 release incident train to RCM and MOW for re-railing process  
 13:59 S100 Clear the scene  
 14:28 R22 on scene Old Pineville  
 19:31 S107 advised LRV 201 successfully Re-railed, Ready for bump test  
 19:39 R312 Released C truck brake in LRV 201  
 19:42 S107 advised LRV 201 has a locked axle and needs to uncouple  
 19:48 R22 successfully uncoupled 201 from the 114  
 19:55 R22 performed a successful bump test  
 20:03 R22 relocated 201 NB track 1 from incident site into the yard tr. 4S  
 20:12 RCM R312 and all RCM personnel clear Old Pineville  
 20:15 R4/R8 advised repairs complete to track 1 and ready for a test train once the incident train is cleared.  
 21:20 LRV 201 clear mainline.  
 21:35 R22 moved 114 reverse, track 1 SB to Old Pineville Access. for test run  
 21:42 LRV 114 successful, S111 clear track 1 for revenue  
 21:50 All personnel/equipment clear  
 22:01 Gates unpinned at GC's, Train 17 Sweep track 2 SB

### LRV Information

|                      |     |                            |              |                                  |     |                 |     |
|----------------------|-----|----------------------------|--------------|----------------------------------|-----|-----------------|-----|
| Lead LRV             | N/A | N/A                        | Trailing LRV | N/A                              | N/A | Other Vehicle # | N/A |
| Point of Impact      | N/A |                            |              | Point of Impact                  | N/A |                 |     |
| Point of Rest        | N/A |                            |              | Point of Rest                    | N/A |                 |     |
| Number of Passengers | N/A | Number of Claimed Injuries | N/A          | Number of Passengers Transported | N/A |                 |     |

### Other Vehicle and Driver

|                                   |     |                            |     |                              |                |               |     |       |     |
|-----------------------------------|-----|----------------------------|-----|------------------------------|----------------|---------------|-----|-------|-----|
| Registered Owner's Name           | N/A |                            |     |                              | Street Address | N/A           |     |       |     |
| City                              | N/A | State                      | N/A | Zip                          | N/A            | Daytime       | N/A | Other | N/A |
| Vehicle Make                      | N/A | Vehicle Model              | N/A | License #                    | N/A            | Year          | N/A | State | N/A |
| Registration Exp Date             | N/A | Insurance Company          | N/A |                              |                | Policy Number | N/A |       |     |
| Number of Passengers              | N/A | Number of Claimed Injuries | N/A | Number of People Transported | N/A            |               |     |       |     |
| Description of Damage             | N/A |                            |     |                              |                |               |     |       |     |
| Other Driver's Statements/Remarks |     |                            |     |                              |                |               |     |       |     |

Enter Text

## RAIL OPERATIONS

**Authorized Personnel Involved**

|                                  |       |       |       |
|----------------------------------|-------|-------|-------|
| Police Officer's Names           | N/A   | N/A   | N/A   |
| Safety & Security Rep's Names    | S-100 | S-111 | S-114 |
| Rail Car Maintenance Rep's Names | R-301 | R-344 | R-340 |
| Rail System Names                | R-408 | R-426 | N/A   |
| Rail Transportation Names        | R-157 | R-22  | N/A   |
| Incident Commander Names         | R-30  | S-111 | N/A   |

**Other Information**

|                          |     |                             |     |
|--------------------------|-----|-----------------------------|-----|
| Official Police Report # | N/A | Reporting Officer's Phone # | N/A |
|--------------------------|-----|-----------------------------|-----|

**Witnesses**

| Name | Address | Home Phone | Cell Phone |
|------|---------|------------|------------|
| N/A  | N/A     | N/A        | N/A        |
| N/A  | N/A     | N/A        | N/A        |
| N/A  | N/A     | N/A        | N/A        |

**Required Attachments (Check Documents that were attached)**

- Passenger Status Cards (number of cards attached: 1)
- Track Inspection Report (New report required for major incidents/accidents and derailments)
- Drug Testing Determination Form
- Police Report (If Available)
- Employee Written Statement
- Diagram of Scene/Additional Photos

**Photographs of Scene and of vehicles involved:**

|  |                    |             |
|--|--------------------|-------------|
| <b>Investigating Supervisor's Name</b> | <b>Signature</b>   | <b>Date</b> |
| Doug Estep                             | Douglas W Estep Jr | 5/23/2022   |



# EMPLOYEE ACCIDENT REPORT

The employee should use area below to describe, in detail, the circumstances leading up to, during and after the Accident/Incident/Injury or Liability situation. Record everything you can remember while it is fresh in your mind. Remember, the more you can tell us now, the less we will have to ask later.

As I was traveling northbound pass old pineville Access grade crossing I notice a fault 7153 Hydraulic Suspension illuminated on the TOD. It did go away and then I notice the train stalling hesitant. I slowed the train down still having propulsion when the train suddenly started wobbling from side to side like the wheels have flats. I immediately stop the train and contact the ROCC. For the safety of the passengers as well as myself I did not try to further move the ~~train~~ train. I did not feel safe. The ROCC then advise me to hold my location until RAILCAR maintenance arrived.

All of the information submitted is true, accurate and complete as it relates to the Accident/Incident/

Injury or liability situation on (Date) 5-21-22 at or near (location) Near/old Pineville Rd - G/C  
NORTHBOUND toward Sealeybark Sta.

Name and Employee #: Unique Cohen / 98385

Route: Train # 5 / Run 5071 Time: 11:12a Bus #: —

I understand any false or misleading statements; misrepresentations or concealment of a material fact; and fabricating, altering, concealing or destroying a document will be considered fraudulent and will be dealt with in a disciplinary manner up to and including discharge.

Employee Signature: Unique Cohen Date: 5/21/22

## Safety & Security Recorded Interview

SPEAR Incident: 172, 073  
Incident Type: Mainline Derailment  
Interviewee: Unique Cohen  
Interviewer(s): Matt Quales  
Matt Berti  
Rail Transportation Supervisor Collin Hullet  
Rail Transportation Manager Marie Darby

This is Matt Quales and I am interviewing Unique Cohen regarding the derailment of Train 5 that occurred on May 21, 2022.

Today's date is Saturday, May 21, 2022, and the current time is 1637hrs

Do I have your permission to record this conversation? **YES**

Please state your first and last name and your radio number: **Unique Cohen R-157**

How long have you been employed with CATS? **3 years**

What is your current job title? **Rail Operator**

Please describe your job duties: **Responsible for pretripping the train if taking out of the yard, making sure there is no defect and if there is to report to ROCC. Also, the safety of myself and passengers in operating the train by operational procedures.**

How long have you been in that position? **2.5 years**

Have you held any other positions with CATS? **Yes – Bus operator, BOD**

How many hours do you normally work per week? **Roughly about 40-43**

Do you work anywhere besides CATS? **No**

When was your last day off? (If more than one job, make sure it was last day off from both):  
**Friday**

What is your normal shift length? **Between 8.5-9hr/dy**

What is your max duty time allowable? **8, I'm not sure.**

How many shifts have you worked since your last day off? **5 prior to day off Friday**

Do you feel you've gotten adequate rest between shifts and on your days off? **Yes**

Has there been anything going on outside of work that you think may have impacted your ability to get rest between shifts or on your off days? **No.**

What time did you clock in today? **0615**

Please walk me through what happened from the start of your shift until the incident occurred: **I clocked in I was a relief train at New Bern. From New Bern going northbound, the operator I relieved informed me that it might be an issue with the train, that the train when it pulls off it seems to hesitate. I asked if there were any faults. He said no, but that there might be a slow propulsion when taking off. I did notice it that it was kinda hesitant giving it propulsion. There were no faults. Got to UNCC with no issues. I switched ends and came back on the other end there were no issues. I traveled along SB going to 485 and didn't experience any issues.**

Was the hesitant propulsion an issue at each station? **No. When I got to 485, I pulled off going back northbound and I noticed that there was a 7153 hydraulic suspension fault on the TOD.**

When did that occur? **That occurred going back towards northbound.**

So it happened before SRW? **Yes. Then it went away. The train was operating just fine. And then that's when I was traveling through OPAGC as I crossed the GC it illuminated.**

And what did you do? **I slowed down. Then also there was another fault that pulled up. A sand/sanding fault. That went away. So I was coming towards OPGC the train started wobbling, it felt like there were flats on the wheels. It just started wobbling a little bit. I stopped the train and contacted the ROCC. I explained to the ROCC what was going on, what I had experienced and what faults I had seen. At the time there was no fault present. As I tried to give the train propulsion it did allow me to move the train it started wobbling. I stopped. I told the ROCC what was going on, they had wanted me to continue to SCB to do troubleshooting. I explained to the ROCC that I did not want to move the train, that I did not feel it was safe. I was told to Aux off and on, I did that, and to turn my radio on and follow instructions and wait two minutes and key back up. I was told that would maybe clear up what was going on. He asked me to give it propulsion and see what happens. I gave it propulsion and it still did the same thing. He asked if I could get it to SCB, I said no, I had to stop it immediately it was not safe to operate. I was then told to hold my location and stay put and make announcements.**

Had you tried to radio the ROCC regarding the faults prior to departing Woodlawn? **No.**

Why did you not radio the ROCC when you received it at 485? **Because it went away and the train was operating just fine.**

Normally what I do when I have that fault in the past, I keep my doors open at the platform, if it happens before I get to a station, I leave the doors open on the platform side to let the train level out.

**Departing Woodlawn felt that same hesitancy in propulsion.**

**Nothing through Old Pineville Access Grade Crossing**

**As you were approaching the curve after Old Pineville Access Grade Crossing didn't feel anything out of the ordinary. I was doing the speed allowed. When I noticed, it had started to hesitate again I stopped the train.**

**Normal braking procedure, not Emergency Braking.**

**Didn't travel even 10ft for all the times I was asked to give it propulsion. The train was wobbling so bad I didn't want to cause anything major.**

**Never instructed to do a ground walkaround.**

**Rail Car Maintenance was first on scene.**

**When they came on the scene they pulled up and couldn't see anything just glancing. When they did a ground walk around, the female, I don't know her name. When she went to the field side, she noticed that it might have been derailed.**

Marie – Not aware the previous operator called it in? **Correct**

Marie - The 7153 fault, this is a typical fault that pops up if the train isn't level? **Correct**

Marie - When you notified ROCC train was wobbling, were you instructed, was it at least 3 times to move the train? **Correct**

Marie - Troubleshooting was key down, key up? **Correct, then I was to let it fully key up and give it propulsion to see if that fixed the problem. I noticed immediately wobble and stopped it. It wouldn't make it to Scaleybark and was told to hold my location.**

Marie - Who was the controller? **Terry**

Marie - Lead car or trailing? **Lead car**

Collin – When you were crossing Old Pineville Access Grade Crossing you drop to 45, when you go past there you go up to 55, were you going 55? **No less 55mph.**

Collin - Did you see anything on the tracks? **No**

Marie – When you say it was sluggish, how long was it taking the train to pick up? **Almost immediately, it was a slow propulsion but almost immediately went back to normal operations.**



Matt - Is there anything you feel could be done or put in place to prevent a similar incident from occurring again in the future? **Yes – any time I see a fault on the TOD to make the ROCC aware. Not assume that if it's not on the pre-trip ticket to just not assume that the train is in good condition.**

Thank you for your time, this concludes today's interview. This is Matt Quales, today's date is May 21, 2022, and the current time is 1701hrs.



CHARLOTTE AREA TRANSIT SYSTEM  
RAIL OPERATIONS



To: Training & Instruction Division Manager – Tina Hall  
From: Training Specialist- Tiffany Jerry *Tiffany Jerry*  
Date: June 5, 2022  
Re: Completion of Post Incident Re-Instruction Training

The following personnel has completed Post Incident Re-Instruction training on the rules and/or modules listed below.

- Rule 1.2 Unsafe Conditions
- Rule 3.1.12 Train Operator Display
- Rule 3.1.14 Defensive Operating
- 4.13 Defective Train
- 4.2.2 Report Unusual Circumstances
  - 1.1 Customer, Employee, Equipment Safety
  - 4.5.1 Safety of Passengers
  - 6.1.1 Notification

| NAME         | EMPLOYEE I.D. # | TRAINING DATE |
|--------------|-----------------|---------------|
| Unique Cohen | 98385           | 06/05/2022    |

Cc: Marie Darby – Operations Manager  
Essence Douglas – Chief Rail Controller  
CATS HR  
File



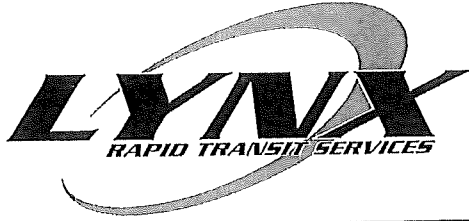
CHARLOTTE AREA TRANSIT SYSTEM  
RAIL OPERATIONS



Post Incident Reinstruction

Training Specialist – Tiffany Jerry  
Date: June 5, 2022

|   | NAME         | EMPLOYEE I.D. | SIGNATURE    | DATE   |
|---|--------------|---------------|--------------|--------|
| 1 | Unique Cohen | 98385         | Unique Cohen | 6-5-22 |

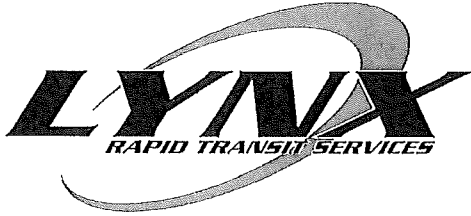


# Post Incident Re-Instruction

| Rulebook                           | Initials | Rulebook | Initials |
|------------------------------------|----------|----------|----------|
| 1.2 Unsafe Conditions              | UC       |          |          |
| 3.1.12 Train Operator Display      | UC       |          |          |
| 3.1.14 Defensive Operating         | UC       |          |          |
| 4.13 Defective Train               | UC       |          |          |
| 4.2.2 Report Unusual Circumstances | UC       |          |          |
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| Additional Subjects                          | Initials | Handouts                        | Initials |
|--|----------|---------------------------------|----------|
| 1.1 Customer, Employee, and Equipment Safety | UC       | PowerPoint Blue Line Derailment | UC       |
| 4.2.1 Safety of passengers                   | UC       |                                 |          |
| 6.1.1 Notification                           | UC       |                                 |          |

Print Name: Unique Cohen Date: 6-5-22  
Employee Signature: [Signature] Badge Number: 98385  
Instructor: Tiffany Jerry



# Reflection Questions

|                                  |                            |
|----------------------------------|----------------------------|
| <b>Name:</b> Unique Cohen        | <b>Date:</b> 6-5-22        |
| <b>Signature:</b> Unique Cohen   | <b>Badge Number:</b> 98385 |
| <b>Instructor:</b> Tiffany Jerry |                            |

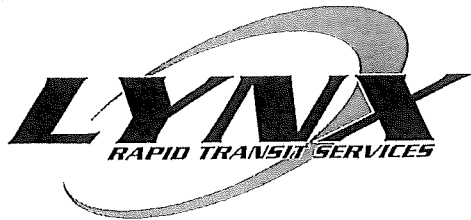
Write the answers in the space provided below.

**Description of the Incident/Event:** (Enter a brief description of what happened, to include location, the original cause, and how the incident escalated.)

Train #5 LRV (201-114) derailed on track #1 between Old Pineville Access grade crossing & Pineville G/C. I operator Unique Cohen was operating when experience wobbling/shaking of train. The TOD displayed a 7153 Hydraulic Suspension fault which I reported at time of incident. Incident escalated by me as operator not using a Safety Time Out, identifying full description of incident doing a full ground walk around to avoid further damage to train. Notifying the ROCC of fault 7153 when it first appeared on TOD.

**Key Response. Actions Taken:** (Describe your actions/activities before and immediately after the incident/event.)

I as operator contacted the ROCC of incident after I stopped the train for unsafe conditions. Immediately after incident Railcar was notified by the ROCC. I was further advised by the ROCC to stand by for further instructions.



# Reflection Questions

**Impacts caused by the Incident/Event:** (Describe the types of impacts and /or disruptions caused by the incident/event.)

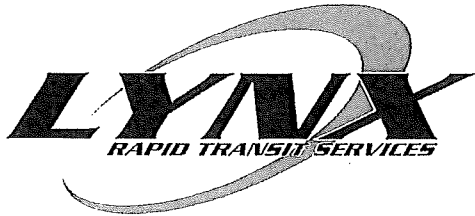
There was a delay in service, caused by incident. Railcar did ~~it~~, and safety did track inspection of incident.

**Lessons Learned:** (Describe lessons learned during the incident/event and during post-incident training.)

I have learn to report any fault displayed on TOD regardless how minor it may be, and await for further instructions from the ROCC. And how important using a Safety time out is in regards to this incident. How to manage defensive operating techniques to avoid incidents of this type.

**Lessons Learned:** (What is the importance of a safety time-out? When should an Operator request a safety timeout?)

I learned how to effectively use a safety time-out and when to use it.



# Reflection Questions

**Lessons Learned:** (List the words learned from your post-incident training that could have been used to express your concerns to the Control Center that the vehicle should not be moved?)

- Safety time-out
- Unsafe Conditions
- Defensive Operating
- Unusual Circumstances
- Defective Train
- Reporting what's displayed on TOD

**Corrective Actions:** (Explain what corrective actions you plan to take to improve your operating skills and knowledge of CATS Light Rail rules and operating procedures to ensure the incident will not reoccur.)

I have learned as an operator how to identify unusual unsafe conditions & circumstances to the ROCC immediately. Report any fault regardless how minor it may seem to be to the ROCC immediately. How to continue to operate safely using defensive operating techniques.



# CHARLOTTE AREA TRANSIT SYSTEM RAIL OPERATIONS


**Rail Operator Ride Check Form**

Operator Name: Unique Cohen Radio #: R157  
 Date: June 5, 2022 Start Time: 13:00 End Time: 13:35  
 Start Location: Linnier loop End Location: Syl  
 Alignment (check one):  Blue Line  Gold Line

**Purpose of this ride check:**

- Periodic efficiency ride-along
- Re-training following infraction
- Recertification
- Return to work following extended absence
- Other (explain) \_\_\_\_\_

Rate each observed behavior on a scale of 1 to 5, with 5 being excellent and 1 being unacceptable, needs retraining. Any re-training needs must be presented to operations manager and/or instructor supervisor.

- 5 Possesses all required items (Operating Orders, radio, Rule Book, etc.)
- 5 Wearing proper uniform (including shoes) and uniform is clean and neat
- 5 In possession of accurate watch which indicates seconds
- 5 Cell phone and unauthorized electronic equipment OFF and out of sight
- 5 Knows the rule of the day Normal operations
- 5 Uses proper radio protocol; reports all appropriate situations that could affect operations
- 5 Performs pre-trip inspection (*note if verbal/physical assistance needed*)
- 5 Always checks both sides of train via cameras prior to closing doors and departing station
- N Coupling
  - \_\_\_\_\_ checked couples
  - \_\_\_\_\_ operates at appropriate speed when coupling
  - \_\_\_\_\_ makes announcements
  - \_\_\_\_\_ works horn or bell prior to moving
  - A brake and rolling free test performed
- 5 Operates switches when leaving yard (*document performance*)
- 5 Request authorization to leave yard
- N/A Operates on time according to schedule DDS
- 5 Smooth station stops and accelerations





# CHARLOTTE AREA TRANSIT SYSTEM RAIL OPERATIONS



## Rail Operator Ride Check Form

- 5 ADA station announcements made if necessary
- N/A Makes proper Streetcar Station/ADA announcements
- 5 Documents and repeats back location of alerts *NO Alerts, Reported fault codes 7073/7078*
- N ROD425 *Switching Streetcar Operating Cabs* compliance
- N Performs proper interior train/streetcar inspections at terminal stations
- A Performs proper interior train inspections at terminal stations
- 5 Makes all appropriate customer service announcements
- 5 Operates to appropriate station berthing marker
- 5 Proper use of horn and bell
- 4 Proper TWC code set
- N/A Proper use of opticom/ommitter
- N/A Uses Door Close button to close doors *DDS*
- N Identifies affected door and able to cut out (*document performance*)
- A Talks through pumping off a handbrake (*document performance*)
- 5 Observes and follows all signals
- 5 Identifies crossover, diamond interlocking, and turnout (*document response*)
- N Sounds horn and slows to 10 mph when workers are on ROW
- A Operates at speeds no greater than 5 mph in curves and obeys speed limits on streetcar alignment
- 5 Uses appropriate station approach speeds during normal and inclement weather
- 5 Scans grade crossings properly to ensure GCI is illuminated and gates are down
- 4 Monitor signal cabinet indications
- 5 Good defensive operating techniques and is always prepared to stop
- 5 Good observation techniques and constantly scans ahead (not "tunnel vision")
- N In seat and ready to depart terminal stations one minute prior to departure time.
- A Notifies ROCC when departing Streetcar Terminals.
- 5 Operates safely and is in compliance with the Rail Rule Book and all rail SOPs
- 5 Non-revenue
- 5 Operates at appropriate speed entering platform



# CHARLOTTE AREA TRANSIT SYSTEM RAIL OPERATIONS



## Rail Operator Ride Check Form

- 5 Operates at appropriate speed passing through
- 5 Makes services announcements
- 5 Utilizes horn or bell when passing through

### Supervisor's Observations:

Operator Cohen advised RORC of two fault codes coming out LRV 301  
 This screen (7073 & 7078 - P.I.S. - sign c left faulty) RORC advised  
 operator Cohen to proceed onto the Blue Line - ODS.

Operator Cohen was reminded of the 15mph speed restriction across crosswalks.

### Suggested Areas for Improvement:

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Overall Rating: 4.8 (Use the same 1 - 5 scale)

Supervisor Name: Tiffany Jerry  
 Supervisor Signature: [Signature]

Operator Comments:  


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Operator Signature: Wigney Cohen

Submit completed form to Instructor/Supervisor.  
 Instructor/Supervisor: Submit form to Manager, Rail Transportation. Form will be maintained in  
 employee's training file.

Manager, Rail Transportation - Signature: \_\_\_\_\_



# CHARLOTTE AREA TRANSIT SYSTEM RAIL OPERATIONS



## Rail Operator Ride Check Form

Operator Name: Unique Cohen Radio #: R157

Date: June 5, 2022 Start Time: 14:20 End Time: 16:07

Start Location: \_\_\_\_\_ End Location: \_\_\_\_\_

Alignment (check one): \_\_\_\_\_ Blue Line  Gold Line

**Purpose of this ride check:**

- Periodic efficiency ride-along      Re-training following infraction  
 Recertification      Return to work following extended absence  
 Other (explain) \_\_\_\_\_

Rate each observed behavior on a scale of 1 to 5, with 5 being excellent and 1 being unacceptable, needs retraining. Any re-training needs must be presented to operations manager and/or instructor supervisor.

- 5 Possesses all required items (Operating Orders, radio, Rule Book, etc.)
- 5 Wearing proper uniform (including shoes) and uniform is clean and neat
- 5 In possession of accurate watch which indicates seconds
- 5 Cell phone and unauthorized electronic equipment OFF and out of sight
- 5 Knows the rule of the day Normal Operations.
- Y Uses proper radio protocol; reports all appropriate situations that could affect operations
- NA Performs pre-trip inspection (*note if verbal/physical assistance needed*)
- 5 Always checks both sides of train via cameras prior to closing doors and departing station
- NA Coupling
  - \_\_\_\_\_ checked couples
  - \_\_\_\_\_ operates at appropriate speed when coupling
  - \_\_\_\_\_ makes announcements
  - \_\_\_\_\_ works horn or bell prior to moving
  - NA brake and rolling free test performed
- NA Operates switches when leaving yard (*document performance*)
- NA Request authorization to leave yard
- 5 Operates on time according to schedule
- 5 Smooth station stops and accelerations



# CHARLOTTE AREA TRANSIT SYSTEM RAIL OPERATIONS



## Rail Operator Ride Check Form

- 5 ADA station announcements made if necessary
- 5 Makes proper Streetcar Station/ADA announcements
- 5 Documents and repeats back location of alerts OO Alerts
- 5 ROD425 *Switching Streetcar Operating Cabs* compliance
- 5 Performs proper interior train/streetcar inspections at terminal stations
- 5 Performs proper interior train inspections at terminal stations
- 5 Makes all appropriate customer service announcements
- 5 Operates to appropriate station berthing marker
- 5 Proper use of horn and bell
- 5 Proper TWC code set
- 5 Proper use of opticom/ommitter
- 5 Uses Door Close button to close doors
- N Identifies affected door and able to cut out (*document performance*)
- NA Talks through pumping off a handbrake (*document performance*)
- 5 Observes and follows all signals
- NA Identifies crossover, diamond interlocking, and turnout (*document response*)
- 5 Sounds horn and slows to 10 mph when workers are on ROW
- 5 Operates at speeds no greater than 5 mph in curves and obeys speed limits on streetcar alignment
- 5 Uses appropriate station approach speeds during normal and inclement weather
- NA Scans grade crossings properly to ensure GCI is illuminated and gates are down
- NA Monitor signal cabinet indications
- 5 Good defensive operating techniques and is always prepared to stop
- 5 Good observation techniques and constantly scans ahead (not "tunnel vision")
- 5 In seat and ready to depart terminal stations one minute prior to departure time.
- 5 Notifies ROCC when departing Streetcar Terminals.
- Operates safely and is in compliance with the Rail Rule Book and all rail SOPs
- ~~Non-revenue~~
- ~~Operates at appropriate speed entering platform~~



# CHARLOTTE AREA TRANSIT SYSTEM RAIL OPERATIONS



## Rail Operator Ride Check Form

- Operates at appropriate speed passing through
- Makes services announcements
- Utilizes horn or bell when passing through

### Supervisor's Observations:

Operator Cohen followed all on/off wire procedures while on the Gold line. He used great defensive operational skills, always checking his cameras.

Operator Cohen informed Rocc of a 7209 (smoke detected in the DES) fault code. Rocc advised to note the fault on the pre-trip card and proceed.

### Suggested Areas for Improvement:

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Overall Rating: 5 (Use the same 1 – 5 scale)

Supervisor Name: Tiffany Jones

Supervisor Signature: Tiffany Jones

### Operator Comments:

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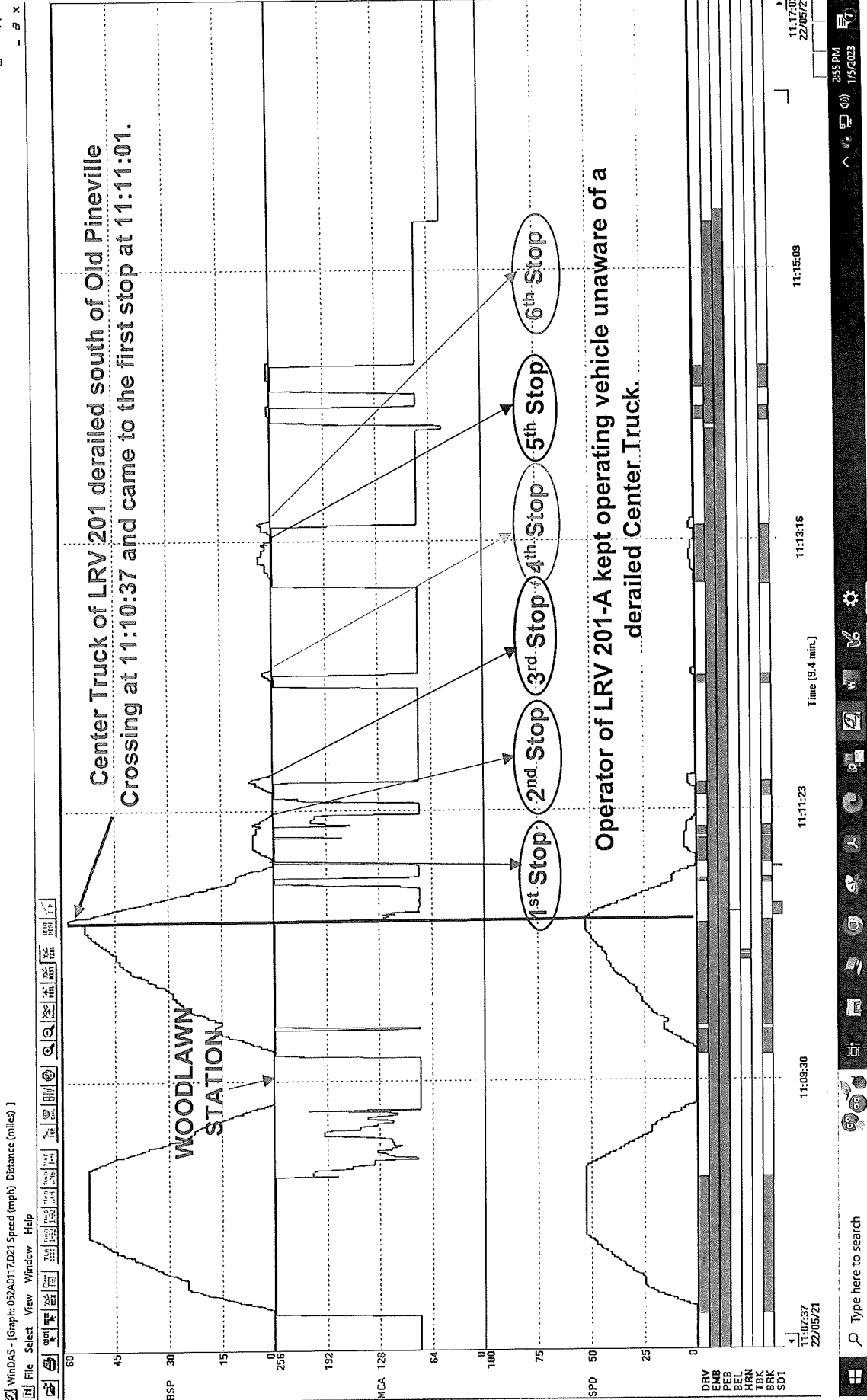
Operator Signature: Uigun Cohen

Submit completed form to Instructor/Supervisor.

Instructor/Supervisor: Submit form to Manager, Rail Transportation. Form will be maintained in employee's training file.

Manager, Rail Transportation - Signature: \_\_\_\_\_

# LRV 201 Center Truck Derailment South of Old Pineville Grade Crossing 05/21/2022





# Rail Operations & Facilities

## Lessons Learned

# LESSONS LEARNED



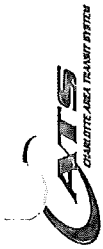
What went well?

What did not go well?

What could we improve?

Action Items?

**Safety is Everyone's Responsibility!**



## INTRODUCTION

Capturing lessons learned is an integral part of every incident/emergency and serves several purposes. The lessons learned document serves as a valuable tool for use by other department managers within an organization who needs to understand what we did correctly and what was done wrong. This document should not only describe what went wrong during a incident/emergency and suggestions to avoid similar occurrences in the future, but it should also describe what went well and how the CATS organization may benefit from this information.

The purpose of the lessons learned document for the most recent Red Signal Overrun and Derailment is to capture this information from lessons learned perspective. This document may be used as a learning tool part to determine what problems occurred, how those problems were handled, and how similar issues may be avoided in the future. This document will be formally communicated with the organization and will become a part of the organizational assets and archives.

## DESCRIPTION OF INCIDENT

At approximately 1112 hours on May 21, 2022, the operator of Train #5 reported to the Rail Operation Control Center (ROCC) that LRV 201 experienced a 7153 fault earlier that cleared but he was having trouble moving the train. At approximately 1115 hours the operator of Train 5 reported to the ROCC that he was trying to make it to Scaleybark, but he did not believe he could. At approximately 1116 hours, the Rail Operations Control Center instructed the operator of Train 5 to aux off/on to see if the train could move to the next station. The operator reported back to the ROCC that, he attempted to move the train was wobbling back and forth on the tracks really bad.

## FACTS TO CONSIDER/MISSED OPPORTUNITY

When the operator of Train #5 relieved the outgoing operator, the operator was informed the train appeared to be “sluggish” in propulsion **4½ hours prior**. After relieving the operator, the ROCC was notified of a 7153 fault and that the train was shaking badly and was unable to move safely. During troubleshooting procedures, the operator was asked to AUX off/AUX on and attempt to move to the next station which contributed to “dragging trucks or moving with brakes applied.”

**Safety is Everyone’s Responsibility!**





**LESSONS LEARNED FROM THIS INCIDENT**

The following chart lists the lessons learned for the Red Signal Overtake and Derailment Descriptions, impacts, and recommendations are provided for consideration on similar or future incidents of this nature. It is important to note all information must be considered when overseeing, reporting, and responding to emergencies where there is the potential for causing damage to equipment, or loss of life.

| SUCCESS or ISSUE | Description of Incident  | What was the Impact?  | How Does This Effect Future Processes?  | Action Items  | Additional Comments/Recommendations  |
|------------------|--|---|---|---|--|
| ISSUE            | Derailment   | Upon Rail Car Maintenance's investigation of the scene, axel 3 of Train 5 LRV 201 was derailed to the west side/rail's field side, which caused extensive damage to the roadway/infrastructure. | The Rail Operations Control Center must stop the train and allow an operator to perform a ground walk-around for all reports of unusual sounds, abnormal operations, fire/smoke, unusual odor, coming from under the train. (Jerking, shaking, making contact with or running over an object.). | Dispatch RCM, and Rail Supv, make announcements and determine if it's safe to single track. | <p><b>Trigger Words to Lookout for:</b></p> <ul style="list-style-type: none"> <li>• Shaking badly</li> <li>• Sluggish operations</li> <li>• Unable to operate safely</li> <li>• Fire/smoke</li> <li>• Jerking in propulsion</li> <li>• Major flats</li> <li>• Stuck brake</li> <li>• Brake odor</li> <li>• Unusual noise</li> <li>• Unusual odor</li> </ul> |
| ISSUE            | The outgoing operator stated to the relief operator the train appeared to be "sluggish" in propulsion. | The impact this had on the incidents was the operator's failure to notify ROCC of the fault/train defect and allow RCM to board and investigate.  | After hearing the word "sluggish," the operator should have notified the ROCC to dispatch Rail Car Maintenance to the train and investigate.  | Dispatch RCM, and Rail Supv, make announcements and determine if it's safe to single track. | <ul style="list-style-type: none"> <li>• Follow Recommendations from RCM</li> <li>• Request updates from MOW to determine if there are any damages to the roadway</li> <li>• Send nearest supervisor</li> </ul>  |

**Safety is Everyone's Responsibility!**



## Rail Operations & Facilities

## Lessons Learned

### Red Signal Overrun and Derailment

|                     |   |   |  |  |  |
|---------------------|---|---|--|--|--|
| <p><b>ISSUE</b></p> | <p>After relieving the operator, the ROCC was notified of a 7153 fault and that the train was shaking badly and was unable to move safely resulting in a derailment.</p>                                  | <p>Extensive damage was caused to the infrastructure, roadway and equipment due to the decision to AUX On/AUX off and attempt to move to the next station without performing a ground walk-around inspection.</p> | <p>When an operator uses the following terms: shaking badly or unable to move safely the train must be stopped and the operator should immediately request permission to investigate or perform a ground walk-around inspection.</p>   | <p>Dispatch RCM, and Rail Supv, make announcements and determine if it's safe to single track.</p>   | <ul style="list-style-type: none"> <li>• Follow Recommendations from RCM</li> <li>• Request updates from MOW to determine if there are any damages to the roadway</li> <li>• Send nearest supervisor</li> </ul>                                    |
| <p><b>ISSUE</b></p> | <p>During troubleshooting procedures, the operator was asked to AUX on/AUX off and attempt to move to the next station which contributed to dragging trucks or moving while the brakes were "locked."</p> | <p>Extensive damage was caused to the infrastructure, roadway and equipment (1200 feet of rail clips were damaged)</p>  | <p>The safest course of action to take is to not move the train and allow the ROCC to dispatch Rail Car Maintenance personnel or a supervisor to investigate.</p>  | <p>Dispatch RCM, and Rail Supv, make announcements and determine if it's safe to single track.</p>   | <ul style="list-style-type: none"> <li>• Be governed by the ROCC</li> <li>• Follow Recommendations from RCM</li> <li>• Request updates from MOW to determine if there are any damages to the roadway</li> <li>• Send nearest supervisor</li> </ul> |
| <p><b>ISSUE</b></p> | <p>Red Signal Overrun</p>   | <p>Red Signal Overrun</p>   | <p>The ROCC will communicate the following "Train 1, you have permission to pass Red Signal B04-002A, utilizing yard mode, stopping short of each switch verifying switches are laying in the normal position, speed not to exceed 5mph over the switches with an absolute block to platform 1, contact control when you regain speed commands."</p> | <p>It is important to communicate properly when passing a red signal. First and foremost, this should never be done without receiving the correct verbiage, authorization from the ROCC.</p> | <ul style="list-style-type: none"> <li>• Be governed by the ROCC</li> <li>• Follow Recommendations from RCM</li> <li>• Request updates from MOW to determine if there are any damages to the roadway</li> <li>• Send nearest supervisor</li> </ul> |

**Safety is Everyone's Responsibility!**



**Rail Operations & Facilities**

**Lessons Learned**

**Red Signal Overtake and Derailment**

|              |  |  |   |  |   |
|--------------|--|--|---|--|---|
| <p>ISSUE</p> |  |  | <p>The operator should repeat those instructions verbatim, once the instructions are repeated and acknowledged by ROCC then the operator can pass the red signal.</p> | <p>There should never be confusion in regard to if instructions were given to pass a red signal.</p> | <ul style="list-style-type: none"> <li>• Be governed by the ROCC's Instructions</li> <li>• Follow Recommendations from RCM</li> <li>• Request updates from MOW to determine if there are any damages to the roadway</li> <li>• Send nearest supervisor</li> </ul> |
|--------------|--|--|---|--|---|



### LESSONS LEARNED APPLIED FROM PREVIOUS INCIDENTS

The lessons learned document might also state which historical lessons learned were used on this incident. This information not only shows the value of the documentation of such lessons, but it also shows what was done correctly and incorrectly and how best to move forward or improve.

The Red Signal Overrun and Derailment utilized several lessons learned from incidents:

- Red Signal – Communications (Repeat Backs/Never Assume/Always Reconfirm or Do Not Move)
- Derailment – Internal Breakdown in Communications (ROCC unaware of Defective Train/Operator Assumed the Train was OK after being informed of a sluggish train by the outgoing operator)

### INCIDENT IMPROVEMENT RECOMMENDATIONS

As lessons learned are collected and documented, the organization should approve and implement any process improvements identified. It is important for organizations to strive for continuous improvement and this portion of the lessons learned process is an integral step.

As indicated in the lessons learned chart above, the Red Signal Overrun and Derailment, there should never be confusion regarding whether instructions were given to pass a red signal or if a train should be moved after receiving critical information. It is important to communicate properly and providing clear instructions through **100% repeat-backs!**

#### **Rail Car Maintenance –**

The C truck on this train failed a few days prior. The wheel flats were repaired, and the train was returned to service.

Rail Car Maintenance will be held to the following action items moving forward:

- ✓ when wheel cuts are required, Rail Car Maintenance must investigate the root cause and perform a riding inspection before releasing the train to Rail Transportation.
- ✓ Rail Car Maintenance must confirm if the bearings failed, which was the root cause, and a known failure.

#### **What We Did Right**

Response – all personnel responded to the incident as requested to provide the necessary assistance and guidance.

Recovery/Removal – recovery/repair efforts from MOW were excellent.

Re-rail Efforts – the re-rail team experienced a few challenges initially; once the equipment was re-railed, the train was moved back to the South Yard with the C-truck locked. Rail Car Maintenance must consider a process of unlocking the C-truck before moving the train to avoid further damages.

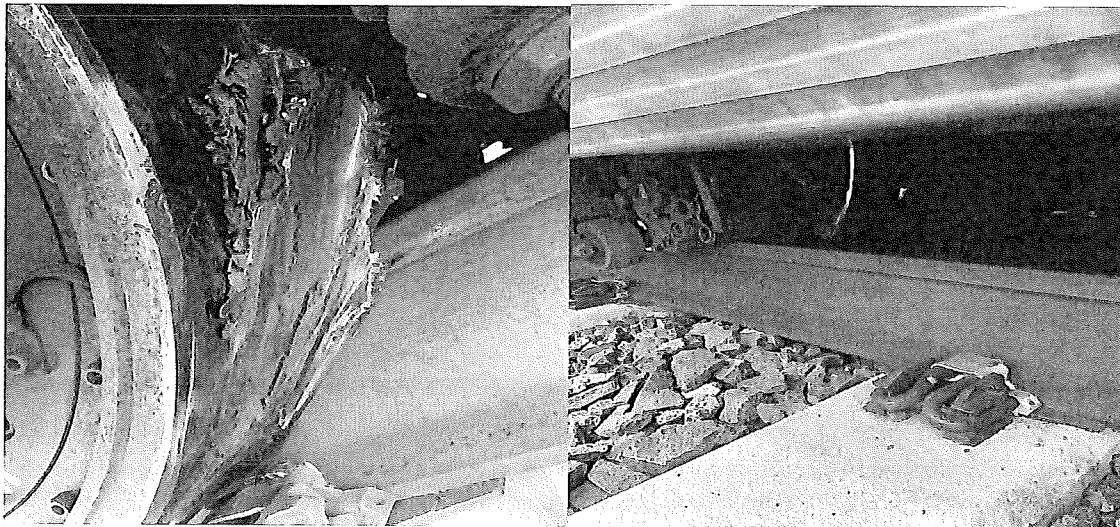
**Conclusion –**

No attempts were made to follow up with the Rail Operations Control Center (ROCC) to determine if Rail Car Maintenance cleared Train #5 to remain in service. Instead, the operator assumed Train #5 was OK to operate, resulting in a derailment outside of Old Pineville.

**Complacency in the workplace –**

Complacency in the workplace is when you become so secure in your work that you take potentially dangerous shortcuts in your tasks, don't perform to the same quality as you once did or become unaware of deficiencies.

**SAFETY IS EVERYONE'S RESPONSIBILITY!**



**Safety is Everyone's Responsibility!**



# CHARLOTTE AREA TRANSIT SYSTEM LIGHT RAIL SYSTEM



## SAFETY BLITZ

|   |   |                      |
|---|---|----------------------|
| SUPERVISOR NAME: <i>Essence Douglas</i>     | EMPLOYEE ID #: <i>96255</i>             | DATE: <i>8-25-22</i> |
| SECTION: <i>Rail Transportation/MOW/RCM</i> | MANAGER/Supervisor: <i>DeHra Harris</i> |                      |

### TYPE OF SAFETY CONVERSATION

|                  |   |  |
|------------------|---|--|
| Signals          |   | Yard Training                            |
| Switches         | x | Operations                               |
| Door Operations  | x | Incident (Derailment/Red Signal Overrun) |
| Trouble Shooting |   | Audit                                    |

**3.1.10** A walk-around inspection must be performed with the doors closed: any time the train doors have been operated on the off side of the platform, outside of the platform limits, after making contact or running over objects/persons, **hearing any unusual sounds**, observing excessive arcing.

**4.1.3** DEFECTIVE TRAIN Operator will notify the ROCC of any train defect. ROCC will either allow the train to continue normal service, direct the operator to continue to operate the train with restrictions, or direct the operator to off-load passengers at the nearest station and take the train out of service.

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**5.1.5** STOP OVERRUN If a train or On-Track equipment overruns a signal indicating stop, including a horizontal bar signal, a red stop light, an employee on the ROW giving a stop hand signal, a dark signal, and a flashing GCI, the train/On-Track equipment must be stopped and the ROCC must be notified, immediately. The ROCC must notify all affected personnel at once by radio and stop approaching train movement in the area. The train or on-track equipment must not be moved until ROCC receives confirmation from MOW that there is no sign of derailment, switch damage, or damage to equipment or receives authorization to move from MOW, Transportation Manager, or higher-ranking Rail Officer within the Chain of Command. If the stop overrun results in damage to an LRV/On-Track equipment, switches, wayside equipment, or a derailment, the train or on-track equipment must not be moved until Safety & Security releases the equipment and inspections have been conducted by MOW and RCM to ensure the LRV or On-Track equipment can be moved to the nearest yard safely.

| PRINT NAME:                 | INITIALS  | DATE:          |
|-----------------------------|-----------|----------------|
| <i>DANNY BLANN</i>          | <i>DB</i> | <i>8-25-22</i> |
| <i>TOMMIE SLOMORÉ</i>       | <i>TS</i> | <i>8-25-22</i> |
| <i>BYRON ENGLAND</i>        | <i>BE</i> | <i>8-25-22</i> |
| <i>Christopher Williams</i> | <i>CW</i> | <i>8-26-22</i> |
| <i>M. Miles</i>             | <i>MM</i> | <i>8-26-22</i> |
|                             |           |                |
|                             |           |                |

Please scan and email this report and attach supporting documentation to management.

|  |                                  |                         |
|--|----------------------------------|-------------------------|
| Supervisor's Name:<br><i>Essence Douglas</i> | Signature:<br><i>[Signature]</i> | Date:<br><i>8-25-22</i> |
|--|----------------------------------|-------------------------|



# CHARLOTTE AREA TRANSIT SYSTEM LIGHT RAIL SYSTEM



## SAFETY BLITZ

|  |                                   |                       |
|--|-----------------------------------|-----------------------|
| SUPERVISOR NAME: <u>Brian J Brooks</u> | EMPLOYEE ID #: <u>99893</u>       | DATE: <u>9/7/2022</u> |
| SECTION: Rail Transportation/MOW/RCM   | MANAGER/Supervisor: <u>L. LEE</u> |                       |

| TYPE OF SAFETY CONVERSATION |   |  |
|-----------------------------|---|--|
| Signals                     |   | Yard Training                            |
| Switches                    | x | Operations                               |
| Door Operations             | x | Incident (Derailment/Red Signal Overrun) |
| Trouble Shooting            |   | Audit                                    |

**3.1.10** A walk-around inspection must be performed with the doors closed: any time the train doors have been operated on the off side of the platform, outside of the platform limits, after making contact or running over objects/persons, hearing any unusual sounds, observing excessive arcing.

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| PRINT NAME:           | INITIALS  | DATE:           |
|-----------------------|-----------|-----------------|
| <u>Clayna Potts</u>   | <u>CP</u> | <u>09/06/22</u> |
| <u>Damon Pyle</u>     | <u>DP</u> | <u>09/06/22</u> |
| <u>Robert Dalton</u>  | <u>RD</u> | <u>09/07/22</u> |
| <u>Melvin Jones</u>   | <u>MJ</u> | <u>9/7/22</u>   |
| <u>Joshua Black</u>   | <u>JB</u> | <u>9/7/22</u>   |
| <u>Willie Jackson</u> | <u>WJ</u> | <u>9/7/22</u>   |
| <u>Alex Sarpun</u>    | <u>AS</u> | <u>9/7/22</u>   |

Please scan and email this report and attach supporting documentation to management.

|  |                               |                         |
|--|-------------------------------|-------------------------|
| Supervisor's Name: <u>Brian J Brooks</u> | Signature: <u>[Signature]</u> | Date: <u>09/07/2022</u> |
|--|-------------------------------|-------------------------|



# CHARLOTTE AREA TRANSIT SYSTEM LIGHT RAIL SYSTEM



## SAFETY BLITZ

|  |                                   |                       |
|--|-----------------------------------|-----------------------|
| SUPERVISOR NAME: <u>Brian J Brooks</u> | EMPLOYEE ID #: <u>99893</u>       | DATE: <u>9/7/2022</u> |
| SECTION: Rail Transportation/MOW/RCM   | MANAGER/Supervisor: <u>G. LEE</u> |                       |

| TYPE OF SAFETY CONVERSATION |   |  |  |
|-----------------------------|---|--|--|
| Signals                     |   |  | Yard Training                            |
| Switches                    | x |  | Operations                               |
| Door Operations             | x |  | Incident (Derailment/Red Signal Overrun) |
| Trouble Shooting            |   |  | Audit                                    |

**3.1.10** A walk-around inspection must be performed with the doors closed: any time the train doors have been operated on the off side of the platform, outside of the platform limits, after making contact or running over objects/persons, **hearing any unusual sounds**, observing excessive arcing.

**4.1.3** DEFECTIVE TRAIN Operator will notify the ROCC of any train defect. ROCC will either allow the train to continue normal service, direct the operator to continue to operate the train with restrictions, or direct the operator to off-load passengers at the nearest station and take the train out of service.

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| PRINT NAME:                 | INITIALS             | DATE:         |
|-----------------------------|----------------------|---------------|
| <u>DOBRA MARSHALL</u>       | <u>DM</u>            | <u>9/7/22</u> |
| <u>Willie Gladney</u>       | <u>WG</u>            | <u>9-7-22</u> |
| <u>Will H. G. [unclear]</u> | <u>WHA [unclear]</u> | <u>9/7/22</u> |
| <u>Tewis Harley</u>         | <u>TH</u>            | <u>9/7/22</u> |
| <u>Tewis Harley</u>         | <u>TH</u>            | <u>9/7/22</u> |
|                             |                      |               |
|                             |                      |               |

Please scan and email this report and attach supporting documentation to management.

|  |                               |                         |
|--|-------------------------------|-------------------------|
| Supervisor's Name: <u>Brian J Brooks</u> | Signature: <u>[Signature]</u> | Date: <u>09/07/2022</u> |
|--|-------------------------------|-------------------------|





# CHARLOTTE AREA TRANSIT SYSTEM LIGHT RAIL SYSTEM



## SAFETY BLITZ

|   |                                   |                       |
|---|-----------------------------------|-----------------------|
| <b>SUPERVISOR NAME:</b> Eric Williams       | <b>EMPLOYEE ID #:</b> 94820       | <b>DATE:</b> 08/24/22 |
| <b>SECTION:</b> Rail Transportation/MOW/RCM | <b>MANAGER/Supervisor:</b> G. Lee |                       |

| TYPE OF SAFETY CONVERSATION |   |  |
|-----------------------------|---|--|
| Signals                     |   | Yard Training                            |
| Switches                    | x | Operations                               |
| Door Operations             | x | Incident (Derailment/Red Signal Overrun) |
| Trouble Shooting            |   | Audit                                    |

**3.1.10** A walk-around inspection must be performed with the doors closed: any time the train doors have been operated on the off side of the platform, outside of the platform limits, after making contact or running over objects/persons, **hearing any unusual sounds**, observing excessive arcing.

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| PRINT NAME:       | INITIALS | DATE:   |
|-------------------|----------|---------|
| Khosrow Chakaravi | K.C      | 8/25/22 |
| JAVARNE BARNETT   | JB       | 8/25/22 |
| Bryan Thomas      | BT       | 8/25/22 |
| John Fletcher     | JF       | 8-25-22 |
| William Matthews  | WM       | 8-25-22 |
| STEVE MORING      | SM       | 8-25-22 |
| EASTON HUNTER     | EH       | 8/25/22 |

Please scan and email this report and attach supporting documentation to management.

|  |                   |                     |
|--|-------------------|---------------------|
| <b>Supervisor's Name:</b> Brian J Brooks | <b>Signature:</b> | <b>Date:</b> 9/8/22 |
|--|-------------------|---------------------|



# CHARLOTTE AREA TRANSIT SYSTEM LIGHT RAIL SYSTEM



## SAFETY BLITZ

|  |                                   |                     |
|--|-----------------------------------|---------------------|
| SUPERVISOR NAME: <u>Brian J Brooks</u> | EMPLOYEE ID #: <u>99893</u>       | DATE: <u>9/8/22</u> |
| SECTION: Rail Transportation/MOW/RCM   | MANAGER/Supervisor: <u>G. Lee</u> |                     |

| TYPE OF SAFETY CONVERSATION |  |   |  |
|-----------------------------|--|---|--|
| Signals                     |  |   | Yard Training                            |
| Switches                    |  | x | Operations                               |
| Door Operations             |  | x | Incident (Derailment/Red Signal Overrun) |
| Trouble Shooting            |  |   | Audit                                    |

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| PRINT NAME:                | INITIALS  | DATE:         |
|----------------------------|-----------|---------------|
| <u>Richard Sommer</u>      | <u>RS</u> | <u>9-4-22</u> |
| <u>WILLIAM WEATHERFORD</u> | <u>WW</u> | <u>9/4/22</u> |
| <u>Alireza Zadeh</u>       | <u>AZ</u> | <u>9/4/22</u> |
| <u>JAVARNE BARNETT</u>     | <u>JB</u> | <u>9/4/22</u> |
| <u>Bryan Thomas</u>        | <u>BT</u> | <u>9/4/22</u> |
| <u>Shawn Wynn</u>          | <u>SW</u> | <u>9/4/22</u> |
| <u>Jason Murray</u>        | <u>jm</u> | <u>9-5-22</u> |

Please scan and email this report and attach supporting documentation to management.

|  |                               |                     |
|--|-------------------------------|---------------------|
| Supervisor's Name: <u>Brian J Brooks</u> | Signature: <u>[Signature]</u> | Date: <u>9/8/22</u> |
|--|-------------------------------|---------------------|



# CHARLOTTE AREA TRANSIT SYSTEM LIGHT RAIL SYSTEM



## SAFETY BLITZ

|   |                                     |                      |
|---|-------------------------------------|----------------------|
| <b>SUPERVISOR NAME:</b> Brian J Brooks      | <b>EMPLOYEE ID #:</b> 99893         | <b>DATE:</b> 8-25-22 |
| <b>SECTION:</b> Rail Transportation/MOW/RCM | <b>MANAGER/Supervisor:</b> GARY LEE |                      |

| TYPE OF SAFETY CONVERSATION |   |  |
|-----------------------------|---|--|
| Signals                     |   | Yard Training                            |
| Switches                    | x | Operations                               |
| Door Operations             | x | Incident (Derailment/Red Signal Overrun) |
| Trouble Shooting            |   | Audit                                    |

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| PRINT NAME:        | INITIALS | DATE:     |
|--------------------|----------|-----------|
| KEVIN PORTERFIELD  | KP       | 8/25/2022 |
| Eric Tat           | ET       | 8/25/2022 |
| Brian Brooks       | BBB      | 8/25/2022 |
| Terrence Cherry    | TC       | 8/25/22   |
| Eric Williams      | EW       | 8/25/2022 |
| <i>[Signature]</i> | Hit      | 8-25-2022 |
| <i>[Signature]</i> | hit      | 8-25-2022 |

Please scan and email this report and attach supporting documentation to management.

|  |                                      |                      |
|--|--------------------------------------|----------------------|
| <b>Supervisor's Name:</b> Brian J Brooks | <b>Signature:</b> <i>[Signature]</i> | <b>Date:</b> 9/10/22 |
|--|--------------------------------------|----------------------|



# CHARLOTTE AREA TRANSIT SYSTEM LIGHT RAIL SYSTEM



## SAFETY BLITZ

|   |                                |                        |
|---|--------------------------------|------------------------|
| SUPERVISOR NAME: <i>Kevin Porteryield</i> | EMPLOYEE ID #: <i>98023</i>    | DATE: <i>8/24/2022</i> |
| SECTION: Rail Transportation/MOW/RCM      | MANAGER/Supervisor: <i>LEE</i> |                        |

| TYPE OF SAFETY CONVERSATION |   |  |  |
|-----------------------------|---|--|--|
| Signals                     |   |  | Yard Training                            |
| Switches                    | x |  | Operations                               |
| Door Operations             | x |  | Incident (Derailment/Red Signal Overrun) |
| Trouble Shooting            |   |  | Audit                                    |

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| PRINT NAME:              | INITIALS   | DATE:           |
|--------------------------|------------|-----------------|
| <i>Alex Wolford</i>      | <i>AW</i>  | <i>8-24-22</i>  |
| <i>Gwendolyn White</i>   | <i>GW</i>  | <i>8-25-22</i>  |
| <i>Darold Haskins Jr</i> | <i>DCH</i> | <i>08/30/22</i> |
| <i>Tadashi Watabe</i>    | <i>TW</i>  | <i>9/3/22</i>   |
| <i>Chad Daulton</i>      | <i>CD</i>  | <i>9/6/22</i>   |

Please scan and email this report and attach supporting documentation to management.

|  |                               |                     |
|--|-------------------------------|---------------------|
| Supervisor's Name: <i>Brian J Brooks</i> | Signature: <i>[Signature]</i> | Date: <i>9/8/22</i> |
|--|-------------------------------|---------------------|



# CHARLOTTE AREA TRANSIT SYSTEM LIGHT RAIL SYSTEM



## SAFETY BLITZ

|  |                             |                     |
|--|-----------------------------|---------------------|
| SUPERVISOR NAME: <u>Brian J Brooks</u> | EMPLOYEE ID #: <u>99893</u> | DATE: <u>9/8/22</u> |
| SECTION: Rail Transportation/MOW/RCM   | MANAGER/Supervisor:         |                     |

| TYPE OF SAFETY CONVERSATION |   |  |
|-----------------------------|---|--|
| Signals                     |   | Yard Training                            |
| Switches                    | x | Operations                               |
| Door Operations             | x | Incident (Derailment/Red Signal Overrun) |
| Trouble Shooting            |   | Audit                                    |

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| PRINT NAME:           | INITIALS   | DATE:           |
|-----------------------|------------|-----------------|
| <u>Mark W. Cole</u>   | <u>MC</u>  | <u>9/3/22</u>   |
| <u>Brian Allen</u>    | <u>BA</u>  | <u>9/3/22</u>   |
| <u>BRANDON MCKEY</u>  | <u>B</u>   | <u>9/3/2022</u> |
| <u>PASILIP NOVAK</u>  | <u>PN</u>  | <u>9/3/22</u>   |
| <u>Derek Higgins</u>  | <u>DH</u>  | <u>9/3/22</u>   |
| <u>DAVID LEE MOSS</u> | <u>DLM</u> | <u>9-4-22</u>   |
| <u>CAREY GAFFNEY</u>  | <u>CG</u>  | <u>9-4-22</u>   |

Please scan and email this report and attach supporting documentation to management.

|  |                               |                     |
|--|-------------------------------|---------------------|
| Supervisor's Name: <u>Brian J Brooks</u> | Signature: <u>[Signature]</u> | Date: <u>9/8/22</u> |
|--|-------------------------------|---------------------|



# CHARLOTTE AREA TRANSIT SYSTEM LIGHT RAIL SYSTEM



## SAFETY BLITZ

|   |                                   |                        |
|---|-----------------------------------|------------------------|
| SUPERVISOR NAME: <i>Kevin Porterfield</i> | EMPLOYEE ID #: <i>98023</i>       | DATE: <i>8/24/2022</i> |
| SECTION: Rail Transportation/MOW/RCM      | MANAGER/Supervisor: <i>G. LEE</i> |                        |

| TYPE OF SAFETY CONVERSATION |                  |   |  |
|-----------------------------|------------------|---|--|
|                             | Signals          |   | Yard Training                            |
|                             | Switches         | x | Operations                               |
|                             | Door Operations  | x | Incident (Derailment/Red Signal Overrun) |
|                             | Trouble Shooting |   | Audit                                    |

**3.1.10** A walk-around inspection must be performed with the doors closed: any time the train doors have been operated on the off side of the platform, outside of the platform limits, after making contact or running over objects/persons, **hearing any unusual sounds**, observing excessive arcing.

**4.1.3** DEFECTIVE TRAIN Operator will notify the ROCC of any train defect. ROCC will either allow the train to continue normal service, direct the operator to continue to operate the train with restrictions, or direct the operator to off-load passengers at the nearest station and take the train out of service.

**4.1.5** DERAILMENT Operators must inform the ROCC and be guided by their instructions. Inform passengers of the situation, lower the pantograph; receive instructions from the ROCC before opening any doors, and assist passengers as necessary.

**5.1.5** STOP OVERRUN If a train or On-Track equipment overruns a signal indicating stop, including a horizontal bar signal, a red stop light, an employee on the ROW giving a stop hand signal, a dark signal, and a flashing GCI, the train/On-Track equipment must be stopped and the ROCC must be notified, immediately. The ROCC must notify all affected personnel at once by radio and stop approaching train movement in the area. The train or on-track equipment must not be moved until ROCC receives confirmation from MOW that there is no sign of derailment, switch damage, or damage to equipment or receives authorization to move from MOW, Transportation Manager, or higher-ranking Rail Officer within the Chain of Command. If the stop overrun results in damage to an LRV/On-Track equipment, switches, wayside equipment, or a derailment, the train or on-track equipment must not be moved until Safety & Security releases the equipment and inspections have been conducted by MOW and RCM to ensure the LRV or On-Track equipment can be moved to the nearest yard safely.

| PRINT NAME:              | INITIALS   | DATE:           |
|--------------------------|------------|-----------------|
| <i>David Haskins Jr</i>  | <i>DCH</i> | <i>08/24/22</i> |
| <i>LIMOTHY TENHENGEL</i> | <i>LT</i>  | <i>8/24/22</i>  |
| <i>Lee Piel</i>          | <i>LP</i>  | <i>8/24/22</i>  |
| <i>RAYMOND WUNSCHCI</i>  | <i>RW</i>  | <i>8-24-22</i>  |
| <i>Mark Rhodes</i>       | <i>MR</i>  | <i>8-24-22</i>  |
| <i>ANDRES ORELLANO</i>   | <i>AO</i>  | <i>08/24/22</i> |
| <i>Freddy Miller</i>     | <i>FM</i>  | <i>8-24-22</i>  |
| <i>Philip McClain</i>    | <i>PM</i>  | <i>8/24/22</i>  |
| <i>Rolando Bermeo</i>    | <i>RB</i>  | <i>8/22/22</i>  |

Please scan and email this report and attach supporting documentation to management.

|  |                             |                     |
|--|-----------------------------|---------------------|
| Supervisor's Name: <i>Brian J Brooks</i> | Signature: <i>B. Brooks</i> | Date: <i>9/8/22</i> |
|--|-----------------------------|---------------------|



# CHARLOTTE AREA TRANSIT SYSTEM LIGHT RAIL SYSTEM



## SAFETY BLITZ

|   |                             |                      |
|---|-----------------------------|----------------------|
| <b>SUPERVISOR NAME:</b> <i>Letitia D. Blalock</i> | <b>EMPLOYEE ID #:</b> 93590 | <b>DATE:</b> 8/31/22 |
| <b>SECTION:</b> Rail Transportation/MOW/RCM       | <b>MANAGER/Supervisor:</b>  |                      |

| TYPE OF SAFETY CONVERSATION |   |  |  |
|-----------------------------|---|--|--|
| Signals                     |   |  | Yard Training                            |
| Switches                    | x |  | Operations                               |
| Door Operations             | x |  | Incident (Derailment/Red Signal Overrun) |
| Trouble Shooting            |   |  | Audit                                    |

**3.1.10** A walk-around inspection must be performed with the doors closed; any time the train doors have been operated on the off side of the platform, outside of the platform limits, after making contact or running over objects/persons, **hearing any unusual sounds**, observing excessive arcing.

**4.1.3** DEFECTIVE TRAIN Operator will notify the ROCC of any train defect. ROCC will either allow the train to continue normal service, direct the operator to continue to operate the train with restrictions, or direct the operator to off-load passengers at the nearest station and take the train out of service.

**4.1.5** DERAILMENT Operators must inform the ROCC and be guided by their instructions. Inform passengers of the situation, lower the pantograph; receive instructions from the ROCC before opening any doors, and assist passengers as necessary.

**5.1.5** STOP OVERRUN If a train or On-Track equipment overruns a signal indicating stop, including a horizontal bar signal, a red stop light, an employee on the ROW giving a stop hand signal, a dark signal, and a flashing GCI, the train/On-Track equipment must be stopped and the ROCC must be notified, immediately. The ROCC must notify all affected personnel at once by radio and stop approaching train movement in the area. The train or on-track equipment must not be moved until ROCC receives confirmation from MOW that there is no sign of derailment, switch damage, or damage to equipment or receives authorization to move from MOW, Transportation Manager, or higher-ranking Rail Officer within the Chain of Command. If the stop overrun results in damage to an LRV/On-Track equipment, switches, wayside equipment, or a derailment, the train or on-track equipment must not be moved until Safety & Security releases the equipment and inspections have been conducted by MOW and RCM to ensure the LRV or On-Track equipment can be moved to the nearest yard safely.

| PRINT NAME:                | INITIALS  | DATE:          |
|----------------------------|-----------|----------------|
| <i>Marilyn Bellamyhill</i> | <i>MB</i> | <i>8/31/22</i> |
| <i>Anthony Y. Pineda</i>   | <i>AP</i> | <i>8/31/22</i> |
| <i>Anthony Paul</i>        | <i>PS</i> | <i>8/31/22</i> |
| <i>A. Weldon</i>           | <i>KW</i> | <i>8/31/22</i> |
| <i>S. E. H.</i>            | <i>EB</i> | <i>8/31/22</i> |
|                            |           |                |
|                            |           |                |

Please scan and email this report and attach supporting documentation to management.

|  |   |                                  |
|--|---|----------------------------------|
| <b>Supervisor's Name:</b><br><i>Letitia D. Blalock</i> | <b>Signature:</b><br><i>[Signature]</i> | <b>Date:</b><br><i>8/31/2022</i> |
|--|---|----------------------------------|



# CHARLOTTE AREA TRANSIT SYSTEM LIGHT RAIL SYSTEM



## SAFETY BLITZ

|  |   |                             |
|--|---|-----------------------------|
| <b>SUPERVISOR NAME:</b> <i>Richard Dixon</i> | <b>EMPLOYEE ID #:</b> <i>12489</i>            | <b>DATE:</b> <i>8-29-22</i> |
| <b>SECTION:</b> Rail Transportation/MOW/RCM  | <b>MANAGER/Supervisor:</b> <i>Marie Darby</i> |                             |

| TYPE OF SAFETY CONVERSATION |   |  |  |
|-----------------------------|---|--|--|
| Signals                     |   |  | Yard Training                            |
| Switches                    | x |  | Operations                               |
| Door Operations             | x |  | Incident (Derailment/Red Signal Overrun) |
| Trouble Shooting            |   |  | Audit                                    |

**3.1.10** A walk-around inspection must be performed with the doors closed: any time the train doors have been operated on the off side of the platform, outside of the platform limits, after making contact or running over objects/persons, **hearing any unusual sounds**, observing excessive arcing.

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| PRINT NAME:              | INITIALS   | DATE:           |
|--------------------------|------------|-----------------|
| <i>Charles Jones Jr.</i> | <i>CCJ</i> | <i>8-29-22</i>  |
| <i>Clayton Hill</i>      | <i>CH</i>  | <i>8-29-22</i>  |
| <i>Bob D. Dwyer</i>      | <i>BB</i>  | <i>8-29-22</i>  |
| <i>Duatisa Hall</i>      | <i>DH</i>  | <i>08/29/22</i> |
| <i>Jordan Kargo</i>      | <i>JK</i>  | <i>8/29/22</i>  |
| <i>James Voindexter</i>  | <i>JV</i>  | <i>8/29/22</i>  |
| <i>Michael Miller</i>    | <i>MM</i>  | <i>8-29-22</i>  |

Please scan and email this report and attach supporting documentation to management.

|   |   |                                  |
|---|---|----------------------------------|
| <b>Supervisor's Name:</b><br><i>Richard Dixon</i> | <b>Signature:</b><br><i>Marie Darby</i> | <b>Date:</b><br><i>8-29-2022</i> |
|---|---|----------------------------------|





# CHARLOTTE AREA TRANSIT SYSTEM LIGHT RAIL SYSTEM



## SAFETY BLITZ

|   |                                     |                       |
|---|-------------------------------------|-----------------------|
| <b>SUPERVISOR NAME:</b> Eric Williams       | <b>EMPLOYEE ID #:</b> 94820         | <b>DATE:</b> 08/24/22 |
| <b>SECTION:</b> Rail Transportation/MOW/RCM | <b>MANAGER/Supervisor:</b> Gary Lee |                       |

| TYPE OF SAFETY CONVERSATION |   |  |
|-----------------------------|---|--|
| Signals                     |   | Yard Training                            |
| Switches                    | x | Operations                               |
| Door Operations             | x | Incident (Derailment/Red Signal Overrun) |
| Trouble Shooting            |   | Audit                                    |

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| PRINT NAME:      | INITIALS | DATE:   |
|------------------|----------|---------|
| Khosrow Ghavami  | K.G      | 8/25/22 |
| JAVARNE BARNETT  | JB       | 8/25/22 |
| Bryan Thomas     | BT       | 8/25/22 |
| John Fletcher    | JF       | 8-25-22 |
| William Matthews | WM       | 8-25-22 |
| STEVE MORING     | SM       | 8-25-22 |
| EASTON HUNTER    | EH       | 9/25/22 |

Please scan and email this report and attach supporting documentation to management.

|                                    |                   |                      |
|------------------------------------|-------------------|----------------------|
| <b>Supervisor's Name:</b> Gary Lee | <b>Signature:</b> | <b>Date:</b> 8-26-22 |
|------------------------------------|-------------------|----------------------|



**CUSTOMER: Siemens**

**PO NR: 4400239735**

**MJO NR: 3804-68**

**DATE: 12/12/2022**

## **FINAL REPORT – Teardown/Failure Analysis of S70 center truck wheel bearings Bearing Assy #1**

### **INTRODUCTION**

Siemens contracted with the laboratory to analyze 4 failed wheel bearing assemblies. This report details the findings only for Bearing Assembly #1 which was received as shown in Appendix 1, Figure 1. No information was provided about time in service, service location, lubrication/inspection intervals or disassembly observations (wheel operation, condition of seals, etc.).

### **FINDINGS AND ANALYSIS**

#### **Grease & Debris Analysis –**

6 grease and debris samples were collected from bearing assembly #1. (See Appendix 1, Figure 2) What little grease was found was collected mostly from the space under the track cap and not from the bearing surfaces. Grease was thermally damaged (blackened) and contained reddish corrosion particles. One sample taken from the cylindrical bearing displayed a very small amount of water which separated from the grease. The wheel seal was not provided to the laboratory for inspection however the presence of water may indicate an issue. No sand or other outside contamination was found indicating any seal problem is limited in nature.

#### **Bearing Surface Damage -**

The bearing track surfaces displayed spalling (see Appendix 1, Figure 13) which is indicative of metal-to-metal contact, a lubrication issue. Damage was worst in the cylindrical bearing which was completely torn apart and seized. It is believed

Martin Failure Analysis  
A Division of Materials Technology Laboratories, Inc.  
PO Box 2988/150 Meadow Ridge Rd.  
Alpine, WY 82138  
Ph: (916) 997-9551

that the cylindrical bearing got the worst of it due to higher amounts of water being present in that location. As seen in the diagrams (Figures 10 & 11) the smaller cylindrical bearing is nearer the outside of the wheel. Water can reduce the viscosity of the grease, increasing wear, while also causing corrosion.

### **DISCUSSION ON CORROSION**

There are two types of corrosion present in this bearing assembly. A "dry" corrosion can occur when metal-to-metal friction heats the metal which then corrodes in the presence of oxygen. The other type of corrosion is due to the presence of water. The water type is much more prevalent in the cylindrical bearing.

### **RECOMMENDATIONS**

- Check the housing seals to make sure they can adequately prevent the ingress of liquid contaminants. Alternatively, consider using sealed bearings.
- The relubrication interval may need to be shortened. Supplying smaller quantities of fresh grease more frequently can help purge contaminated grease from the bearing/housing cavity.

**Prepared By:**

A handwritten signature in black ink, appearing to read "Perry L. Martin". The signature is written in a cursive style with a large initial "P" and "M".

**Perry L. Martin**  
**Materials Engineer**

APPENDIX 1

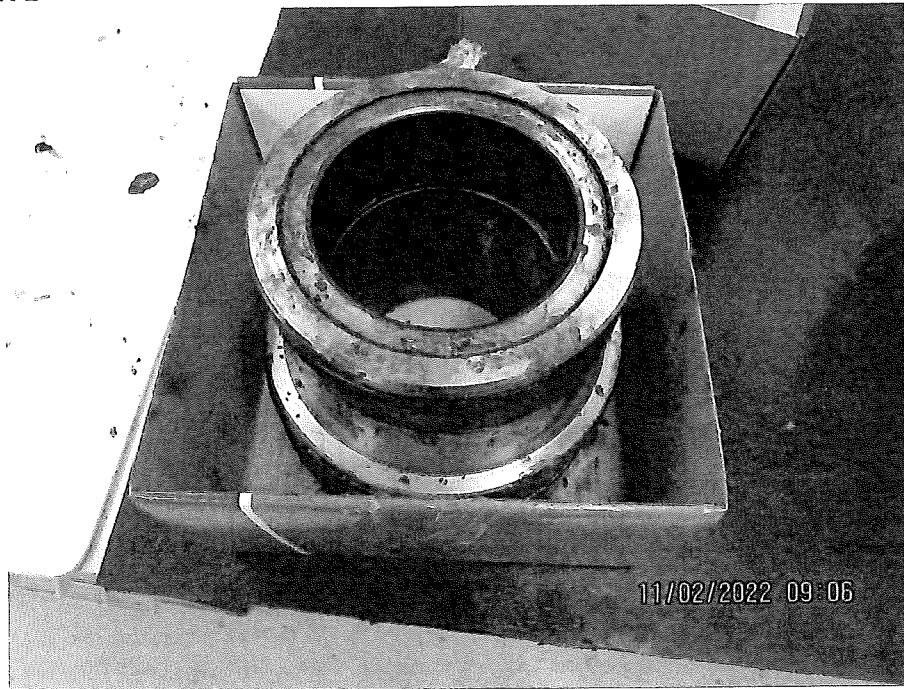


Figure 1 – Bearing Assy #1 as received. Note the reddish corrosion contamination in the grease.

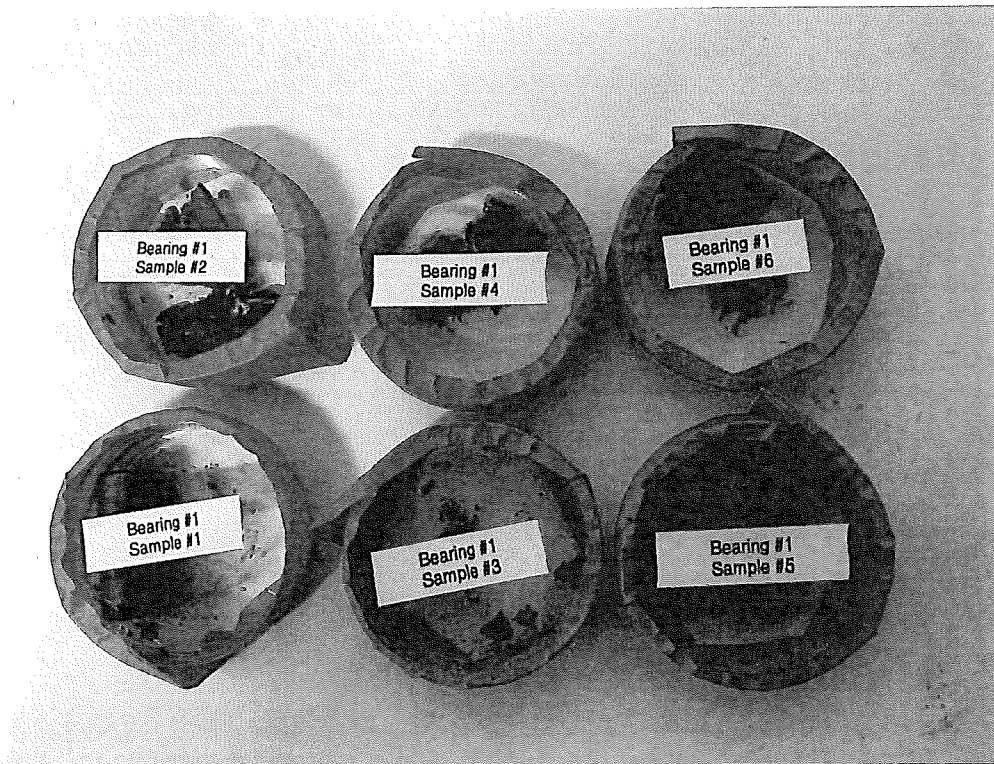


Figure 2 – 6 grease and debris samples collected from bearing assy #1.

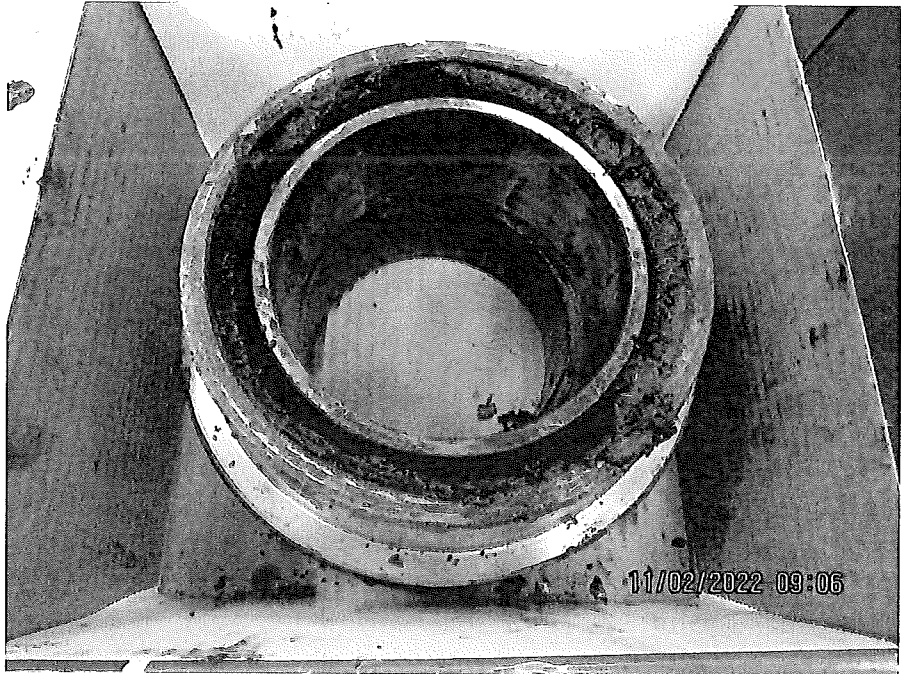


Figure 3 – “Top” ring collar removed from the Assy. Note the degraded caked grease & debris which collected underneath. Very little to no grease was found on the rollers/track.

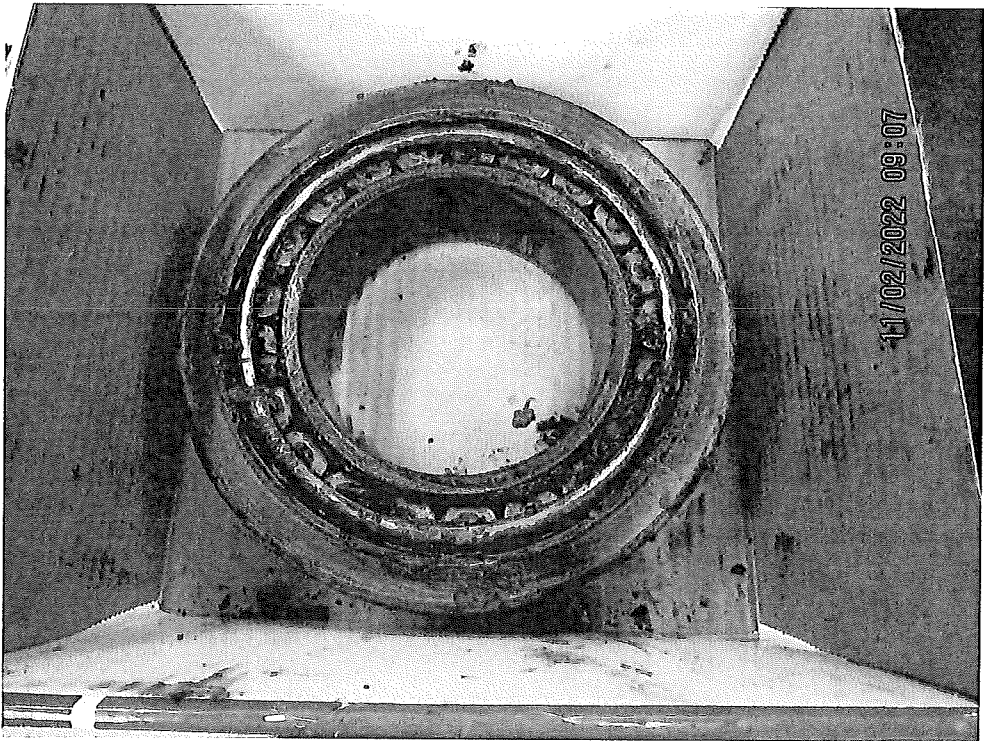


Figure 4 – Same as Figure 3 except the “top” bearings have been removed to expose the “bottom” rollers.



Figure 5 – Disassembly allowed isolation of the “cylindrical” roller assembly. This was the section with the greatest degree of damage. Much of the metal cage has been destroyed.



Figure 6 – Same as Figure 5 but different angle/view.

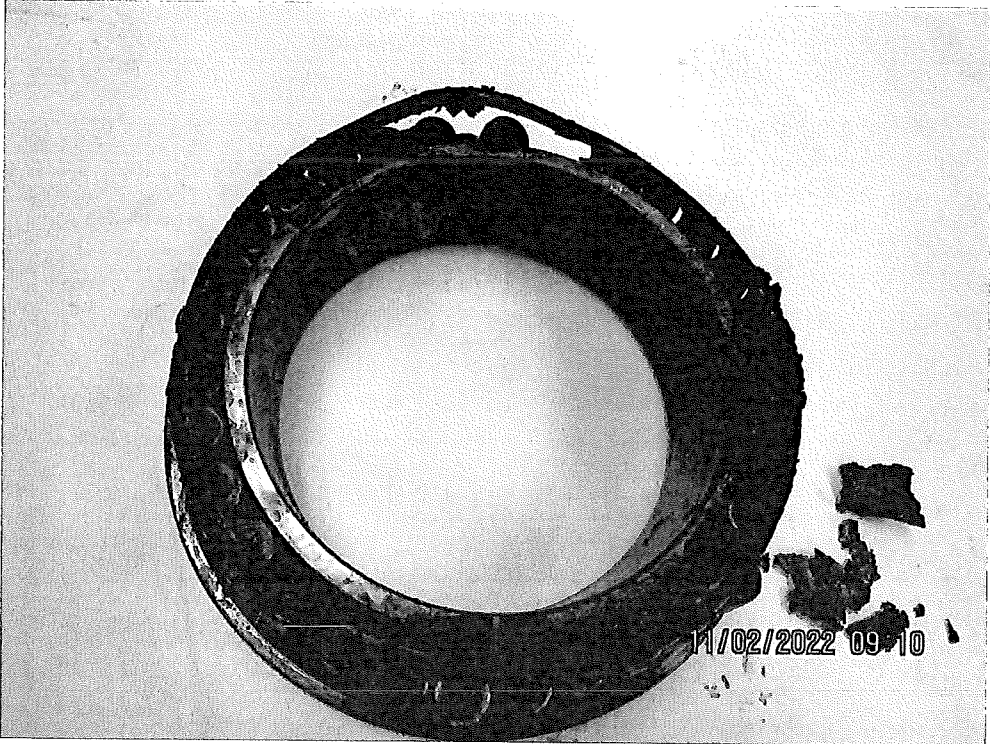


Figure 7 – Top-down view. Here we can see that the cage was pushed outward after sections of the cage were broken off and the debris and displaced rollers piled up underneath.

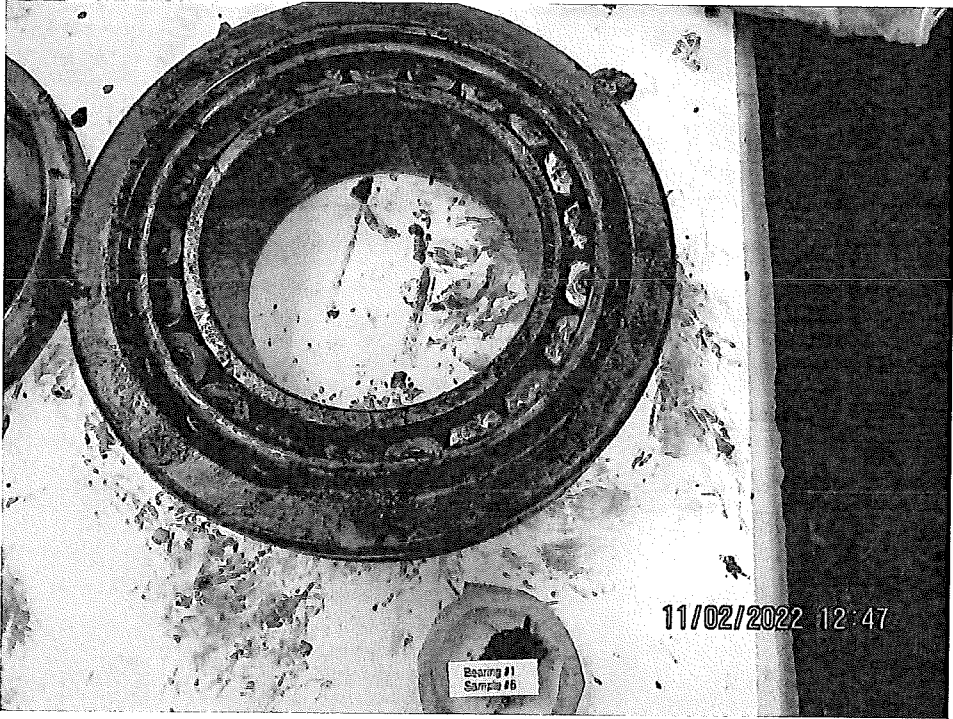
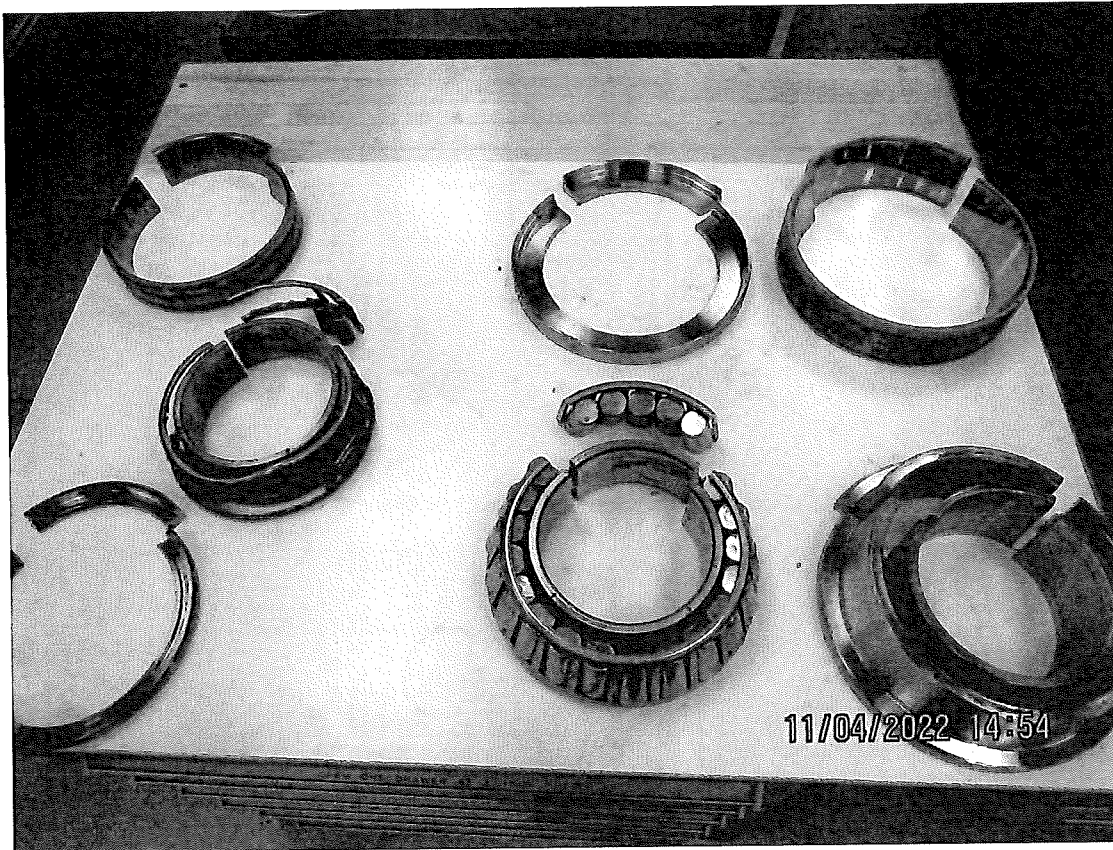


Figure 8 – The tapered bearing section from Assy #1. Note the plastic sample holder (blue tape seal) at the bottom center of image. Sample holder contains grease and debris sample #6 from Assy #1.



**Figure 9 – After some cleaning, bearing assy #1 is laid out to show the tapered roller group (near photo center), the cylindrical roller group (at left) and the housing. The groups have been sectioned to allow for closer inspection of damaged areas.**



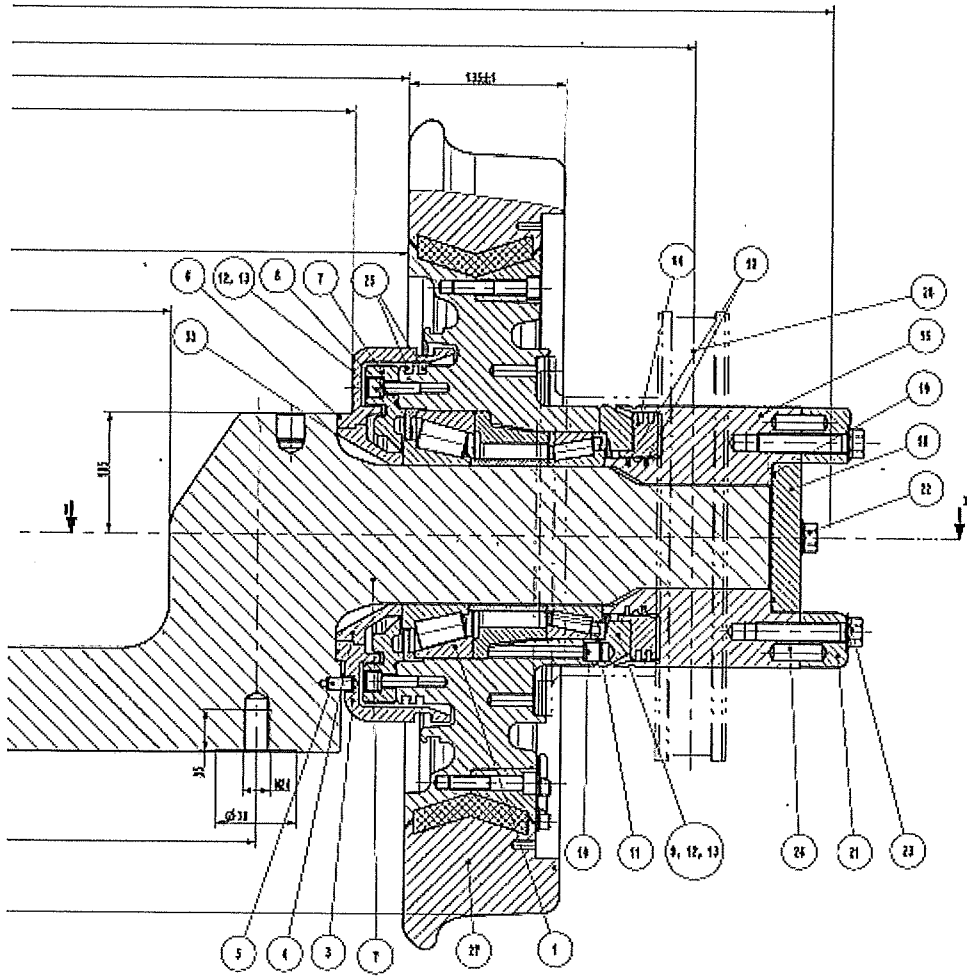


Figure 10 – Wheel drawing. The bearing Assy is shown in close-up below.

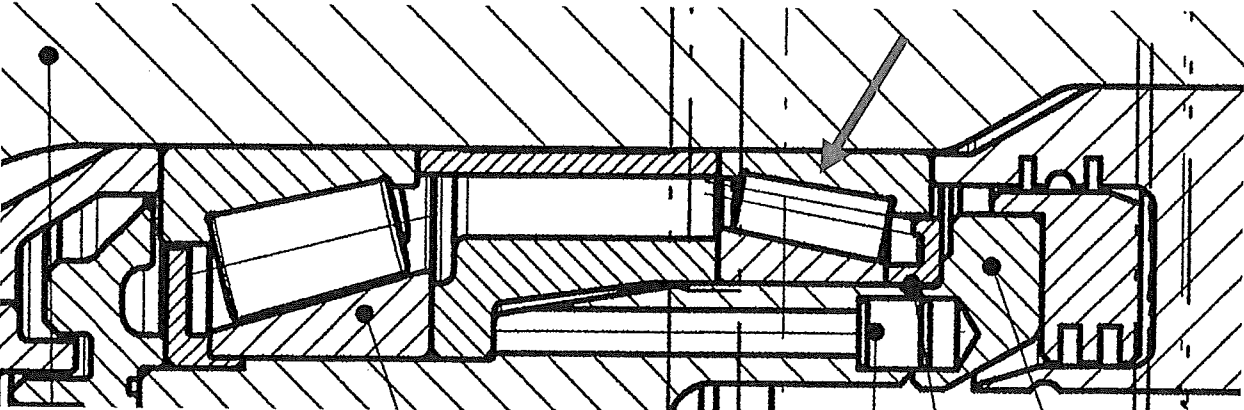
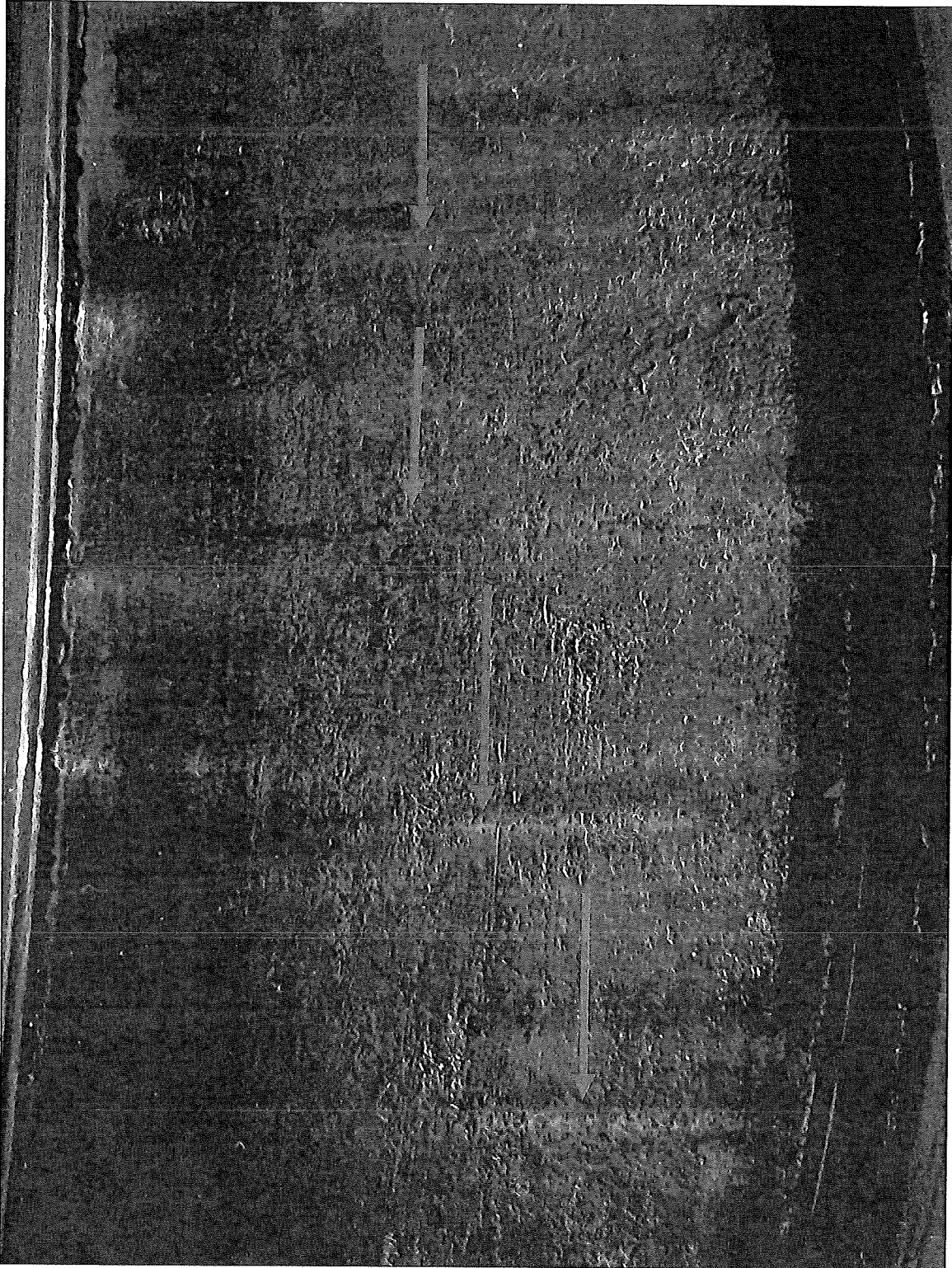


Figure 11 – Diagram of the wheel showing a close-up of the roller bearing assy. What I am calling the cylindrical rollers (red arrow) is nearest the outer-face of the wheel.



**Figure 12 – the cylindrical roller after cleaning. The metal cage failed ends are all swept in the same direction. The missing pieces account for most of the debris found.**



**Figure 13 – a close-up of the roller track surface. Spalling is very apparent. Spalling is due to metal-to-metal contact which indicates lubrication issues. The linear pattern which you see (arrows) is due to corrosion.**

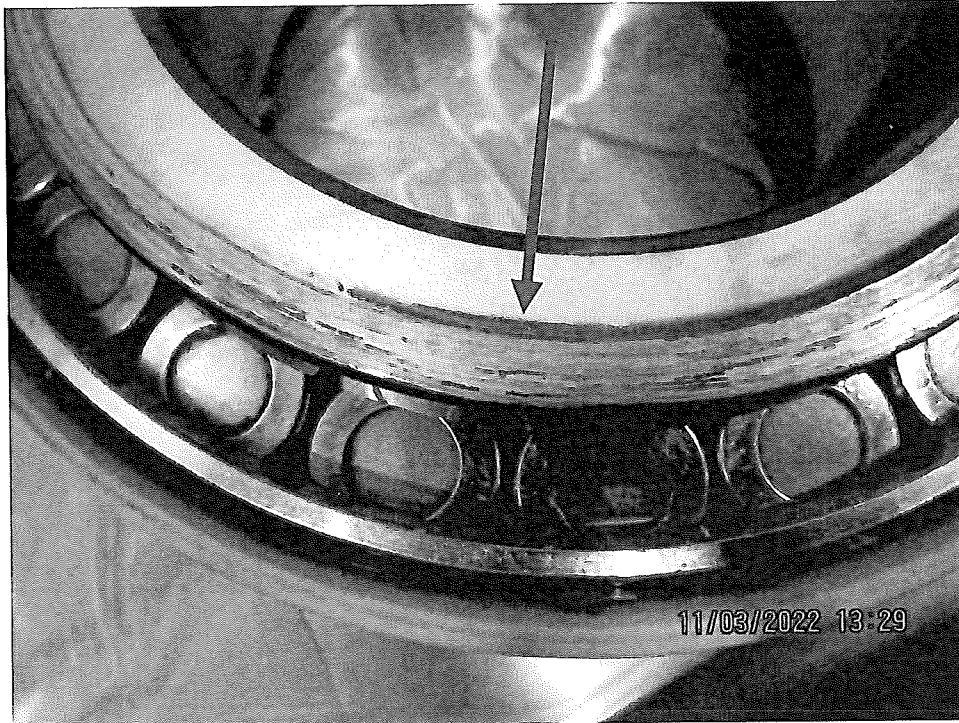


Figure 14 – Lubrication was also an issue for the intact tapered bearing. Note the blued metal (arrow) indicative of localized heating.

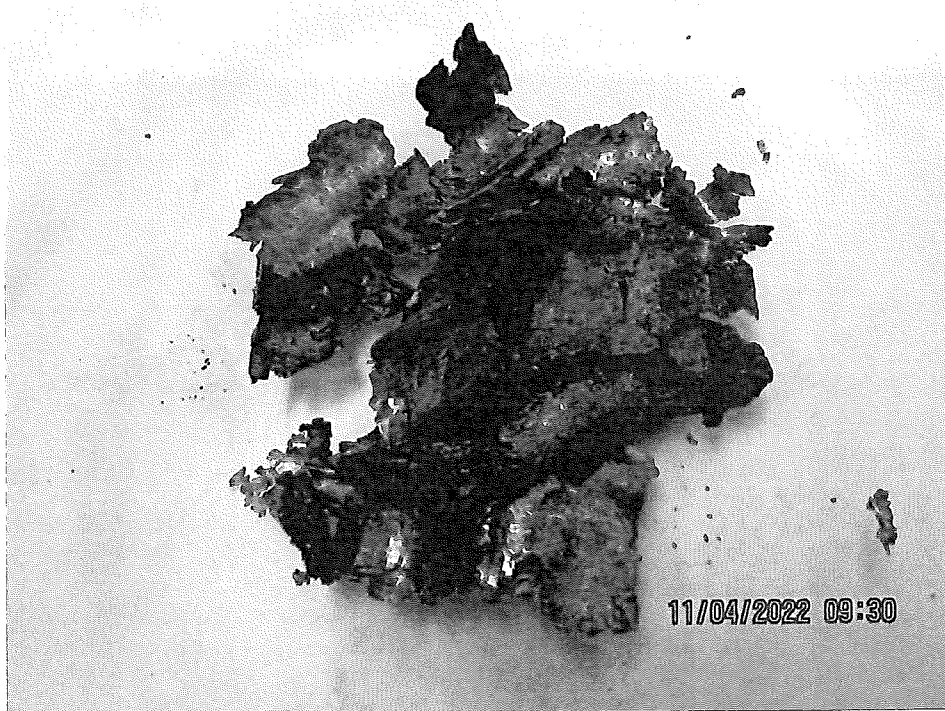


Figure 15 – a collection of debris from the failed metal cage.



Figure 16 – a collection of cylindrical rollers after cleaning. Scoring, corrosion and bluing from heat is evident.



Figure 17 – even the intact tapered bearing displayed some localized corrosion.



**CUSTOMER: Siemens**

**PO NR: 4400239735**

**MJO NR: 3804-68**

**DATE: 12/16/2022**

## **FINAL REPORT – Teardown/Failure Analysis of S70 center truck wheel bearings Bearing Assy #2**

### **INTRODUCTION**

Siemens contracted with the laboratory to analyze 4 failed wheel bearing assemblies. This report details the findings only for Bearing Assembly #2 which was received as shown in Appendix 1, Figure 1. No information was provided about time in service, service location, lubrication/inspection intervals or disassembly observations (wheel operation, condition of seals, etc.).

### **FINDINGS AND ANALYSIS**

#### **Grease & Debris Analysis –**

6 grease and debris samples were collected from bearing assembly #2. There was much more grease present on the contact surfaces and the grease was closer to its normal brown color (only minor thermal degradation). All cages and rollers were intact and there was much less damage than observed on Bearing Assy #1. Appendix 1, Figure 2 shows the inside of the bearing cover. Note the presence of a great deal of water! The water can lower the grease viscosity causing increased friction, heat and wear. It is believed that Assy #2 is much like Assy #1 but at an earlier stage of "failure" and the metal-to-metal contact did not yet develop enough heat to blacken the grease and drive off (evaporate) the water. The wheel seal was not provided to the laboratory for inspection however the presence of water may indicate an issue. No sand or other outside contamination was found indicating any seal problem is limited in nature.

### **Bearing Surface Damage -**

The bearing track surfaces displayed only minor and localized spalling (see Appendix 1, Figure 6) which is indicative of metal-to-metal contact, a lubrication issue. Damage was worst in the cylindrical bearing. It is believed that the cylindrical bearing got the worst of it due to higher amounts of water being present in that location. As seen in the previous report the smaller cylindrical bearing is nearer the outside of the wheel and the water has a shorter path to reach this point. Water can reduce the viscosity of the grease, increasing wear, while also causing corrosion.

### **DISCUSSION ON CORROSION**

There are two types of corrosion present in this bearing assembly. A "dry" corrosion can occur when metal-to-metal friction heats the metal which then corrodes in the presence of oxygen. The other type of corrosion is due to the presence of water. The water type is again much more prevalent in the cylindrical bearing.

### **RECOMMENDATIONS**

- Check the housing seals to make sure they can adequately prevent the ingress of liquid contaminants. Alternatively, consider using sealed bearings.
- The relubrication interval may need to be shortened. Supplying smaller quantities of fresh grease more frequently can help purge contaminated grease from the bearing/housing cavity.

**Prepared By:**

A handwritten signature in black ink, appearing to read "Perry L. Martin". The signature is written in a cursive style with a large initial "P" and "M".

**Perry L. Martin  
Materials Engineer**

APPENDIX 1

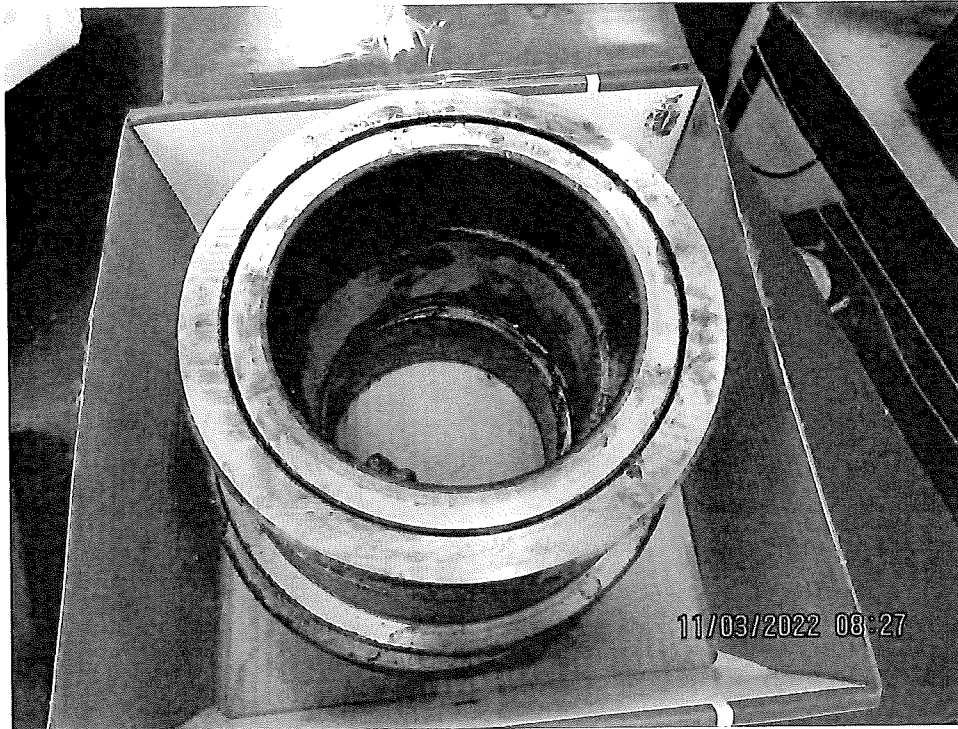


Figure 1 – Bearing assembly #2 as-received.



Figure 2 – There was a lot of water mixed with the grease inside the cylindrical bearing.





Figure 3 – A disassembled and cleaned bearing assy #2 laid out for viewing.

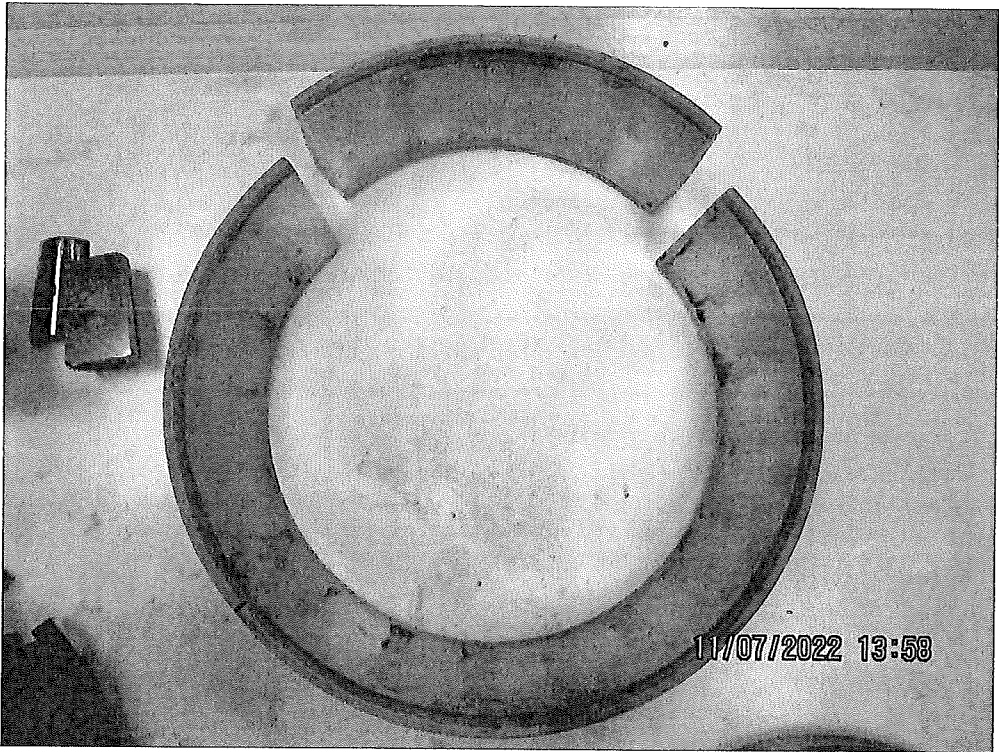


Figure 4 – Close-up of a cover after mild cleaning which showed localized corrosion at roller locations.

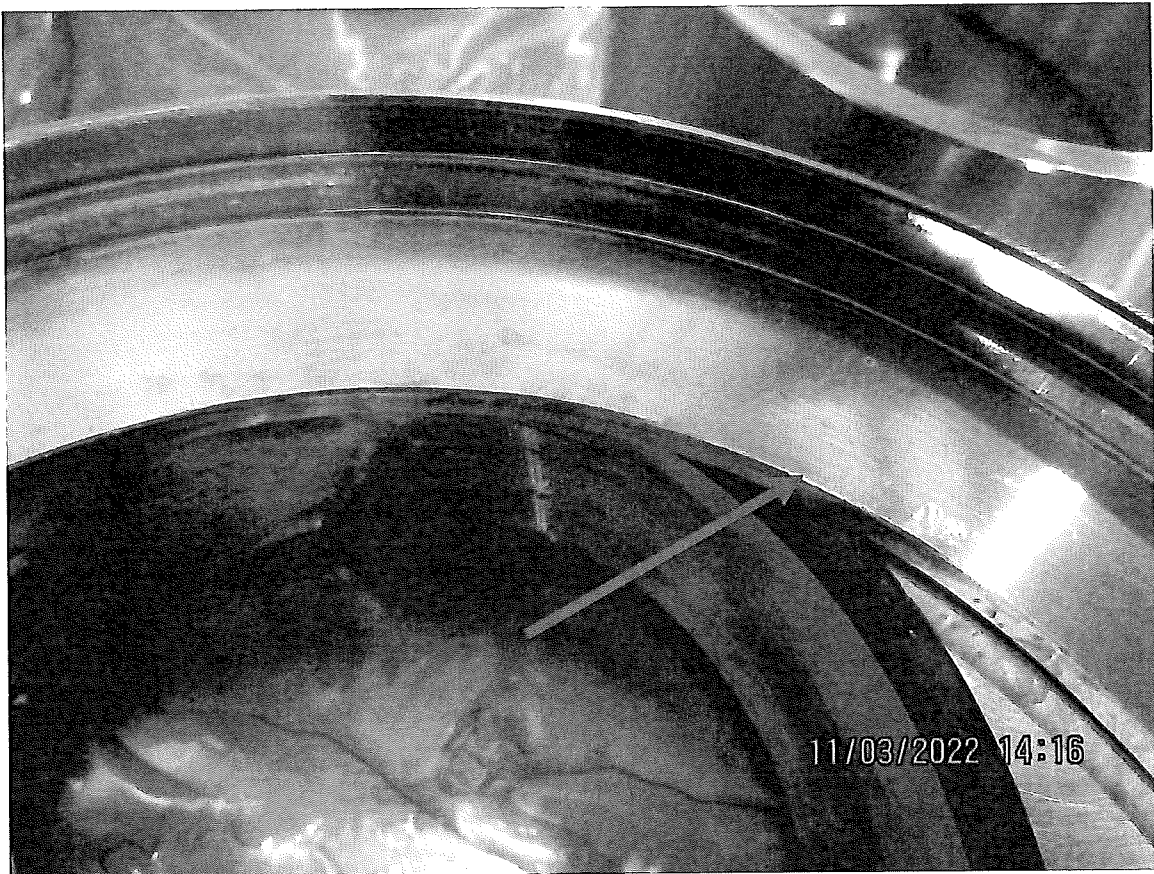


Figure 5 – Minor thermal heating discoloration (arrow).

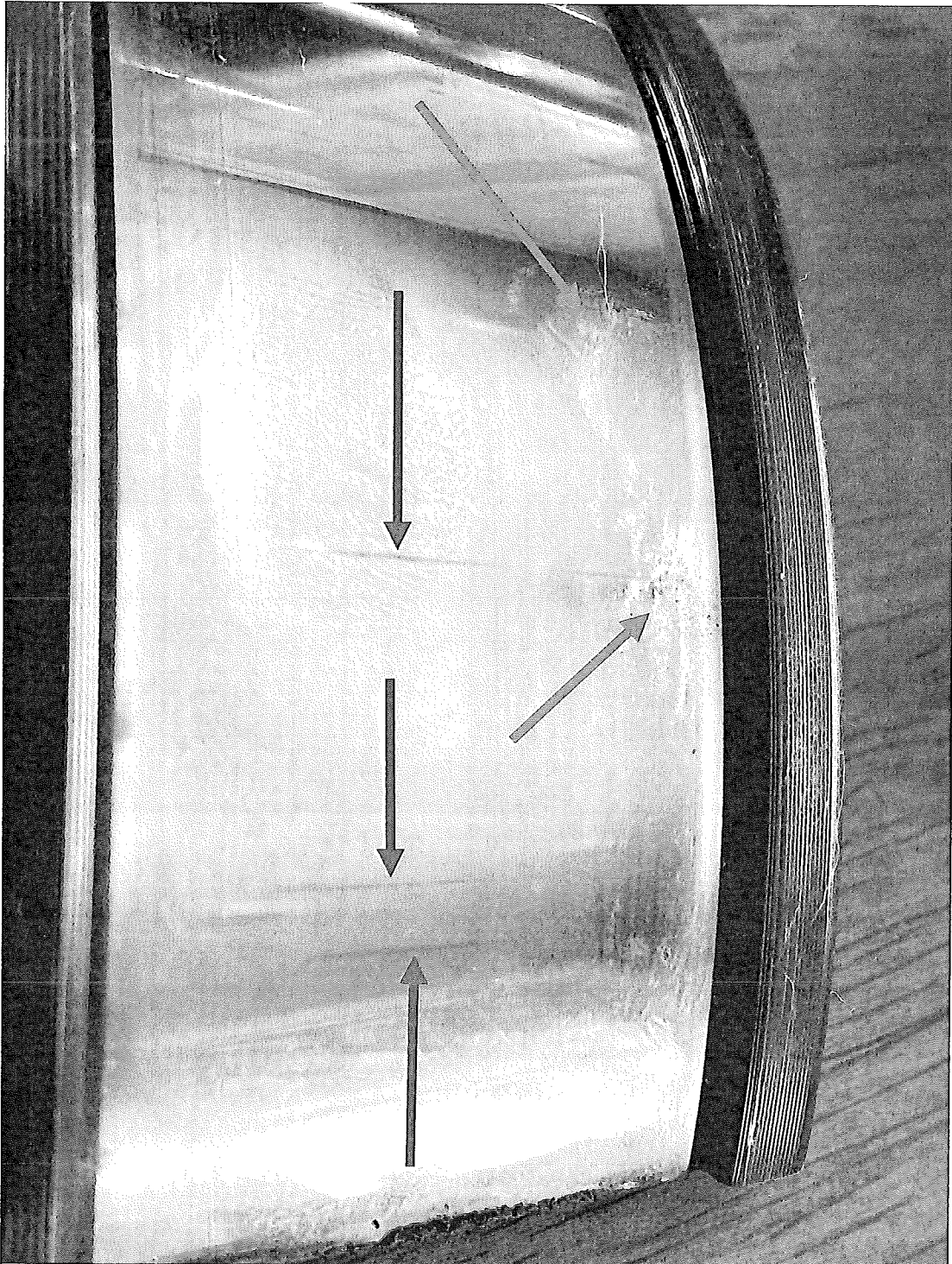


Figure 6 – The track surface for the cylindrical bearings. There is some linear scoring (red arrows). Minor spalling is indicated (blue arrows).

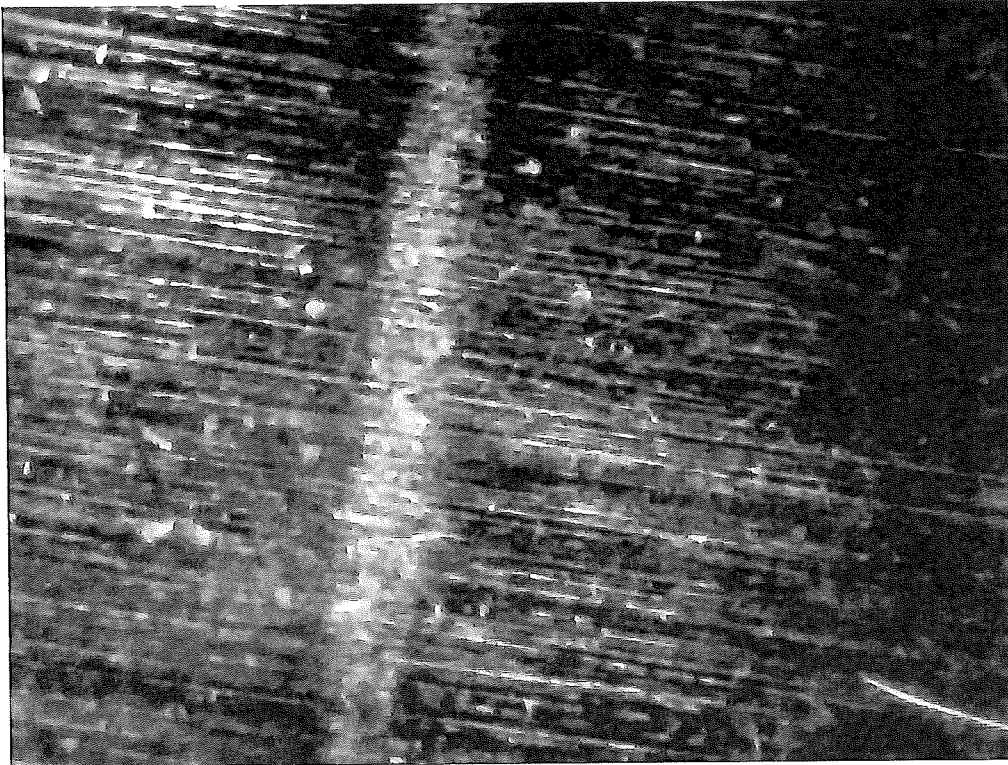


Figure 7 – 500x the arrow indicates a close-up of the linear scoring seen in Figure 6.

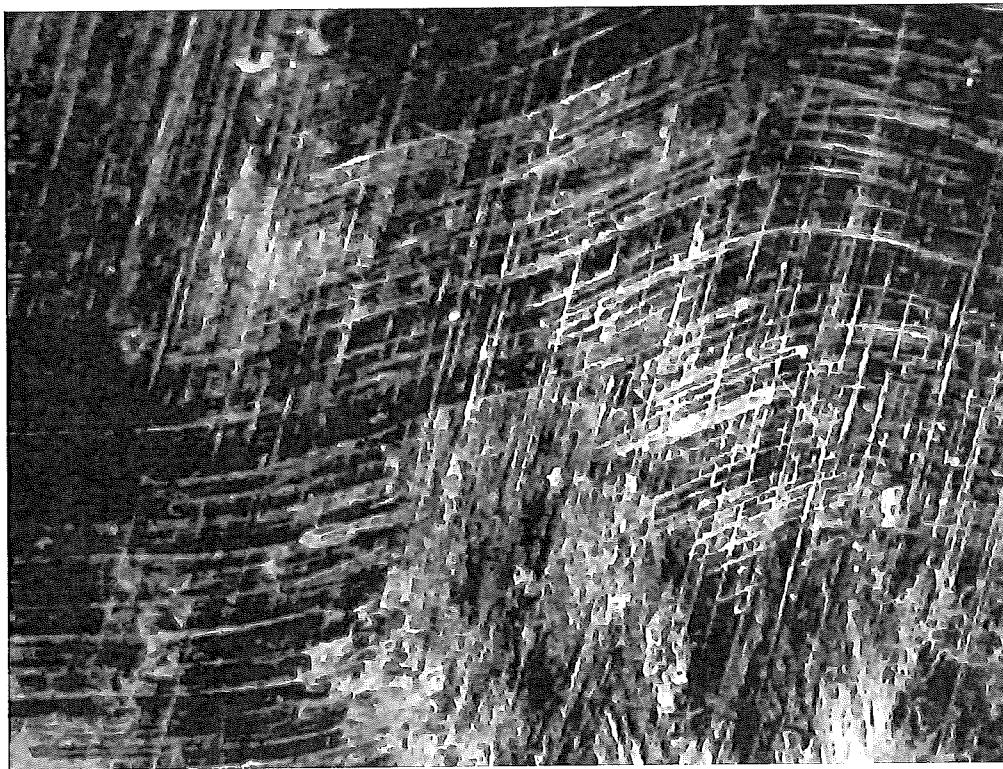


Figure 8 – 500x, a wavy scoring and some smearing was also seen on the cylindrical bearing track.

# **S70 Quick Reference Troubleshooting Guide**

Charlotte Area Transit System

January 2022

## DOCUMENT REVISION POLICY

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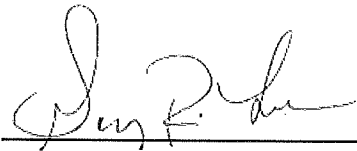
## DOCUMENT REVISION RECORD

| <b>Revision Number</b>       | <b>Date</b>    |
|------------------------------|----------------|
| Revision 0 - Initial Release | July 2012      |
| Revision 1                   | September 2014 |
| Revision 2                   | August 2017    |
| Revision 3                   | March 2021     |
| Revision 4                   | January 2022   |

## PURPOSE

This troubleshooting guide is designed to provide basic information on corrective actions for common fault codes found on the LRV. It is designed to be utilized by Rail Transportation and Rail Maintenance as a quick reference to recover or rescue a vehicle or consist by providing corrective actions for common fault code failures.

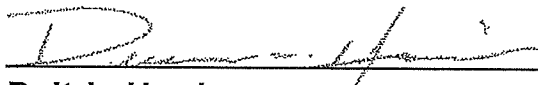
## APPROVALS:



**Gary Lee**  
Rail Car Maintenance Manager

01/24/2022

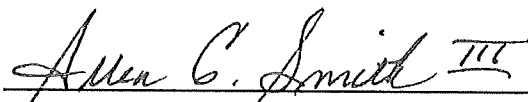
Date



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Date



**Allen C. Smith, III**  
Deputy Director of Transit - Chief Operating  
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01/18/2022

Date

## Summary of Changes Revision 4

| Location                       | Change  |
|--------------------------------|---|
| Entire Document                | Minor wording and organizational changes to improve clarity. Corrected various typos.   |
| CATS S70 Troubleshooting Guide | Added Codes 7115, 7117, 7120-7127, 7128-7135, N/A and corresponding information.<br><br>In Code “7218 (IV Only)” section, added fourth bullet to ROCC column: “If the fault did not clear instruct operator to clear the train of passengers, remove train from service at the terminal and operate OOS to the nearest yard.” |



## CATS S70\* Troubleshooting Guide

- \* Applies to all CATS I-IV series vehicles unless noted otherwise.

**CATS I/II AUX OFF / AUX ON PROCEDURES:**

1. Inform passengers that auxiliaries are going to be cycled.
2. Key down
3. Aux the vehicle Off for 30 seconds
4. Aux the vehicle On and do not key up or enable doors for 2 minutes
5. Key up and open or enable doors if at a platform and wait for vehicle to level completely (2-3 minutes)
6. If not at a platform then key up, wait for propulsion self-test to clear. Operate vehicle to the next station, open or enable doors and allow it to level completely (2-3 minutes)

**NOTE:** *If the vehicle is not allowed to finish leveling before moving, the vehicle will generate a 7153 Hydraulic System Maintenance Required Fault and can escalate to a more serious fault forcing the operator to start the process all over again*

**CATS III/IV AUX OFF / AUX ON PROCEDURES:**

1. Inform passengers that auxiliaries are going to be cycled.
2. Key down
3. Aux the vehicle Off for 30 seconds
4. Aux the vehicle On and do not key up or enable doors for 30 seconds.
5. Key up, wait for propulsion self-test to clear (approximately 30 seconds)

| CODE | STATUS | TOD MSG TEXT        | CORRECTIVE ACTION   |   |
|------|--------|---------------------|---|---|
|      |        |                     | Operator  | ROCC  |
| 7001 | B      | Pantograph<br>Fault | <ul style="list-style-type: none"> <li>Notify ROCC</li> </ul> <p><b>WARNING:</b> Do not open the doors or leave the vehicle if OCS is not intact or down wires are visible. Follow ROCC instructions.</p> | <ul style="list-style-type: none"> <li>Check condition of the pantograph.</li> <li>Lower the pantograph. Then raise the pantograph. If necessary, try this a few times until fault clears</li> <li>If faults have not cleared prepare to move the vehicle in off wire to safely off load passengers.</li> </ul> <p>NOTE: Stage vehicle per SOP.</p> |

| CODE | STATUS | TOD MSG TEXT                  | CORRECTIVE ACTION   |   |
|------|--------|-------------------------------|---|---|
|      |        |                               | Operator  | ROCC  |
| 7003 | B      | Master<br>Controller<br>Fault | <ul style="list-style-type: none"> <li>Notify ROCC</li> </ul> | <ul style="list-style-type: none"> <li>Activate EMERGENCY DRIVE<br/>BYPASS switch in active cab.</li> </ul> <p><b>WARNING:</b> Master controller provides maximum propulsion and brake rate; passengers must be offloaded at nearest station.</p> |

| CODE | STATUS | TOD MSG TEXT | CORRECTIVE ACTION  |  |
|------|--------|--------------|--|--|
|      |        |              | Operator   | ROCC   |
| 7004 | A      | HSCB OPEN    | <ul style="list-style-type: none"> <li>• Key down and key back up.</li> <li>• Notify ROCC.</li> <li>• Perform Aux On/Aux Off Procedures in the “Instructions Table” above. (As long as monitoring is active the HSCB cannot close.)</li> <li>• If fault clears continue to operate vehicle.</li> <li>• If fault does not clear notify ROCC and prepare vehicle for TOW.</li> </ul> | <ul style="list-style-type: none"> <li>• Instruct Operator to Press HSCB button on Operator Control Panel.</li> <li>• Key down and key back up.</li> <li>• Instruct the operator to perform Aux On/Aux Off Procedures in the “Instructions Table” above. (If monitoring is active HSCB cannot close.)</li> </ul> |

| CODE              | STATUS | TOD MSG TEXT   | CORRECTIVE ACTION  |   |
|-------------------|--------|--|--|---|
|                   |        |  | Operator   | ROCC  |
| 7006<br>/<br>7007 | B/C    | Serious Vehicle<br>Control Fault /<br>Vehicle<br>Control Fault | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Perform Aux On/Aux Off Procedures in the “Instructions Table” above.</li> <li>If fault still exists update ROCC and prepare vehicle to be TOWED.</li> </ul> <p><b>WARNING:</b> Master controller provides maximum propulsion rate and maximum brake rate. Operator must inform passengers of condition and offload.</p> | <ul style="list-style-type: none"> <li>Instruct the operator to perform Aux On/Aux Off Procedures in the “Instructions Table” above.</li> <li>If fault still exists either TOW vehicle or use EMERGENCY DRIVE BYPASS (Located on both the A and B ends).</li> </ul> <p><b>WARNING:</b> Master controller provides maximum propulsion and brake rate; passengers must be offloaded at nearest station.</p> |

| CODE                                 | STATUS | TOD MSG TEXT                    | CORRECTIVE ACTION  |  |
|--------------------------------------|--------|---------------------------------|--|--|
|                                      |        |                                 | Operator   | ROCC   |
| 7010<br>/<br>7011<br>(I-III<br>Only) | C      | TOD A Fault<br>/<br>TOD B Fault | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Cycle TOD CB.</li> <li>Inform ROCC of the fault status.</li> </ul>  | <ul style="list-style-type: none"> <li>Instruct the operator to cycle the TOD CB.</li> <li>If the fault does not clear stage the vehicle to return to the nearest yard.</li> </ul> |
| 7012                                 | B      | Event Recorder                  | <ul style="list-style-type: none"> <li>Notify ROCC</li> <li>Prepare to clear train of passengers at terminal station for maintenance.</li> <li>Bring Vehicle to nearest yard.</li> </ul> | <ul style="list-style-type: none"> <li>Take vehicle Out-Of-Service (OOS) at a terminal for maintenance (event recorder failure)</li> <li>Bring Vehicle to nearest yard</li> </ul>  |

|                    |                 |                             |   |  |
|--------------------|-----------------|-----------------------------|---|--|
| <p><b>7013</b></p> | <p><b>C</b></p> | <p><b>Gateway Fault</b></p> | <ul style="list-style-type: none"> <li>• Notify ROCC</li> <li>• If not at a station, Activate Emergency Drive By-pass switch to get to next station.</li> <li>• Prepare to clear train of passengers.</li> <li>• Follow ROCC instructions.</li> </ul> | <p><b>NOTE:</b> When Gateway fault occurs vehicle will not move as a consist.</p> <ul style="list-style-type: none"> <li>• If not at a station, Activate Emergency Drive By-pass switch to get to next station.</li> </ul> <p><b>At Station:</b></p> <ul style="list-style-type: none"> <li>• Isolate Coupler and identify affected vehicle.</li> <li>• Uncouple vehicle and operate as a single if a replacement LRV is not available.</li> <li>• Return affected vehicle to the nearest yard.</li> <li>• Return defective vehicle to the nearest yard as a single vehicle or in emergency drive as a consist if a second operator is not available.</li> </ul> |
|--------------------|-----------------|-----------------------------|---|--|



| CODE | STATUS | TOD MSG TEXT                  | CORRECTIVE ACTION   |   |
|------|--------|-------------------------------|---|---|
|      |        |                               | Operator  | ROCC  |
| 7014 | B      | VCU<br>Communication<br>Fault | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Perform Aux On/Aux Off Procedures in the “Instructions Table” above.</li> </ul> <p>NOTE: There will be a 25 MPH speed restriction.</p> | <ul style="list-style-type: none"> <li>Instruct the operator to perform Aux On/Aux Off Procedures in the “Instructions Table” above.</li> <li>If VCU Communication faults still exist instruct the operator to break the PROPULSION CUTOUT bypass seal in the affected car.</li> <li>Bring vehicle to nearest yard.</li> </ul> <p>NOTE: The VCU imposes a 25 MPH speed restriction.</p> |

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|                      |        | CORRECTIVE ACTION                            |  |
|----------------------|--------|--|--|
| CODE                 | STATUS | TOD MSG TEXT                                 | Operator   |
| 7015<br>(IV<br>Only) | B      | Train Operator<br>Display Fault<br>(end cab) | <p>Operator</p> <ul style="list-style-type: none"> <li>• Notify ROCC</li> <li>• Announce to passenger that the train will be turned off then back on.</li> <li>• Per ROCC permission perform Aux On/Aux Off Procedures in the “Instructions Table” above.</li> <li>• Report to ROCC the fault status.</li> </ul> |
|                      |        |  | ROCC   |
|                      |        |  | <ul style="list-style-type: none"> <li>• Instruct the operator to perform Aux On/Aux Off Procedures in the “Instructions Table” above.</li> <li>• If the fault persists and the TOD is down. Stage vehicle to return to nearest yard.</li> </ul>   |

| CODE              | STATUS | TOD MSG TEXT                 | CORRECTIVE ACTION  |   |
|-------------------|--------|------------------------------|--|---|
|                   |        |                              | Operator   | ROCC  |
| 7017<br>/<br>7018 | B      | Drive Car A<br>Fault/B Fault | <ul style="list-style-type: none"> <li>• Key down and key back up.</li> <li>• If fault doesn't clear, notify ROCC.</li> <li>• Perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>• If Drive fault does not clear update ROCC and follow ROCC instructions.</li> </ul> | <ul style="list-style-type: none"> <li>• Key down and key back up.</li> <li>• Instruct the operator to perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>• If fault doesn't clear, activate "Propulsion Cutout" A-Car/B-Car bypassing propulsion of the affected LRV.</li> <li>• Off-load passengers.</li> <li>• Bring vehicle to nearest yard.</li> </ul> <p>NOTE: The VCU imposes a 25 MPH speed restriction.</p> |

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| CODE | STATUS | TOD MSG TEXT                               | CORRECTIVE ACTION   |   |
|------|--------|--|---|---|
|      |        |  | Operator  | ROCC  |
| 7019 | D      | Read Diagnostic Memory of Traction Control | <ul style="list-style-type: none"> <li>Press OK, fault will clear</li> <li>Continue to operate vehicle.</li> <li>Report to ROCC.</li> </ul> | <ul style="list-style-type: none"> <li>Instruct Operator to press the OK on the TOD, fault will clear.</li> <li>Log for maintenance follow-up.</li> </ul> |

| CODE | STATUS | TOD MSG TEXT                      | CORRECTIVE ACTION  |   |
|------|--------|-----------------------------------|--|---|
|      |        |                                   | Operator   | ROCC  |
| 7036 | A      | Panic Brake<br>Contactor<br>Fault | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>If TOD displays "A" fault:<br/>Request to recycle the ATP circuit breaker in the A cab.<br/>Wait 3 seconds before turning the breaker back on</li> <li>If Class "A" fault remains update ROCC.</li> <li>Perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>If "A" fault remains update ROCC and follow ROCC instructions.</li> </ul> | <ul style="list-style-type: none"> <li>Instruct the operator to cycle ATP circuit breaker off/on.<br/>NOTE: Wait three (3) seconds before cycling the CB back on.<br/>The ATP CB is in the A end cab.</li> <li>If fault remains instruct the operator to perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>If fault remains off-load customers in the station, cut out ATP BYPASS located in the active cab, if fault reduces to "B" fault, return to the nearest yard 25 MPH under absolute block procedures. If above steps fail, "PREPARE FOR TOW".</li> </ul> |

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| CODE                           | STATUS | TOD MSG TEXT   | CORRECTIVE ACTION  |  |
|--------------------------------|--------|--|--|--|
|                                |        |  | Operator   | ROCC   |
| 7042<br>/<br>7043<br>/<br>7044 | B/A/C  | <p>APS Faults:</p> <p>Main Inverter<br/>fault /<br/>Down fault /<br/>No Backup<br/>fault</p> | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Follow ROCC instructions and prepare to take the Vehicle OOS.</li> <li>Off-load passengers as instructed.</li> </ul> <p>NOTE: There will be a 25 MPH speed restriction.</p> | <ul style="list-style-type: none"> <li>Instruct operator to lower the pantograph.</li> <li>Instruct the operator to perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>Raise the pantograph.</li> <li>If fault does not clear take the vehicle OOS at a terminal station and off-load passengers.</li> <li>Bring vehicle to nearest yard for maintenance.</li> </ul> <p>NOTE: The VCU imposes a 25 MPH speed restriction.</p> |

| CODE | STATUS               | TOD MSG TEXT                                  | CORRECTIVE ACTION   |   |
|------|----------------------|---|---|---|
|      |                      |   | Operator  | ROCC  |
| 7045 | B                    | APS Fault-LVPS<br>Inv. Battery<br>Discharging | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Follow ROCC instructions and prepare to take the Vehicle OOS.</li> <li>Off-load passengers as instructed.</li> </ul> | <ul style="list-style-type: none"> <li>Instruct operator to lower the pantograph.</li> <li>Instruct the operator to perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>Raise the pantograph.</li> <li>If fault does not clear take the vehicle OOS at a terminal station and off-load passengers. Prepare to tow.</li> </ul> |
| 7049 | I/II: C<br>III/IV: B | Battery Fault                                 | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Move the vehicle to the nearest station and prepare to off load passengers.</li> </ul>                               | <ul style="list-style-type: none"> <li>Notify RCM.</li> <li>Inform the operator to off load passengers.</li> <li>Return the vehicle to the nearest yard.</li> </ul>   |

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| CODE | STATUS | TOD MSG TEXT             | CORRECTIVE ACTION   |  |
|------|--------|--------------------------|---|--|
|      |        |                          | Operator  | ROCC   |
| 7057 | B      | Aux Off<br>Control Fault | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Following ROCC instructions, attempt to aux off vehicle from Auxiliary switch on dash panel.</li> <li>Acknowledge fault alarm and continue to operate vehicle.</li> </ul> <p>NOTE: Vehicle can be auxed off by cutting out the Aux Off circuit breaker (located in B-Cab). Use door 1 or 8 emergency access to access LRV.</p> | <ul style="list-style-type: none"> <li>Instruct operator to Check Aux Off/On exterior crew key switches to ensure a switch is not stuck in the "ON" position.</li> <li>Instruct operator to attempt to aux off vehicle from Auxiliary switch on dash panel.</li> <li>Instruct operator to acknowledge fault alarm and continue to operate vehicle.</li> </ul> <p>NOTE: Vehicle can be auxed off by cutting out the Aux Off circuit breaker (located in B-Cab). Use door 1 or 8 emergency access to access LRV.</p> |



| CODE              | STATUS | TOD MSG TEXT               | CORRECTIVE ACTION   |  |
|-------------------|--------|----------------------------|---|--|
|                   |        |                            | Operator  | ROCC   |
| 7061<br>/<br>7064 | C      | HVAC A or B<br>Minor Fault | <ul style="list-style-type: none"> <li>• Notify ROCC</li> <li>• Press "OK" button on TOD to acknowledge fault alarm.</li> <li>• Continue to operate vehicle.</li> </ul> | <ul style="list-style-type: none"> <li>• Instruct Operator to press OK on the TOD to clear alarm.</li> <li>• Instruct operator to continue.</li> </ul> |

| CODE | STATUS | TOD MSG TEXT                               | CORRECTIVE ACTION   |   |
|------|--------|--|---|---|
|      |        |  | Operator  | ROCC  |
| 7068 | C      | TWC<br>Equipment<br>Fault or Power<br>Loss | <ul style="list-style-type: none"> <li>Notify ROCC</li> <li>Check the TWC CB and reset or cycle per ROCC instructions.</li> <li>If the fault remains follow ROCC instructions.</li> </ul> <p>NOTE: CATS I-III prepare to off load passengers and return the vehicle to the nearest yard.<br/>CATS IV (SC) can run on the Gold line without the TWC.</p> | <ul style="list-style-type: none"> <li>Instruct operator to check the TWC CB located in the B-Cab.</li> <li>If the CB is tripped have the operator reset the CB. If it is not tripped have the operator cycle the CB off for 30 seconds then back on.</li> <li>If the fault remains:<br/>CATS I-III off load passengers and return the vehicle to the nearest yard.<br/>CATS IV (SC) can run on the Gold line without the TWC.</li> </ul> |

| CODE | STATUS | TOD MSG TEXT                  | CORRECTIVE ACTION   |   |
|------|--------|-------------------------------|---|---|
|      |        |                               | Operator  | ROCC  |
| 7069 | C      | Digital Video Recorder Faulty | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Cycle CCTV CB per ROCC instructions.</li> </ul> LRV I/II - CCTV CB location A-Cab<br>LRV III/IV – CCTV CB location B-Cab<br><ul style="list-style-type: none"> <li>If the fault did not clear follow ROCC instructions to clear the train of passengers, remove train from service at the terminal and operate OOS to the nearest yard.</li> </ul> | <ul style="list-style-type: none"> <li>Instruct the operator to cycle the CCTV circuit breaker (CB) off for 30 seconds then back on.</li> </ul> Allow the DVR to reboot.<br>LRV I/II - CCTV CB location A-Cab<br>LRV III/IV – CCTV CB location B-Cab<br><ul style="list-style-type: none"> <li>If the fault did not clear instruct operator to clear the train of passengers, remove train from service at the terminal and operate OOS to the nearest yard.</li> </ul> |

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|------|---|--|---|--|
| 7070 | C | ATP<br>Equipment<br>Fault or Power<br>Loss | <ul style="list-style-type: none"> <li>• Notify ROCC.</li> <li>• Request authorization to Cycle the ATP Circuit Breaker. If fault clears update ROCC and continue to operate vehicle.</li> <li>• If fault remains update ROCC, perform Aux On/Aux Off Procedures in the "Instructions Table" above</li> <li>• If fault continues, update ROCC and follow ROCC instructions to off-load passenger and cut out "ATP BYPASS".</li> <li>• Operate vehicle to the nearest yard. 25 MPH speed restriction imposed.</li> </ul> | <ul style="list-style-type: none"> <li>• Instruct operator to re-cycle the ATP circuit breaker located in the A-Cab.</li> <li>• If fault remains, perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>• If fault remains, instruct the operator to off-load the passengers, cut out ATP by-pass and operate to the nearest yard under absolute block procedures.</li> </ul> <p>NOTE: The VCU imposes a 25 MPH speed restriction.</p> |
|------|---|--|---|--|

| CODE  | STATUS | TOD MSG TEXT | CORRECTIVE ACTION   |   |
|---|--------|--------------|---|---|
|   |        |              | Operator  | ROCC  |
| 7071  | C      | PIS Fault    | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Press "OK" button on TOD to acknowledge fault alarm.</li> <li>Follow ROCC instructions to Reset PIS circuit breaker</li> <li>Perform Aux On/Aux Off Procedures in the "Instructions Table" above, update ROCC</li> <li>Continue to operate vehicle.</li> </ul> | <ul style="list-style-type: none"> <li>Instruct the operator to press the ok button on the TOD.</li> <li>Recycle PIS circuit breaker located in the A-Cab.</li> <li>Instruct the operator to perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>In the event the PIS fault cannot be cleared instruct operator to make manual announcements.</li> <li>Continue to operate under manual announcements or off load passengers and return the vehicle to the nearest yard.</li> </ul> |
| <p><b>Note for 7082, 7083 &amp; 7084: Corrective actions apply only when faults occur in yard or at a terminal station. If fault appears on the mainline, the operator shall notify the ROCC for appropriate instruction.</b></p> |        |              |   |   |

| CODE | STATUS | TOD MSG TEXT    | CORRECTIVE ACTION  |  |
|------|--------|-----------------|--|--|
|      |        |                 | Operator   | ROCC   |
| 7082 | C      | Coupling Failed | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Following instructions recheck the coupler assembly, pins, alignment and for debris for damage.</li> <li>Retry to Couple after inspection</li> <li>Ensure vehicles are uncoupled.</li> <li>Perform Aux On/Aux Off Procedures in the "Instructions Table" above on both LRVs.</li> <li>Retry to couple.</li> </ul> | <ul style="list-style-type: none"> <li>Instruct operator to check coupler assembly for alignment and debris.</li> <li>Retry to couple.</li> <li>Ensure vehicles are uncoupled.</li> <li>Instruct the operator to perform Aux On/Aux Off Procedures in the "Instructions Table" above on both LRVs.</li> <li>Retry to couple.</li> <li>If fault remains, if at a terminal station return the vehicles to the nearest yard.</li> </ul> |

| CODE | STATUS | TOD MSG TEXT      | CORRECTIVE ACTION  |   |
|------|--------|-------------------|--|---|
|      |        |                   | Operator   | ROCC  |
| 7083 | C      | Uncoupling Failed | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Retry to Uncouple</li> <li>Perform Aux On/Aux Off Procedures in the "Instructions Table" above on both vehicles.</li> <li>Attempt to uncouple.</li> </ul> | <ul style="list-style-type: none"> <li>Instruct operator to buff couplers and retry uncoupling.</li> <li>Instruct the operator to perform Aux On/Aux Off Procedures in the "Instructions Table" above on both vehicles.</li> <li>Attempt to uncouple.</li> <li>Manually uncouple using manual release.</li> </ul> |

|      |   |   |   |   |
|------|---|---|---|---|
| 7084 | C | <p><b>Uncoupling Ended with Failure</b></p> | <ul style="list-style-type: none"> <li>• Notify ROCC</li> <li>• Follow instructions to Uncouple and Couple vehicle.</li> <li>• If fault continues to be displayed, update ROCC</li> <li>• At terminal, perform Aux On/Aux Off Procedures in the "Instructions Table" above on both vehicles.</li> <li>• Attempt to uncouple.</li> <li>• At terminal OOS vehicle and operate to the nearest yard.</li> </ul> | <p>First determine if the fault is a coupled or uncoupled end.</p> <p>Coupled End:</p> <ul style="list-style-type: none"> <li>• If vehicles are still coupled, buff couplers and attempt to uncouple again.</li> <li>• Instruct the operator to perform Aux On/Aux Off Procedures in the "Instructions Table" above on both vehicles.</li> <li>• Attempt to uncouple.</li> <li>• Manually uncouple using manual release.</li> <li>• Contact RCM.</li> </ul> <p>Uncoupled End:</p> <ul style="list-style-type: none"> <li>• Check the electrical heads for exposed electrical connectors.</li> </ul> |
|------|---|---|---|---|



| CODE | STATUS | TOD MSG TEXT | CORRECTIVE ACTION |  |
|------|--------|--------------|-------------------|--|
|      |        |              | Operator          | ROCC   |
|      |        |              |                   | <ul style="list-style-type: none"> <li>• Recycle the coupler switch on the face of the coupler.</li> <li>• If fault remains contact RCM for restriction.</li> <li>• Continue to operate in service or return to the nearest yard. <b>DO NOT</b> operate in service in inclement weather with exposed electrical pins. Return to yard.</li> </ul> |

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| <p>7099<br/>to<br/>7106</p> | <p>C</p> <p><b>Door 1 through<br/>8 Serious Door<br/>Fault</b></p> | <ul style="list-style-type: none"> <li>• Make PA announcements to customers to remove any object in door and to stand clear of the doors</li> <li>• If only properly berthed at a station, recycle doors on the platform side to verify that doors will close.</li> <li>• If the fault is still active, notify ROCC.</li> <li>• Follow ROCC instructions to Mechanically Cut Out effected Door.</li> <li>• Update ROCC, continue to operate vehicle after confirming all doors closed.</li> </ul> | <ul style="list-style-type: none"> <li>• Instruct operator to make announcement to stand clear of doors and to check for obstructions in the doorway.</li> <li>• Verify train is properly berthed at a station, instruct operator to re-cycle the doors on the platform side only.</li> <li>• If train doors close. Instruct the operator to continue.</li> <li>• If doors do not close and fault still exists. Instruct the operator to make announcements to the passengers, turn on handheld radio and mechanically cut out the affect door/s. Continue to operate in service.</li> </ul> |
|-----------------------------|--|---|--|

| CODE               | STATUS | TOD MSG TEXT                   | CORRECTIVE ACTION  |  |
|--------------------|--------|--------------------------------|--|--|
|                    |        |                                | Operator   | ROCC   |
| 7107<br>to<br>7114 | NA     | Door #<br>Emergency<br>Release | <ul style="list-style-type: none"> <li>• Notify ROCC.</li> <li>• Reset the INT/EXT EM door release.</li> </ul> | <ul style="list-style-type: none"> <li>• Have the operator reset the INT/EXT EM door release switch/handle.</li> <li>• If the fault persists contact RCM.</li> </ul> |

| CODE | STATUS | TOD MSG TEXT                | CORRECTIVE ACTION   |  |
|------|--------|-----------------------------|---|--|
|      |        |                             | Operator  | ROCC   |
| 7115 | B      | Door Summary<br>Implausible | <ul style="list-style-type: none"> <li>• Notify ROCC</li> <li>• Follow instructions to continue to operate vehicle and off load passengers.</li> <li>• Operate Vehicle to nearest yard</li> </ul> | <ul style="list-style-type: none"> <li>• Instruct the operator to perform Aux On/Aux Off Procedures in the “Instructions Table” above.</li> <li>• If fault is still present, instruct operator to off-load at the nearest station.</li> <li>• Notify RCM to determine if vehicle can be operated back to the nearest yard or prepared for tow.</li> <li>• Instruct operator that before removing the vehicle from service, ensure all doors are closed and locked. Initiate the Door Interlock Bypass to allow movement of the vehicle.</li> </ul> |

| CODE           | STATUS | TOD MSG TEXT                   | CORRECTIVE ACTION   |   |
|----------------|--------|--------------------------------|---|---|
|                |        |                                | Operator  | ROCC  |
| 7117           | B      | Door Release Discrepancy       | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Locate door(s) not opening and cut the door out.</li> </ul>  | <ul style="list-style-type: none"> <li>Instruct operator to locate door(s) not opening and cut the door out.</li> </ul>   |
| 7119           | B      | Main Fuse Blown                | <ul style="list-style-type: none"> <li>Notify ROCC</li> <li>Follow instructions to continue to operate vehicle and off load passengers.</li> <li>Operate Vehicle to nearest yard</li> </ul> | <ul style="list-style-type: none"> <li>Instruct operator to off-load at the nearest station.</li> <li>Notify RCM to determine if vehicle can be operated back to the nearest yard or prepared for tow.</li> </ul>   |
| 7120 -<br>7127 | C      | Door # – No Motion Discrepancy | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Locate door(s) not opening and isolate the affected door(s).</li> </ul>  | <ul style="list-style-type: none"> <li>Instruct the operator to isolate the affected door(s)</li> <li>If vehicle movement is not successful instruct operator to off-load at the station.</li> <li>Activate the No Motion Bypass and operate the vehicle back to the yard.</li> </ul> |

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TRANSIT SYSTEM

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| CODE           | STATUS | TOD MSG TEXT                       | CORRECTIVE ACTION  |   |
|----------------|--------|------------------------------------|--|---|
|                |        |                                    | Operator   | ROCC  |
| 7128 -<br>7135 | C      | Door # -<br>Release<br>Discrepancy | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Locate door(s) not opening and isolate the affected door(s).</li> </ul> | <ul style="list-style-type: none"> <li>Instruct the operator to isolate the affected door(s) and trip the appropriate door number power supply circuit breaker on the A-end panel for doors 1-4 and B-end panel for doors 5-8.</li> </ul> |

|   |              |   |  |  |
|---|--------------|---|--|--|
| <p>7136<br/>/<br/>7137<br/>/<br/>7138</p> | <p>A/A/B</p> | <p><b>BCU Faulty:</b><br/><br/>PT A<br/>/<br/>PT B<br/>/<br/>CT</p> | <ul style="list-style-type: none"> <li>• Notify ROCC.</li> <li>• Perform Aux On/Aux Off Procedures in the “Instructions Table” above.</li> <li>• If at station, enable doors.</li> <li>• If BCU fault does not clear, update ROCC. Follow ROCC instructions to break the FRICTION BRAKE CUTOUT seal of the affected car.</li> <li>• PT-A &amp; CT FB cutout switches are in the A-Cab.</li> <li>• PT-B FB cutout switch is in the B-Cab.</li> <li>• Off-load passengers.</li> <li>• Operate vehicle to the nearest yard at 25 MPH speed restriction</li> </ul> | <ul style="list-style-type: none"> <li>• Instruct the operator to perform Aux On/Aux Off Procedures in the “Instructions Table” above.</li> <li>• Enable doors if at a station.</li> <li>• If fault fails to clear, instruct the operator to cut out the Friction Brakes on the affected car.</li> </ul> <p>PT-A &amp; CT FB cutout switches are in the A-Cab.<br/>PT-B FB cutout switch is in the B-Cab.</p> <ul style="list-style-type: none"> <li>• Off-load passengers, operate vehicle to the nearest yard.</li> </ul> <p>NOTE: The VCU imposes a 25 MPH speed restriction.</p> |
|---|--------------|---|--|--|

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| CODE              | STATUS | TOD MSG TEXT  | CORRECTIVE ACTION  |  |
|-------------------|--------|---|--|--|
|                   |        |   | Operator   | ROCC   |
| 7139<br>/<br>7140 |        | 1 <sup>st</sup> Stage A/C<br>or B/C Car<br>Floor Heat<br>Ground Fault | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Press "OK" button on TOD to acknowledge fault alarm.</li> <li>Continue to operate vehicle.</li> </ul> | <ul style="list-style-type: none"> <li>Instruct operator to press OK on the TOD.</li> <li>Vehicle can continue to operate.</li> <li>Notify RCM.</li> </ul> |
| 7141<br>/<br>7142 | C      | 2 <sup>nd</sup> Stage A/C<br>or B/C Car<br>Floor Heat<br>Ground Fault |  |  |



| CODE | STATUS | TOD MSG TEXT                              | CORRECTIVE ACTION   |   |
|------|--------|---|---|---|
|      |        |   | Operator  | ROCC  |
| 7143 | B      | All Floor Heaters Disabled- Ground Fault  | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Inform ROCC if the loss of floor heaters does not allow the car to heat up enough to continue in service.</li> <li>Off-load passengers and Operate vehicle to the nearest yard.</li> </ul> | <ul style="list-style-type: none"> <li>Report to RCM.</li> <li>If the passenger area is too cold to comfortably continue in service remove from service and return to the nearest yard.</li> </ul>        |
| 7153 | C      | Hydraulic Suspension Maintenance Required | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>Update ROCC and Continue to operate vehicle.</li> </ul>  | <ul style="list-style-type: none"> <li>Instruct the operator to perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>Fault should clear, continue to operate vehicle.</li> </ul> |

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| CODE              | STATUS | TOD MSG TEXT                                     | CORRECTIVE ACTION  |  |
|-------------------|--------|--|--|--|
|                   |        |  | Operator   | ROCC   |
| 7154<br>/<br>7155 | C      | PT A or B<br>Suspension<br>System Ctrl.<br>Fault | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>Update ROCC and Continue to operate vehicle.</li> </ul> | <ul style="list-style-type: none"> <li>Instruct the operator to perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>Fault should clear</li> <li>Instruct operator to continue after leveling and propulsion self-test clears.</li> </ul> |

| CODE                              | STATUS | TOD MSG TEXT                                   | CORRECTIVE ACTION  |  |
|-----------------------------------|--------|--|--|--|
|                                   |        |  | Operator   | ROCC   |
| 7201<br>/<br>7202<br>(IV<br>Only) | A      | HV<br>Disconnect<br>Switch Fault<br><br>ON/OFF | <ul style="list-style-type: none"> <li>• Key down and key back up.</li> <li>• Notify ROCC.</li> <li>• Inform ROCC if the fault occurred during off-wire transitioning.</li> <li>• Perform Aux On/Aux Off Procedures in the “Instructions Table” above.</li> <li>• Cycle the pantograph</li> <li>• Follow ROCC instructions.</li> </ul> | <ul style="list-style-type: none"> <li>• Key down and key back up.</li> <li>• Instruct the operator to perform Aux On/Aux Off Procedures in the “Instructions Table” above.</li> <li>• Lower and raise the pantograph.</li> <li>• Notify RCM.</li> </ul> |

| CODE                 | STATUS | TOD MSG TEXT               | CORRECTIVE ACTION   |  |
|----------------------|--------|----------------------------|---|--|
|                      |        |                            | Operator  | ROCC   |
| 7203<br>(IV<br>Only) | A      | OESS: Cooling<br>CB Status | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Cutout OESS.</li> <li>Follow ROCC instructions.</li> </ul> | <ul style="list-style-type: none"> <li>Instruct operator to cutout the OESS.</li> <li>Instruct operator to clear the train of passengers, remove train from service and operate OOS to the nearest yard.</li> <li>Notify RCM.</li> </ul> <p>NOTE 1: The SC cannot be operated in off-wire mode.</p> <p>NOTE 2: Leaving the OESS exposed to high ambient temperatures without cooling may reduce the overall life of the batteries.</p> <p>Move to the shop on hot days ASAP.</p> |

| CODE                              | STATUS | TOD MSG TEXT                          | CORRECTIVE ACTION  |   |
|-----------------------------------|--------|---------------------------------------|--|---|
|                                   |        |                                       | Operator   | ROCC  |
| 7204<br>/<br>7205<br>(IV<br>Only) | B      | Fault in<br>Battery String<br><br>1/2 | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Continue normal operation per ROCC instructions.</li> </ul> <p>NOTE: If the fault persists off-wire operation will be degraded to HVAC ventilation only with a speed limitation of 12.5 MPH (20 km/h) and limited acceleration.</p> | <ul style="list-style-type: none"> <li>Instruct the operator to continue to operate normally and monitor fault condition.</li> <li>Notify RCM.</li> </ul> <p>NOTE: If the fault persists off-wire operation will be degraded to HVAC ventilation only with a speed limitation of 12.5 MPH (20 km/h) and limited acceleration.</p> |

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| CODE                 | STATUS | TOD MSG TEXT          | CORRECTIVE ACTION  |   |
|----------------------|--------|-----------------------|--|---|
|                      |        |                       | Operator   | ROCC  |
| 7206<br>(IV<br>Only) | A      | OESS Fire<br>Detected | <ul style="list-style-type: none"> <li>• Notify ROCC.</li> <li>• Cutout OESS.</li> <li>• Prepare to off load passengers</li> <li>• Follow direction of first responders/Incident Coordinator (IC)</li> </ul> | <ul style="list-style-type: none"> <li>• Instruct operator to cutout the OESS and lower pantograph (if applicable).</li> <li>• Call 911 and de-energize OCS (if applicable)</li> <li>• Instruct the operator to evacuate passengers to a minimum of 100ft from vehicle and to wait for first responders and/or supervisor.</li> </ul> |

| CODE                 | STATUS | TOD MSG TEXT           | CORRECTIVE ACTION  |   |
|----------------------|--------|------------------------|--|---|
|                      |        |                        | Operator   | ROCC  |
| 7207<br>(IV<br>Only) | A      | OESS Smoke<br>Detected | <ul style="list-style-type: none"> <li>• Notify ROCC.</li> <li>• Cutout OESS.</li> <li>• Prepare to off load passengers</li> <li>• Follow direction of first responders/Incident Coordinator (IC)</li> </ul> | <ul style="list-style-type: none"> <li>• Instruct operator to cutout the OESS and lower pantograph (if applicable).</li> <li>• Call 911 and de-energize OCS (if applicable)</li> <li>• Instruct the operator to evacuate passengers to a minimum of 100ft from vehicle and to wait for first responders and/or supervisor.</li> </ul> |

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| CODE                 | STATUS | TOD MSG TEXT             | CORRECTIVE ACTION  |  |
|----------------------|--------|--------------------------|--|--|
|                      |        |                          | Operator   | ROCC   |
| 7210<br>(IV<br>Only) | B      | OESS Off-Wire<br>Failure | <ul style="list-style-type: none"> <li>Key down and key back up.</li> <li>Notify ROCC.</li> <li>Per ROCC instructions:</li> <li>Raise pantograph (Only in OCS sections).</li> <li>Transition to off wire.</li> <li>Report fault status to ROCC.</li> </ul> | <ul style="list-style-type: none"> <li>Key down and key back up.</li> <li>Instruct the operator to raise the pantograph (Only in OCS sections).</li> <li>Transition to off-wire mode.</li> <li>If the fault persists the SC cannot be operated in off-wire mode, stage vehicle to be returned to the yard.</li> <li>Notify RCM.</li> </ul> |



| CODE                 | STATUS | TOD MSG TEXT                    | CORRECTIVE ACTION  |   |
|----------------------|--------|---------------------------------|--|---|
|                      |        |                                 | Operator   | ROCC  |
| 7217<br>(IV<br>Only) | B      | OESS:<br>Communication<br>error | <ul style="list-style-type: none"> <li>Key down and key back up.</li> <li>Notify ROCC.</li> <li>Perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>Follow ROCC instructions.</li> </ul> | <ul style="list-style-type: none"> <li>Key down and key back up.</li> <li>Instruct the operator to perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>Notify RCM</li> </ul> <p>NOTE: If fault persists off-wire operation may not be possible.</p> |

| CODE                 | STATUS | TOD MSG TEXT         | CORRECTIVE ACTION  |  |
|----------------------|--------|----------------------|--|--|
|                      |        |                      | Operator   | ROCC   |
| 7218<br>(IV<br>Only) | C      | CCTV Camera<br>Fault | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Cycle the NVR CCTV 47-F01 CB in the B-Cab.</li> <li>If fault remains, cycle the CCTV Monitors B 47-F02 in the B-Cab.</li> <li>If fault remains, cycle the CCTV Monitors A 47-F02 in the A-Cab.</li> </ul> | <ul style="list-style-type: none"> <li>Instruct the operator to cycle the NVR CCTV 47-F01 CB in the B-Cab.</li> <li>If fault remains, instruct the operator to cycle the CCTV Monitors B 47-F02 in the B-Cab.</li> <li>If fault remains, instruct the operator to cycle the CCTV Monitors A 47-F02 in the A-Cab.</li> <li>If the fault did not clear instruct operator to clear the train of passengers, remove train from service at the terminal and operate OOS to the nearest yard.</li> </ul> |

| CODE                 | STATUS | TOD MSG TEXT  | CORRECTIVE ACTION   |  |
|----------------------|--------|---|---|--|
|                      |        |   | Operator  | ROCC   |
| 7219<br>(IV<br>Only) | A      | Loss of OESS<br>Power While<br>Driving Off-<br>Wire | <ul style="list-style-type: none"> <li>Notify ROCC.</li> <li>Prepare to off load passengers.</li> <li>Prepare for tow.</li> </ul> | <ul style="list-style-type: none"> <li>Notify RCM.</li> <li>If in off-wire region instruct operator, if possible, to safely off load passengers and prepare for tow.</li> </ul> <p>NOTE: SC can operate in on-wire region.<br/>If the fault occurred in the off-wire region, towing it to an on-wire section and raising the pantograph may charge the batteries and cancel the fault.</p> <ul style="list-style-type: none"> <li>Notify RCM.</li> </ul> |

|      |     |                  |   |   |
|------|-----|------------------|---|---|
| 8003 | A   | Train Break-Away | <ul style="list-style-type: none"> <li>• Notify ROCC</li> <li>• Follow instructions to</li> <li>• Verify coupling of consist.</li> <li>• If vehicle is coupled update ROCC.</li> <li>• Operate vehicle at restricted speed to terminal and off-load passengers.</li> <li>• Continue to operate to nearest yard 25mph restriction with RCM personnel on-board.</li> </ul> <p>NOTE: There will be a 25 MPH speed restriction.</p> | <ul style="list-style-type: none"> <li>• Instruct the operator to perform Aux On/Aux Off Procedures in the "Instructions Table" above.</li> <li>• If fault is still present, instruct operator to make announcements and to verify that the consist is still coupled.</li> <li>• Operate vehicle, at restricted speed, to the nearest station and off load passengers.</li> <li>• Dispatch Line Supervisor or second operator to sit in trailing vehicle intermediate cab in case of actual break-away.</li> </ul> <p>NOTE: The VCU imposes a 25 MPH speed restriction.</p> |
| N/A  | N/A | FAILOVER*        | <ul style="list-style-type: none"> <li>• Notify ROCC</li> </ul>   | <ul style="list-style-type: none"> <li>•</li> </ul>   |

| CODE   | STATUS | TOD MSG TEXT   | CORRECTIVE ACTION   |      |
|--|--------|--|---|------|
|  |        |  | Operator  | ROCC |
|  |        | (message is displayed on mirrors in left and right corner) | <ul style="list-style-type: none"> <li>Off-load passengers, operate vehicle to the nearest yard.</li> </ul> |      |
| <p><b>*Note for FAILOVER:</b> Indicates a camera failure on (external) side cameras only. If A-Cab is keyed up and the left side camera has a failure, then the left side mirror only will display FAILOVER. If A-Cab is keyed up and the right-side camera has a failure, then the right-side mirror only will display FAILOVER. The same applies to B-Cab when keyed up.</p> |        |  |   |      |

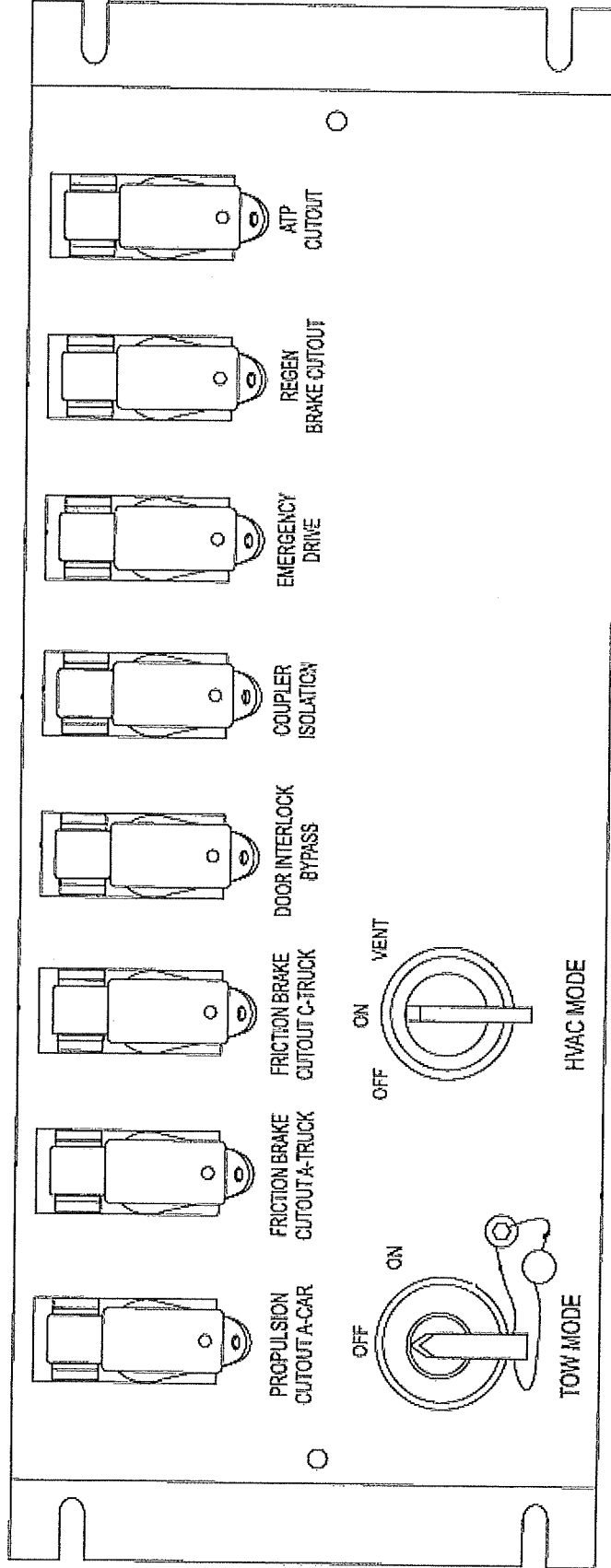
## **DEFINITIONS OF COMMON BYPASS PANEL CUTOUTS, BYPASSES, & MODES**

- **PROPULSION CUTOUT "A" CAR**- Used to cut out the Traction Control Unit on the "A" car.
- **PROPULSION CUTOUT "B" CAR**- Used to cut out the Traction Control Unit on the "B" car.
- **FRICTION BRAKE CUTOUT "A" TRUCK**- Used to cut out the friction Brake Control Unit on the "A" Truck.
- **FRICTION BRAKE CUTOUT "B" TRUCK**- Used to cut out the friction Brake Control Unit on the "B" Truck.
- **FRICTION BRAKE CUTOUT "C" TRUCK**- Used to cut out the friction Brake Control Unit on the "C" Truck.
- **DOOR INTERLOCK BYPASS**- Used to bypass door summary circuit and allow train to take power in case of door system failure.
  - **Symptom:** Doors closed but no propulsion. With the Door Interlock Bypass activated, confirm that all doors are closed and locked before moving vehicles.

- **COUPLER ISOLATION**- Used to isolate the vehicle from the consist trainline in case of failure. Allows operation from an immediate cab.
- **EMERGENCY DRIVE**- Isolates vehicle MVB and TCN from assisting. In any propulsion position, master controller provides maximum allowable propulsion rate and in any braking position maximum brake rate imposed.
- **ATP CUTOUT**- Used to cut out ATP system.
- **TOW MODE**- Used to activate TOW Mode. When towing an LRV activate the TOW MODE of the leading vehicle (not the disabled vehicle).
- **NO MOTION BYPASS**- Used to cut out No Motion feature on door system.
  - Symptom: Doors will not open on command. Note: With the No Motion Bypass activated doors can be opened at any speed.
- **BATTERY ISOLATION**- Used to isolate the vehicle's battery from the APS circuit in case of over-temperature or other battery failure condition.

- When operated, the Battery Isolation switch effects a remote trip of the Main Battery Circuit Breaker in the +321 CB Panel. Once tripped, this breaker can only be reset by first moving it fully to the OFF position, then to ON.
- **REGEN BRAKE CUTOUT**- Used to cut out regenerative (dynamic) braking in case of failure.
- **HVAC MODE**- 3-position rotary switch, normally ON. Can be moved to OFF position in case of system fault, or to VENT position to maintain air flow, in B-car.
- **AUTO AUX OFF BYPASS**- 2-position, NORMAL and BYPASS, switch. Used to bypass the Automatic Auxiliaries Off feature.
  - Auxiliaries switch off automatically 60 mins after cab is keyed-off.
- **OESS CUTOUT**- 2-position (NORMAL/CUTOUT) rotary switch used to cut out the OESS enable circuit, in case of failure. (Applies to Streetcar only.)
- **PANTOGRAPH LOCKED**- 2-position, NORMAL/BYPASS, switch used to bypass the Pantograph Lowered Limit Switch, when that switch does not confirm that the pantograph is lowered, thus preventing Off-Wire operation.





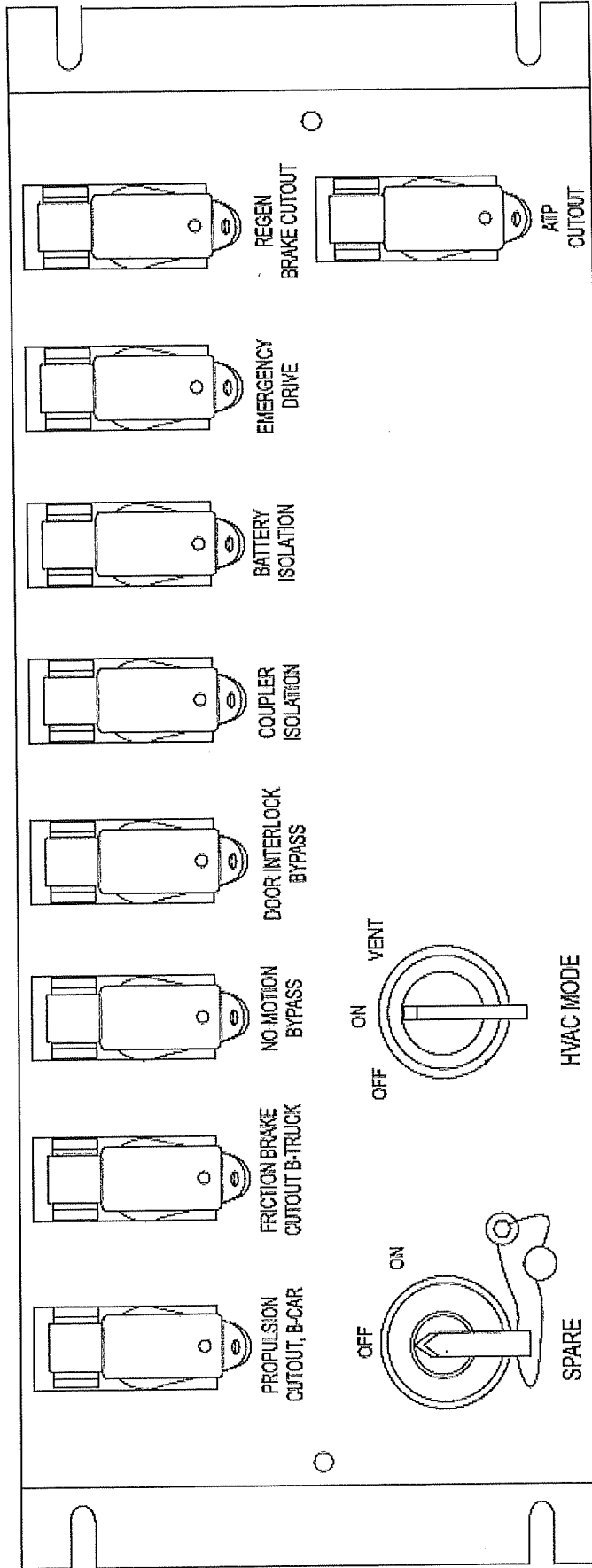
CATS I/II A-Cab Bypass Panel





CHARLOTTE AREA  
TRANSIT SYSTEM

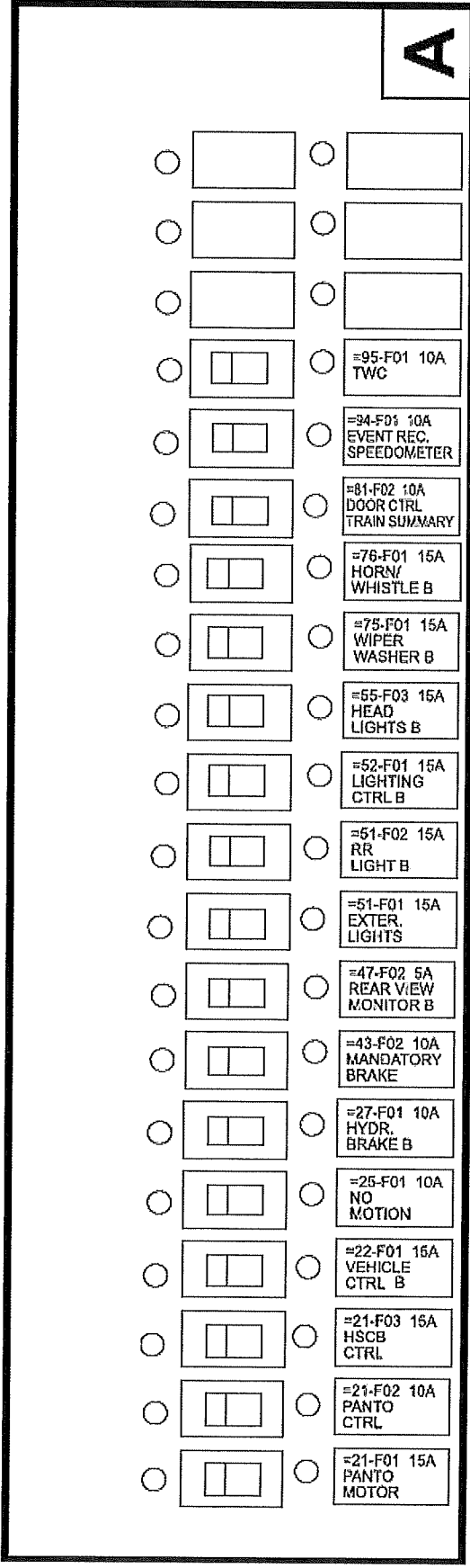
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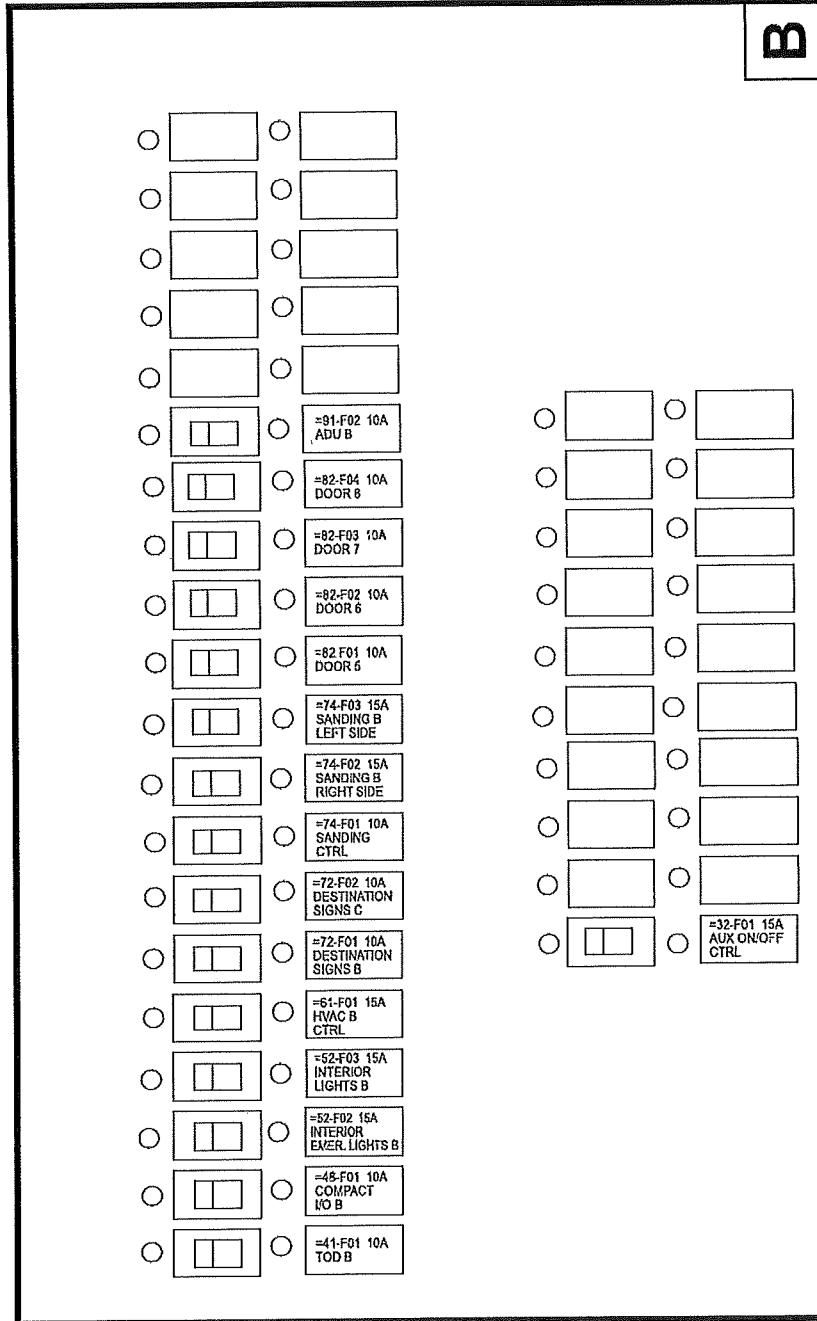
CATS I/II B-Cab Bypass Panel

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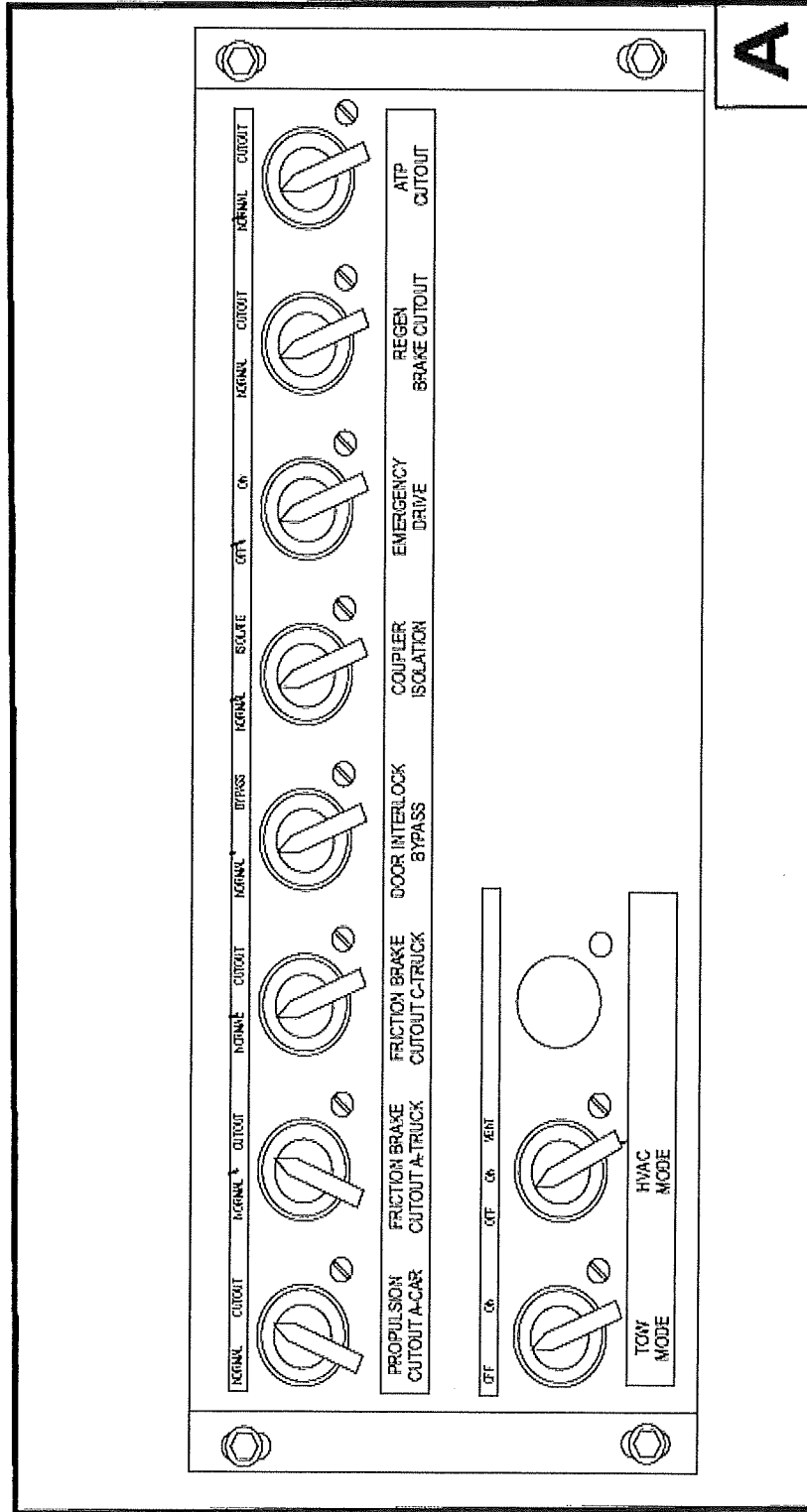
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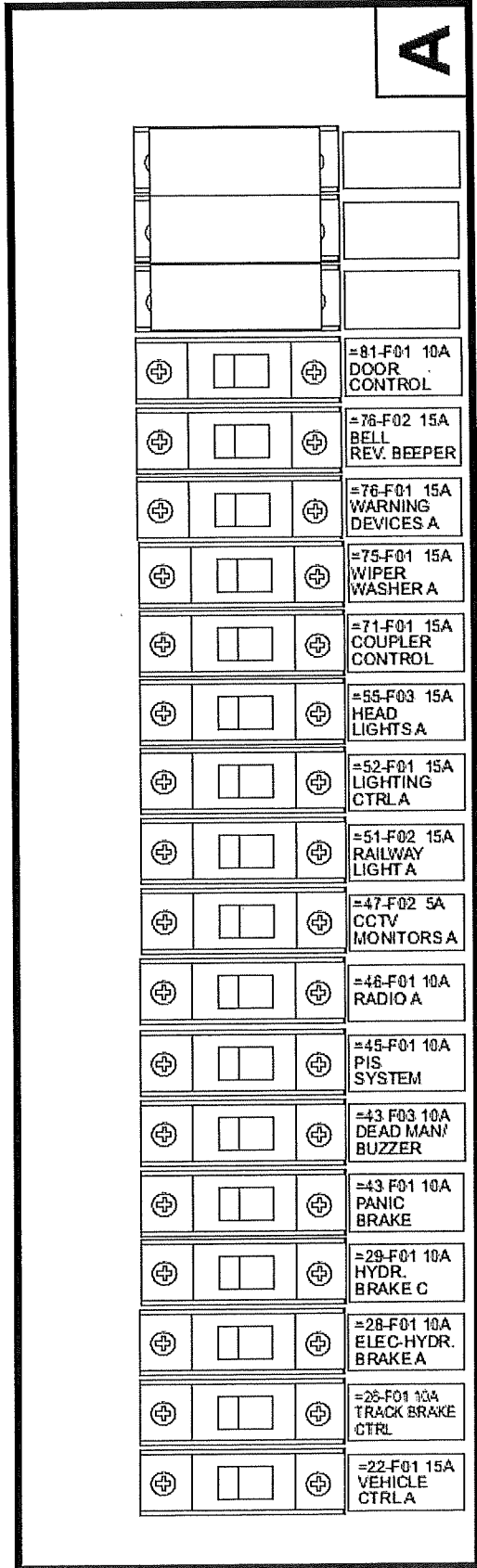
CATS III +214 DC Circuit Breaker Panel 1 of 2 (B-Cab)



CATS I/II +214 DC Circuit Breaker Panel 2 of 2 (B-Cab)



CATS III A-Cab Bypass Panel

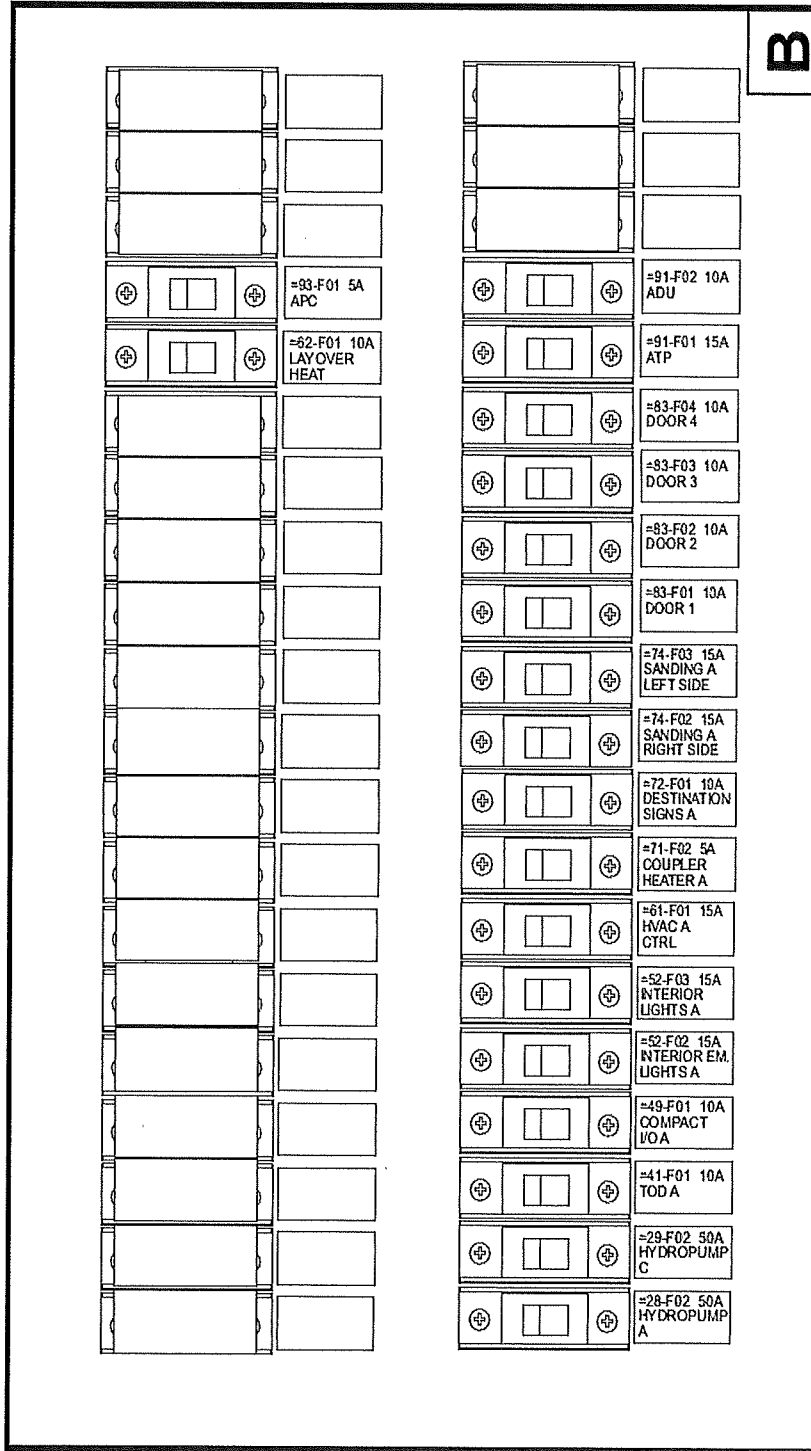


CATS III +114 DC Circuit Breaker Panel 1 of 2 (A-Cab)



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TRANSIT SYSTEM

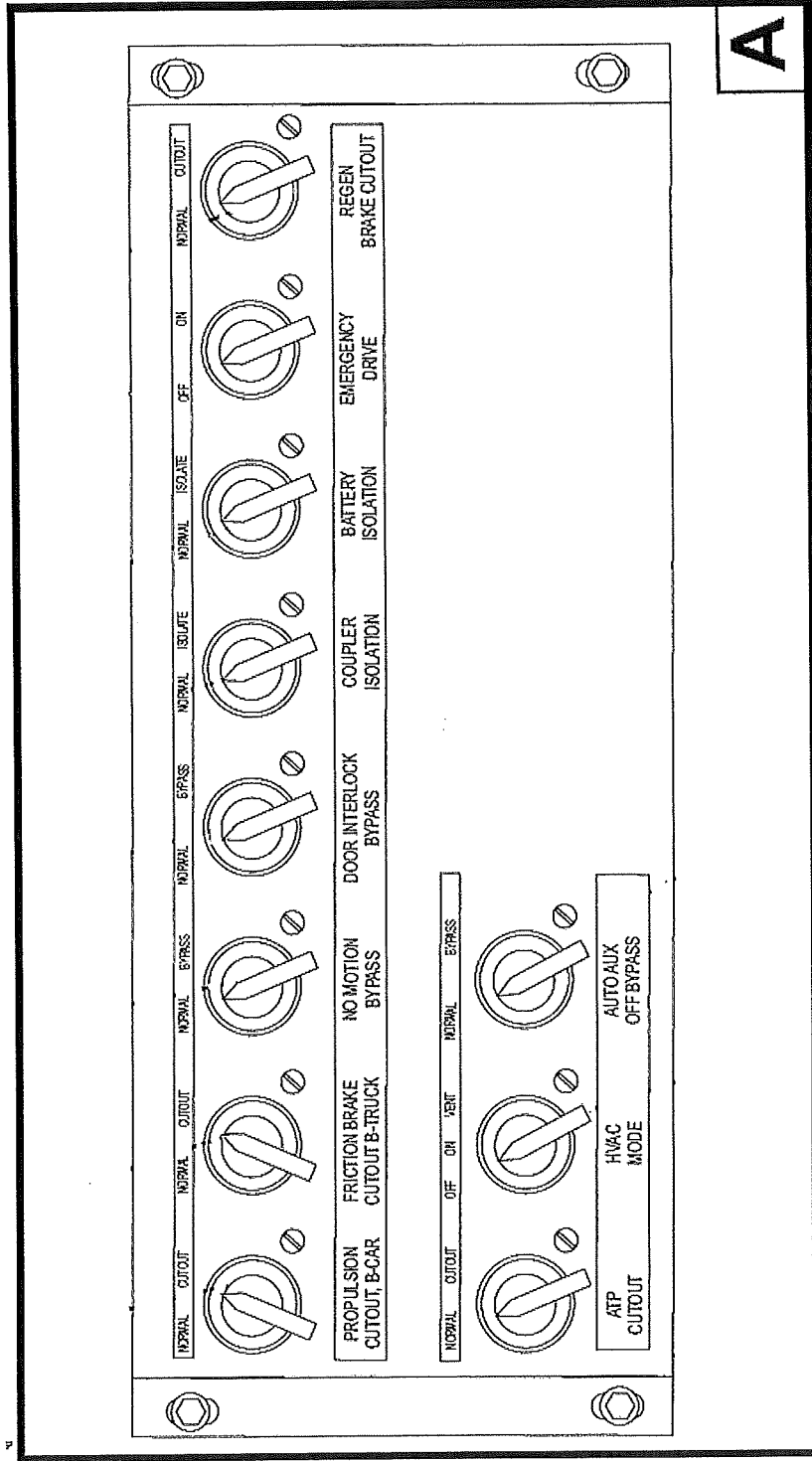


**B**

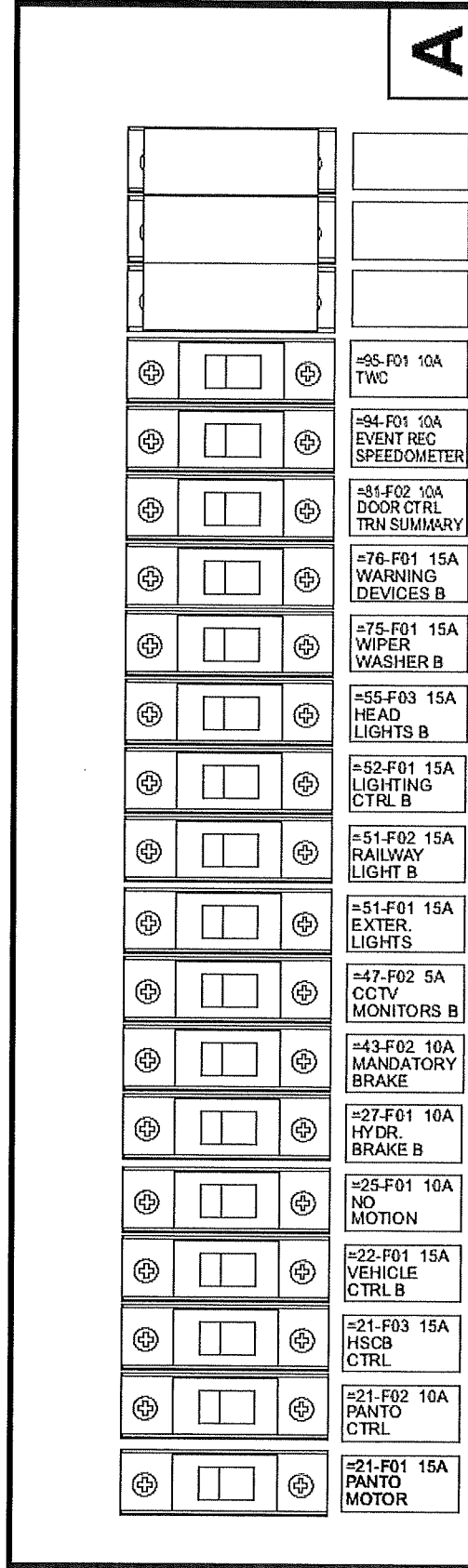
CATS III +114 DC Circuit Breaker Panel 2 of 2 (A-Cab)

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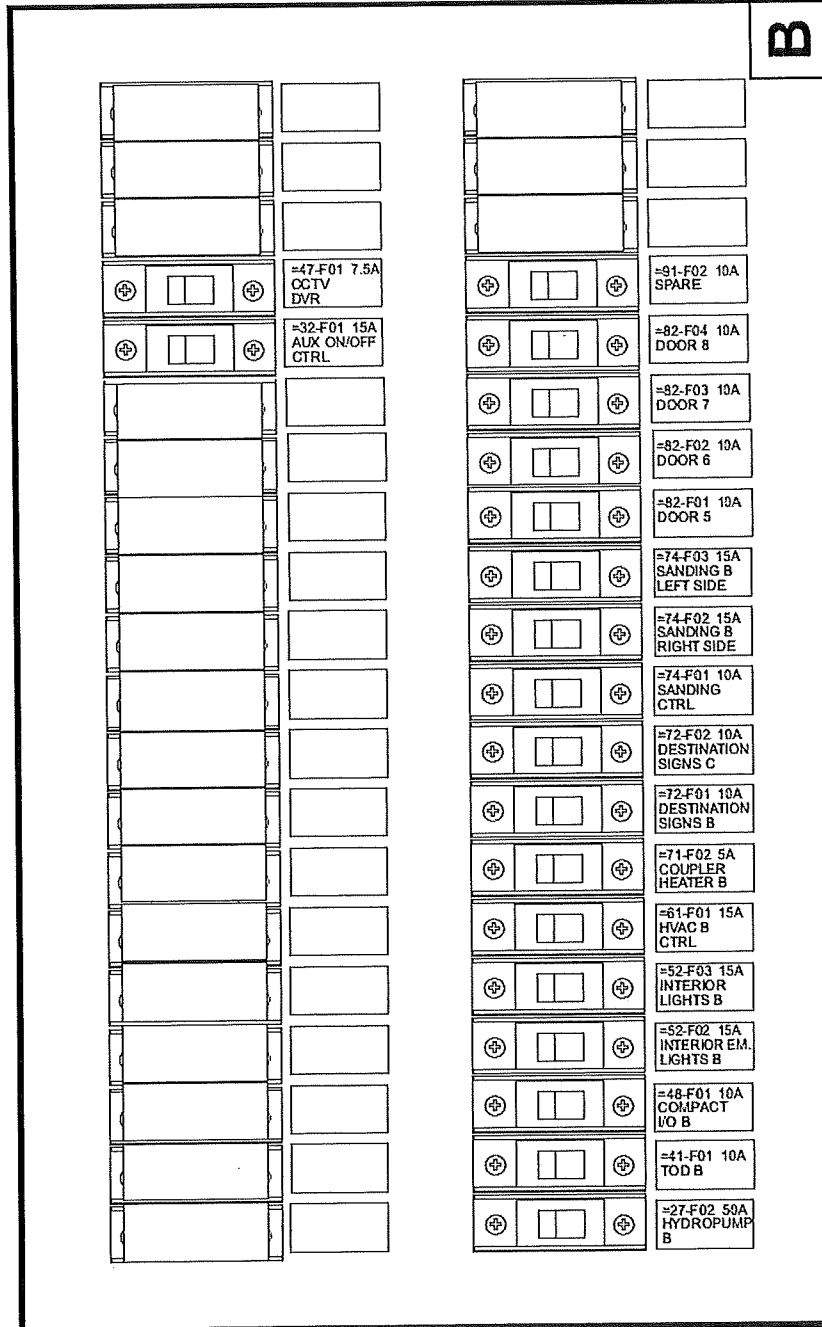
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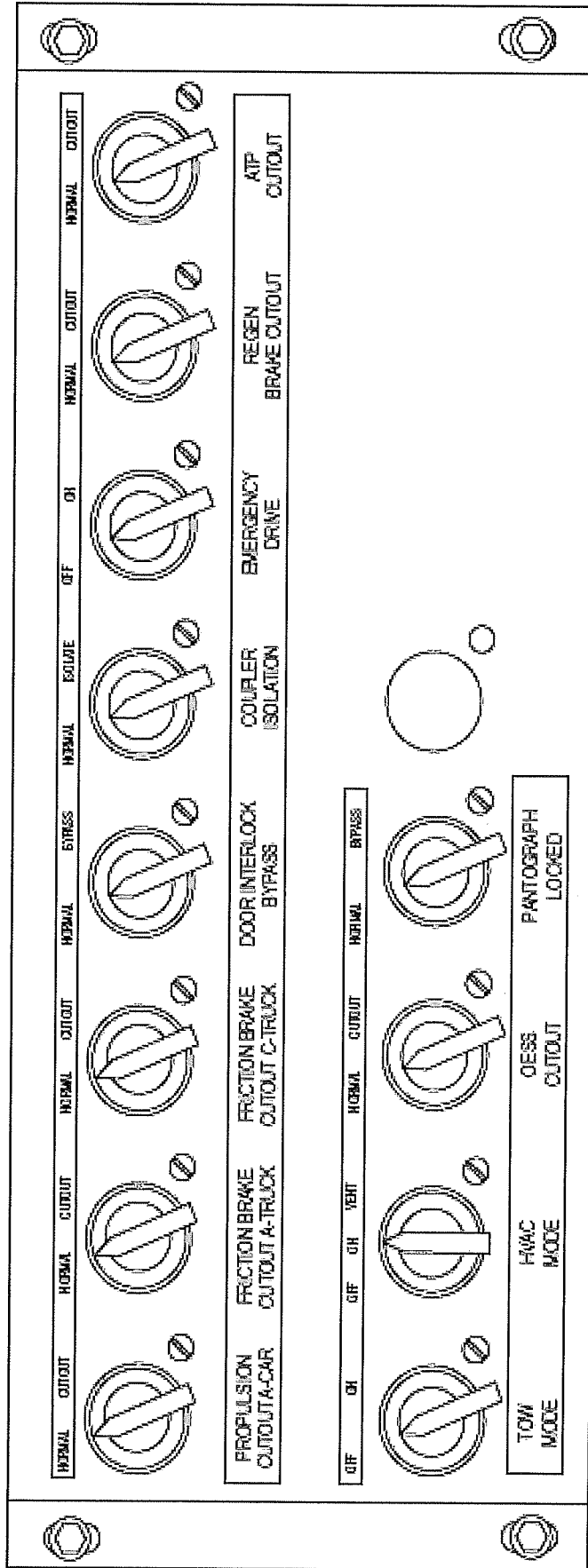
CATS III B-Cab Bypass Panel



CATS III +214 DC Circuit Breaker Panel 1 of 2 (B-Cab)



CATS III +214 DC Circuit Breaker Panel 2 of 2 (B-Cab)



CATS SC A-Cab Bypass Panel

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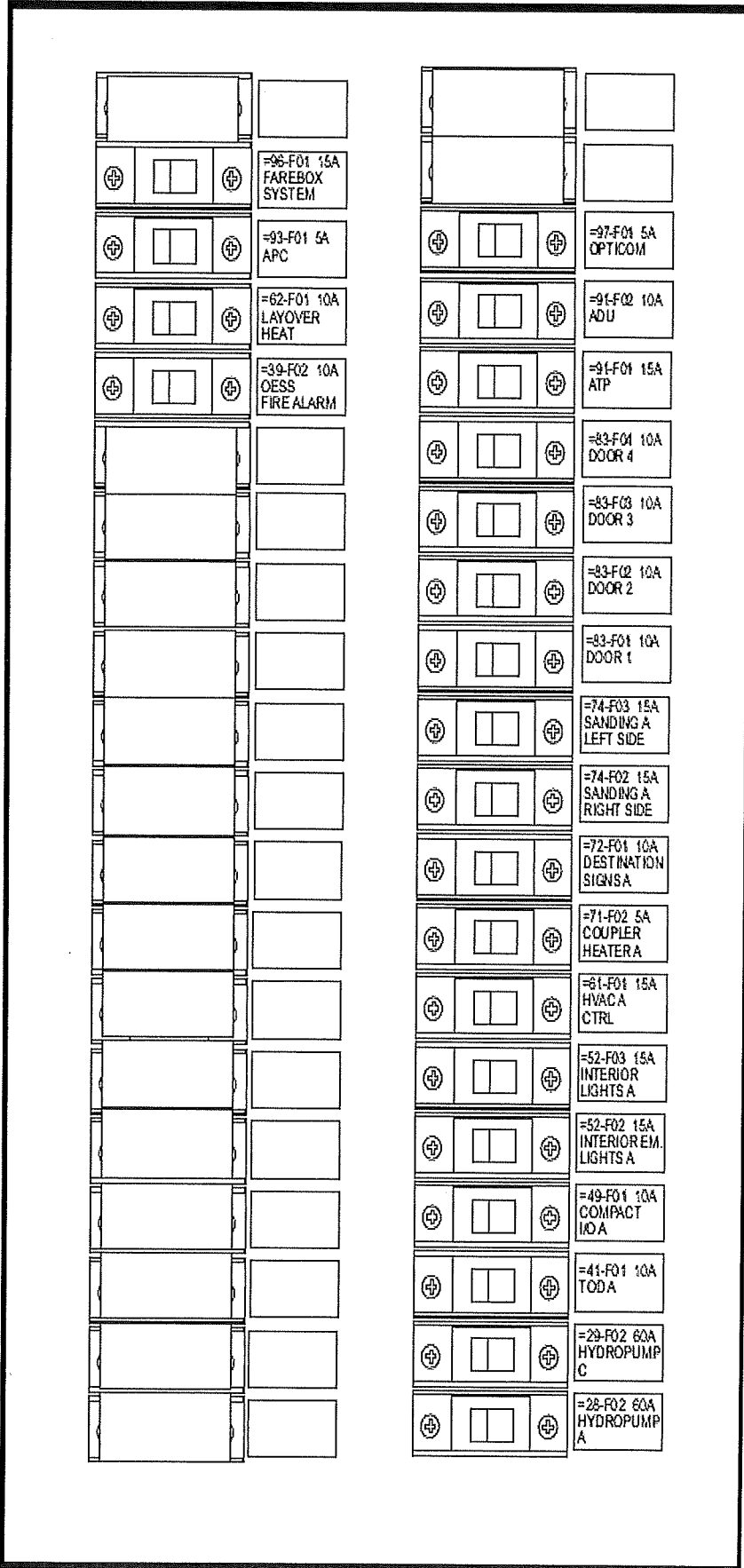
CHARLOTTE AREA  
TRANSIT SYSTEM

|  |  |  |                                     |
|--|--|--|-------------------------------------|
|  |  |  |                                     |
|  |  |  | =95-F01 10A<br>TWC                  |
|  |  |  | =81-F01 10A<br>DOOR<br>CONTROL      |
|  |  |  | =76-F02 15A<br>BELL<br>REV. BEEPER  |
|  |  |  | =76-F01 15A<br>WARNING<br>DEVICES A |
|  |  |  | =75-F01 15A<br>WIPER<br>WASHER A    |
|  |  |  | =71-F01 15A<br>COUPLER<br>CONTROL   |
|  |  |  | =55-F03 15A<br>HEAD<br>LIGHTS A     |
|  |  |  | =52-F01 15A<br>LIGHTING<br>CTRL A   |
|  |  |  | =51-F02 15A<br>RAILWAY<br>LIGHT A   |
|  |  |  | =47-F02 15A<br>CCTV<br>MONITORS A   |
|  |  |  | =46-F01 10A<br>RADIO A              |
|  |  |  | =45-F01 15A<br>PIS<br>SYSTEM        |
|  |  |  | =43-F03 10A<br>DEAD MAN             |
|  |  |  | =43-F01 10A<br>PANIC<br>BRAKE       |
|  |  |  | =29-F01 10A<br>HYDR.<br>BRAKE C     |
|  |  |  | =28-F01 10A<br>HYDR.<br>BRAKE A     |
|  |  |  | =26-F01 10A<br>TRACK BRAKE<br>CTRL  |
|  |  |  | =22-F01 15A<br>VEHICLE<br>CTRL A    |

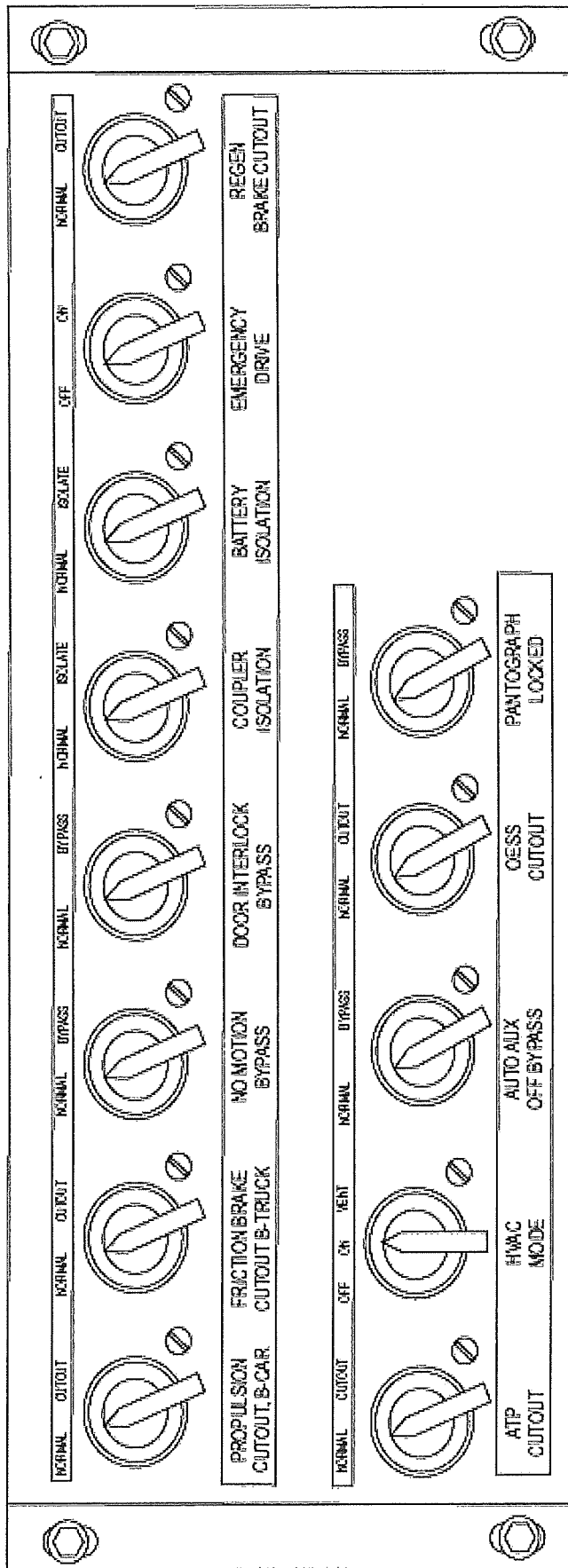
CATS SC +114 DC Circuit Breaker Panel 1 of 2 (A-Cab)

CHARLOTTE AREA  
TRANSIT SYSTEM

S70 QUICK REFERENCE  
TROUBLESHOOTING GUIDE



CATS SC +114 DC Circuit Breaker Panel 2 of 2 (A-Cab)

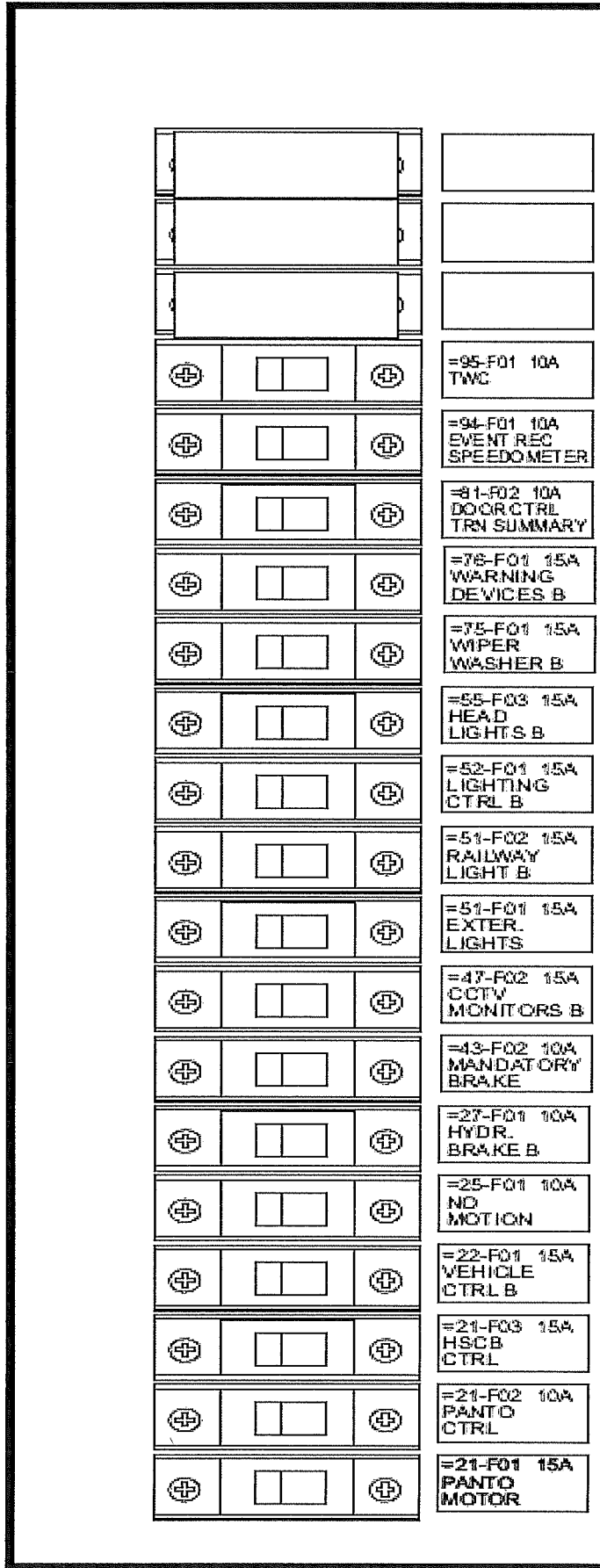


CATS SC B-Cab Bypass Panel



S70 QUICK REFERENCE  
TROUBLESHOOTING GUIDE

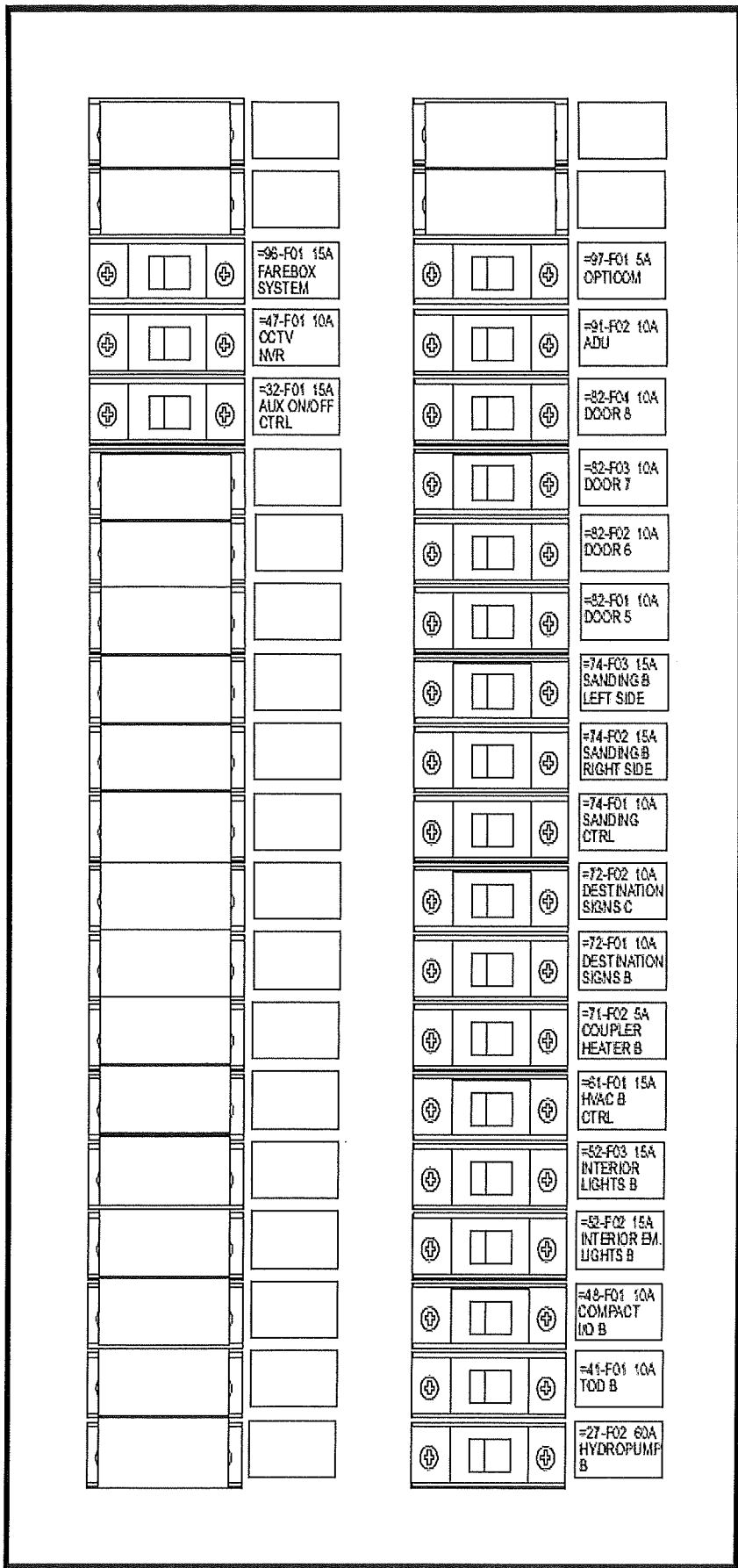
CHARLOTTE AREA  
TRANSIT SYSTEM



CATS SC +214 DC Circuit Breaker Panel 1 of 2 (B-Cab)

S70 QUICK REFERENCE  
TROUBLESHOOTING GUIDE

CHARLOTTE AREA  
TRANSIT SYSTEM



CATS SC +214 DC Circuit Breaker Panel 2 of 2 (B-Cab)



## 22-0521-01 Train 5 Derailment South of Old Pineville Grade Crossing ROCC Timeline

[Pulled from SPEAR 172,073]

### TIMELINE

11:12 R157 reported 7153 fault, Train shaking bad  
11:15 R157 advised Tr 5 could not move safely, unable to continue  
11:20 Train 5 Auxed off/on, Advised train 5 still unable to proceed safely  
11:27 R172 PO SYNYL New Train 5(304-317) NB in service at New Bern  
11:27 RCM R344/340 on scene, Boarded LRV 201  
11:30 RCM R340 advised the 201 C Truck derailed, Request Derail Team  
11:31 R340 cleared scene to get derail equipment  
11:38 Bus Bridge requested between Archdale and New Bern stations  
11:41 R408 on scene  
11:43 R30 on scene  
11:46 R426 Pinned Gates Myers & Chapman; S. Blvd North  
11:50 R408 reports track 1 damaged  
11:51 R301,344,340 on scene  
11:52 R30 offloaded passengers, 24 total  
11:55 R30 advised 1 pregnant female passenger request MEDIC  
12:01 CFD Engine 43 on scene  
12:25 S111 on scene  
12:29 S100 on scene; on scene command, Rail ops 5  
12:36 R30 advised unable to single track on track 2  
12:50 S111 Walking SB track 1 from incident site to south of Woodlawn  
13:36 S114 Arrived on scene  
13:58 S107 release incident train to RCM and MOW for re-railing process  
13:59 S100 Clear the scene  
14:28 R22 on scene Old Pineville  
19:31 S107 advised LRV 201 successfully Re-railed, Ready for bump test  
19:39 R312 Released C truck brake in LRV 201  
19:42 S107 advised LRV 201 has a locked axle and needs to uncouple  
19:48 R22 successfully uncoupled 201 from the 114  
19:55 R22 performed a successful bump test  
20:03 R22 relocated 201 NB track 1 from incident site into the yard tr. 4S  
20:12 RCM R312 and all RCM personnel clear Old Pineville  
20:15 R4/R8 advised repairs complete to track 1 and ready for a test train once the incident train is cleared.  
21:20 LRV 201 clear mainline.  
21:35 R22 moved 114 reverse, track 1 SB to Old Pineville Acs. for test run  
21:42 LRV 114 successful, S111 clear track 1 for revenue  
21:50 All personnel/equipment clear  
22:01 Gates unpinned at GC's, Train 17 Sweep track 2 SB



NCDOT Communications





STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

J. ERIC BOYETTE  
SECRETARY

February 6, 2023

Mr. Brent Cagle  
Interim Chief Executive Officer, Charlotte Area Transit System  
Assistant City Manager, City of Charlotte  
600 E. 4th Street, CMGC - 7<sup>th</sup> Floor  
Charlotte, NC 28202

**Subject: Unacceptable Hazardous Conditions – Corrective Action Plans Required**

Mr. Cagle:

The North Carolina Department of Transportation (NCDOT) State Safety Oversight (SSO) Program has identified two (2) Unacceptable Hazardous Conditions (UHC) within the Charlotte Area Transit System's (CATS) rail operations. The UHCs were identified during NCDOT's ongoing review of CATS' final Accident Investigation Report, 22-0521-01 and a subsequent accident review meeting held with CATS' Safety and Rail Car Maintenance (RCM) personnel on February 1, 2023.

On Saturday, May 21, 2022, at approximately 11:10hrs the leading axle of the center truck (C-truck) of LRV 201 derailed south of Old Pineville Grade Crossing and came to rest next to Traction Power Substation 7. At the time of the incident LRV 201 was operating out of the A-cab and serving as the lead car of Train 5 (LRVs 201/114) which was traveling northbound on Track 1. Measurements taken at the scene indicate that the train traveled a total of 1,260 ft. from the point of derailment to the train's final point of rest (measured to the C-truck's resting point). A total of 490 railroad ties had damaged clips as a result of this derailment. LRV 114 sustained no damage during the derailment. A total of twenty-four passengers were offloaded safely with one passenger requesting medical evaluation on-scene. No passengers or employees were injured or transported from the scene. LRV 201 was re-railed and successfully removed from the alignment without incident.

As part of its ongoing review of the circumstances and conditions leading up to and following the derailment of CATS' Light Rail Vehicle (LRV) 201, NCDOT identified the following two (2) UHCs:

1. Delayed maintenance of the Siemens S70 LRVs directly contributed to the derailment of LRV 201 on May 21, 2022. Although CATS is working with its contractors to address needed overhauls of the safety critical axles for this LRV (and the other LRVs in this fleet), the overhaul completion date is currently scheduled for some time in calendar year 2026. CATS is currently operating LRVs, in revenue service, which have surpassed the manufacturer's recommended axle overhaul thresholds. NCDOT identifies the planned fleet overhaul completion date as an unacceptable hazardous condition.

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*Fax:* (919) 707-4154  
*Customer Service:* 1-877-368-4968

*Website:* [www.ncdot.gov](http://www.ncdot.gov)  
[www.ncbytrain.org](http://www.ncbytrain.org)

*Location:*  
862 CAPITAL BLVD  
RALEIGH, NC 27603



2. Current risk mitigations, implemented by CATS' RCM personnel, following the May 21, 2022, derailment, includes the installation and monitoring of temperature strips on the LRV axles. However, this safety risk mitigation, alone, is reactive to unpredictable and potentially catastrophic LRV axle failures and does not reduce the associated safety risk to an acceptable level. Additionally, the procedure for inspecting axle temperature strips requires a written procedure and must be adhered to; contrary to noncompliance found by NCDOT. As such, NCDOT identifies the limited mitigation, missing documentation, and inconsistent compliance to be an unacceptable hazardous condition.

To address the UHCs, NCDOT offers the following measures to comply with minimum safety standards.

Pertaining to UHCs, NCDOT's State Safety Oversight Program Standard (SSOPS),

Section 4.2.4 – Safety Risk Resolutions, states the following:

*“UHCs must be mitigated in the most expedient manner possible before normal service may resume. Interim corrective action(s) may be required to mitigate the hazard to an acceptable level while the permanent resolution is developed”.*

Section 9.0 – Corrective Action Plans (CAPs), states the following

*“In the course of performing on-site safety reviews, investigations, annual safety reviews, or any other means by which NCDOT becomes aware of an unacceptable hazard, it will be brought to the immediate attention of the RTA so action can be taken to prepare and implement a CAP as appropriate. The timeframe for the CAP shall be specified in the written notification from NCDOT.”*

For CATS' safety risk assessment process, CATS' Agency Safety Plan (ASP), Section 2.3.4 – Hazard Risk Assessment, defines an unacceptable risk as requiring the following:

*“Unacceptable: The hazard must be mitigated in the most expedient manner possible before normal service may resume. Interim corrective action may be required to mitigate the hazard to an acceptable level while the permanent resolution is in development.”*

In accordance with the requirements of NCDOT's SSOPS and 49 CFR Part 674, please be advised that NCDOT hereby directs CATS to develop a CAP, for each of the UHCs included herein, and submit both to NCDOT for review and approval **within ten (10) calendar days** from the date of this letter. The CAPs shall include proposed actions to expeditiously reduce the current level of safety risk associated with the UHCs, a timeframe for CAP implementation, and the assignment of responsible staff or personnel.

During NCDOT's review of the UHCs listed above, NCDOT also reviewed CATS' standard operating procedures and response plans which CATS has established to address known unsafe conditions or circumstances effecting its operations. In its response to known conditions, CATS routinely implements speed restrictions, for LRV's operating on the mainline and/or within facility yards. Some of these circumstances include inclement weather, maintenance crews working in or near the track alignment, and LRV displays of electronic fault codes (depending on severity).

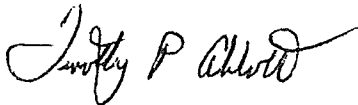
With this in mind, NCDOT proposes CATS consider implementing a systemwide LRV speed restriction on the Blue Line light rail system until the affected LRVs have been overhauled, per the LRV manufacturer's recommendations. A speed restriction would provide the following benefits to reduce safety risk:

- 1) Provides LRV operators with additional time to react and respond to vehicle performance abnormalities.
- 2) Reduces the level of speed-related wear and tear on the LRV axle components.

NCDOT also directs CATS to provide a written analysis/response to NCDOT's consideration of a speed restriction, as suggested above, when submitting the required CATS corrective action plans to NCDOT for review and approval.

NCDOT greatly appreciates your continued cooperation and support of the SSO Program. If you have any questions, please contact me at 919-707-4149.

Regards,



Timothy P. Abbott  
Safety Enforcement and Oversight Manager  
SSO Program Manager  
Rail Division  
North Carolina Department of Transportation

Cc: Chad Hagans, CATS  
David Moskowitz, CATS  
Jason Orthner, NCDOT  
Jahmal Pullen, NCDOT  
Jason Sergent, NCDOT Contractor  
Don Pike, NCDOT Contractor  
Jerrad Jones, NCDOT Contractor  
Jason Jackson, NCDOT Contractor





February 15, 2023

Timothy P. Abbott  
Safety Enforcement and Oversight Manager  
SSO Program Manager  
Rail Division  
North Carolina Department of Transportation  
1553 Mail Service Center  
Raleigh, NC 27699-1566

**Subject: CATS Response to Letter of Unacceptable Hazardous Condition (UHC)**

Dear Mr. Abbott,

In response to your letter of Unacceptable Hazardous Condition (UHC) dated February 6, 2023, please see our responses below.

- Item #1: CATS Rail Operations plan for fleet maintenance included timelines for the Truck overhaul and the mid-life overhaul since 2014. In 2020, CARE ACTS funds were set aside to begin the Truck overhaul based on the manufacturer's recommendation of 10 years or 600,000 miles. During this time, a few things occurred; there was staff turnover in procurement and the finance office, procurement was removed from under Finance and placed as their own department, and the funding for the Truck overhaul was moved from the Capital Budget to the Operating Budget along with funds that were earmarked for vehicle preventive maintenance. In addition to supply chain issues and staffing challenges by our vendor due to the pandemic, starting this program as planned would be challenging. Due to the aforementioned items coupled with other exigent circumstances the start of the truck overhaul was delayed until FY 2023. CATS identified the importance of this issue and had planned to address this issue through the 600K truck overhaul program that should be completed by end of 2025 instead of waiting for the Mid-life overhaul of the 100 and 200 series light rail vehicles which is not scheduled to begin until 2026.

To address this delay, and to expedite these overhauls, CATS shifted Truck overhaul funding from the Operating Budget to the Capital Budget and will program \$50 million dollars for this project. This programs funding for the project through its expected completion in FY 2026. The project has already started with one set of axles already returned from Siemens with the second set due in March 2023. CATS acknowledges the concerns noted by NCDOT and will work with Siemens on what can be done to accelerate the turnaround time so the project can be completed sooner rather than later. CATS has also identified those axles which will be a priority to be completed; those axles with the highest mileage or have temperature readings more than 130 degrees will be sent for overhaul first.

- Item #2: Siemens OEM recommends removing a vehicle from service with a temperature reading of 150 degrees or higher. Readings should be completed monthly. In an abundance of caution, CATS has set the temperature threshold to 130 degrees for when a train is taken out of service. Also, center truck temperature strips are checked during the daily preventive



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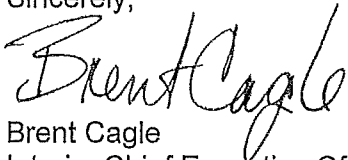
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maintenance (PM) inspection and noted on the daily check form to help identify a train that may have a wheel bearing increasing in temperature as the gradual increase in temperature should be noticed by rail car maintenance personnel. The Corrective Action Plan (CAP) that CATS will put into place regarding the reading of temperature strips daily is as follows:

- o CAP: The work plan will be reviewed and revised as necessary to ensure the process of tracking on a spreadsheet monthly temperature reading for each light rail vehicle in addition to visually inspecting daily each C-truck temperature strip and noting that reading on the daily inspection form as part of the daily PM check. Rail Car Maintenance staff will be reinstructed on the work plan and the importance of daily inspection of the C-truck temperature strip. Vehicles that have a reading of 130 degrees or higher will be removed from service.
  - o Responsible Person: Gary Lee
  - o Completion Date: March 17, 2023
- 
- Item #3: Regarding the recommendation of initiating a speed restriction of no more than 45 mph on the Blue Line until the Truck overhaul is completed, CATS is requesting a two-week extension. To provide a written analysis/report to this request, CATS needs to draft a variety of schedules, assess schedule impact, identify the number of resources needed to operate at that speed, and run test trains to verify the head ways and new schedule if it is decided to implement the overall speed restriction. Please note that we have been working in concordance Siemens on this issue since the start. Recently we requested their thoughts on the temperature reading and recommended speed restriction. Please see their responses below:
    - o The daily inspections for the (C-truck) bearing housing temperature are an appropriate measure to check if the bearing housing is close to or exceeds 130 degrees Fahrenheit. 130 degrees Fahrenheit is an appropriate bearing temperature to remain under.
    - o The maximum speed of 55 vs 45 mph will not significantly impact bearing temperature since 55 mph is only maintained for a short period of time.

Our transit agency is committed to the safety of its operation and will continue to monitor this situation and work with Siemens on an expedited schedule to overhaul the axles and ensure appropriate funds are available to complete this project. We appreciate the cooperative and supportive relationship with NCDOT. For additional information, please contact the General Manager of Safety and Security, David Moskowitz at (704) 336-7661.

Sincerely,



Brent Cagle  
Interim Chief Executive Officer, Charlotte Area Transit System  
Director of Public Transit, City of Charlotte

cc: Mr. Jahmal Pullen, Engineering Coordination and Safety Manager  
David Moskowitz, CATS General Manager of Safety and Security  
Allen C. Smith III, CATS Deputy Director of Transit – Chief Operating Officer  
Thurman C. Howell, CATS Deputy Director – Chief Financial Officer  
Chad Hagans, CATS Safety Manager – Rail  
Donald Pike, NCDOT Contractor  
Jerrad Jones, NCDOT Contractor



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

J. ERIC BOYETTE  
SECRETARY

February 17, 2023

Mr. Brent Cagle  
Interim Chief Executive Officer, Charlotte Area Transit System  
Assistant City Manager, City of Charlotte  
600 E. 4th Street, CMGC - 7th Floor  
Charlotte, NC 28202

**Subject: NCDOT's Review of the Charlotte Area Transit System's (CATS) Response to NCDOT's Unacceptable Hazardous Conditions Letter**

Mr. Cagle:

The North Carolina Department of Transportation (NCDOT) State Safety Oversight (SSO) Program has reviewed your response, dated February 15, 2023, to NCDOT's Unacceptable Hazardous Conditions (UHC) letter dated February 6, 2023. NCDOT responds as follows.

**UHC #1:** *Delayed maintenance of the Siemens S70 LRVs directly contributed to the derailment of LRV 201 on May 21, 2022. Although CATS is working with its contractors to address needed overhauls of the safety critical axles for this LRV (and the other LRVs in this fleet), the overhaul completion date is currently scheduled for some time in calendar year 2026. CATS is currently operating LRVs, in revenue service, which have surpassed the manufacture's recommended axle overhaul thresholds. NCDOT identifies the planned fleet overhaul completion date as an unacceptable hazardous condition.*

In stating UHC#1, NCDOT directed CATS to develop a correction action plan (CAP) to be submitted for NCDOT's review and approval. Instead, CATS has provided an explanation of the delayed maintenance, including both fiscal year details, and unspecified calendar years for planned completion of the overdue LRV overhauls. CATS' letter stated:

*"In addition to supply chain issues and staffing challenges by our vendor due to the pandemic, starting this program as planned would be challenging. Due to the aforementioned items coupled with other exigent circumstances the start of the truck overhaul was delayed until FY 2023. CATS identified the importance of this issue and had planned to address this issue through the 600K truck overhaul program that should be completed by end of 2025 instead of waiting for the Mid-life overhaul of the 100 and 200 series light rail vehicles which is not scheduled to begin until 2026".*

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[www.ncbytrain.org](http://www.ncbytrain.org)

Location:  
862 CAPITAL BLVD  
RALEIGH, NC 27603

Additionally, information was provided regarding CATS' actions to appropriate the needed funding for the overhaul project and stated:

*"To address this delay, and to expedite these overhauls, CATS shifted Truck overhaul funding from the Operating Budget to the Capital Budget and will program \$50 million dollars for this project. This programs funding for the project through its expected completion in FY 2026. The project has already started with one set of axles already returned from Siemens with the second set due in March 2023".*

CATS' response to UHC #1 also indicates that CATS has implemented a plan to prioritize the required vehicle overhauls stating:

*"CATS has also identified those axles which will be a priority to be completed; those axles with the highest mileage or have temperature readings more than 130 degrees will be sent for overhaul first".*

**NCDOT RESPONSE:**

**CATS' plan as stated, is unclear, insufficient and is not an acceptable CAP in response to UHC#1.**

CATS states the prioritization for overhaul will be based on vehicle mileage "or" axle temperature readings above 130 degrees. NCDOT notes that CATS' response does not address the possibility of both criteria being met (i.e., axles having the highest mileage AND having temperature readings more than 130 degrees). If CATS is basing its overhaul prioritization on the measures of mileage and temperature, this combined condition would present the highest priority for overhaul.

NCDOT further notes that mileage and temperature alone should not be CATS' only measures for determining overhaul priority. Numerous other factors including mechanical wear and tear and physical condition must also be considered and included in CATS' determination of overhaul priority.

Following NCDOT's review of CATS' February axle temperature readings, NCDOT determined more than 33% of the installed axle bearing temperature strips, on revenue service vehicles, have reached 130 degrees or higher, during the past year. Although a small number of the axles have been overhauled or replaced, this percentage represents 1/3 of the CATS total light rail vehicle fleet axles. All of which are operating in revenue service today.

CATS' has not adequately identified how it will prioritize truck and axle overhauls; it has not provided a specific schedule to NCDOT identifying which trucks and axles will be overhauled and in what order; it has not conducted any form of risk assessment or hazard analysis as required by CATS' Agency Safety Plan and NCDOT's Program Standard to quantify the risks presented by UHC#1 or to identify additional risks that the condition of deferred maintenance may be causing; nor has CATS examined and presented information on potential other contributing factors and/or mitigations that may exacerbate or reduce hazard risk.

NCDOT again directs CATS to provide a detailed plan for the prioritization of vehicle overhauls. Per NCDOT's original UHC letter, CATS is directed to provide a CAP for UHC #1, to include the overhaul prioritization details, for NCDOT's review and approval. This CAP is currently overdue and must be submitted by CATS, to NCDOT **within five (5) business days** following receipt of this letter.

**UHC #2:** *Current risk mitigations, implemented by CATS' RCM personnel, following the May 21, 2022, derailment, includes the installation and monitoring of temperature strips on the LRV axles. However, this safety risk mitigation, alone, is reactive to unpredictable and potentially catastrophic LRV axle failures and does not reduce the associated safety risk to an acceptable level. Additionally, the procedure for inspecting axle temperature strips requires a written procedure and must be adhered to; contrary to noncompliance found by NCDOT. As such, NCDOT identifies the limited mitigation, missing documentation, and inconsistent compliance to be an unacceptable hazardous condition.*

In stating UHC#2, NCDOT directed CATS to develop a CAP to be submitted to NCDOT for review and approval. CATS responded with the following:

*CAP: The work plan will be reviewed and revised as necessary to ensure the process of tracking on a spreadsheet monthly temperature reading for each light rail vehicle in addition to visually inspecting daily each C-truck temperature strip and noting that reading on the daily inspection form as part of the daily PM check. Rail Car Maintenance staff will be reinstructed on the work plan and the importance of daily inspection of the C-truck temperature strip. Vehicles that have a reading of 130 degrees or higher will be removed from service.*

- *Responsible Person: Gary Lee*
- *Completion Date: March 17, 2023*

Following its review of the proposed CAP, NCDOT directs CATS to revise the CAP to state the following approved plan content:

*“The work plan will be revised to ensure the process of tracking, on a spreadsheet, the daily temperature reading for **each** light rail vehicle axle bearing temperature strip for all light rail vehicles deemed available for revenue service on a daily basis. In addition to visually inspecting each axle bearing temperature strip daily and noting the reading on a spreadsheet, CATS will assign a staff member to submit the spreadsheet to NCDOT on a daily basis until further notice. Additionally, staff will be reinstructed on the revised work plan and the importance of daily inspection of all axle bearing temperature strips for vehicles deemed available for revenue service on a daily basis. Vehicles that have a reading of 130 degrees or higher will be removed from service and a comprehensive rail car maintenance inspection will be completed, per current inspection procedures, specific to this axle condition. Inspection results will be reviewed and approved by a Rail Car Maintenance Manager, before the vehicle can be released to revenue service operations and must be submitted to NCDOT for review and ongoing monitoring”.*

- *Responsible Person: to be determined by CATS*
- *Completion Date: February 23, 2023*

Regarding the spreadsheet to be used for tracking the above data, NCDOT directs CATS to modify its current spreadsheet to track the temperature strips by axle (and then by vehicle) in order to track the axles by installation date, axle mileage, and axle overhaul history effectively and specifically. Tracking the vehicle mileage, alone, does not necessarily document each axle's true mileage.



CATS must submit the revised CAP, to NCDOT **within five (5) business days** following receipt of this letter.

**Consideration of System-Wide Speed Restriction:**

In your response, CATS requested a time extension of two weeks to provide a written analysis/report consistent with NCDOT's below request:

*With this in mind, NCDOT requires CATS consider implementing a system wide LRV speed restriction on the Blue Line light rail system until a time when the affected LRVs have been overhauled, per the LRV manufacture's recommendations. A speed restriction would provide the following benefits to reduce safety risk:*

- 1. Provides LRV operators with additional time to react and respond to vehicle performance abnormalities.*
- 2. Reduces the level of speed-related wear and tear on the LRV axle components.*

CATS stated the time extension will be needed for CATS to include the following considerations in its analysis:

*To provide a written analysis/report to this request, CATS needs to draft a variety of schedules, assess schedule impact, identify the number of resources needed to operate at that speed, and run test trains to verify the head ways and new schedule if it is decided to implement the overall speed restriction. Please note that we have been working in concordance Siemens on this issue since the start. Recently we requested their thoughts on the temperature reading and recommended speed restriction. Please see their responses below:*

- o The daily inspections for the (C-truck) bearing housing temperature are an appropriate measure to check if the bearing housing is close to or exceeds 130 degrees Fahrenheit. 130 degrees Fahrenheit is an appropriate bearing temperature to remain under.*
- o The maximum speed of 55 vs 45 mph will not significantly impact bearing temperature since 55 mph is only maintained for a short period of time.*

NCDOT hereby approves a **ten (10) calendar day** extension to further facilitate CATS' completion of an analysis/report for implementing a system-wide speed restriction.

However, NCDOT wishes to be clear, that the analysis/report expected, shall illustrate CATS' findings related to safety and maintenance and not service impacts, as your response indicates is the current plan. In its truest form, a safety risk mitigation addresses safety-related issues first.

As listed in the original letter from NCDOT, the focus must be given to the two (2) potential benefits associated with implementing a speed restriction (employee response time and wear/tear on axles). As such, CATS is directed to determine a best-case scenario for a maximum speed allowance to provide the greatest level of these two benefits. From NCDOT's perspective, if your manufacturer has determined that a speed reduction, from 55 mph to 45 mph, would have little impact, then it seems to reason, that a lower speed restriction may realize the benefits listed (i.e., 35mph or lower).

**NCDOT Directive:**

Per the NCDOT's State Safety Oversight Program Standard, Section 7.1, CATS is required to mitigate UHCs before normal service may resume and to mitigate undesirable hazards unless a documented decision to manage the hazard is made by executive management and forwarded to NCDOT for review and approval/disapproval.

Today, NCDOT does not approve CATS' current risk mitigation plan, as stated in your response letter. Based on current plans to complete overdue vehicle maintenance overhauls by year 2026 or 2027, it is prudent to implement both short-term and long-term risk mitigation strategies.

**In an abundance of caution, NCDOT hereby directs CATS to implement a Blue Line light rail system-wide speed restriction of no more than a maximum speed of 35 miles per hour. As CATS' Accountable Executive, you shall implement this speed restriction, no later than 8:00am on Tuesday, February 21, 2023, and notify NCDOT when the speed restriction has been implemented.** NCDOT's directive to implement this speed restriction, by the date specified, does not relieve CATS of its responsibility to complete its Management of Change process, as outlined in CATS' Agency Safety Plan, Section 3.5:

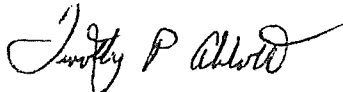
*CATS established policies or procedures intended to reduce safety risk shall not be changed until formal review by CATS Safety & Security, Quality Assurance and Operations staff meet and agree on the change to ensure no additional hazard or safety risk is introduced. The formal review will be documented using either the Hazard Analysis Form or Safety Analysis Form signed by appropriate management personnel, or by having the Rail Safety Manager co-sign the bulletin or notice indicating Safety was involved in the review and accepts the change.*

In the event that CATS identifies a safety hazard, specific to implementing NCDOT's speed restriction, by the due date, CATS shall request a meeting with NCDOT to discuss the matter further. Ultimately, CATS is responsible for implementing NCDOT's directive in a safe and timely manner.

Following your submittal of a speed restriction analysis/report, providing additional information from your staff, CATS' engineering personnel, and any other sources deemed appropriate, NCDOT will further evaluate the current directive of a maximum revenue service speed restriction of 35 mph.

NCDOT greatly appreciates your continued cooperation and support of the SSO Program. If you have any questions, please contact me at 919-707-4149.

Regards,



Timothy P. Abbott  
Safety Enforcement and Oversight Manager  
SSO Program Manager  
Rail Division  
North Carolina Department of Transportation

Brent Cagle, CATS  
February 17, 2023  
Page 6 of 6

Cc: David Moskowitz, CATS  
Chad Hagans, CATS  
Jason Orthner, NCDOT  
Jahmal Pullen, NCDOT  
Jason Sergent, NCDOT Contractor  
Don Pike, NCDOT Contractor  
Jerrad Jones, NCDOT Contractor



February 23, 2023

Timothy P. Abbott  
Safety Enforcement and Oversight Manager  
SSO Program Manager  
Rail Division  
North Carolina Department of Transportation  
1553 Mail Service Center  
Raleigh, NC 27699-1566

**Subject: CATS Response to Letter of Unacceptable Hazardous Condition (UHC) Dated February 17, 2023**

Dear Mr. Abbott,

CATS continues to maintain its commitment to operating the safest and most effective transit system in the City of Charlotte. CATS plans to maintain the current service levels of the NCDOT directed 35mph and will not consider service level changes until a majority of the truck overhaul program is completed. In response to your letter of Unacceptable Hazardous Condition (UHC) dated February 17, 2023, please see responses from the Charlotte Area Transit System (CATS) below. Note that each item is addressed in the NCDOT UHC letter with a summary of information prior to listing the specific correction actions.

- Item #1: In response to NCDOT's comment and concern the CATS's plan for addressing this issue and ensuring the truck overhaul is conducted as expeditiously as possible, the following steps have been implemented which describes the steps CATS is currently taking and plans to take to address these concerns as noted in the three CAPS below:
  - CATS-Rail Car Maintenance (RCM) will Blue tag a minimum of eight Siemens S70 series 100 and 200 vehicles with the highest mileage (see CAP #1 below) until such time they may be needed for revenue service due to other vehicles out of service for repair, damage, preventive maintenance, temperature strip readings of 130 degrees or higher, or any other reason to ensure CATS can make revenue services with the fewest needed trains. Of the identified eight LRVs blue tagged, CATS will temporarily use the lowest risk vehicle to substitute for a vehicle pulled out of service for immediate maintenance or repairs. The eight vehicles that have been blue tagged will be identified on the spreadsheets submitted to NCDOT.
    - CATS has committed to blue tag out of service a minimum of eight trains daily if not more dependent on vehicle availability
    - RCM will try at every opportunity to utilize the lowest miles vehicles available for revenue service requirements
  - A schedule of truck overhaul will be provided to NCDOT for review and monitoring (see CAP #2 below) that will include, at a minimum, the vehicle number, mileage, the date the truck was sent to Siemens and the projected date the vehicle will be returned to service



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600 East Fourth Street  
Charlotte, NC 28202  
PH: 704-336-6917  
FAX: 704-353-0797

- In order to increase the number of trucks being sent to Siemens to be overhauled, CATS will make every effort dependent on availability to purchase additional dollies. The dollies are brackets that sit on the tracks and are used in place of the trucks to allow the train car body to safely be stored until trucks are reattached to the train. All trains with dollies are blue tagged and never put into service.
  - CATS will request from Siemens a scheduled timeline on delivery and cost of S70 LRV Truck Dollies from Siemens
  - CATS has already spoken with City Procurement and Finance to begin the process to purchase three additional truck sets
  - Understanding the purchase of additional truck sets is a long lead item, it may take up to 18 months to acquire
  - CATS is also contacting other properties to see borrow dollies
- Any truck inspected that “displays a temperature reading at or above 130 degrees Fahrenheit” will be removed from service immediately. The vehicle will not be returned to service until a proper inspection per current guidelines and protocols is completed and the vehicle is deemed safe to return to service. All temperature strips will be replaced with new strips.
- All vehicles deemed “out of service” for any reason must have all truck temperature strips inspected and documented before being returned to service. All temperature strips will be replaced with new strips.
- Management will try to provide financial incentives to “RCM” employees to work scheduled/mandatory overtime weekly not to exceed the (60) hours to maintain the high inspection rates that will be required of vehicles daily
- Management will work with Siemens (the OEM) to try and expediate the current 600K overhaul schedule to be completed prior to 07/2025
- CATS will be adding the requirement of bearing replacement to the 300K overhaul contract of the 300 series vehicles
- Management will work with Siemens to expediate a contractual mechanism to begin the “midlife” overhaul of the 100 and 200 series vehicles (see CAP #3 below)
  - Item #1 - CAP #1: Review the available vehicles for service and blue tag a minimum of eight Siemens S70 100 and 200 series vehicles with the highest mileage until such time they may be needed for revenue service due to other vehicles out of service for repair, damage, preventive maintenance, temperature strip readings of 130 degrees or higher, or any other reason to ensure CATS can make revenue services with the fewest needed trains. A minimum of eight trains will always be blue tagged out of service.
    - Responsible Person: Gary Lee
    - Completion Date: February 24, 2023
  - Item #1 - CAP #2: Provide NCDOT with a truck overhaul schedule that provides, at a minimum, the vehicle number, mileage, the date the truck was sent to Siemens and the projected date the vehicle will be returned to service (see sample spreadsheet below). The priority for trucks to be sent to Siemens will start with mileage. However, if a truck is deemed unsafe due to wear and tear, has any noted defect, or has constant high temperature readings, that truck will be prioritized for overhaul. Since this is obviously a fluid situation, updates to the overhaul schedule will be shared with NCDOT for review and monitoring.
    - Responsible Person: Gary Lee
    - Completion Date: March 3, 2023

- Item #1 - CAP #3: Work with City Procurement, CATS Finance and Siemens to purchase additional Dollies so more trucks can be overhauled than currently allowed with existing CATS resources. Work on updating current contracts or entering into new contracts with Siemens to complete all truck overhauls on CATS 100, 200 and 300 series vehicles including the “midlife” overhaul project. In addition, explore the possibility and enter into long term fleet maintenance contracts, as applicable, with Siemens to ensure all preventive and recommended maintenance is provided at the appropriate intervals and time for the remaining life of the vehicle.
      - Responsible Person: Finance and Procurement
      - Completion Date: December 31, 2025
- Item #2: In response to NCDOT’s CAP request included in the UHC letter, to revise the proposed CAP to include a daily reading of all axle bearing temperature strips and provide NCDOT with a spreadsheet with a daily report of all temperature readings, CATS has determined that due to limited resources and manpower, we would not be able meet this directive for the following reasons:
  - Current RCM staffing is 24 employees short. They currently have 26 employees and 23 available to perform this work.
  - At 35 mph maximum operating speed, current maximum number of revenue trains operating on the Blue Line are 10 two car consist trains (20 Siemens S70 Light Rail Vehicles) with 6 spares for a total of 26 LRVs used for revenue service.
  - Each train has three trucks with four temperature strips on each truck for a total of 12 temperature strips on each train.
    - That equates to 312 temperature strips that would need to be inspected each day (26 X 12 = 312)
  - A review of the daily inspection process identified the following timeline
    - Approximately 14 minutes to inspect 12 temperature strips
    - Total of approximately 47 minutes (by an experienced Rail Car Technician) to complete the daily inspection and complete the required paperwork per LRV
    - Additional time needs to be added to this process for supervisors to review the paperwork and determine if a train needs to be removed from service due to any number of issues, including the recorded temperature strip
  - With the NCDOT requirement of a daily report, staff would then have to sort through 312 temperature readings, enter that information from both yards, by hand, into an Excel spreadsheet and prepare the report for daily submission
    - All this additional time would mean Preventive Maintenance (PM), repairs, and all other shop work would drastically be reduced putting CATS in a position of possibly not having enough trains to make service
  - In addition, CATS has two pull-in times. The second pull-in time occurs around 0150hrs in the morning. The pull-out time for revenue service is approximately 0350hrs. This gives RCM approximately two hours to complete daily inspections, preventive maintenance, repairs, and any other work needed to be done on approximately 10 to 12 trains.
  - All this work is done between two yards so any data collection will have to be collected and combined to create one comprehensive report
  - Because of the manpower constraints and the discussions with Siemens indicating any issues with the wheel bearing would be a progressive process, CATS acknowledges the request for the CAP for review and approval, however CATS will not be able to implement the suggested CAP by the requested date as stated in the letter without

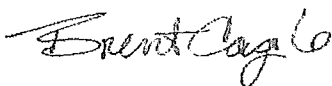
additional time to address the implementation processes. Additionally, CATS proposes below an alternate Corrective Action Plan (CAP) for NCDOT to review and consider based on existing staffing resources in RCM. Changing the CAP from daily to weekly will provide for maximum practical axle temperature monitoring without creating serious challenges, based on limited staffing, and address NCDOT's concern regarding the current monthly inspection frequency:

- Item #2 - CAP #1: The work plan will be revised as necessary to ensure the process of tracking, on a spreadsheet, the temperature reading for ten revenue service light rail trains (20 light rail vehicles) and three spare trains (6 light rail vehicles). ALL revenue service vehicles and spares will have ALL temperature strips read on the agreed upon frequency with NCDOT. If required daily, this equates to a reading of 312 strips daily (26 LRVs X 12 temp strips =312). If agreed to adjust frequency to readings of weekly, CATS can implement the following plan:
  - 26 LRVs are available for revenue service and as spares equates to 312 temperature strips to be read weekly with an average of 52 temperature strips read daily over 6 days (312 temp strips/ 6 days = 52).
  - CATS will assign a staff member to submit the spreadsheet to NCDOT on a weekly basis by 12 noon each Wednesday until further notice.
  - Rail Car Maintenance staff will be reinstructed on the revised work plan and the importance of daily inspection of all axle bearing temperature strips for the nine identified vehicles going into revenue service that day.
  - Vehicles that have a reading of 130 degrees or higher will be removed from service and a comprehensive rail car maintenance inspection will be completed, per current inspection procedures, specific to the axle condition.
  - Once the inspection of the affected axle is completed, all temperature strips will be replaced. Inspection results will be reviewed and approved by a Rail Car Maintenance Supervisor and/or the Manager of Rail Car Maintenance prior to the vehicle returning to revenue service operations.
  - In addition to a vehicle being removed for a temperature strip reading of 130 degrees or higher, ANY train that is removed from service for any other maintenance reason will be inspected prior to revenue service release.
  - A report of vehicles removed and returned to revenue service after passing the inspection will be submitted to NCDOT weekly for review and ongoing monitoring.
  - Responsible Person: Gary Lee
  - Completion Date: March 8, 2023
    - City work week is from Saturday to Friday
    - Need to identify administrative resources and train them on how to enter and report data for submission to NCDOT on a daily basis
    - Need to notify and give time to RCM staff to adjust schedules for mandatory overtime of four hours a day
    - Need time to train all shifts on revised work plan due to currently staggered schedules throughout the week

- The suggested CAP above will be supported by the following committed resources:
  - By requiring the daily frequency, CATS will be required to schedule four RCM technicians with mandatory overtime for four hours a day to ensure ample resources are dedicated to daily inspections to ensure all axle bearing temperature strips are read and recorded. If the proposed CAP is accepted, CATS would only have to schedule two RCM technicians with mandatory overtime a few days a week as opposed to daily mandatory overtime. This will be on a rotating basis to limit the potential of Hours of Service (HOS) violations. CATS will notify NCDOT of HOS violations as described in the current ASP, if applicable.
  - Administrative resources will be identified and assigned to RCM to support the recording of the temperature strips and generate the daily spreadsheet to be submitted to NCDOT. This will also be mandatory overtime if ample resources cannot be identified.
  - The commitment to pay mandatory overtime is expected and supported for up to two years.
  - As truck overhauls are completed and a majority of the trucks have been replaced, CATS will coordinate with NCDOT as to the closing of the above CAP
- Item #3: In response to NCDOT's directive to reduce maximum operating speed to 35 miles per hour on the Blue Line and provide a formal hazard analysis on the speed restriction, CATS provided NCDOT, on February 21, 2023, the Hazard Analysis regarding any identifiable safety hazards for CATS operating at a maximum speed of 35 miles per hour. An email was sent to NCDOT on February 18, 2023, stating CATS initiated the 35mph speed restriction on the afternoon of February 17, 2023, to demonstrate to NCDOT the importance safety is to CATS and to be responsive to NCDOT's concerns after an informal, preliminary hazard analysis did not immediately identify any safety hazards.

The Charlotte Area Transit System is committed to the safety of its operation, equipment, personnel and will continue to monitor this situation and work with Siemens to expedite the schedule to overhaul the axles and ensure appropriate funds are available to complete this project. To emphasize this commitment, members of the senior leadership team are planning to fly out to Sacramento, CA next week to meet in person with Siemens Senior Management to emphasize the importance of completing the truck overhaul project as quickly and safely as possible and to discuss long term contracts to ensure maintenance of the vehicles are done as recommended for the remainder of the vehicle's life. We appreciate the cooperative and supportive relationship with NCDOT and look forward to resolving and alleviating any concerns you may have regarding this issue. For additional information, please contact the General Manager of Safety and Security, David Moskowitz at (704) 336-7661.

Sincerely,



Brent Cagle,  
Interim Chief Executive Officer, Charlotte Area Transit System  
Director of Public Transit, City of Charlotte



cc: Mr. Jahmal Pullen, Engineering Coordination and Safety Manager  
 David Moskowitz, CATS General Manager of Safety and Security  
 Allen C. Smith III, CATS Deputy Director of Transit – Chief Operating Officer  
 Thurman C. Howell, CATS Deputy Director – Chief Financial Officer  
 Chad Hagans, CATS Safety Manager – Rail  
 Donald Pike, NCDOT Contractor  
 Jerrad Jones, NCDOT Contractor

SAMPLE SCHEDULE SPREADSHEET

| LRV    | Status Code | Status Reason      | Current Reading Date | Miles   | Equipment Status Explanation                            | Ship date  | Overhaul Duration in Days | Projected Ship Date | Conditional Acceptance Date |
|--------|-------------|--------------------|----------------------|---------|---|------------|---------------------------|---------------------|-----------------------------|
| LRV115 | 1           |                    | 2/18/23              | 790,463 | Please use for service everyday                         | 4/11/2023  | 56                        | 6/6/2023            |                             |
| LRV106 | 1R          | B-Car Minor Defect | 2/18/23              | 771,065 | Couple B only (Coupler switch)                          | 6/6/2023   | 56                        | 8/1/2023            |                             |
| LRV111 | 1           |                    | 2/18/23              | 764,602 | 2-18 & 2-19 Safety Event Train Only / Please use        | 5/6/2021   | 56                        |                     |                             |
| LRV116 | 2           | Testing RCM        | 2/14/23              | 739,728 | 2 RT Test Runs For 7017 Drive Car A Faults              | 8/1/2023   | 56                        | 9/26/2023           |                             |
| LRV112 | 2           | Unscheduled Maint  | 1/18/23              | 716,948 | MVB Faults  | 9/26/2023  | 56                        | 11/21/2023          |                             |
| LRV109 | 1           |                    | 2/18/23              | 714,786 |   | 11/21/2023 | 56                        | 1/16/2024           |                             |
| LRV114 | 2           | Unscheduled Maint  | 2/6/23               | 712,421 | 7017: Drive Car A Fault                                 | 1/16/2024  | 56                        | 3/12/2024           |                             |
| LRV102 | 2           | Awaiting Parts     | 2/8/23               | 710,551 | Pantograph Damaged                                      | 3/12/2024  | 56                        | 5/7/2024            |                             |
| LRV110 | 1R          | A-Car Minor Defect | 2/18/23              | 689,473 | Couple-A(Cab Speaker)                                   | 5/7/2024   | 56                        | 7/2/2024            |                             |
| LRV108 | 1           |                    | 2/18/23              | 675,804 | 2-18 & 2-19 Safety Event Train Only                     | 7/2/2024   | 56                        | 8/27/2024           |                             |
| LRV107 | 2           | Testing RCM        | 9/6/22               | 670,450 | New Truck Vibration                                     | 7/27/2022  | 56                        |                     |                             |
| LRV105 | 2           | Awaiting Parts     | 1/4/20               | 657,440 | APS /Trucks/ Accident Repair                            | 6/25/2022  | 56                        |                     |                             |
| LRV104 | 1R          | A-Car Minor Defect | 2/18/23              | 643,961 | 2-19 1st PM Pull-in TrKs 7S 15K / Couple-A(Cab Speaker) | 8/27/2024  | 56                        | 10/22/2024          |                             |
| LRV204 | 2           | Testing RCM        | 2/15/23              | 635,760 | 1 RT Test Run For 7138- BCU- C Faults                   | 10/22/2024 | 56                        | 12/17/2024          |                             |
| LRV101 | 2           | Awaiting Parts     | 3/28/20              | 626,767 | APS/ C-Truck EHU / (4) PEIs / CCTV / VCU                | 12/17/2024 | 56                        | 2/11/2025           |                             |



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

J. ERIC BOYETTE  
SECRETARY

March 2, 2023

Mr. Brent Cagle  
Interim Chief Executive Officer, Charlotte Area Transit System  
Assistant City Manager, City of Charlotte  
600 E. 4th Street, CMGC - 7th Floor  
Charlotte, NC 28202

**Subject: NCDOT Approval of the Charlotte Area Transit System's (CATS) Corrective Action Plans (CAPs) to address NCDOT's Unacceptable Hazardous Conditions (UHC) Letter and Speed Restriction Directive**

Mr. Cagle:

The North Carolina Department of Transportation (NCDOT) State Safety Oversight (SSO) Program has reviewed your February 23, 2023, submittal of proposed CAPs to further mitigate the safety risks associated with NCDOT's identified UHCs on February 6, 2023. Your submittal also includes assurances that CATS will continue to abide by NCDOT's directive to restrict Blue Line light rail vehicle (LRV) maximum speed to 35 mph until further notice, as imposed by NCDOT on February 17, 2023. NCDOT responds as follows.

For the purpose of summarizing NCDOT's oversight activities regarding the accident investigation and reviewing deferred maintenance, as well as CATS' follow-up actions, the following timeline is provided:

**May 21, 2022:**

- CATS LRV 201 center truck derailed.
- NCDOT directed CATS to investigate the accident, submit a preliminary accident investigation report within 72 hours, and provide monthly accident investigation updates until the final accident report was submitted to NCDOT for review and approval.

**Jun-Dec 2022:**

- NCDOT reviewed CATS' required monthly accident investigation status updates submitted by CATS.

**Dec 7, 2022:**

- NCDOT directed CATS to send an email to manufacture and obtain a status update of the axle analysis findings report.
- CATS sent email to manufacturer-requesting status update for axle analysis.

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NC DEPARTMENT OF TRANSPORTATION  
RAIL DIVISION  
1556 MAIL SERVICE CENTER  
RALEIGH, NC 27699-1556

*Telephone:* (919) 707-4100  
*Fax:* (919) 707-4154  
*Customer Service:* 1-877-368-4968

*Website:* [www.ncdot.gov](http://www.ncdot.gov)  
[www.ncbytrain.org](http://www.ncbytrain.org)

*Location:*  
862 CAPITAL BLVD  
RALEIGH, NC 27603

**Dec 19, 2022:**

- During the monthly NCDOT/CAT CEO Rail Safety Meeting, NCDOT facilitated a lengthy discussion regarding root cause of May 21, 2022, derailment and requested a status update of email response from manufacturer. During this meeting, CATS explained that they had received two (2) preliminary analysis reports from the manufacturer and would include them in the final accident investigation report. CATS went on to explain that the reports indicated that the locked axle seal allowed water intrusion into the bearing and caused the grease to dissipate, which caused the axle to lock.

**Jan 23, 2023:**

- During the monthly NCDOT/CATS CEO Rail Safety Meeting, NCDOT, again inquired about the status of the final accident investigation report. NCDOT also asked if CATS had reached out to other transit systems to determine if they too had experienced similar axle locking event. CATS responded that another transit system had experienced this issue with the same series rail cars.

**Jan 25, 2023:**

- CATS submitted final accident investigation report to NCDOT.

**Feb 1, 2023:**

- NCDOT facilitated an on-site meeting at CATS, per NCDOT's request. This meeting included NCDOT staff and contractors, as well as CATS' Rail Car Maintenance (RCM) and Safety and Security (S&S) staff. The purpose of the meeting was to discuss 1) RCM response to accident, 2) Discuss RCM's scheduled maintenance plans vs. OEM, and 3) Conduct a shop walk-through and inspection of LRV axles/trucks.

**Feb 6, 2023:**

- NCDOT sent accident investigation report SSO Comment Tracking Sheet to CATS for completion of final report revisions and resubmittal.

**Feb 6, 2023:**

- NCDOT sent UHC Letter to CATS' CEO - Unacceptable Hazardous Conditions-CAPs Required

**Feb 13, 2023:**

- CATS facilitated a requested meeting with NCDOT to discuss UHC Letter and NCDOT's safety concerns.

**Feb 15, 2023:**

- CATS' Interim CEO submitted response letter to NCDOT for Unacceptable Hazardous Conditions-CAPs Required letter:

**Feb 17, 2023:**

- CATS provided response to NCDOT SSO Comment Tracking Sheet for final accident investigation report.
- Following its review of CATS' response to NCDOT's UHC Letter, NCDOT sent a rebuttal letter to CATS' CEO – and included a Directive for a system-wide speed restriction for Blue Line light rail service (35mph):
- CATS implemented speed restriction, verbally to all Blue Line light rail operators, via ROCC two-way radio announcement.

**Feb 18, 2023:**

- CATS submitted “draft” revised Final Accident Investigation Report to NCDOT for review and comment:

**Feb 21, 2023:**

- CATS submitted Hazard Analysis Report (for speed restriction) to NCDOT for review and comment.

**Feb 23, 2023:**

- CATS submitted its response to NCDOT's rebuttal letter and proposed revised CAPs and included an assurance that CATS will continue to comply with NCDOT's Directive for the speed restriction until directed otherwise.

**Feb 27, 2023:**

- During the monthly NCDOT/CATS CEO Rail Safety Meeting, CATS' CEO explained that his team was traveling to manufacturer's headquarters to discuss additional potential actions that may be available to accelerate the LRV overhaul program.

**Feb 28, 2023:**

- CATS submitted the 2<sup>nd</sup> revised final accident investigation report to NCDOT for review and approval.

Following its review of CATS' CEO letter, dated February 27, 2023, including revised CAPs, NCDOT responds as follows:

CATS' February 27, 2023, letter states that *“CATS plans to maintain the current service levels of the NCDOT directed 35mph and will not consider service level changes until a majority of the truck overhaul program is completed”*.

**NCDOT response:** NCDOT concurs that service levels at CATS shall not increase until all deferred maintenance of safety-critical axles, for LRVs scheduled for service, has been completed. This may require CATS to decrease service levels, based on results of ongoing axle temperature monitoring and the potential need for additional risk mitigation actions. Additionally, NCDOT's system-wide speed restriction for the Blue Line light rail system will remain in effect until further notice.

CATS' February 27, 2023, letter includes four (4) CAPs and NCDOT wishes to acknowledge the increased level of information and response provided.

Regarding the submitted new and revised CAPs, NCDOT's below response includes:

- The original stated CAP requested.
- NCDOT's rebuttal comments for CATS' response (received on February 15, 2023)
- CATS' new or revised proposed CAP (submitted on February 23, 2023)
- NCDOT's approval and comments for each CAP.

NCDOT, UHC 1-CAP 1:

*As stated, Delayed maintenance of the Siemens S70 LRVs directly contributed to the derailment of LRV 201 on May 21, 2022. Although CATS is working with its contractors to address needed overhauls of the safety critical axles for this LRV (and the other LRVs in this fleet), the overhaul completion date is currently scheduled for some time in calendar year 2026. CATS is currently operating LRVs, in revenue service, which have surpassed the manufacture's recommended axle overhaul thresholds. NCDOT identifies the planned fleet overhaul completion date as an unacceptable hazardous condition.*

NCDOT Rebuttal for UHC 1-CAP-1 Response from CATS:

CATS' has not adequately identified how it will prioritize truck and axle overhauls; it has not provided a specific schedule to NCDOT identifying which trucks and axles will be overhauled and in what order; it has not conducted any form of risk assessment or hazard analysis as required by CATS' Agency Safety Plan and NCDOT's Program Standard to quantify the risks presented by UHC#1 or to identify additional risks that the condition of deferred maintenance may be causing; nor has CATS examined and presented information on potential other contributing factors and/or mitigations that may exacerbate or reduce hazard risk. NCDOT again directs CATS to provide a detailed plan for the prioritization of vehicle overhauls. Per NCDOT's original UHC letter, CATS is directed to provide a CAP for UHC #1, to include the overhaul prioritization details, for NCDOT's review and approval.

CATS, UHC 1-Revised CAP 1:

*Review the available vehicles for service and blue tag a minimum of eight Siemens S70 100 and 200 series vehicles with the highest mileage until such time they may be needed for revenue service due to other vehicles out of service for repair, damage, preventive maintenance, temperature strip readings of 130 degrees or higher, or any other reason to ensure CATS can make revenue services with the fewest needed trains. A minimum of eight trains will always be blue tagged out of service.*

- Responsible Person: Gary Lee
- Completion Date: February 24, 2023

NCDOT Response:

NCDOT concurs with removing the highest mileage S70 100 and 200 series vehicles from service immediately. Without exception, NCDOT will not permit CATS to operate these vehicles until the past due maintenance overhauls are completed. If necessary, CATS will need to reduce service levels. As such, NCDOT hereby approves this CAP, with changes stated herein, and directs CATS to remove a minimum of eight (8) highest mileage LRVs and submit a list of these vehicles to NCDOT for review and monitoring of required maintenance work. CAP ID: 23-02-06-UHC-1-01-BlueTags

**CATS, UHC 1-New CAP 2:**

*Provide NCDOT with a truck overhaul schedule that provides, at a minimum, the vehicle number, mileage, the date the truck was sent to Siemens and the projected date the vehicle will be returned to service (see sample spreadsheet below). The priority for trucks to be sent to Siemens will start with mileage. However, if a truck is deemed unsafe due to wear and tear, has any noted defect, or has constant high temperature readings, that truck will be prioritized for overhaul. Since this is obviously a fluid situation, updates to the overhaul schedule will be shared with NCDOT for review and monitoring.*

- *Responsible Person: Gary Lee*
- *Completion Date: March 3, 2023*

**NCDOT Response:**

NCDOT hereby approves this CAP, with the addition of notifying NCDOT, each time the overhaul schedule is modified and provide rationale for schedule changes and indicate staff level person approving each schedule change. CAP ID: 23-02-06-UHC-1-02-Overhaul Schedule

**CATS, UHC 1-New CAP 3:**

*Work with City Procurement, CATS Finance and Siemens to purchase additional Dollies so more trucks can be overhauled than currently allowed with existing CATS resources. Work on updating current contracts or entering into new contracts with Siemens to complete all truck overhauls on CATS 100, 200 and 300 series vehicles including the “midlife” overhaul project. In addition, explore the possibility and enter into long term fleet maintenance contracts, as applicable, with Siemens to ensure all preventive and recommended maintenance is provided at the appropriate intervals and time for the remaining life of the vehicle.*

- *Responsible Person: Finance and Procurement*
- *Completion Date: December 31, 2025*

**NCDOT Response:**

NCDOT hereby approves this CAP and requests status updates, via email, immediately following CATS’ completion of actions resulting in the attainment of additional resources. CAP ID: 23-02-06-UHC-1-03-Procurement

**NCDOT, UHC 2-CAP 1:**

*As stated, current risk mitigations, implemented by CATS’ RCM personnel, following the May 21, 2022, derailment, includes the installation and monitoring of temperature strips on the LRV axles. However, this safety risk mitigation, alone, is reactive to unpredictable and potentially catastrophic LRV axle failures and does not reduce the associated safety risk to an acceptable level. Additionally, the procedure for inspecting axle temperature strips requires a written procedure and must be adhered to; contrary to noncompliance found by NCDOT. As such, NCDOT identifies the limited mitigation, missing documentation, and inconsistent compliance to be an unacceptable hazardous condition.*

**NCDOT Rebuttal for UHC 2-CAP-1 Response from CATS:**

Following its review of the proposed CAP, NCDOT directs CATS to revise the CAP to state the following approved plan content:

The work plan will be revised to ensure the process of tracking, on a spreadsheet, the daily temperature reading for **each** light rail vehicle axle bearing temperature strip for all light rail vehicles deemed available for revenue service on a daily basis. In addition to visually inspecting each axle bearing temperature strip daily and noting the reading on a spreadsheet,

CATS will assign a staff member to submit the spreadsheet to NCDOT on a daily basis until further notice. Additionally, staff will be reinstructed on the revised work plan and the importance of daily inspection of all axle bearing temperature strips for vehicles deemed available for revenue service on a daily basis. Vehicles that have a reading of 130 degrees or higher will be removed from service and a comprehensive rail car maintenance inspection will be completed, per current inspection procedures, specific to this axle condition. Inspection results will be reviewed and approved by a Rail Car Maintenance Manager, before the vehicle can be released to revenue service operations and must be submitted to NCDOT for review and ongoing monitoring”.

CATS, UHC 2-Revised CAP 1:

*The work plan will be revised as necessary to ensure the process of tracking, on a spreadsheet, the temperature reading for ten revenue service light rail trains (20 light rail vehicles) and three spare trains (6 light rail vehicles). ALL revenue service vehicles and spares will have ALL temperature strips read on the agreed upon frequency with NCDOT. If required daily, this equates to a reading of 312 strips daily (26 LRVs X 12 temp. strips = 312). If agreed to adjust frequency to readings of weekly, CATS can implement the following plan:*

- *26 LRVs are available for revenue service and as spares equates to 312 temperature strips to be read weekly with an average of 52 temperature strips read daily over 6 days (312 temperature strips/ 6 days = 52).*
- *CATS will assign a staff member to submit the spreadsheet to NCDOT on a weekly basis by 12 noon each Wednesday until further notice.*
- *Rail Car Maintenance staff will be reinstructed on the revised work plan and the importance of daily inspection of all axle bearing temperature strips for the nine identified vehicles going into revenue service that day.*
- *Vehicles that have a reading of 130 degrees or higher will be removed from service and a comprehensive rail car maintenance inspection will be completed, per current inspection procedures, specific to the axle condition.*
- *Once the inspection of the affected axle is completed, all temperature strips will be replaced. Inspection results will be reviewed and approved by a Rail Car Maintenance Supervisor and/or the Manager of Rail Car Maintenance prior to the vehicle returning to revenue service operations.*
- *In addition to a vehicle being removed for a temperature strip reading of 130 degrees or higher, ANY train that is removed from service for any other maintenance reason will be inspected prior to revenue service release.*
- *A report of vehicles removed and returned to revenue service after passing the inspection will be submitted to NCDOT weekly for review and ongoing monitoring.*
  - *Responsible Person: Gary Lee*
  - *Completion Date: March 8, 2023*

**NCDOT Response:**

NCDOT hereby approves this CAP, as proposed for weekly report submittals, for all axle temperature strip readings each week. Regarding the spreadsheet to be used for tracking the above data, NCDOT directs CATS to modify its current spreadsheet to also track the temperature strips, by axle (and then by vehicle) in order to track the axles by installation date, axle mileage, and axle overhaul history effectively and

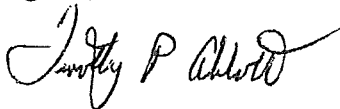
Brent Cagle, CATS  
March 2, 2023  
Page 7 of 7

specifically. Tracking the vehicle mileage, alone, does not necessarily document each axle's true mileage. NCDOT will work with CATS to establish an approved format for the reporting spreadsheet. **CAP ID: 23-02-06-UHC-2-01-Temp Readings**

As required by NCDOT's SSO Program Standard (SSOPS), Section 9-Corrective Action Plans (CAPs), CATS is required to submit the four (4) approved CAPs (to include additional requirements stated by NCDOT herein), via the designated Rail.Safety web application, for NCDOT's review and monitoring. The CAPs must be submitted within **five (5) calendar days** from the date of this letter. NCDOT will monitor and verify CATS' CAP activities through to verification and closure for each CAP submitted.

NCDOT greatly appreciates your continued cooperation and support of the SSO Program. If you have any questions, please contact me at 919-707-4149.

Regards,



Timothy P. Abbott  
Safety Enforcement and Oversight Manager  
SSO Program Manager  
Rail Division  
North Carolina Department of Transportation

Cc: David Moskowitz, CATS  
Chad Hagans, CATS  
Jason Orthner, NCDOT  
Jahmal Pullen, NCDOT  
Jason Sergent, NCDOT Contractor  
Don Pike, NCDOT Contractor  
Jerrad Jones, NCDOT Contractor







STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

J. ERIC BOYETTE  
SECRETARY

**FINDINGS OF NONCOMPLIANCE**

**To:** Mr. Brent Cagle  
Interim Chief Executive Officer, Charlotte Area Transit System  
Assistant City Manager, City of Charlotte  
600 E. 4th Street, CMGC - 7th Floor  
Charlotte, NC 28202

**Date:** March 21, 2023

**Number:** FNC-2023-03-21

**Subject:** Findings of Noncompliance with North Carolina Department of Transportation (NCDOT) State Safety Oversight Program Standard (SSOPS), Section 1.5.10 and Charlotte Area Transit System's (CATS) Bridge Maintenance Plan, Section 2.1.

During the week of March 6-10, CATS' Interim CEO became aware of past due bridge structure inspections. This information was communicated to the Federal Transit Administration's Region IV office on March 8, 2023. However, CATS did not inform NCDOT of the overdue inspections, nor the contact made by a Federal agency, until March 16, 2023. As such, CATS was noncompliant with the State Safety Oversight Program Standard (SSOPS), Section 1.5.10 which states:

*NCDOT requires all RTAs under its jurisdiction to notify and share the results of contacts made by federal agencies, such as FTA, the National Transportation Safety Board (NTSB), and FRA, in regard to the rail operations and safety programs of the RTA.*

Additionally, CATS' Bridge Maintenance Plan, Section 2.1 requires that CATS complete bridge structure inspections every two years. However, CATS has not completed these inspections since 2019. As such, CATS is noncompliant with its inspection requirements, as required in section 2.1 of the plan:

*All CATS bridges, except underwater structures, will be inspected at least every two years in accordance with the National Federal Standard for Bridge Inspection. This includes fracture critical bridges. Underwater structures will be inspected every six years.*

Mailing Address:  
NC DEPARTMENT OF TRANSPORTATION  
RAIL DIVISION  
1556 MAIL SERVICE CENTER  
RALEIGH, NC 27699-1556

Telephone: (919) 707-4100  
Fax: (919) 707-4154  
Customer Service: 1-877-368-4968

Website: [www.ncdot.gov](http://www.ncdot.gov)  
[www.ncbytrain.org](http://www.ncbytrain.org)

Location:  
862 CAPITAL BLVD  
RALEIGH, NC 27603

**NCDOT hereby finds that:**

- CATS is NONCOMPLIANT with NCDOT's communication requirements for the CATS results of contacts made by Federal agencies.
- CATS is NONCOMPLIANT with the requirements of its Bridge Maintenance Plan.

In response to the above Findings of Noncompliance, CATS is required to submit Corrective Action Plans (CAPs) to NCDOT for review and approval for the following:

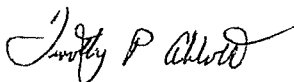
1. Establish a policy and procedure to promptly notify NCDOT of the results of contacts made by federal agencies.
2. CATS shall establish a policy and procedure to track the status of asset management components, as listed in its own Transit Asset Management (TAM) Plan and provide a monthly status report to NCDOT. The monthly report shall be submitted to NCDOT by the 20<sup>th</sup> of each month, using the format included below.
3. Effective April 1, 2023, CATS shall prepare and submit a monthly bridge inspection schedule to NCDOT until all bridge structures have been inspected and all identified safety-related bridge structure deficiencies have been mitigated.

Per SSOPS, Section, 1.5.2.3: Third Level of Enforcement and Escalation, NCDOT wishes to remind you that future occurrences of noncompliance for proper reporting to NCDOT and monitoring of assets may result in NCDOT's enforcement and escalation to include the delay, suspension, or cancelling of rail service and potentially include ramifications related to the RTA's State and Federal funding programs.

NCDOT appreciates CATS' continued support of NCDOT's SSO Program and directs CATS to submit the aforementioned CAPs **within ten (10) calendar days** following receipt of this letter.

If you have any questions, please contact me at 919-707-4149.

Regards,



Timothy P. Abbott  
Safety Enforcement and Oversight Manager  
SSO Program Manager  
Rail Division  
North Carolina Department of Transportation

Cc: David Moskowitz, CATS  
Chad Hagans, CATS  
Jahmal Pullen, NCDOT  
Jason Sergent, NCDOT Contractor  
Don Pike, NCDOT Contractor  
Jerrad Jones, NCDOT Contractor

## Monthly Asset Management Status Report

| Asset  | # Planned Inspections   | # Actual Inspections | Plan Reference Document | Priority 1 - Operational / Safety Related Issues Identified | Priority 1 - Operational / Safety Related Issues Open | Planned Date to Complete Priority 1 - Open Items |
|--|---|----------------------|-------------------------|---|---|--|
| <b>Rolling Stock</b>                             |   |                      |                         |   |   |  |
| Light Rail Vehicles                              |   |                      |                         |   |   |  |
| Streetcars                                       |   |                      |                         |   |   |  |
| <b>Equipment</b>                                 |   |                      |                         |   |   |  |
| Non-Revenue Track Vehicles                       |   |                      |                         |   |   |  |
| Emergency Response Equipment                     |   |                      |                         |   |   |  |
| <b>Infrastructure</b>                            |   |                      |                         |   |   |  |
| Signal Systems                                   |   |                      |                         |   |   |  |
| Power Substations                                |   |                      |                         |   |   |  |
| Guideway (OCS) System                            |   |                      |                         |   |   |  |
| Grade Crossings                                  |   |                      |                         |   |   |  |
| Turnouts and Crossovers                          |   |                      |                         |   |   |  |
| Bridges  |   |                      |                         |   |   |  |
| Walls and drainage systems                       |   |                      |                         |   |   |  |
| Yards and Lighting                               |   |                      |                         |   |   |  |
| Technology / IT Infrastructure                   |   |                      |                         |   |   |  |
| <b>Facilities</b>                                |   |                      |                         |   |   |  |
| Passenger Facilities (stations)                  |   |                      |                         |   |   |  |
| Parking Facilities                               |   |                      |                         |   |   |  |
| Maintenance Facilities                           |   |                      |                         |   |   |  |
| <b>State of Good Repair (SGR) Status</b>         | <b>Explain Condition Assessment Ratings below 3.0 and Mitigation Plans</b><br><i>(Per, Transit Asset Management (TAM) Plan)</i>   |                      |                         |   |   |  |
| Rolling Stock (i.e., CATS I & II 600k overhauls) |   |                      |                         |   |   |  |
| Equipment  |   |                      |                         |   |   |  |
| Infrastructure                                   |   |                      |                         |   |   |  |
| Facilities                                       |   |                      |                         |   |   |  |
| <b>Funding/Budgeting</b>                         | <b>Explain the Status of Current Funding Available, Source of Funding, and Shortfalls to Address Assessment Ratings below 3.0</b> |                      |                         |   |   |  |
|  |   |                      |                         |   |   |  |



## LRV Maintenance Records





# Work Order

589157

Print Date: 4/05/2023

Print Time: 15:17 PM

## Reprofile CT due to flat spots

WO Type: Corrective  
 WO Status: Closed  
 Requested By: Massey, Larry

CSR #: Not Entered  
 Fac. Code: Not Entered  
 Assigned 1:  
 Assigned 2:

Due Start: Not Entered  
 Due Finish: Not Entered  
 WO Priority: None

Light Rail Vehicle: LRV201  
 Address: Not Applicable

Route(s): Not Applicable

Area: Not Applicable  
 Zone: Not Applicable

### Task # 1: Reprofile CT due to flange wear

WO Task Status: Closed

Actual Task Start Date: 05/20/2022

Actual Task Finish Date: 05/20/2022

| Job # | Job Description  | System                         | Component                      |
|-------|--|--------------------------------|--------------------------------|
| 1     | TRUE CT WHEELS FOR FLAT SPOTS AS REQUIRED                  | Wheel/Axle Assembly            | Wheel Tire                     |
| 2     | Enter new Wheel Size in VCU                                | Propulsion                     | Vehicle Control Unit           |
| 3     | Change ATP Wheel Size setting as required (every 1/4 inch) | ATP / TWC                      | ATP Enclosure                  |
| 4     | SHIM PRIMARY SUSPENSION as required                        | Friction Brake/Hydraulic Levlg | Friction Brake / Hydr Leveling |
| 5     | Check and LEVEL Vehicle as required                        | Friction Brake/Hydraulic Levlg | Friction Brake / Hydr Leveling |
| 6     | Check and adjust TRACK BRAKES as required                  | Track Brake                    | Track Brake Assembly           |
| 7     | Check and adjust RAIL CLEARERS as required                 | Trucks                         | Rail Clearer                   |

### Job Notes

Note For Job 1 Created By Massey, L. On 05-19-2022 At 08:57PM  
 19-22 Pics. Is in the Docs. section of this WO

### Time Worked

| Name             | ID       | Hours:Minutes | Cost    |
|------------------|----------|---------------|---------|
| Gharavi, Khosrow | KGHARAVI | 2:00          | \$55.14 |
| Hunter, Easton   | EHUNTER  | 2:00          | \$55.14 |
| Moss, David L.   | DLMOSS   | 2:00          | \$55.14 |
| Sommer, Richard  | RSOMMER  | 0:05          | \$2.30  |
| Sommer, Richard  | RSOMMER  | 0:55          | \$25.27 |
| Sommer, Richard  | RSOMMER  | 0:20          | \$9.19  |
| Sommer, Richard  | RSOMMER  | 0:20          | \$9.19  |
| Sonpon, Alex W.  | AWSONPON | 1:00          | \$27.57 |
| Sonpon, Alex W.  | AWSONPON | 0:30          | \$13.79 |
| Sonpon, Alex W.  | AWSONPON | 0:30          | \$13.79 |
| Sonpon, Alex W.  | AWSONPON | 0:30          | \$13.79 |

### Parts Used

| ID | Description | Qty | U/M | Cost |
|----|-------------|-----|-----|------|
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |

### Work Order Notes



## CATS--101358

## identification

|                                |                       |
|--------------------------------|-----------------------|
| machining data:                | 19.05.2022 15:13:04   |
| operator ID                    | 94999                 |
| reason for machining           | 3                     |
| mileage                        | 569567                |
| machining type                 | S70-CENTER TRUCK      |
| profile type                   | D02D 09421656 / 135mm |
| wheel ID                       | 103188-C-AXLE-4       |
| bogie position                 | 2                     |
| wheel set position             | 4                     |
| bogie ID                       | 103188-C              |
| vehicle ID                     | 201                   |
| vehicle direction 0=A-B, 1=B-A | 1                     |
| vehicle type                   | S70                   |
| vehicle position               | 2                     |

## pre-measurement data

|                     |         |    |        |    |
|---------------------|---------|----|--------|----|
| back to back        | 1367.93 | mm |        |    |
| gauge               | 0.00    | mm |        |    |
| diameter difference | 0.14    | mm |        |    |
|                     | left    |    | right  |    |
| diameter            | 626.78  | mm | 626.91 | mm |
| axial runout        | 0.27    | mm | 0.15   | mm |
| radial runout       | 0.01    | mm | 0.05   | mm |
| flange height       | 27.54   | mm | 27.29  | mm |
| flange thickness    | 29.76   | mm | 29.56  | mm |
| qr cross measure    | 0.00    | mm | 0.00   | mm |

## nominal data

|                  |        |    |       |    |
|------------------|--------|----|-------|----|
| variant          | 1      |    |       |    |
| diameter         | 623.00 | mm |       |    |
|                  | left   |    | right |    |
| flange thickness | 29.37  | mm | 29.37 | mm |

## post-measurement data

|                     |         |    |        |    |
|---------------------|---------|----|--------|----|
| back to back        | 1367.73 | mm |        |    |
| gauge               | 0.00    | mm |        |    |
| diameter difference | 0.03    | mm |        |    |
|                     | left    |    | right  |    |
| diameter            | 622.98  | mm | 623.01 | mm |
| axial runout        | 0.26    | mm | 0.09   | mm |
| radial runout       | 0.05    | mm | 0.06   | mm |
| flange height       | 27.24   | mm | 27.32  | mm |
| flange thickness    | 29.59   | mm | 29.21  | mm |
| qr cross measure    | 0.00    | mm | 0.00   | mm |

FLAT SPOTS ON AXLE #3

5-19-22

HEGENSCHEIDT - MFD

CATS--101358

LRV201

identification

machining data: 19.05.2022 14:22:27  
 operator ID 99407  
 reason for machining 3  
 mileage 569567  
 machining type S70-CENTER TRUCK  
 profile type D02D 09421656 / 135mm  
 wheel ID 103188-C-AXLE-3  
 bogie position 2  
 wheel set position 3  
 bogie ID 103188-C  
 vehicle ID 201  
 vehicle direction 0=A-B, 1=B-A 1  
 vehicle type S70  
 vehicle position 2

pre-measurement data

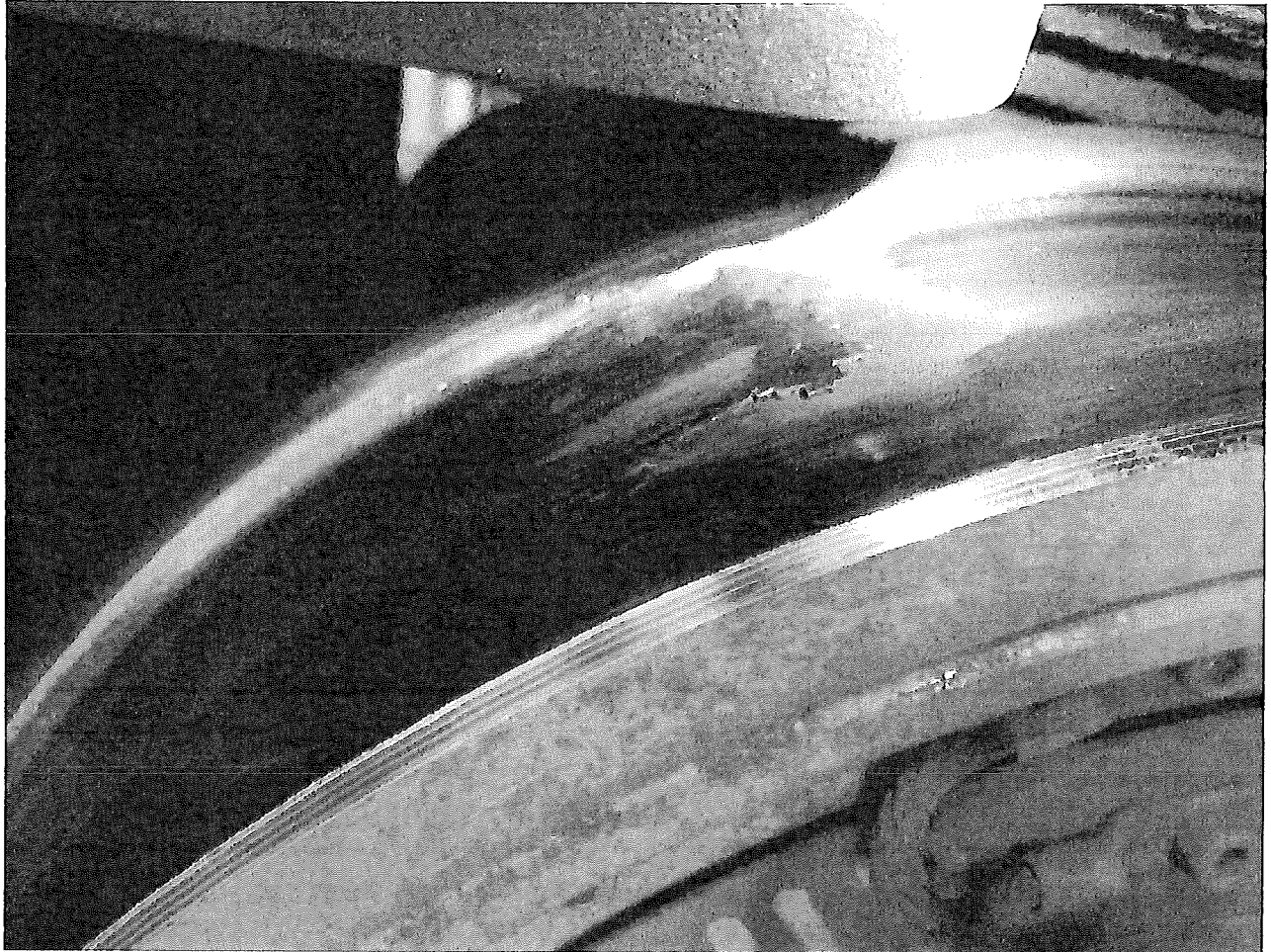
|                     |         |    |        |    |
|---------------------|---------|----|--------|----|
| back to back        | 1367.97 | mm |        |    |
| gauge               | 0.00    | mm |        |    |
| diameter difference | 0.11    | mm |        |    |
|                     | left    |    | right  |    |
| diameter            | 627.55  | mm | 627.44 | mm |
| axial runout        | 0.15    | mm | 0.10   | mm |
| radial runout       | 0.03    | mm | 0.03   | mm |
| flange height       | 27.47   | mm | 27.31  | mm |
| flange thickness    | 29.66   | mm | 29.36  | mm |
| qr cross measure    | 0.00    | mm | 0.00   | mm |

nominal data

|                  |        |    |       |    |
|------------------|--------|----|-------|----|
| variant diameter | 1      | mm |       |    |
|                  | 623.15 | mm |       |    |
|                  | left   |    | right |    |
| flange thickness | 29.37  | mm | 29.37 | mm |

post-measurement data

|                     |         |    |        |    |
|---------------------|---------|----|--------|----|
| back to back        | 1367.72 | mm |        |    |
| gauge               | 0.00    | mm |        |    |
| diameter difference | 0.60    | mm |        |    |
|                     | left    |    | right  |    |
| diameter            | 622.82  | mm | 622.22 | mm |
| axial runout        | 0.21    | mm | 0.20   | mm |
| radial runout       | 0.03    | mm | 0.07   | mm |
| flange height       | 27.26   | mm | 27.33  | mm |
| flange thickness    | 29.49   | mm | 29.29  | mm |
| qr cross measure    | 0.00    | mm | 0.00   | mm |



Total number of Flat Spot Work Orders CY 2022

| Count of Work Order<br>Row Labels | Column Labels<br>Damaged | Flange Wear | Flat Spots (blank) | Grand Total |           |
|-----------------------------------|--------------------------|-------------|--------------------|-------------|-----------|
| <1/1/2022                         |                          | 1           | 4                  | 2           | 7         |
| LRV104                            |                          |             |                    | 1           | 1         |
| LRV111                            |                          |             | 1                  |             | 1         |
| LRV112                            |                          |             | 1                  |             | 1         |
| LRV202                            |                          | 1           |                    |             | 1         |
| LRV204                            |                          |             |                    | 1           | 1         |
| SC403                             |                          |             | 2                  |             | 2         |
| <b>2022</b>                       | <b>2</b>                 |             | <b>12</b>          | <b>9</b>    | <b>23</b> |
| LRV102                            |                          |             | 1                  |             | 1         |
| LRV104                            |                          |             | 1                  |             | 1         |
| LRV107                            |                          |             | 1                  |             | 1         |
| LRV108                            |                          |             |                    | 1           | 1         |
| LRV112                            |                          |             |                    | 1           | 1         |
| LRV113                            |                          |             |                    | 1           | 1         |
| LRV115                            |                          |             | 1                  | 1           | 2         |
| LRV201                            |                          |             | 1                  |             | 1         |
| LRV203                            |                          |             | 2                  | 1           | 3         |
| LRV302                            | 1                        |             |                    |             | 1         |
| LRV303                            |                          |             |                    | 1           | 1         |
| LRV308                            |                          |             |                    | 1           | 1         |
| LRV316                            | 1                        |             |                    |             | 1         |
| LRV322                            |                          |             | 1                  |             | 1         |
| SC401                             |                          |             | 1                  | 1           | 2         |
| SC403                             |                          |             | 3                  | 1           | 4         |
| <b>2023</b>                       |                          |             |                    | <b>1</b>    | <b>1</b>  |
| SC403                             |                          |             |                    | 1           | 1         |
| <b>Grand Total</b>                | <b>2</b>                 | <b>1</b>    | <b>16</b>          | <b>12</b>   | <b>31</b> |



# CHARLOTTE AREA TRANSIT SYSTEM RAIL OPERATIONS



Date: May 21, 2022

**To:** Tommy Woolard – (Acting) Light Rail General Manager  
**From:** Ryan Conner – (Acting) Rail Car Maintenance Manager  
**Location:** Track #1 approaching Old Pineville Rd  
**Date of Incident:** May 21, 2022, @ 1138

**Subject:** Incident #172073 NB Train #5 201-114 derailed near Old Pineville

## Summary of the Facts:

On May 21, 2022, @1145 (Robert Hudgins) R301, Rolando Bermeo) R340, (Tim Tenhengel) 341, and (Darnelle Rice) R344 responded to the derailment scene near Old Pineville. Once on the scene I immediately noticed axle#3 of LRV201 off the rails. The RCM team then gathered the re-rail equipment and remained on standby until the consist was released by safety. Then the RCM 2<sup>nd</sup> Shift team (Kevin Porterfield) R306, (Freddy Miller) R345, (Larry Massey) R312, (Justin Bibbins) R327, (Andres Orellano) R328, (Mark Rhodes) R357, (Alireza Zadeh) R351 and (Tadashi Watabe) R346 showed up, relieved the 1<sup>st</sup> shift team, and remained on standby due to inclement weather. Once the LRV was released by safety and the weather passed the RCM team began re-rail procedures. Once the LRV was lifted, it also had to be articulated (pushed) into the right position then placed back on the rails. The slag from the wheel sliding had to be removed with a side grinder to decrease the possibility of another de-rail. R306 removed as much slag as he could with the grinder and the LRV moved to the VMF at walking speed.

### Incident timeline:

11:12 R157 operating Train 5 (114-201) NB, track 1, approaching Old Pineville Rd reported a 7153, stated he could not continue, requested Rail Car Maintenance, RCM R340 advised 201 C truck derailed.

11:12 R157 reported 7153 faults, Train shaking bad  
11:15 R157 advised Tr 5 could not move safely, unable to continue  
11:20 Train 5 Auxed off/on, advised train 5 still unable to proceed safely  
11:27 R172 PO S YNYL New Train 5 (304-317) NB in service at New Bern  
11:27 RCM R344/340 on scene, Boarded LRV 201  
11:30 RCM R340 advised the 201 C Truck derailed, Request Derail Team  
11:31 R340 cleared scene to get derail equipment  
11:38 Bus Bridge requested between Archdale and New Bern stations  
11:41 R408 on scene  
11:43 R30 on scene  
11:46 R426 Pinned Gates Myers & Chapman, S. Blvd North  
11:50 R408 reports track 1 damaged  
11:51 R301, 344, 340 on scene  
11:52 R30 offloaded passengers  
11:55 R30 advised 1 pregnant female passenger request MEDIC 114 Car  
12:01 CFD Engine 43 on scene  
12:25 S111 on scene  
12:29 S100 on scene; on scene command, Rail ops 5



## CHARLOTTE AREA TRANSIT SYSTEM RAIL OPERATIONS



12:36 R30 advised unable to single track, track 2  
12:50 S111 Walking SB track 1 from incident site to south of Woodlawn  
13:36 S114 Arrived on scene  
13:58 S107 release incident train to RCM and MOW for re-railing process  
13:59 S100 Clear the scene  
14:28 R22 on scene Old Pineville  
19:31 S107 advised LRV 201 successfully Re-railed, Ready for bump test  
19:39 R312 Released C truck brake in LRV 201  
19:42 S107 advised LRV 201 has a locked axle and needs to uncouple  
19:48 R22 successfully uncoupled 201 from the 114  
19:55 R22 performed a successful bump test  
20:03 R22 relocated 201 NB track 1 from incident site into the yard tr. 4S  
20:12 RCM R312 and all RCM personnel clear Old Pineville  
20:15 R4/R8 advised repairs complete to track 1 and ready for a test train once the incident train is cleared.  
21:20 LRV 201 clear mainline.

### **Investigation:**

R301 performed a walkaround inspection of the entire consist and the preliminary investigation showed only significant damage to the left wheel on axle#3 of LRV201 which was the northbound train. All other wheels on the consist were on the rails.

After further investigation it found that the bearing on axle#3 had seized bearing and the axle needed to be replaced.

### **Damage**

#### **LRV201:**

Preliminary investigation showed significant damage to the wheel on axle#3. Work Order # 589305 was created for LRV201 for accident protocols and inspections. Repairs could not be made on axle#3 due to the damage and the axle was replaced on Work Order#589902

#### **LRV114:**

Preliminary investigation showed no sign of damage. Work Order # 589308 has been created for LRV114 for accident protocols and inspections.

### **Conclusion:**

TBD

### **Corrective Action:**

Work order 590588 was created to remove and replace the center truck. The truck was reconditioned on work order 588902 and axle#3 was replaced.



CHARLOTTE AREA TRANSIT SYSTEM  
RAIL OPERATIONS



**Cost:**

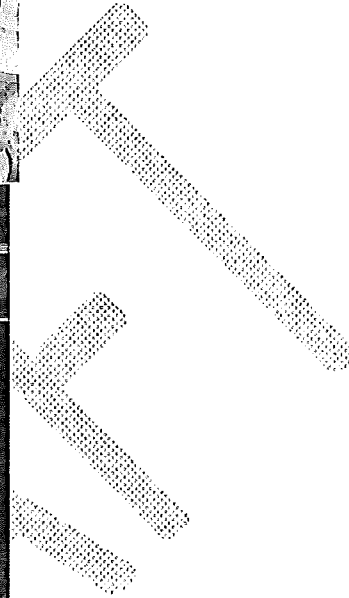
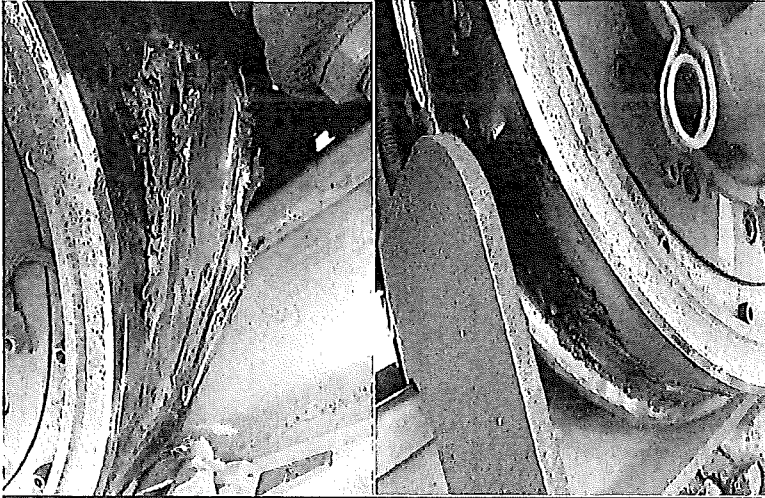
| Description                 | Part Number              | Price      | Qty. | Total Cost   |
|-----------------------------|--------------------------|------------|------|--------------|
| Brake Disc, CT              | RC-1200-BRAKE-DISC-CT    | \$1,422.63 | 4    | \$5,690.52   |
| Brake Pad, CT               | RC-1200-BRAKE-PAD-CT     | \$220.46   | 8    | \$1,763.68   |
| Buffer                      | RC-1200-BUFFER           | \$2,513.5  | 8    | \$20,108.0   |
| KIT, TIRE, WHEEL            | RC-1200-WHEEL-TIRE KIT   | \$2422.8   | 4    | \$9,691.2    |
| Center truck axle stub axle | RC-1200-AXLE-CT-STUBAXLE | \$36,852   | 2    | \$73,704     |
|                             |                          |            |      | Labor Cost   |
| Man hours                   | 177.34                   | 56         |      | \$9,931.04   |
|                             |                          |            |      | Total Cost   |
|                             |                          |            |      | \$ 120,88.44 |

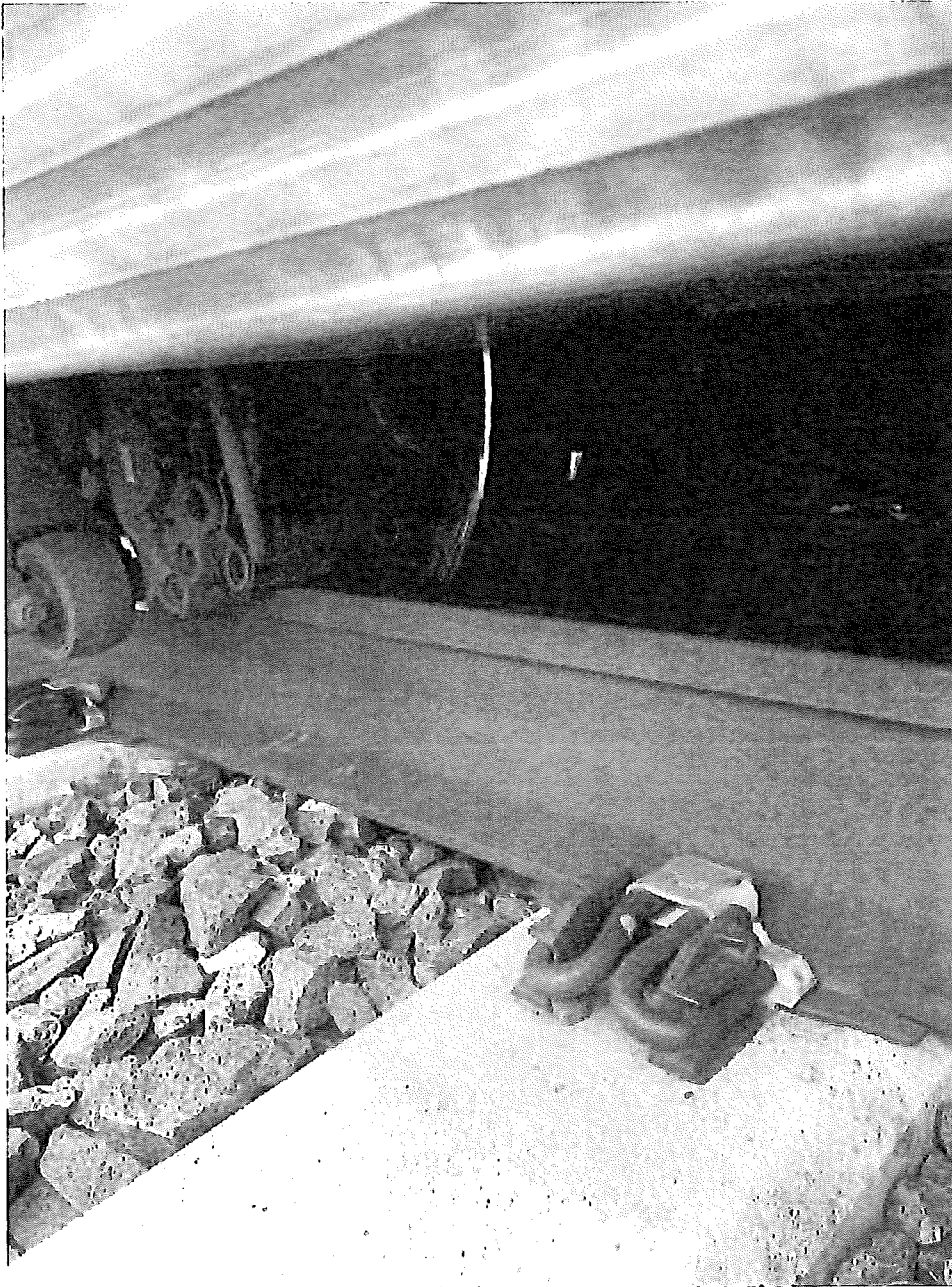
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CHARLOTTE AREA TRANSIT SYSTEM  
RAIL OPERATIONS







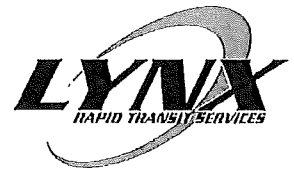








# CHARLOTTE AREA TRANSIT SYSTEM RAIL OPERATIONS



Date: May 30, 2022

**To:** Deltrin Harris- General Manager Rail Operations and Facilities  
**From:** Gary Lee- Rail Car Maintenance Manager  
Ryan Conner – (Acting) Rail Car Maintenance Manager  
Robert Hudgins-RCM Supervisor  
**Location:** Track #1 approaching Old Pineville Rd  
**Date of Incident:** May 21, 2022, @ 1138  
**Subject:** Update of Incident #172073 NB Train #5 201-114 Derailment

## Summary of the Facts:

On May 21, 2022, @1145 (Robert Hudgins) R301, (Rolando Bermeo) R340, (Tim Tenhengel) R341, and (Darnelle Rice) R344 responded to the derailment scene near Old Pineville. Once on the scene R301 immediately noticed LRV201 axle #3 off the rails. The RCM team then gathered the re-rail equipment and remained on standby until the consist was release by safety. The RCM 2<sup>nd</sup> Shift team (Kevin Porterfield) R306, (Freddy Miller) R345, (Larry Massey) R312, (Justin Bibbins) R327, (Andres Orellano) R328, (Mark Rhodes) R357, (Alireza Zadeh) R351 and (Tadashi Watabe) R346 arrived to relieve the 1<sup>st</sup> shift team.

The RCM 2<sup>nd</sup> Shift team remained on standby due to inclement weather. Upon Safety release, Once the LRV was released by Safety and the weather passed the RCM team began re-rail procedures. Once the LRV was lifted, it also had to be articulated(push) into the right position then placed back on the rails. The slag from the wheel sliding had to be removed with a side grinder to decrease the possibility of another de-rail. R306 removed as much slag as he could with the grinder and the LRV moved to the VMF at walking speed.

## Incident timeline:

- 11:12 R157 operating Train 5 (114-201) NB, track 1 approaching Old Pineville Rd reported a 7153, stated he could not continue, requested Rail Car Maintenance, RCM R340 advised 201 C truck derailed.
- 11:12 R157 reported 7153 fault, Train shaking bad
- 11:15 R157 advised Tr 5 could not move safely, unable to continue
- 11:20 Train 5 Auxed off/on, Advised train 5 still unable to proceed safely
- 11:27 R172 PO SYNYL New Train 5(304-317) NB in service at New Bern
- 11:27 RCM R344/340 on scene, Boarded LRV 201
- 11:30 RCM R340 advised the 201 C Truck derailed, Request Derail Team
- 11:31 R340 cleared scene to get derail equipment
- 11:38 Bus Bridge requested between Archdale and New Bern stations
- 11:41 R408 on scene
- 11:43 R30 on scene
- 11:46 R426 Pinned Gates Myers & Chapman; S. Blvd North
- 11:50 R408 reports track 1 damaged
- 11:51 R301,344,340 on scene
- 11:52 R30 offloaded passengers
- 11:55 R30 advised 1 pregnant female passenger request MEDIC 114 Car
- 12:01 CFD Engine 43 on scene



## CHARLOTTE AREA TRANSIT SYSTEM RAIL OPERATIONS



- 12:25 S111 on scene
- 12:29 S100 on scene; on scene command, Rail ops 5
- 12:36 R30 advised unable to single track, track 2
- 12:50 S111 Walking SB track 1 from incident site to south of Woodlawn
- 13:36 S114 Arrived on scene
- 13:58 S107 release incident train to RCM and MOW for re-railing process
- 13:59 S100 Clear the scene
- 14:28 R22 on scene Old Pineville
- 19:31 S107 advised LRV 201 successfully Re-railed, Ready for bump test
- 19:39 R312 Released C truck brake in LRV 201
- 19:42 S107 advised LRV 201 has a locked axle and needs to uncouple
- 19:48 R22 successfully uncoupled 201 from the 114
- 19:55 R22 performed a successful bump test
- 20:03 R22 relocated 201 NB track 1 from incident site into the yard tr. 4S
- 20:12 RCM R312 and all RCM personnel clear Old Pineville
- 20:15 R4/R8 advised repairs complete to track 1 and ready for a test train once the incident train is cleared.
- 21:20 LRV 201 clear mainline.

### **Investigation:**

R301 performed a walkaround inspection of the entire consist on day of incident and the preliminary investigation showed only significant damage to the left wheel on axle#3 of LRV201 which was the northbound train. All other wheels on the consist were on the rails.

After inspection LRV114 has been released back to revenue service.

### **Preliminary assessment:**

At this time of initial report, preliminary assessment was not performed. Staffing restriction prevented further investigation of the C-truck until 5-30-2022.

### **5-30-2022 Update**

The root cause of damage will be determined by manufacturers inspection of the stub axle. We will request them to perform failure analysis of the failed and non-failed bearings. We will provide further updates upon receipt of failure report.

Relocated LRV201 to track 8 north and lifted trucks for Safety inspection. Safety performed inspected and released LRV to RCM for de-trucking.

### **Corrective Action:**

The corrective actions performed by RCM:

- Installation of temperature strips on center truck axles and the LRV fleet is 63 % percentage completed. The purpose of the strips is to indicate any temperature rise on center truck axle (as indication of failure).
- Implemented Center truck visual inspections incorporated into dally inspections for fleet investigation. The purpose of daily checks to monitor failed system more closely.

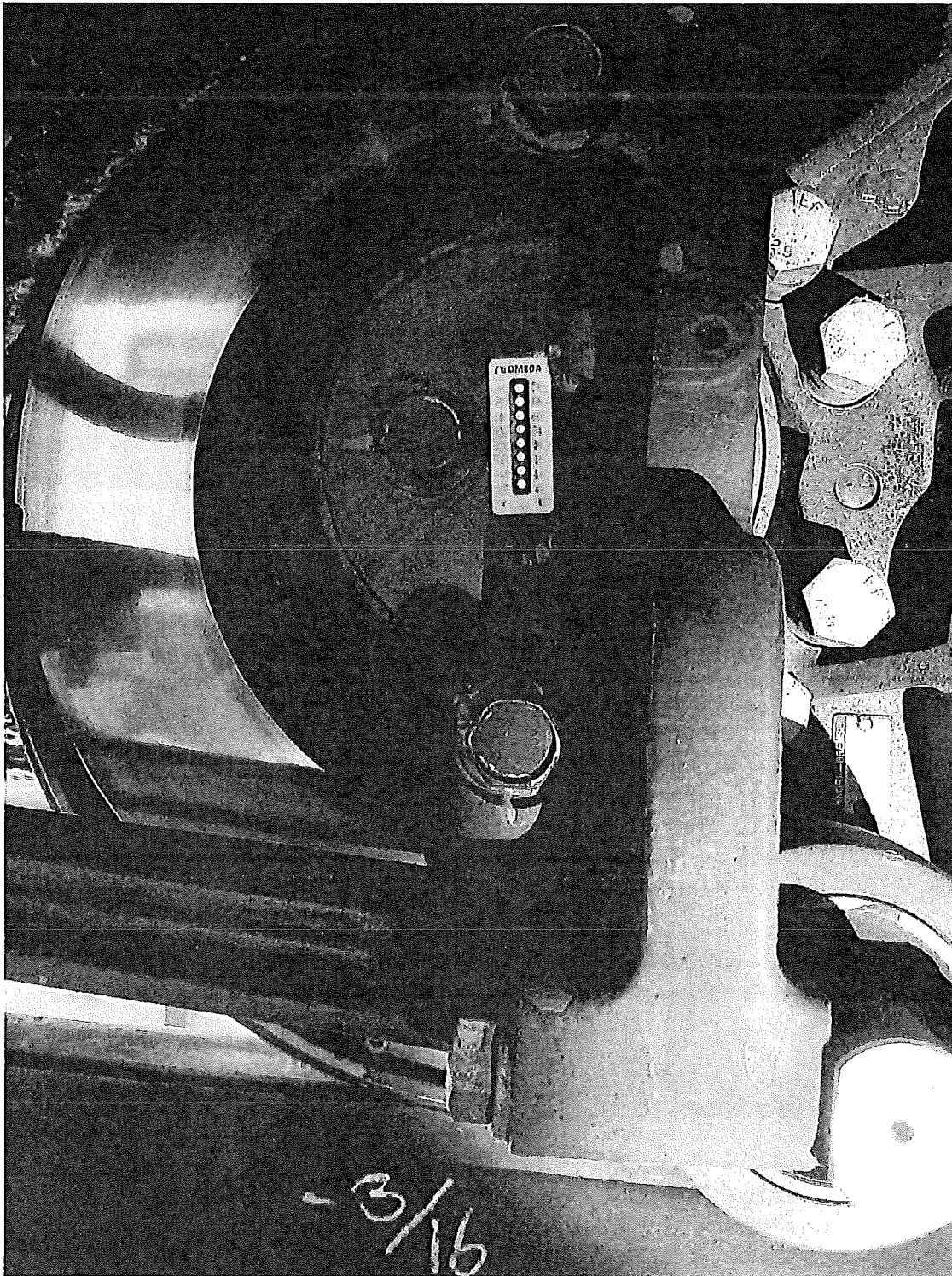


Figure 1 Center Truck Temperature Labels



CHARLOTTE AREA TRANSIT SYSTEM  
RAIL OPERATIONS



**Damage**

**LRV201:**

Preliminary investigation showed significant damage to the wheel on axle#3. Work Order # 589305 has been created for LRV201 for accident protocols and inspections. Repairs on axle#3 will be included. (See Pics)

**LRV114:**

Investigation showed no sign of damage. Work Order # 589308 has been created for LRV114 for accident protocols and inspections

**Preliminary Cost Estimate:**

Preliminary damage to the C-Truck cost estimate is \$50,000 for, this will be updated when failure report received.



CHARLOTTE AREA TRANSIT SYSTEM  
RAIL OPERATIONS

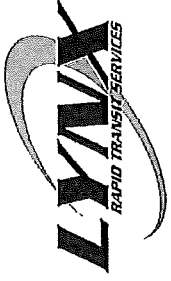
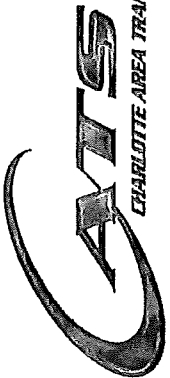


Figure 2 Center Truck Wheel #3 LRV 201

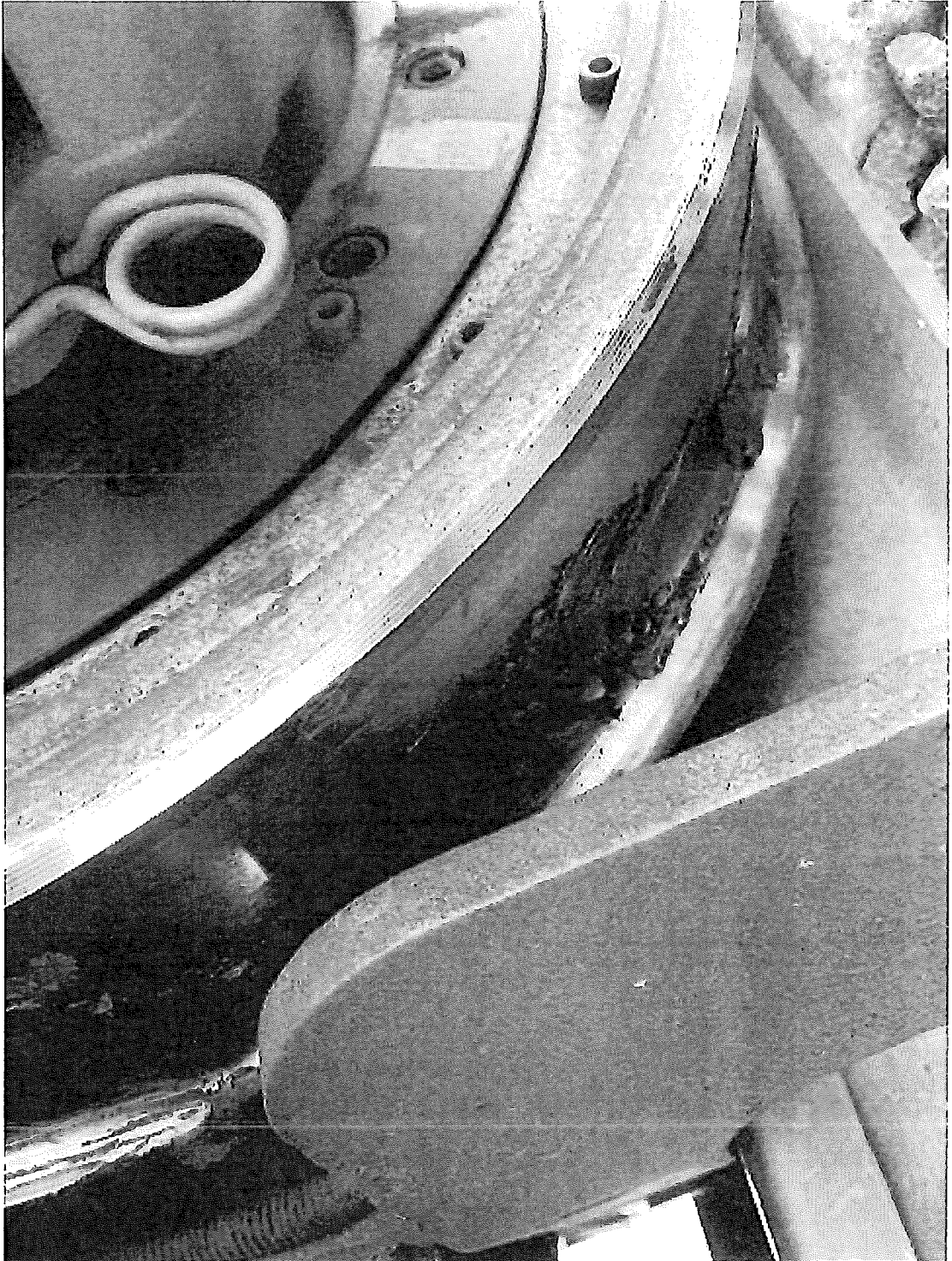
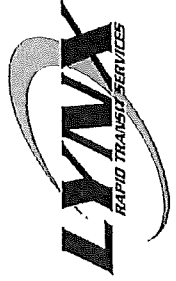


Figure 3 Wheel #3 Derailed

CHARLOTTE AREA TRANSIT SYSTEM  
RAIL OPERATIONS

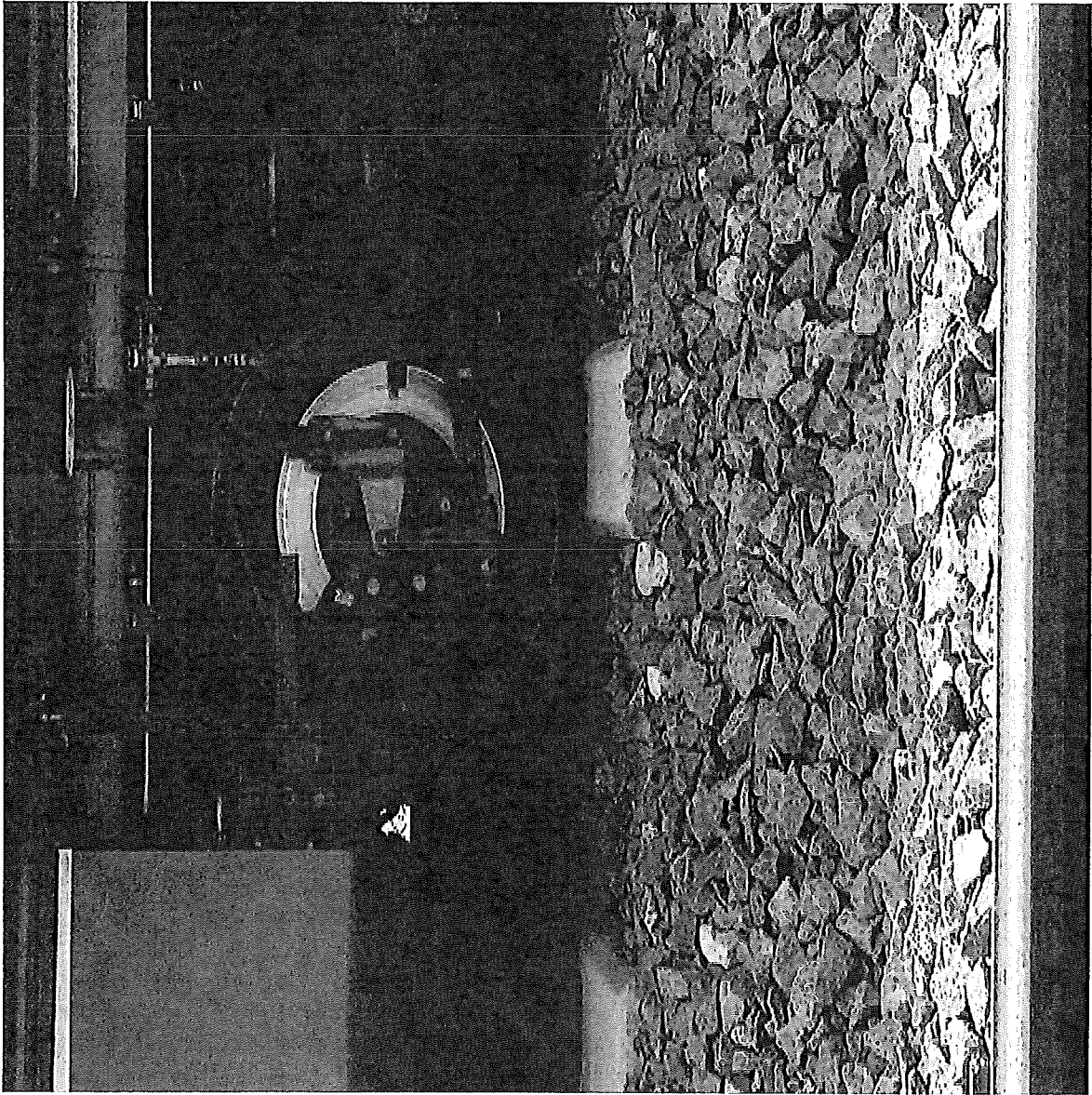
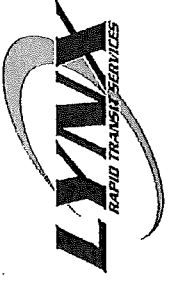
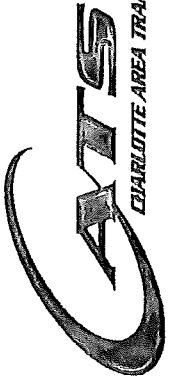


Figure 4 Center Truck Derailment



Figure 5 Center Truck Derailment



# Work Order

## 589305

Print Date: 4/05/2023

Print Time: 15:21 PM

### Derailment on the mainline

WO Type: Corrective  
WO Status: Closed  
Requested By: Bermeo, Rolo

CSR #: Not Entered  
Fac. Code: Not Entered  
Assigned 1:  
Assigned 2:

Due Start: 05/21/2022  
Due Finish: Not Entered  
WO Priority: Normal

Light Rail Vehicle: LRV201  
Address: Not Applicable

Route(s): Not Applicable

Area: Not Applicable  
Zone: Not Applicable

#### Task # 1: Investigate root cause of the derailment on the mainline

WO Task Status: Closed

Actual Task Start Date: 05/21/2022

Actual Task Finish Date: 06/22/2022

| Job # | Job Description         | System      | Component   |
|-------|-------------------------|-------------|-------------|
| 1     | Replace axle #3         | Not Entered | Not Entered |
| 2     | Take accident downloads | Not Entered | Not Entered |



Work Order

Print Date: 4/05/2023

589305

Print Time: 15:21 PM

Derailment on the mainline

Job Notes

Note For Job 1 Created By Watabe, T. On 05-21-2022 At 09:52PM

05/21/22 Rescue LRV201 derailed.

TW

Note For Job 1 Created By Massey, L. On 05-21-2022 At 09:58PM

5-21-22 Re-rail of LRV201.

Note For Job 1 Created By Ehrhardt, M. On 05-21-2022 At 10:45PM

1430 - CONTACTED ROCC TO PIN GATES FROM SOUTH BLVD NORTH TO OLD PINEVILLE. ASSISTED WITH FLAGGING DAMAGED LRV FROM OLD PINEVILLE THROUGH SOUTH BLVD NORTH. 2100 UNPINNED AND TESTED ALL PREVIOUSLY PINNED GATES - CHECKED FOR PROPER OPERATION - TEST OK.

Note For Job 1 Created By Bermeo, R. On 05-22-2022 At 02:27PM

05/22/22 Went on a rescue to old pineville rd. Arrived at the scene an found out the center truck Axle 3 has been derailed. Notified the ROCC and i advise we need to get the proper equipment to put the truck back on the tracks. Went back to the shop and got the derail trailer and set it up for the next shift could work on it

Note For Job 1 Created By Miller, F. On 05-22-2022 At 09:44PM

5/21/22  
Assisted on LRV 201 center truck derailment

Note For Job 1 Created By Hunter, E. On 05-27-2022 At 02:17PM

5-27-22 LRV201 - ISSUE: Derailment on the mainline

Pulled Evgent Recorder Downloads as requested.

EH

Note For Job 1 Created By Maring, S.D. On 05-30-2022 At 01:49PM

05/30/2022 Center truck Skirt removed

Note For Job 1 Created By Hunter, E. On 05-31-2022 At 01:17PM

5-27-22 LRV201 - ISSUE: Derailment on the mainline

Assisted with Dead Tow from 4SA to 8N.

Assisted with lifting Vehicle for Safety and Security inspection..

EH

Note For Job 1 Created By Tenhengel, T.M. On 05-31-2022 At 01:25PM

5/31/22 I assisted moving LRV 201 into the shop and lifting the train for damage inspection.

Note For Job 1 Created By Gaffney, C. On 05-31-2022 At 01:57PM

5-31-22 performed dead tow from 4 s to track 8.  
prepared LRV for lifting  
Lifted the LRV  
Disconnected the lateral buffers to prepare for removal of the C truck

Note For Job 1 Created By Jones, M. On 06-14-2022 At 10:02PM

5/13/22 LRV201 Installed both skirts on the C truck

Note For Job 1 Created By Moulliet, C. On 06-15-2022 At 08:51AM

Please see work order # 590588 for C-Truck replacement.



**Work Order**

Print Date: 4/05/2023

**589305**

Print Time: 15:21 PM

**Derailment on the mainline**

Note For Job 2 Created By Hudgins, R. On 06-13-2022 At 08:14AM

6-13-2022 download were taken and sent on 5/22/2022

| <u>Time Worked</u> |            |               |          |  |
|--------------------|------------|---------------|----------|--|
| Name               | ID         | Hours:Minutes | Cost     |  |
| Bermeo, Rolo       | RBERMEO    | 2:00          | \$55.14  |  |
| Bermeo, Rolo       | RBERMEO    | -2:00         | -\$55.14 |  |
| Bermeo, Rolo       | RBERMEO    | 2:30          | \$68.93  |  |
| Bibbins, Justin    | JBIBBINS   | 6:30          | \$179.21 |  |
| Ehrhardt, Michael  | MEHRHARDT  | 7:30          | \$172.50 |  |
| Gaffney, Carey     | CGAFFNEY   | 3:00          | \$82.71  |  |
| Gaffney, Carey     | CGAFFNEY   | 3:00          | \$82.71  |  |
| Hudgins, Robert    | RHUDGINS   | 0:30          | \$13.79  |  |
| Hunter, Easton     | EHUNTER    | 2:15          | \$62.03  |  |
| Hunter, Easton     | EHUNTER    | 2:00          | \$55.14  |  |
| Hunter, Easton     | EHUNTER    | 1:00          | \$27.57  |  |
| Hunter, Easton     | EHUNTER    | 2:00          | \$55.14  |  |
| Jones, Melvin      | MJONES     | 2:30          | \$68.93  |  |
| Maring, Steve D.   | SMARING    | 0:30          | \$13.79  |  |
| Massey, Larry      | LMASSEY    | 5:00          | \$137.85 |  |
| Miller, Freddy     | FMILLER    | 7:00          | \$192.99 |  |
| Orellano, Andres   | AORELLANO  | 6:30          | \$179.21 |  |
| Rhodes, Mark       | MRHODES    | 6:45          | \$186.10 |  |
| Tenhengel, Tim M.  | TTENHENGEL | 1:00          | \$27.57  |  |
| Tenhengel, Tim M.  | TTENHENGEL | 1:00          | \$27.57  |  |
| Watabe, Ted        | TWATABE    | 6:15          | \$172.31 |  |
| Watabe, Ted        | TWATABE    | 1:15          | \$34.46  |  |
| Zadeh, Alireza     | AZADEH     | 6:30          | \$179.21 |  |

| <u>Parts Used</u> |             |     |     |      |
|-------------------|-------------|-----|-----|------|
| ID                | Description | Qty | U/M | Cost |
|                   |             |     |     |      |
|                   |             |     |     |      |
|                   |             |     |     |      |
|                   |             |     |     |      |
|                   |             |     |     |      |

Work Order Notes

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# Work Order

Print Date: 4/05/2023

**590588**

Print Time: 15:30 PM

## Center Truck Detrucking (S/N:103188 ) & Trucking (S/N:103188 )

|                               |                        |                         |
|-------------------------------|------------------------|-------------------------|
| WO Type: Corrective           | CSR #: Not Entered     | Due Start: Not Entered  |
| WO Status: Closed             | Fac. Code: Not Entered | Due Finish: Not Entered |
| Requested By: Conner, Ryan C. | Assigned 1:            | WO Priority: Normal     |
|                               | Assigned 2:            |                         |

|                            |                          |                      |
|----------------------------|--------------------------|----------------------|
| Light Rail Vehicle: LRV201 | Route(s): Not Applicable | Area: Not Applicable |
| Address: Not Applicable    |                          | Zone: Not Applicable |

### Task # 1: Center Truck Detrucking

WO Task Status: Closed      Actual Task Start Date: 06/03/2022      Actual Task Finish Date: 06/22/2022

| Job # | Job Description  | System      | Component   |
|-------|--|-------------|-------------|
| 1     | Check Creep measurement (if necessary).                      | Not Entered | Not Entered |
| 2     | Record CT Serial Number in Job Note.                         | Not Entered | Not Entered |
| 3     | Chock wheels   | Not Entered | Not Entered |
| 4     | Adjust Power Truck Upstops to upper limit (if necessary).    | Not Entered | Not Entered |
| 5     | Manually release brakes on both power trucks (A/B)           | Not Entered | Not Entered |
| 6     | Depressurize center truck EHU                                | Not Entered | Not Entered |
| 7     | Disconnect quick disconnect hydr. fitting (4 Brake Calipers) | Not Entered | Not Entered |
| 8     | Disconnect electrical harness conn. (4 Axle Speed Sensor)    | Not Entered | Not Entered |
| 9     | Disconnect electrical harness (Axle Grounding)               | Not Entered | Not Entered |
| 10    | Disconnect spring control (Leveling) valve linkage           | Not Entered | Not Entered |
| 11    | Remove suspension leg top four bolts (all legs)              | Not Entered | Not Entered |
| 12    | Disconnect the quick-disconnect fittings (Hyd. Sus. Legs)    | Not Entered | Not Entered |
| 13    | Remove two ground cables (Unpower/C Car Underbody)           | Not Entered | Not Entered |
| 14    | Disconnect two lateral shock absorbers (Truck Frame/C Car)   | Not Entered | Not Entered |
| 15    | Remove nut assembly from 2 lifting stop (Truck Frame/C Car)  | Not Entered | Not Entered |
| 16    | Disconnect electrical connections (Track Brake/C Car Elect.) | Not Entered | Not Entered |
| 17    | Disconnect traction link rods (2 sides of unpowered truck)   | Not Entered | Not Entered |
| 18    | Set up lifting jacks   | Not Entered | Not Entered |

### Job Notes

Note For Job 1 Created By Hagans, D. On 06-07-2022 At 04:32PM  
6/7/22- CT S/N: 103188





**Work Order**

**590588**

Print Date: 4/05/2023

Print Time: 15:30 PM

**Center Truck Detrucking (S/N:103188 ) & Trucking (S/N:103188 )**

| <u>Time Worked</u> |           |               |        |  |
|--------------------|-----------|---------------|--------|--|
| Name               | ID        | Hours:Minutes | Cost   |  |
| Hagans, Derek      | DHAGANS   | 0:01          | \$0.46 |  |
| Hagans, Derek      | DHAGANS   | 0:01          | \$0.46 |  |
| Hagans, Derek      | DHAGANS   | 0:01          | \$0.46 |  |
| Hagans, Derek      | DHAGANS   | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |
| Orellano, Andres   | AORELLANO | 0:01          | \$0.46 |  |

| <u>Parts Used</u> |             |     |     |      |
|-------------------|-------------|-----|-----|------|
| ID                | Description | Qty | U/M | Cost |
|                   |             |     |     |      |
|                   |             |     |     |      |
|                   |             |     |     |      |
|                   |             |     |     |      |
|                   |             |     |     |      |
|                   |             |     |     |      |



# Work Order

Print Date: 4/05/2023

## 590588

Print Time: 15:30 PM

### Center Truck Detrucking (S/N:103188 ) & Trucking (S/N:103188 )

#### Task # 2: Center Truck Trucking

WO Task Status: Closed

Actual Task Start Date: 06/03/2022

Actual Task Finish Date: 06/22/2022

| Job # | Job Description  | System      | Component   |
|-------|--|-------------|-------------|
| 1     | Record CT Serial Number in Job Note.                         | Not Entered | Not Entered |
| 2     | Lower carbody on truck frame                                 | Not Entered | Not Entered |
| 3     | Remove lifting jacks   | Not Entered | Not Entered |
| 4     | Connect traction link rods (2 Sides of Truck)                | Not Entered | Not Entered |
| 5     | Connect electrical connections (Track Brake/C Car Harness)   | Not Entered | Not Entered |
| 6     | Install nut on 2 lifting stop assem. (Truck/C Car Underbody) | Not Entered | Not Entered |
| 7     | Connect 2 lateral shocks absorbers (Truck/C Car Underbody)   | Not Entered | Not Entered |
| 8     | Connect 2 ground cables (Truck/C Car Underbody)              | Not Entered | Not Entered |
| 9     | Connect the quick disconnect for hydraulic suspension legs   | Not Entered | Not Entered |
| 10    | Install suspension leg top 4 bolts (all legs)                | Not Entered | Not Entered |
| 11    | Connect spring control (leveling) valve linkage              | Not Entered | Not Entered |
| 12    | Connect electrical harness (Axle Grounding)                  | Not Entered | Not Entered |
| 13    | Connect electrical harness speed sensors (Axle Mounted)      | Not Entered | Not Entered |
| 14    | Connect hydraulic fitting 4 brake calipers                   | Not Entered | Not Entered |
| 15    | Run down Power Truck Upstops                                 | Not Entered | Not Entered |
| 16    | Connect car mover to Coupler                                 | Not Entered | Not Entered |
| 17    | Manually release brakes on both PT-A, PT-B, & CT             | Not Entered | Not Entered |
| 18    | Remove chocks from wheels                                    | Not Entered | Not Entered |
| 19    | Prepare vehicle for move                                     | Not Entered | Not Entered |

#### Job Notes



**Work Order**

**590588**

Print Date: 4/05/2023

Print Time: 15:30 PM

**Center Truck Detrucking (S/N:103188 ) & Trucking (S/N:103188 )**

| <u>Time Worked</u> |          |               |         |  |
|--------------------|----------|---------------|---------|--|
| Name               | ID       | Hours:Minutes | Cost    |  |
| Bibbins, Justin    | JBIBBINS | 3:00          | \$82.71 |  |
| Bibbins, Justin    | JBIBBINS | 1:45          | \$48.25 |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Hagans, Derek      | DHAGANS  | 0:01          | \$0.46  |  |
| Haskins, Darold    | DHASKINS | 0:30          | \$13.79 |  |
| Haskins, Darold    | DHASKINS | 1:00          | \$27.57 |  |
| Mackey, Brandon    | BMACKEY  | 1:00          | \$27.57 |  |
| Mackey, Brandon    | BMACKEY  | 2:00          | \$55.14 |  |
| Mackey, Brandon    | BMACKEY  | 1:00          | \$27.57 |  |
| Mackey, Brandon    | BMACKEY  | 1:00          | \$27.57 |  |
| Mackey, Brandon    | BMACKEY  | 0:15          | \$6.89  |  |
| Mackey, Brandon    | BMACKEY  | 1:00          | \$27.57 |  |
| Zadeh, Alireza     | AZADEH   | 3:30          | \$96.50 |  |
| Zadeh, Alireza     | AZADEH   | 2:45          | \$75.82 |  |
| Zadeh, Alireza     | AZADEH   | 0:30          | \$13.79 |  |
| Zadeh, Alireza     | AZADEH   | 0:45          | \$20.68 |  |
| Zadeh, Alireza     | AZADEH   | 0:30          | \$13.79 |  |
| Zadeh, Alireza     | AZADEH   | 0:30          | \$13.79 |  |

| <u>Parts Used</u> |             |     |     |      |
|-------------------|-------------|-----|-----|------|
| ID                | Description | Qty | U/M | Cost |
|                   |             |     |     |      |
|                   |             |     |     |      |
|                   |             |     |     |      |
|                   |             |     |     |      |
|                   |             |     |     |      |
|                   |             |     |     |      |
|                   |             |     |     |      |



# Work Order

590588

Print Date: 4/05/2023

Print Time: 15:30 PM

## Center Truck Detrucking (S/N:103188 ) & Trucking (S/N:103188 )

### Task # 3: Center Truck Installation

WO Task Status: Closed

Actual Task Start Date: 06/03/2022

Actual Task Finish Date: 06/22/2022

| Job # | Job Description                                       | System      | Component   |
|-------|---|-------------|-------------|
| 1     | Check Creep measurement.                              | Not Entered | Not Entered |
| 2     | Check truck shimming (OEM Specification)              | Not Entered | Not Entered |
| 3     | Flush & bleed center truck hydraulic system           | Not Entered | Not Entered |
| 4     | Fill EHU fluid  | Not Entered | Not Entered |
| 5     | Torque traction link (Install shims)                  | Not Entered | Not Entered |
| 6     | Adjust all lifting stops                              | Not Entered | Not Entered |
| 7     | Torque suspension leg upper bolts                     | Not Entered | Not Entered |
| 8     | Torque lateral shock absorbers                        | Not Entered | Not Entered |
| 9     | Connect control linkage (HP Springs)                  | Not Entered | Not Entered |
| 10    | Check center truck accumulator pressures              | Not Entered | Not Entered |
| 11    | Adjust track brake/tighten track brake adjusting nuts | Not Entered | Not Entered |
| 12    | Adjust rail clearers                                  | Not Entered | Not Entered |
| 13    | Measure Wheel Sizes                                   | Not Entered | Not Entered |
| 14    | Level vehicle   | Not Entered | Not Entered |
| 15    | Check electrical & hydraulic lines                    | Not Entered | Not Entered |
| 16    | Input VCU wheel sizes                                 | Not Entered | Not Entered |
| 17    | Clear VCU log events                                  | Not Entered | Not Entered |
| 18    | Clear ICU log events                                  | Not Entered | Not Entered |
| 19    | Test run  | Not Entered | Not Entered |
| 20    | Inspect truck wheels                                  | Not Entered | Not Entered |
| 21    | Conduct Vehicle Daily Inspection                      | Not Entered | Not Entered |



# Work Order

Print Date: 4/05/2023

590588

Print Time: 15:30 PM

## Center Truck Detrucking (S/N:103188 ) & Trucking (S/N:103188 )

### Job Notes

Note For Job 12 Created By Haskins, D. On 06-10-2022 At 10:24PM  
06/10/22

I was able to adjust and torque all the Rail Clears, but one on Axle 3 Left.

There is some damage on the Truck that need to be grind down before the rail clear can be adjusted .

Note For Job 12 Created By Jones, M. On 06-11-2022 At 10:18PM  
6/11/22 LRV201 Grind Down the 3L Rail clearer bracket and adjusted it

Note For Job 19 Created By Moulliet, C. On 06-15-2022 At 08:49AM  
6/15/22 - Completed 1RT test run reported by 3rd Shift's turnover.

Note For Job 19 Created By Hunter, E. On 06-15-2022 At 03:50PM  
6-15-22 LRV201 - Accompanied on 2nd round trip Test Run with no faults or failure. Still needs one more trip.

EH

Note For Job 19 Created By Hunter, E. On 06-16-2022 At 02:07PM  
6-16-22 LRV201 - Completed 3rd round trip Test Run with no faults or failure.

EH

Note For Job 19 Created By Hunter, E. On 06-17-2022 At 01:58PM  
ERROR

Note For Job 20 Created By Rice, D. On 06-17-2022 At 01:52PM  
6/17/22 Assisted with lifting LRV.

Note For Job 20 Created By Hunter, E. On 06-17-2022 At 02:03PM  
6-17-22 LRV201 - Performed Center Truck and Wheel Inspection. Found no abnormalities.

Recommend an additional inspection.

EH





# Work Order

Print Date: 4/05/2023

## 590588

Print Time: 15:30 PM

### Center Truck Detrucking (S/N:103188 ) & Trucking (S/N:103188 )

#### Parts Used

| ID | Description | Qty | U/M | Cost |
|----|-------------|-----|-----|------|
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |

#### Work Order Notes

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**Work Order**

**589902**

Print Date: 4/05/2023

Print Time: 15:28 PM

**Center Truck Recondition - S/N:103188**

WO Type: Corrective  
 WO Status: Closed  
 Requested By: Turner, Talon

CSR #: Not Entered  
 Fac. Code: Not Entered  
 Assigned 1:  
 Assigned 2:

Due Start: Not Entered  
 Due Finish: Not Entered  
 WO Priority: None

Light Rail Vehicle: LRV201  
 Address: Not Applicable

Route(s): Not Applicable

Area: Not Applicable  
 Zone: Not Applicable

**Task # 1: Center Truck Disassembly**

WO Task Status: Closed

Actual Task Start Date: 05/26/2022

Actual Task Finish Date: 06/22/2022

| Job # | Job Description                       | System      | Component   |
|-------|---------------------------------------|-------------|-------------|
| 1     | Pressure wash Truck Assembly          | Not Entered | Not Entered |
| 2     | Record CT Serial Number in Job Note.  | Not Entered | Not Entered |
| 3     | Remove guiding rods                   | Not Entered | Not Entered |
| 4     | Remove brake pads                     | Not Entered | Not Entered |
| 5     | Remove brake caliper                  | Not Entered | Not Entered |
| 6     | Remove brake disc                     | Not Entered | Not Entered |
| 7     | Remove track brakes                   | Not Entered | Not Entered |
| 8     | Remove speed sensors                  | Not Entered | Not Entered |
| 9     | Remove truck frame                    | Not Entered | Not Entered |
| 10    | Remove emergency spring shim          | Not Entered | Not Entered |
| 11    | Remove debris from wheel guards       | Not Entered | Not Entered |
| 12    | Remove wheel axle assembly            | Not Entered | Not Entered |
| 13    | Remove tires from wheel axle assembly | Not Entered | Not Entered |
| 14    | Prepare axle assembly for new tires   | Not Entered | Not Entered |

**Job Notes**

Note For Job 2 Created By Huddins, R. On 06-13-2022 At 07:52AM  
 6-13-2022 Serial#103188

Note For Job 14 Created By McClain, P. On 06-02-2022 At 09:40PM  
 6/2/2022 Center truck is complete needs new E-springs when they become available from stores. Currently using E-springs from previous truck.





# Work Order

589902

Print Date: 4/05/2023

Print Time: 15:28 PM

## Center Truck Recondition - S/N:103188

### Time Worked

| Name             | ID        | Hours:Minutes | Cost    |
|------------------|-----------|---------------|---------|
| Hagans, Derek    | DHAGANS   | 0:30          | \$13.79 |
| Hagans, Derek    | DHAGANS   | 3:00          | \$82.71 |
| Hagans, Derek    | DHAGANS   | 3:30          | \$96.50 |
| Hagans, Derek    | DHAGANS   | 3:00          | \$82.71 |
| Hagans, Derek    | DHAGANS   | 1:00          | \$27.57 |
| Hagans, Derek    | DHAGANS   | 1:00          | \$27.57 |
| Hagans, Derek    | DHAGANS   | 1:00          | \$27.57 |
| Hagans, Derek    | DHAGANS   | 1:00          | \$27.57 |
| Hagans, Derek    | DHAGANS   | 1:30          | \$41.36 |
| Hudgins, Robert  | RHUDGINS  | 0:15          | \$6.89  |
| McClain, Philip  | PMCCCLAIN | 3:30          | \$49.00 |
| McClain, Philip  | PMCCCLAIN | 2:30          | \$35.00 |
| McClain, Philip  | PMCCCLAIN | 3:30          | \$49.00 |
| McClain, Philip  | PMCCCLAIN | 2:30          | \$35.00 |
| McClain, Philip  | PMCCCLAIN | 2:00          | \$28.00 |
| McClain, Philip  | PMCCCLAIN | 1:30          | \$21.00 |
| McClain, Philip  | PMCCCLAIN | 1:00          | \$14.00 |
| McClain, Philip  | PMCCCLAIN | 0:30          | \$7.00  |
| McClain, Philip  | PMCCCLAIN | 0:30          | \$7.00  |
| McClain, Philip  | PMCCCLAIN | 0:30          | \$7.00  |
| Orellano, Andres | AORELLANO | 3:00          | \$82.71 |
| Orellano, Andres | AORELLANO | 3:30          | \$96.50 |
| Orellano, Andres | AORELLANO | 3:00          | \$82.71 |
| Orellano, Andres | AORELLANO | 0:30          | \$13.79 |
| Orellano, Andres | AORELLANO | 0:30          | \$13.79 |
| Orellano, Andres | AORELLANO | 0:30          | \$13.79 |
| Orellano, Andres | AORELLANO | 1:00          | \$27.57 |
| Orellano, Andres | AORELLANO | 1:00          | \$27.57 |

### Parts Used

| ID             | Description    | Qty  | U/M  | Cost       |
|----------------|----------------|------|------|------------|
| RC-1200-BRAKE- | Brake Disc, CT | 4.00 | Each | \$4,743.09 |
| RC-1200-BRAKE- | Brake Pad, CT  | 8.00 | Each | \$1,478.07 |
| RC-1200-BUFFER | Buffer         | 4.00 | Each | \$8,743.18 |
| RC-1200-BUFFER | Buffer         | 4.00 | Each | \$8,743.18 |



**Work Order**

**589902**

**Center Truck Recondition - S/N:103188**

Print Date: 4/05/2023

Print Time: 15:28 PM

Task # 2: Center Truck Reassembly

WO Task Status: Closed

Actual Task Start Date: 05/26/2022

Actual Task Finish Date: 06/22/2022

| Job # | Job Description                        | System      | Component   |
|-------|--|-------------|-------------|
| 1     | Install new tires on axle assembly     | Not Entered | Not Entered |
| 2     | Assemble wheel axle                    | Not Entered | Not Entered |
| 3     | Install truck frame                    | Not Entered | Not Entered |
| 4     | Install speed sensors                  | Not Entered | Not Entered |
| 5     | Install track brakes                   | Not Entered | Not Entered |
| 6     | Install brake discs                    | Not Entered | Not Entered |
| 7     | Install brake calipers                 | Not Entered | Not Entered |
| 8     | Install brake pads                     | Not Entered | Not Entered |
| 9     | Install guiding rods                   | Not Entered | Not Entered |
| 10    | Check Unpowered Truck shimming on Tram | Not Entered | Not Entered |
| 11    | Service Suspension legs                | Not Entered | Not Entered |

Job Notes

Time Worked

| Name             | ID        | Hours:Minutes | Cost    |
|------------------|-----------|---------------|---------|
| bbins, Justin    | JBIBBINS  | 3:00          | \$82.71 |
| bbins, Justin    | JBIBBINS  | 1:45          | \$48.25 |
| McClain, Philip  | PMCCCLAIN | 0:01          | \$0.23  |
| McClain, Philip  | PMCCCLAIN | 0:01          | \$0.23  |
| McClain, Philip  | PMCCCLAIN | 0:01          | \$0.23  |
| McClain, Philip  | PMCCCLAIN | 0:01          | \$0.23  |
| McClain, Philip  | PMCCCLAIN | 0:01          | \$0.23  |
| McClain, Philip  | PMCCCLAIN | 0:01          | \$0.23  |
| McClain, Philip  | PMCCCLAIN | 0:01          | \$0.23  |
| McClain, Philip  | PMCCCLAIN | 0:01          | \$0.23  |
| Orellano, Andres | AORELLANO | 1:00          | \$27.57 |
| Orellano, Andres | AORELLANO | 0:30          | \$13.79 |
| Orellano, Andres | AORELLANO | 2:00          | \$55.14 |
| Orellano, Andres | AORELLANO | 1:30          | \$41.36 |
| Orellano, Andres | AORELLANO | 3:00          | \$82.71 |

Parts Used

| ID | Description | Qty | U/M | Cost |
|----|-------------|-----|-----|------|
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |



# Work Order

Print Date: 4/05/2023

## 589902

Print Time: 15:28 PM

### Center Truck Recondition - S/N:103188

#### Task # 3: Wheel Resistance Inspection Report

WO Task Status: Closed

Actual Task Start Date: 05/26/2022

Actual Task Finish Date: 06/22/2022

| Job # | Job Description                    | System      | Component   |
|-------|------------------------------------|-------------|-------------|
| 1     | Wheel Resistance Inspection Report | Not Entered | Not Entered |

#### Job Notes

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#### Time Worked

| Name            | ID        | Hours:Minutes | Cost   |
|-----------------|-----------|---------------|--------|
| McClain, Philip | PMCCCLAIN | 0:01          | \$0.23 |

#### Parts Used

| ID | Description | Qty | U/M | Cost |
|----|-------------|-----|-----|------|
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |
|    |             |     |     |      |

#### Work Order Notes

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Rail Operations Rail Car Maintenance

# JOURNAL BEARING TEMPERATURE LABEL INSPECTIONS WORK PLAN

This documented plan describes and explains the rationale and processes to mitigate the journal-bearing failure on the CATS series 100, 200, and 300. The work plan presents the parameters, inspections, and work processes to ensure we provide reliable LRVs and mitigate journal-bearing failure.

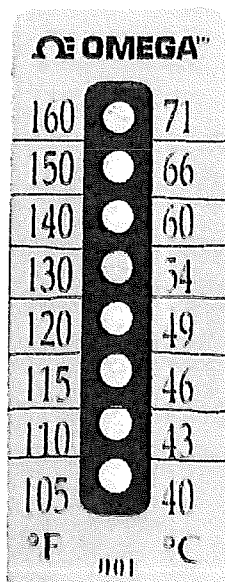
RCM Team  
4-5-2023

## Journal Bearing Temperature Label Inspections

Location:                      Interior                      Exterior                      Undercar

**X**

|   |  |
|---|--|
| <b>Actions:</b><br>Inspect temperature labels on all trucks and record readings on Truck Journal Bearing Inspection Sheet.  | <b>Reference Documents:</b><br>OEM- RMS Section 1206 – Journal Bearing |
| <b>Parts &amp; Supplies:</b><br>Contact Cleaner (RC-2000-LPS MICRO-X CONTACT)<br>Red Rag  | <b>Tools:</b><br>Flashlight<br>Pen (Blue or Black Ink)                 |
| <b>Comments/Special Instructions:</b><br><b>Warning: Excessive bearing temps indicate a failing wheel bearing and should be noted and brought to supervisor's attention immediately.</b><br><br><b>Any Label with an indication of 130°F (54°C) should be brought to your supervisor's attention immediately.</b> | <b>PPE:</b><br>High Visibility Vest                                    |

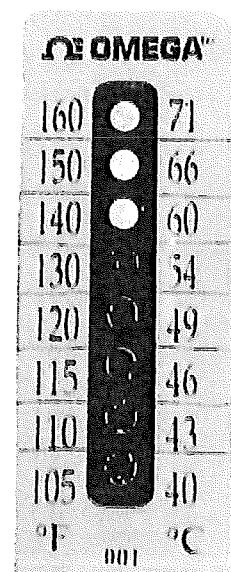


*Good Reading*

The maximum temperature that the bearing has been exposed to is recorded as a black dot next to the associated temperature.

The sticker on the right has reached 130°F or 54°C

The sticker on the left has never been exposed to temps above 105°F.



*Bad Reading*

*130F degrees*

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**Charlotte Area Transit- Light Rail S70 Issue Date:4/7/23 Journal Bearing Temperature Label Inspections**

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Rail Car Maintenance has implemented all mitigations as directed by NCDOT in the event of a finding of temperature reading of 130 degrees. The RCM department will perform journal-bearing inspections and submit a report every Wednesday by 8:00am to CATS Department of Safety. Inspections and report submissions will continue until completion of the CATS 1 and 2 truck overhaul project.

Each Light Rail Vehicle that operates in revenue service during the reporting cycle requires an inspection weekly. A description of the journal bearing inspection process is provided below.

- *The Power trucks must be inspected for temperatures of 130F degrees.* Readings of 130 degrees require the LRV to be removed from operational status. The journal bearing must be inspected per the Power-Truck journal bearing section of this work plan.
  - The Inspection requirements for reports of a 130F degrees:
    - The technician to inform RCM supervision.
    - The supervisor to remove LRV from an operational status.
    - The supervisor to identify if the 130F degree reading is new, or if this reading has already been entered and the appropriate protocols have been followed.
    - If this is a new reading:
      - Create a corrective work order for journal-bearing inspection.
      - The LRV will be scheduled for journal bearing inspection and performed.
    - The inspection findings to be entered into SPEAR and the disposition of the LRV shared with the manager and supervisory team.
  - End caps of Journal Bearing removed and bearing inspected for the following:
    - axle discoloration,
    - foreign matter, and
    - grease seepage.

(If any of the above is identified, the LRV is to remain in non-operational status, and the truck or wheel axle is to be scheduled for replacement)

- If no defects are detected, the old strip is removed and a new temperature strip is applied, and inspection recorded.
  - The inspection results will be entered into SPEAR and the disposition of the LRV shared with the manager and supervisory team.
  - The newly installed temperature strip on the axle is ready to be monitored for temperature change. When new temperature strip is applied, a note must be entered in spear.
- *The Center trucks must be inspected for temperatures of 130F degrees or above.* Readings of 130F degrees or greater require the LRV to be removed from an operational status. Bearing must be inspected per the Center-Truck Journal bearing section of this work plan.

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**Charlotte Area Transit- Light Rail S70 Issue Date:4/7/23 Journal Bearing Temperature Label Inspections**

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- The Inspection requirements for reports of a 130F degrees:
  - The technician to inform RCM supervision.
  - The supervisor to remove LRV from an operational status.
  - The supervisor to identify if the 130F degree reading is new or if this reading has already been entered and the appropriate protocols have been followed.
  - If this is a new reading:
    - Create a corrective work order for journal-bearing inspection.
    - The LRV will be scheduled for center truck journal bearing inspection.
  - The inspection findings to be entered into SPEAR and the disposition of LRV shared with the manager and supervisory team.
- The Center Truck Journal-Bearing inspection:
  - Center truck journal-bearing must as be inspected for:
    - unrestricted movement,
    - resistance of movement,
    - grinding,
    - and grease seepage.

(If any of the above is identified, the LRV is removed from service, and the truck or low-floor wheel axle is replaced)

- If no defects are detected, the old strip is removed and a new temperature strip is applied, and inspection recorded.
- The inspection results will be entered into SPEAR and the disposition of LRV shared with the manager and supervisory team.
- The newly installed temperature strip on the axle is assigned to be monitored for temperature change. When new temperature strip is applied, a note must be entered in spear.

**NOTE: ALL INSPECTIONS AND CORRECTIVE ACTIONS MUST BE CAPTURED IN SPEAR**

Temperature Label Inspection Procedure:

1. Lift each Power Truck skirt and check Bearing temperature stickers on each axle. If the temperature label is not legible, use contact cleaner and a rag to wipe off the surface. Record all readings on the Truck Journal Bearing Inspection sheet. Record a Zero (0) for temperature labels that have no temperature reading.

Power truck Temperature Label

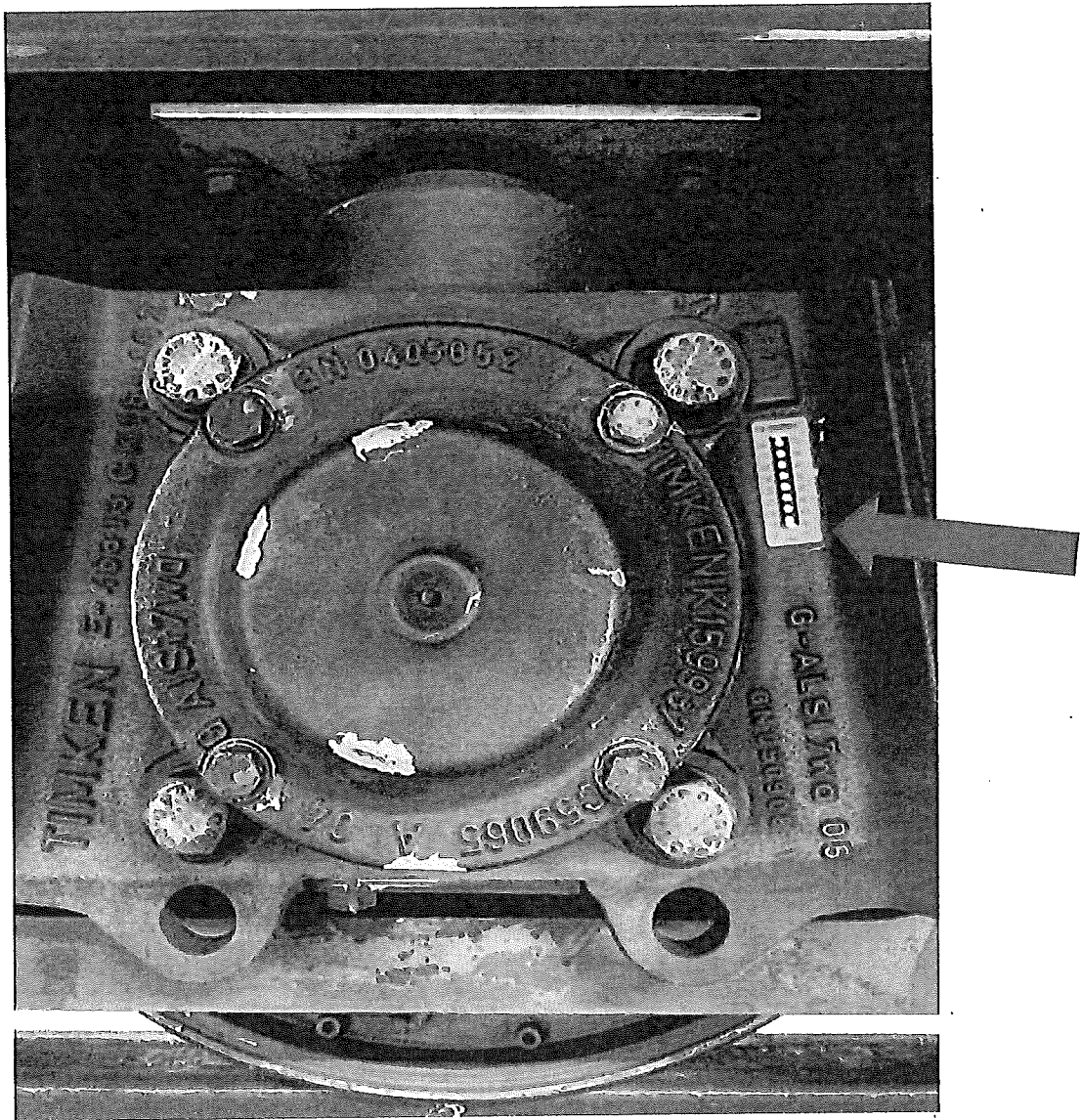


Figure 1 – Without Brushes – Good Reading <105° F



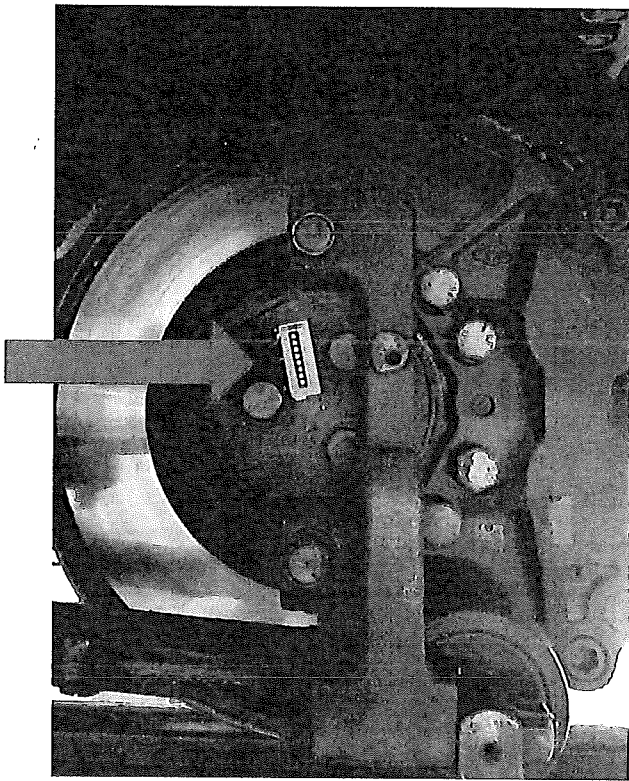
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**Charlotte Area Transit- Light Rail S70 Issue Date:4/7/23 Journal Bearing Temperature Label Inspections**

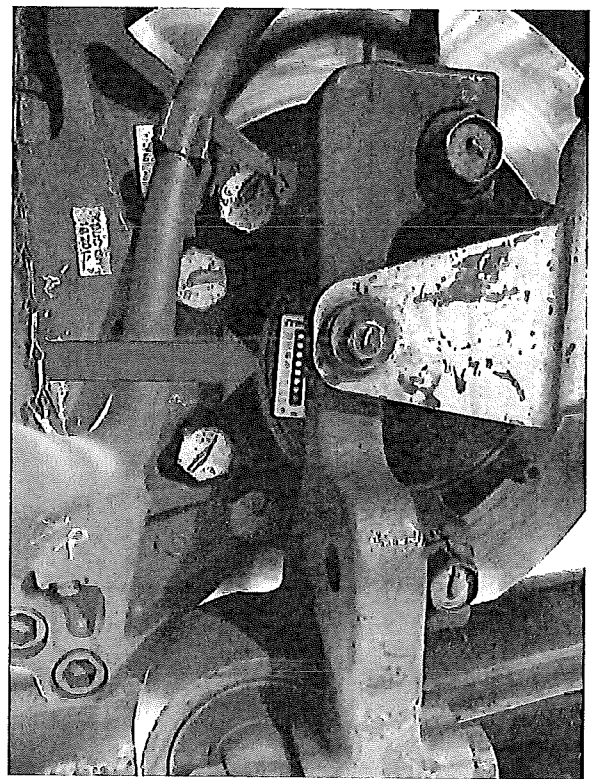
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2. Lift each Center Truck skirt and check Bearing temperature stickers on each axle. If the temp label is not legible, use contact cleaner and a rag to wipe off the surface. Record all readings on the Journal Bearing Inspection sheet. Record a Zero (0) for temperature labels that have no temperature reading.

**C-Truck Temperature Label**



***Without Brushes – Good Reading <105° F***



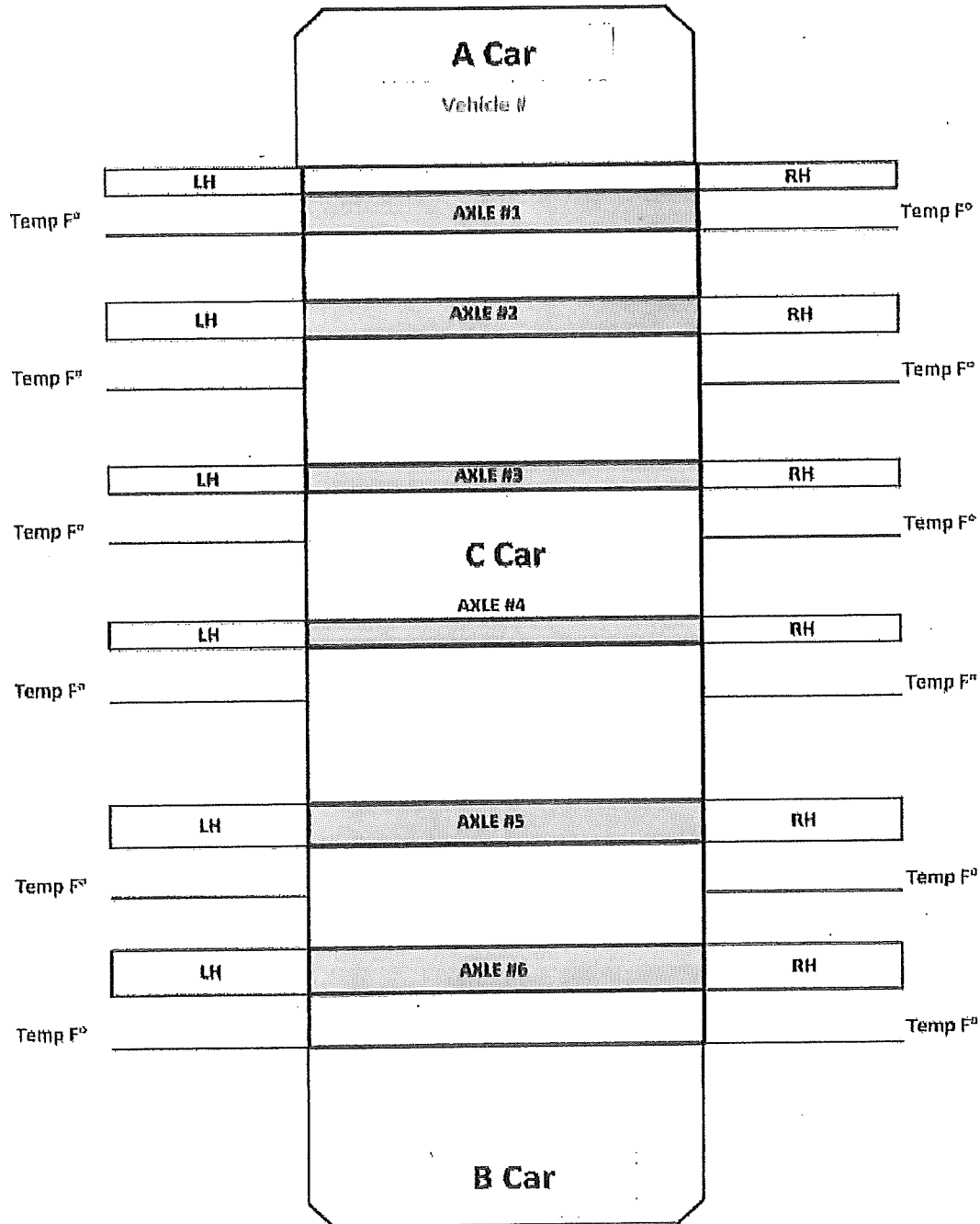
***With Brushes – Good Reading @ 105° F***

**Truck Journal Bearing Inspection**

DATE:

Inspected By:

Wheel positions are oriented from the A car operator view only



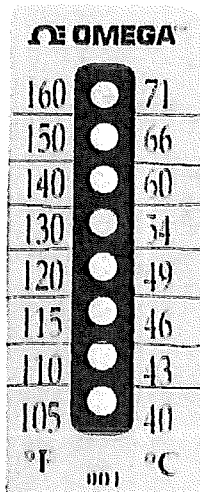
Comments:

Charlotte Area Transit- Light Rail S70 Issue Date:4/7/23 Journal Bearing Temperature Label Inspections

### Power Truck Journal Bearing Inspection

Location: Interior                      Exterior                      Undercar                      Roof  
X

|  |  |
|--|--|
| <p><b>Actions:</b></p> <p>When the power truck temperature monitoring label reaches 130F or more. Inspect the wheels by removing the journal bearing cover and inspected for axle discoloration, foreign matter, and grease seepage.</p> | <p><b>Reference Documents</b><br/> OEM CLT_1206_RMS_CAT1 &amp; 2<br/> OEM CLT_1206_HRM CAT 3</p> |
| <p><b>Parts &amp; Supplies:</b></p> <p>RTV- Silicon High Temp Red Gasket Maker – 3 OZ Tube (RC-2000-RTV SILICON) (non Ground)</p>  | <p><b>Tools:</b></p> <p>Common had tools</p>   |
| <p><b>Comments/Special Instructions:</b></p> <p>Ensure all power is removed from the LRVI</p>  | <p><b>PPE:</b></p> <p>Bump hat, Gloves, Eye protection, flashlight</p>                           |

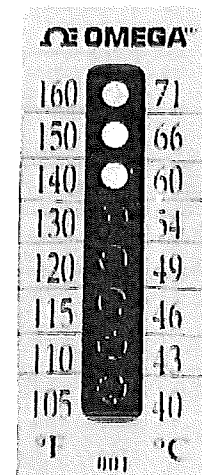


Good - <105° F

The maximum temperature that the bearing has been exposed to is recorded as a black dot next to the associated temperature.

The sticker on the right has reached 130°F or 54°C

The sticker on the left has never been exposed to temps above 105°F.

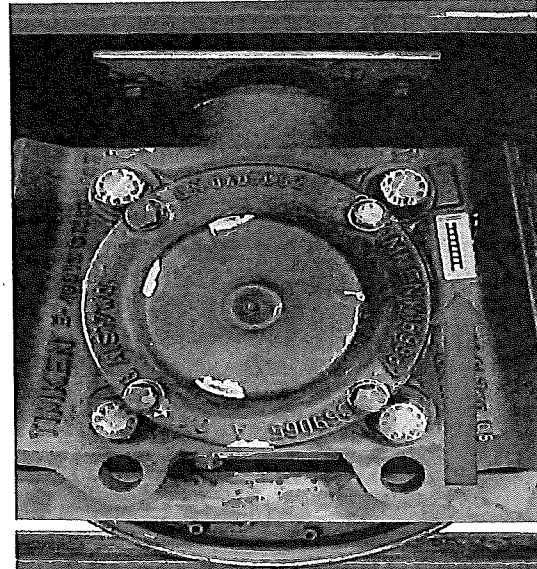
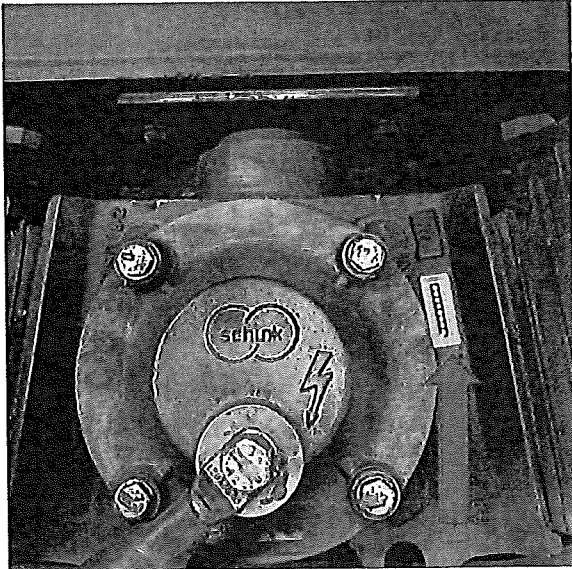


Bad reading - 130° F

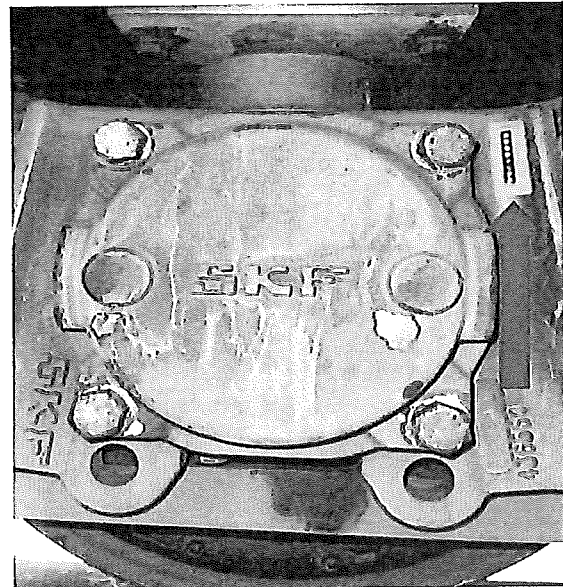
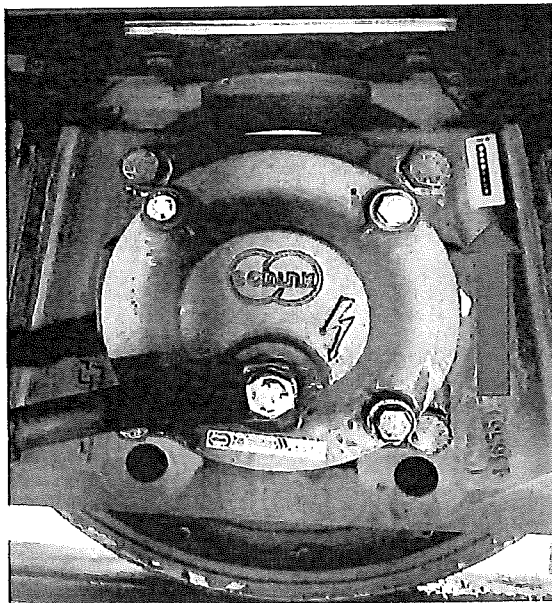
**Charlotte Area Transit- Light Rail S70 Issue Date:4/7/23 Journal Bearing Temperature Label Inspections**

**Procedure:**

1. Ensure the vehicle is Auxed off and all power is removed.
2. Remove the journal bearing cover to be inspected.



*With Brushes – Good Reading <105° F - CATS 1 and 2 - Without Brushes – Good Reading <105° F*



*With Brushes – Good Reading @ 120° F - CATS 3 - Without Brushes – Good Reading @ 120° F*

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**Charlotte Area Transit- Light Rail S70 Issue Date:4/7/23 Journal Bearing Temperature Label Inspections**

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3. Inspect the journal bearing for any abnormalities, such as, cracks corrosion, metal shavings, grease seepage or discoloration caused by heat, some examples are below:

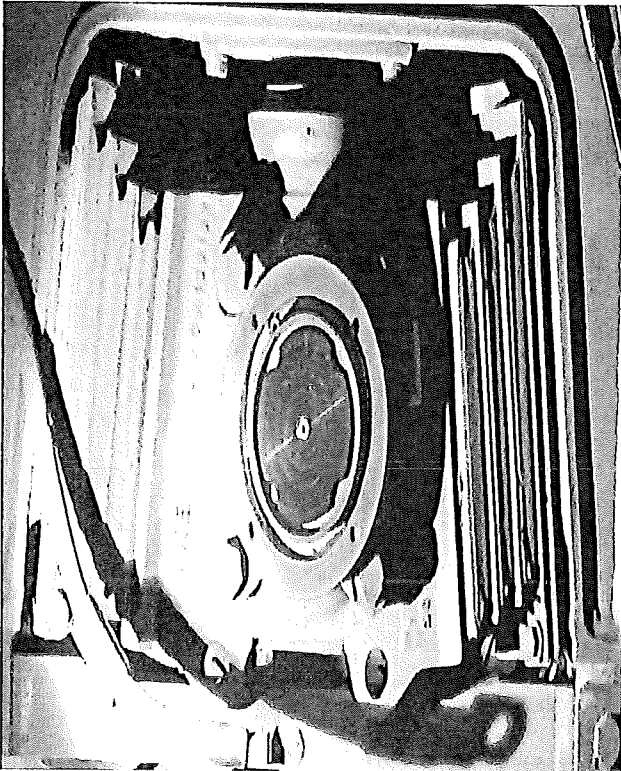


Figure 1 Good Journal Bearing

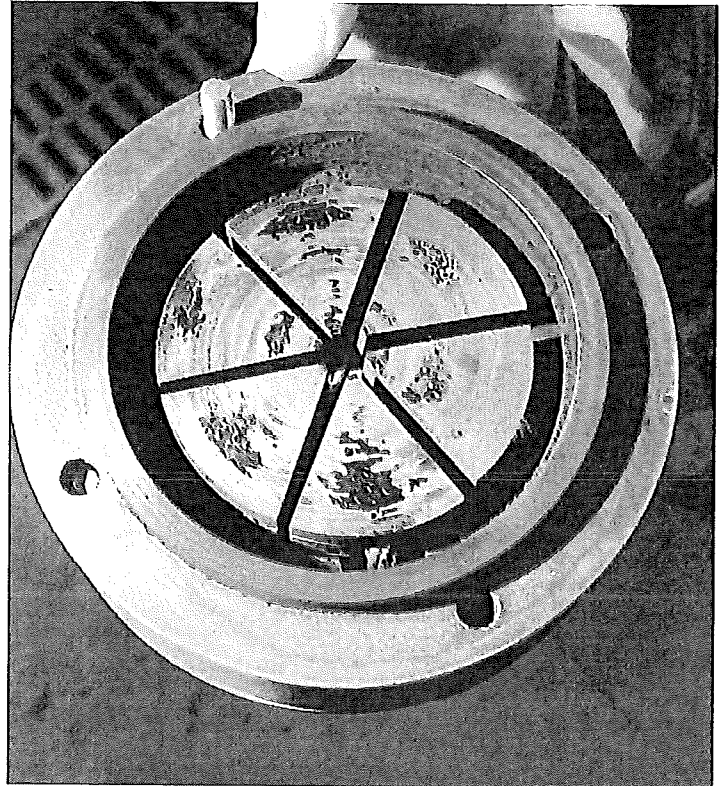
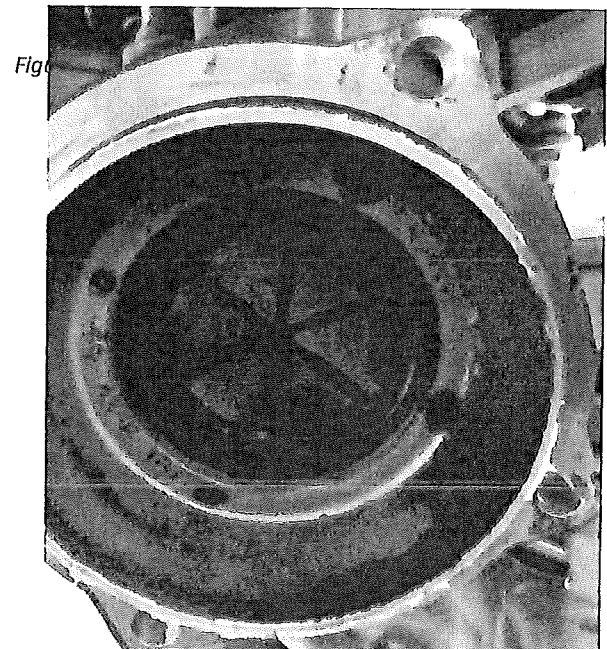
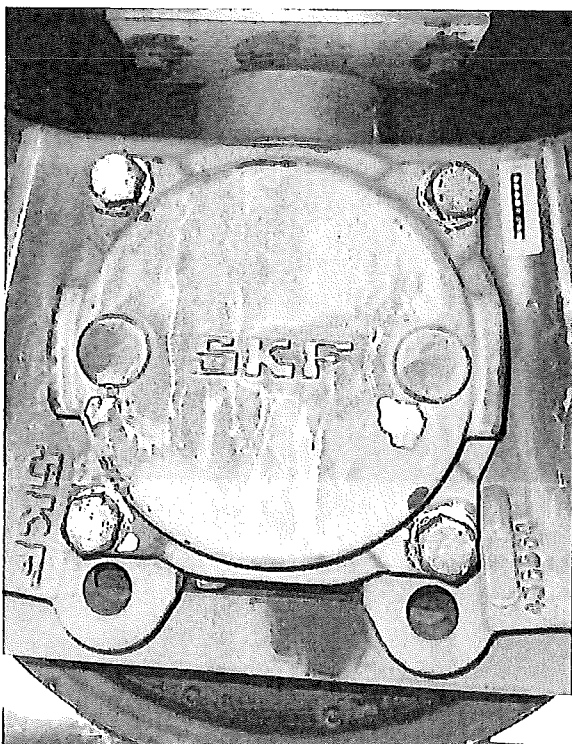


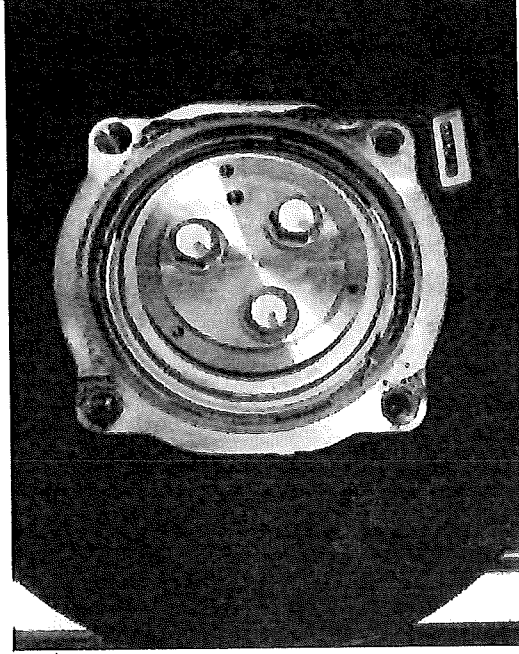
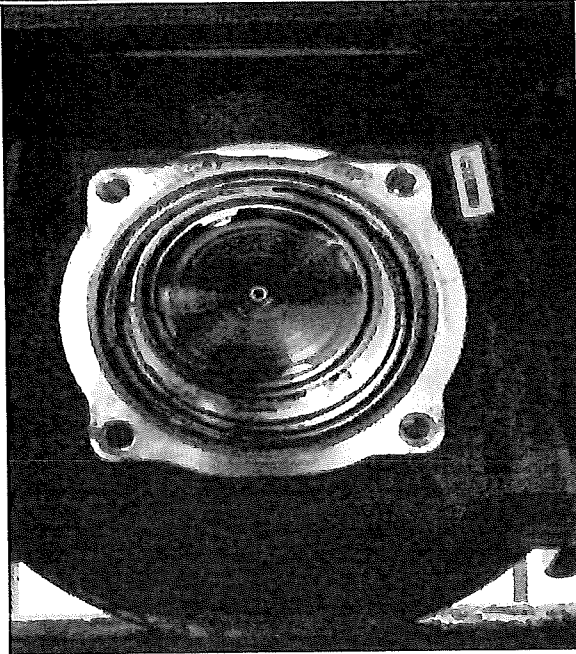
Figure 2 Journal Bearing Cap good



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Charlotte Area Transit- Light Rail S70 Issue Date:4/7/23 Journal Bearing Temperature Label Inspections

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4. If any defect is found, the LRV is removed from service until the axle can be replaced
5. If there is no defect found, install the cover with a bead of sealant (non-ground cap).
6. Remove the old temperature label and apply a new temperature label.
7. Document details of the inspection in the Spear Corrective Work Order, identifying axles and personnel.
8. Report findings to the supervisory team.

**Charlotte Area Transit- Light Rail S70 Issue Date:4/7/23 Journal Bearing Temperature Label Inspections**

**Center Truck Journal Bearing Inspection**

Location: Interior

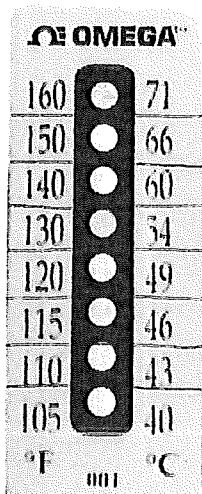
Exterior

Undercar

Roof

X

|   |  |   |
|---|--|---|
| <p><b>Actions:</b></p> <p>When the center truck temperature monitoring label reaches 130F or more. Inspect the wheels by Lifting the Axle. Then rotate the wheel and listen closely for any unusual noise or grinding. Visually check for leaking bearing grease.</p> |  | <p><b>Reference Documents</b></p> <p>OEM CLT_1201_RMS_CAT1 &amp; 2<br/>OEM CLT_1201_HRM CAT 3</p> |
| <p><b>Parts &amp; Supplies:</b></p>   | <p><b>Tools:</b></p> <p>Jack stand, jack</p>                           |   |
| <p><b>Comments/Special Instructions:</b></p> <p>Ensure all power is removed from the LRV!</p>   | <p><b>PPE:</b></p> <p>Bump hat, Gloves, Eye protection, flashlight</p> |   |

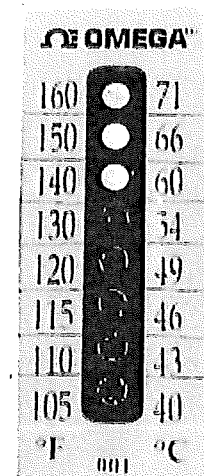


Good - <105° F

The maximum temperature that the bearing has been exposed to is recorded as a black dot next to the associated temperature.

The sticker on the right has reached 130°F or 54°C

The sticker on the left has never been exposed to temps above 105°F.



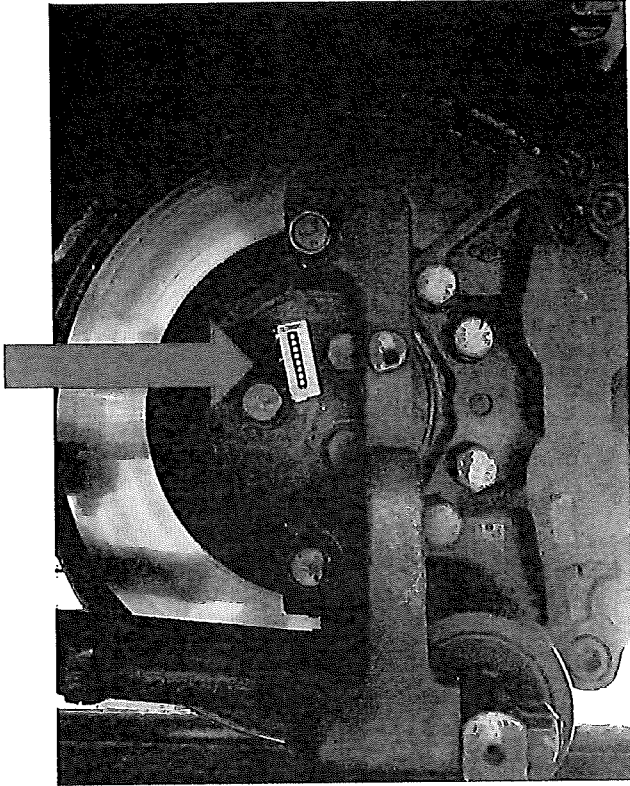
Bad reading - 130° F

---

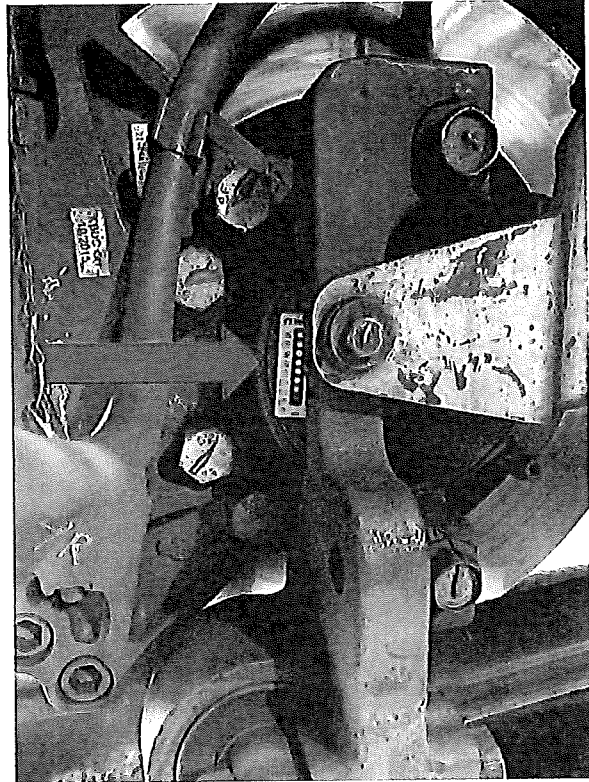
Charlotte Area Transit- Light Rail S70 Issue Date:4/7/23 Journal Bearing Temperature Label Inspections

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C-Truck Temperature Label



*Without Brushes – Good Reading <105° F*



*With Brushes – Good Reading @ 105° F*



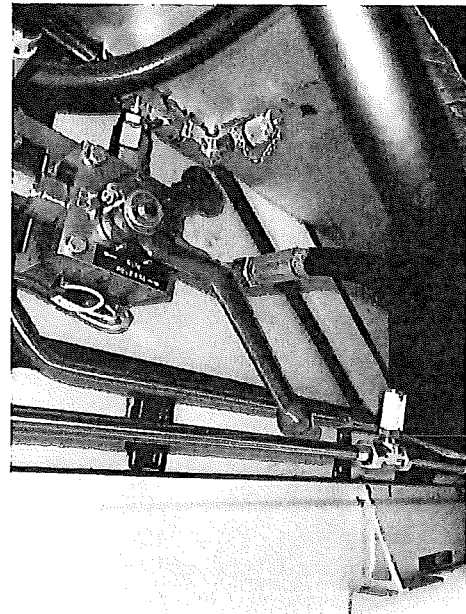
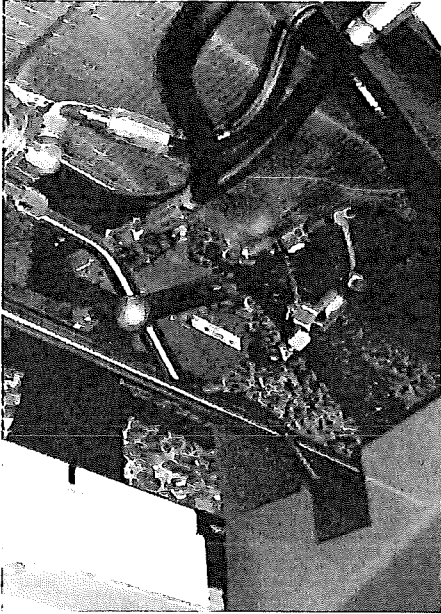
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**Charlotte Area Transit- Light Rail S70 Issue Date:4/7/23 Journal Bearing Temperature Label Inspections**

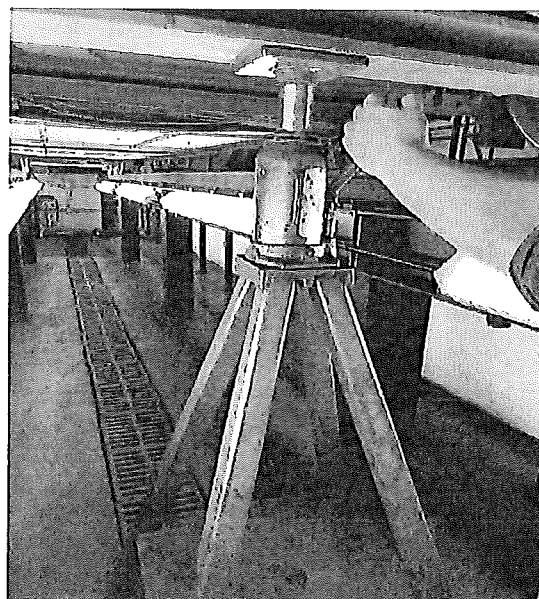
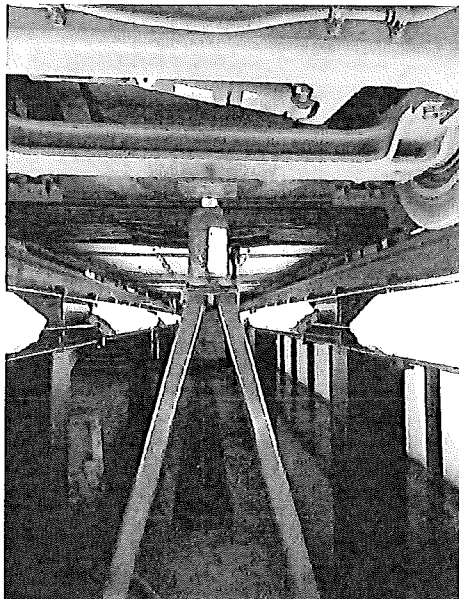
---

**Procedure:**

1. Ensure the vehicle is Auxed off and all power is removed.
2. Release the center truck brakes utilizing the manual brake release handle.



3. Set up the stand and jack on the center of axle 3 or 4 to lift.



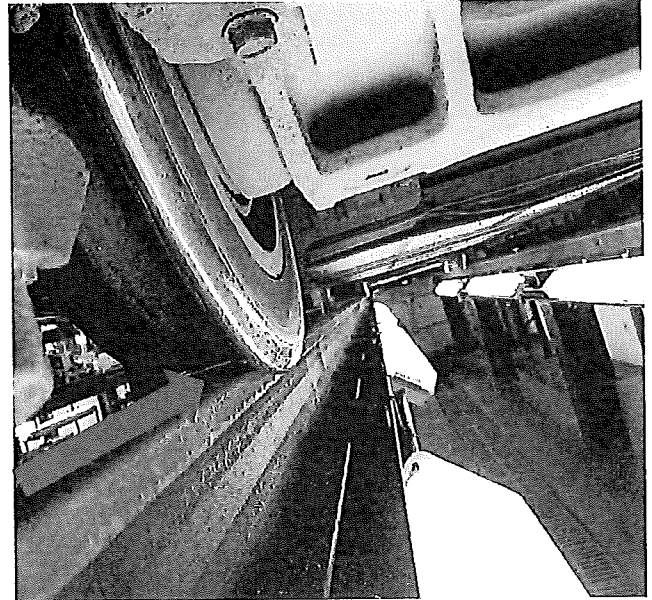
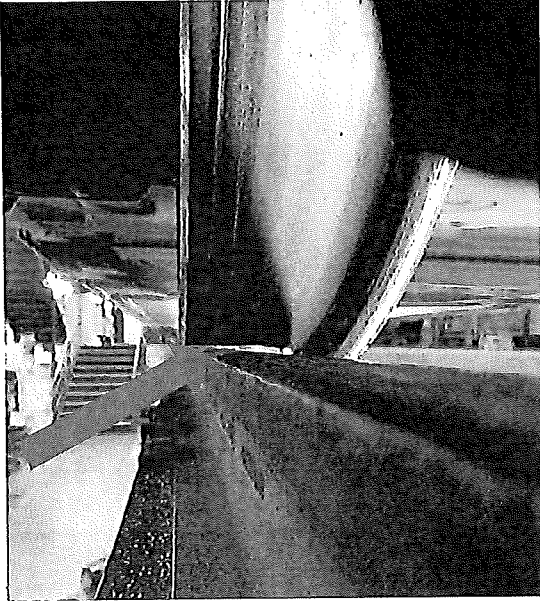
4. Utilizing the jack start lifting the axle until the wheels are off the rails and can move freely.
5. Inspect center truck journal bearing for:
  - Unrestricted movement

---

Charlotte Area Transit- Light Rail S70 Issue Date:4/7/23 Journal Bearing Temperature Label Inspections

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- Resistance of movement
- Grinding
- Grease seepage



6. Using your hands start rotating the wheel as fast as you can. Then listen closely for any unusual noise or grinding and or resistance from wheel (should spin freely).

If you hear any noise report it to your RCM Supervisor.

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Charlotte Area Transit- Light Rail S70 Issue Date:4/7/23 Journal Bearing Temperature Label Inspections

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Pinching point  
Be careful!!!

**Note:**

If you hear any noise coming from the brake pads. Remove the brake pads and re-check the wheels for any noise or grinding.

**Warning:**

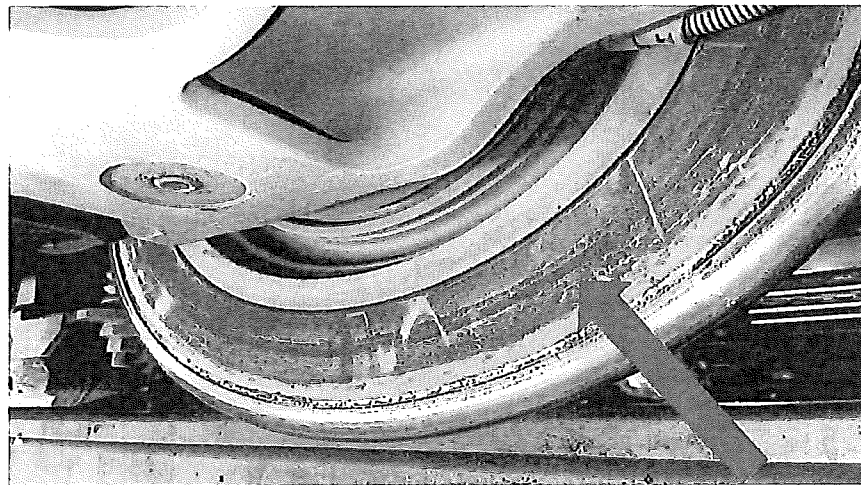
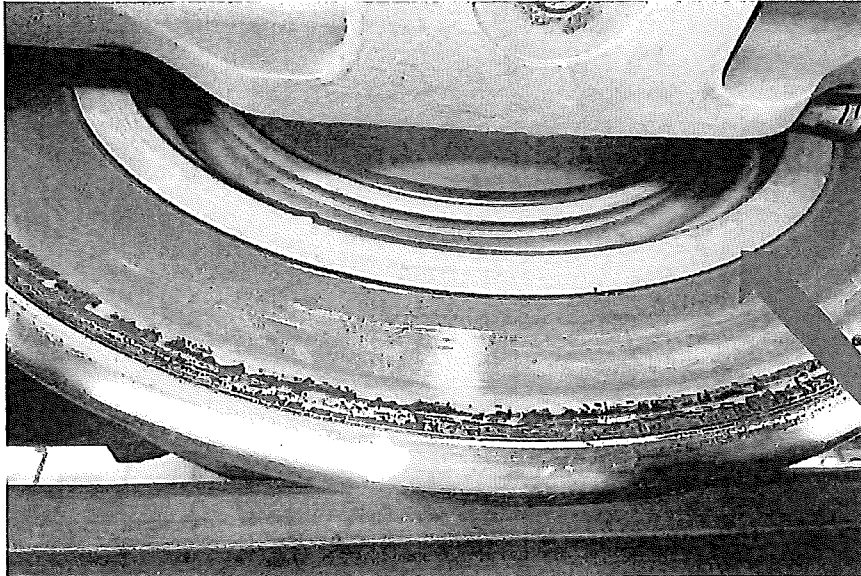
When rotating the wheel with your hand make sure you don't pinch your fingers

---

Charlotte Area Transit- Light Rail S70 Issue Date:4/7/23 Journal Bearing Temperature Label Inspections

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7. Visually inspect the inside of the wheel for any signs of grease or damaged seal.  
(See picture)



8. Slowly lower jack down and ensure the wheels are back on the track.
9. If any defect is found, the LRV is removed from service until the axle can be replaced.
10. If there is no defect found, remove the old temperature label, and apply a new temperature label.
11. Document details of the inspection in the Spear Corrective Work Order, identifying axles and personnel.
12. Report findings to the supervisory team.



Siemens Report



**Final Report**  
**CATS LFAB Bearings Inspection**

|                         |                |
|-------------------------|----------------|
| <b>Document Number:</b> | A4D10000101784 |
|-------------------------|----------------|

|                                   |                                 |
|-----------------------------------|---------------------------------|
| <b>Prepared by: Anson Huang</b>   | <b>Release Date: 03/09/2022</b> |
| <b>Title: Mechanical Engineer</b> | <b>Revision: A</b>              |

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**Release History**

|              | Name               | Department                 | Date       | Signature   |
|--------------|--------------------|----------------------------|------------|---|
| Prepared by: | Anson Huang        | SMO NAM RC-US<br>CS PLM SE | 03/09/2022 | sign. <b>Huang Weijun</b><br><small>Digitally signed by Huang Weijun<br/>DN: cn=Huang Weijun, o=Siemens, email=weijun.huang@siemens.com<br/>Date: 2023.03.10 11:20:39 -08'00'</small> |
| Checked by:  | Duane Kopp         | SMO NAM RC-US<br>CS PLM SE | 03/09/2022 | sign. <b>Duane Kopp</b><br><small>Digitally signed by Duane Kopp<br/>DN: cn=Duane Kopp, c=US, email=duane.kopp@siemens.com<br/>Date: 2023.03.10 14:38:15 -08'00'</small>              |
| Checked by:  | Stephensen Jackson | SMO NAM RC-US<br>CS PI EH  | 03/09/2022 | sign. <b>Jackson Stephensen</b><br><small>Digitally signed by Jackson Stephensen<br/>Date: 2023.03.10 14:22:49 -07'00'</small>  |

**Revision Table**

| Revision | Name     | Date       | Revised Sections, Description, Reason for changes |
|----------|----------|------------|---|
| A        | A. Huang | 03/09/2022 | Initial Release                                   |
|          |          |            |   |
|          |          |            |   |
|          |          |            |   |
|          |          |            |   |

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## **1 Overview/Purpose**

This document is the final inspection report for the CATS failed LFAB bearings, including summary of the performed inspections and findings.

## Acronyms/Definitions

|      |                         |
|------|-------------------------|
| LH   | Left Hand               |
| LRU  | Line Replaceable Unit   |
| LRV  | Light Rail Vehicle      |
| NDT  | Non-Destructive Testing |
| NPT  | Non-Powered Truck       |
| PT   | Powered Truck           |
| RH   | Right Hand              |
| OoT  | Out of Tolerance        |
| LFAB | Low Floor Axle Bridge   |

## 2 CATS LFAB Bearing Inspection

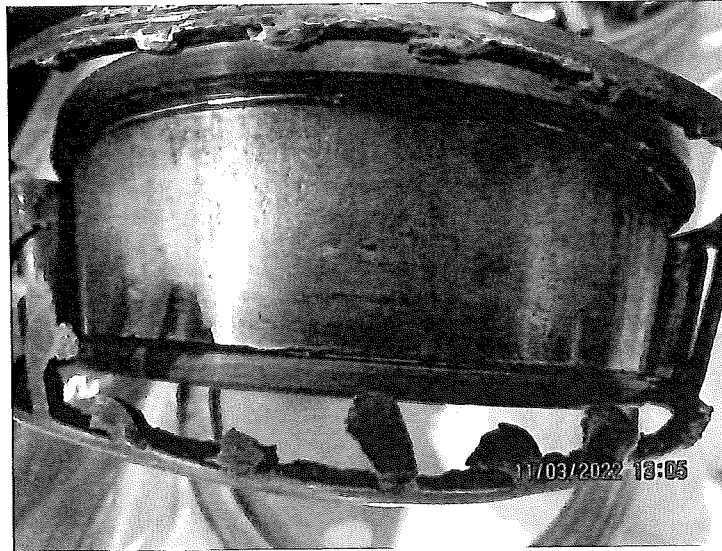
### 2.1 Bearing Assembly #1 Inspection

The SFK bearing was removed from the failed LFAB and sent to Martin Test Lab for bearing analysis. The findings are listed below:

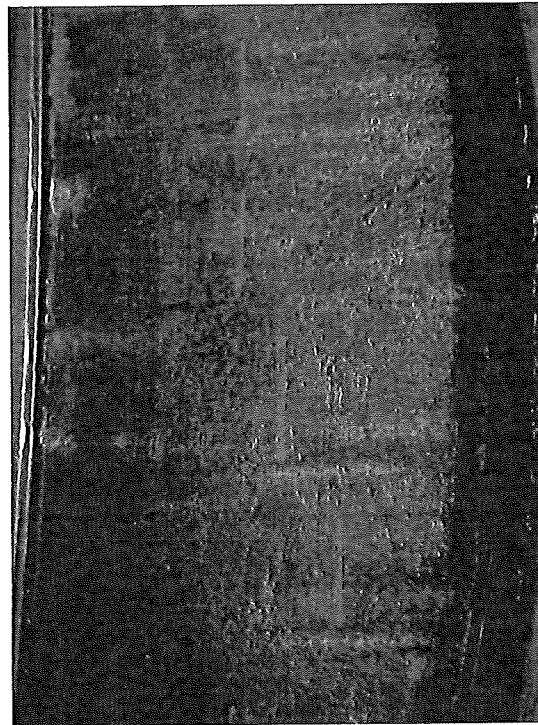
1. Grease was found thermally degraded (blackened) and containing reddish corrosion particles. Six grease and debris samples were collected, and one grease sample from the cylindrical bearing displayed a very small amount of water which separated from the grease. Very little to no grease was found on the rollers/bearing track.
2. The bearing track surfaces displayed spalling, which is indicative of metal-to-metal contact, a lubrication issue. Damage was worst in the smaller taper bearing which was completely torn apart and seized. It is believed that the smaller bearing damage was worst due to higher amounts of water being present in that location.



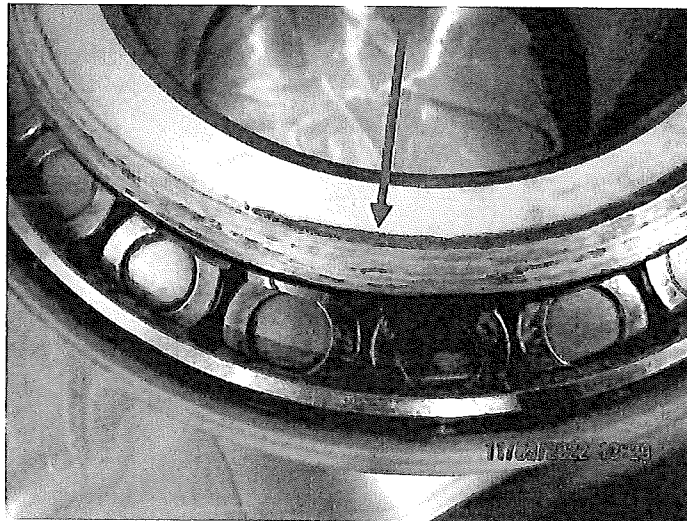
*Figure 1: Disassembled smaller taper roller. This was the section with the greatest degree of damage. Much of the metal cage has been destroyed.*



*Figure 2: The smaller taper roller after cleaning. The metal cage failed ends are all swept in the same direction.*



*Figure 3: close-up of the roller track surface. The linear pattern (arrows) is due to corrosion.*



*Figure 4: Blued metal indicates localized heating on the larger taper bearing.*

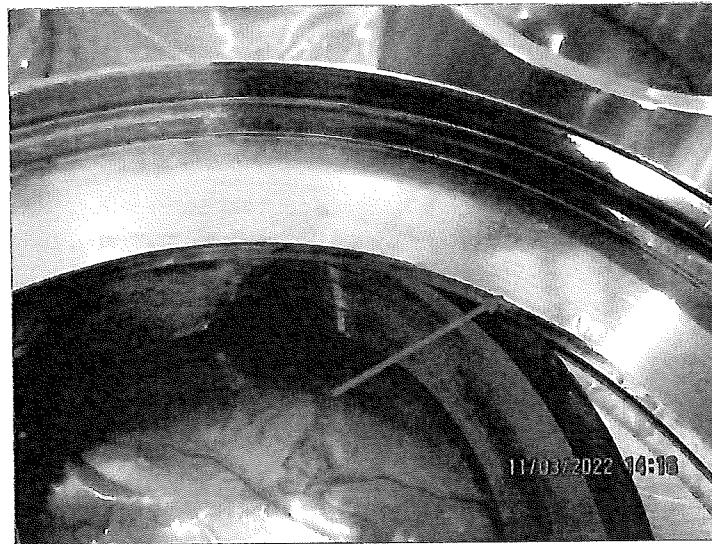
## 2.2 Bearing Assembly #2 Inspection

The SKF bearing was removed from the failed LFAB and sent to Martin Test Lab for bearing analysis. The findings are listed below:

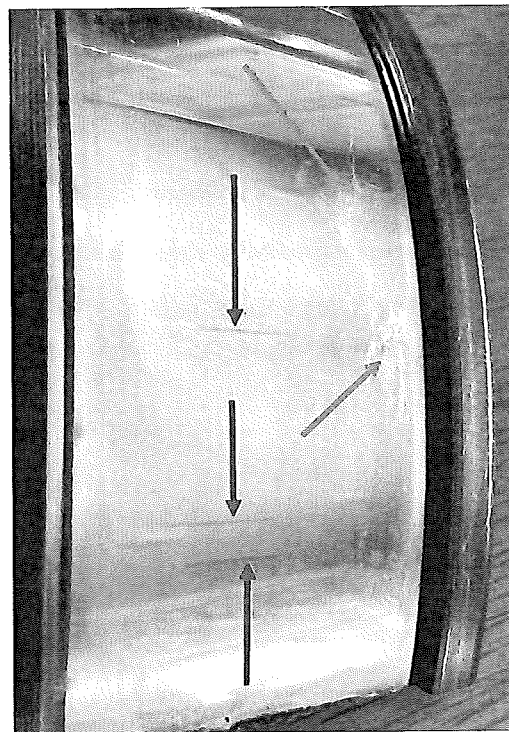
1. Much more grease was present on the contact surfaces and grease color was closer to its normal brown color, which indicated only minor thermal grease degradation.
2. The bearing track surfaces displayed only minor and localized spalling.



*Figure 5: Water mixed with the grease inside the smaller bearing.*



*Figure 6: Minor thermal heating discoloration.*



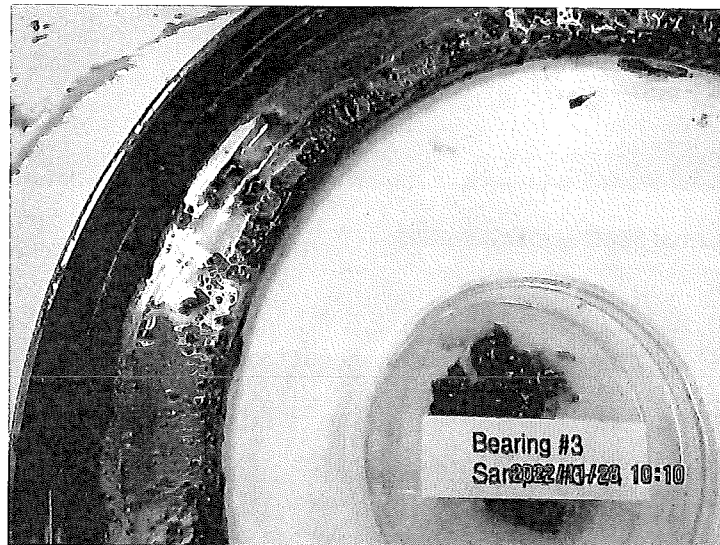
*Figure 7: The track surface for the smaller bearings. There is some linear scoring (red arrows). Minor spalling is indicated (blue arrows).*



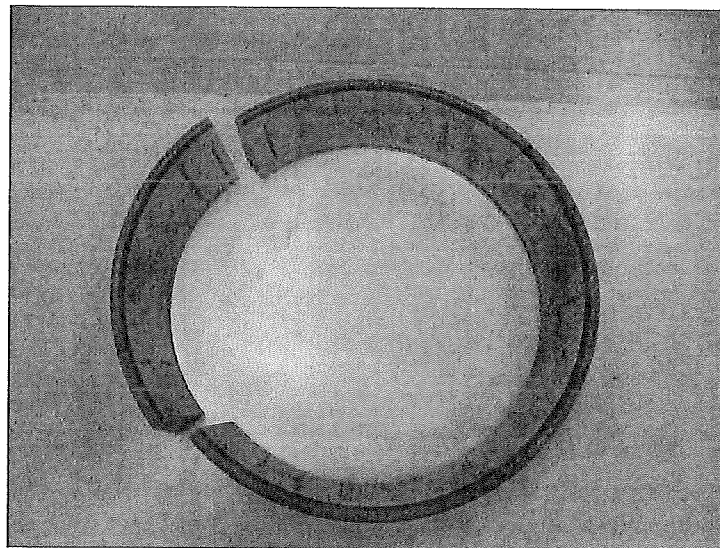
### 2.3 Bearing Assembly #3 Inspection

The SFK bearing was removed from the failed LFAB and sent to Martin Test Lab for bearing analysis. The findings are listed below:

1. Much more grease was present on the contact surfaces and grease color was closer to its normal brown color, which indicated only minor thermal grease degradation.
2. The bearing track surfaces displayed very little minor and localized spalling.



*Figure 8: Water mixed with the grease inside the smaller bearing*

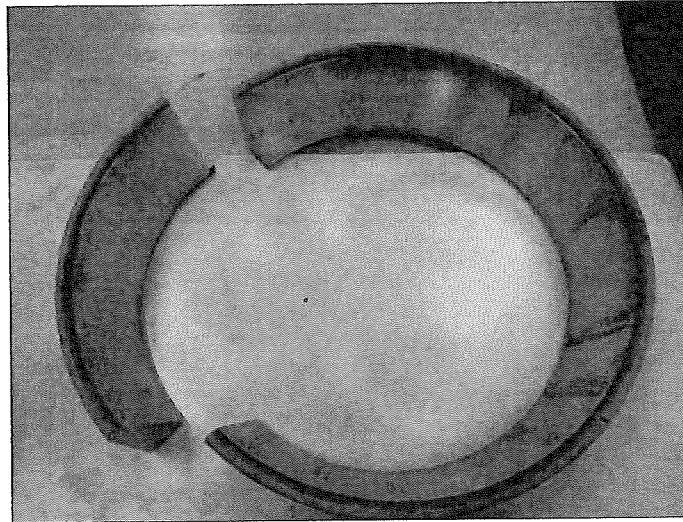


*Figure 9: Linear corrosion patterns on the inside of bearing track.*

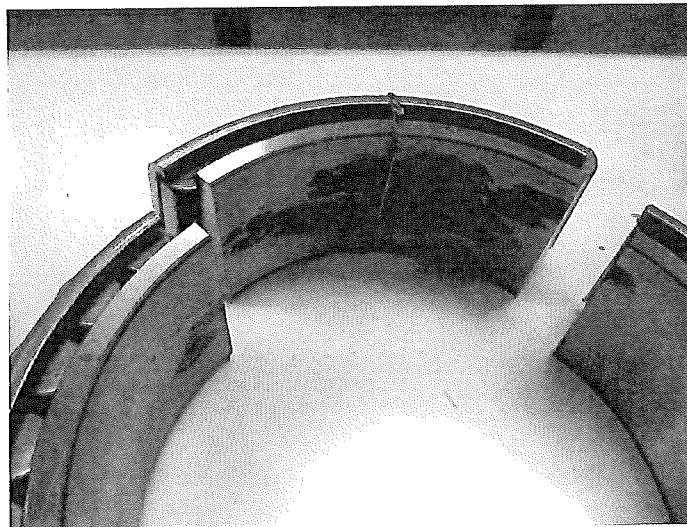
## 2.4 Bearing Assembly #4 Inspection

The SFK bearing was removed from the failed LFAB and sent to Martin Test Lab for bearing analysis. The findings are listed below:

1. Small amounts of grease were present on the contact surfaces however the grease was thermally degraded and darker in color. The grease displayed only small amounts of water as it is believed the heat drove much of the water off.
2. The bearing track surfaces displayed very little spalling.



*Figure 10: Linear corrosion patterns on the inside of bearing track.*



*Figure 11: Smaller bearing displayed a large area of corrosion from water on the inner diameter.*

## 2.5 Bearing Inspections Conclusion

When reviewing the bearing inspection reports, corrosion mark, localized heating and water presence are common findings on all bearings. It is evident that water intrusion had occurred during regular operation. Water presence can reduce the viscosity of the grease, increasing wear, while also causing corrosion.

During the 300K overhaul and inspection of four prototype bearings, the results showed the bearings were in satisfactory condition at the time but with some initial indications of higher water content in the lubricating grease. The failed bearings detailed in this report had approximately 600K miles with no further inspection and no overhaul. The recommended OEM maintenance intervals of either 6 years or 600K kilometers (whichever comes first) were exceeded in both cases, leading to bearing seal degradation which allowed for water intrusion and the corresponding breakdown of the protective lubricating grease, resulting eventually in catastrophic failure of the bearings.

### 3 Supporting Documentation and Attachments

*Table 1: Supporting Documents*

| Document Identifier | Document Title       |
|---------------------|----------------------|
|                     | 3804_68_Report#1.pdf |
|                     | 3804_68_Report#2.pdf |
|                     | MJO 3804-68-2.pdf    |
|                     | MJO 3804-68-3.pdf    |
|                     |                      |
|                     |                      |
|                     |                      |



Item 2: FTA 2022 Triennial Review



First FTA Letter







U.S. Department  
of Transportation  
**Federal Transit  
Administration**

REGION IV  
Alabama, Florida, Georgia,  
Kentucky, Mississippi,  
North Carolina, Puerto  
Rico, South Carolina,

230 Peachtree St., N.W.,  
Suite 1400  
Atlanta, GA 30303  
404-865-5600  
404-865-5605 (fax)

June 22, 2022

Mr. John Lewis  
Chief Executive Officer  
Charlotte Area Transit System  
City of Charlotte  
634 W. Oglethorpe Ave  
Charlotte, NC, 28202

**Re: Federal Transit Administration (FTA) Fiscal Year 2022 Triennial Review - Draft Report**

Dear Mr. Lewis:

I am pleased to provide you with a copy of this FTA report as required by 49 U.S.C. Chapter 53 and other Federal requirements. The enclosed draft report documents the FTA's Triennial Review of the City of Charlotte in Charlotte, NC. Although not an audit, the Triennial Review is the FTA's assessment of the City's compliance with Federal requirements, determined by examining a sample of award management and program implementation practices. As such, the Triennial Review is not intended as, nor does it constitute, a comprehensive and final review of compliance with award requirements.

Due to the Coronavirus 2019 (COVID-19) Public Health Emergency, a virtual site visit was conducted for this Triennial Review. In addition, the review was expanded to address the City's compliance with the administrative relief and flexibilities FTA granted and the requirements of the COVID-19 Relief funds received through the Coronavirus Aid, Relief, and Economic Security (CARES) Act, Coronavirus Response and Relief Supplemental Appropriations Act (CRRSAA) of 2021, and the American Rescue Plan (ARP) Act of 2021.

The Triennial Review focused on the City's compliance in 23 areas. No deficiencies were found with the FTA requirements in 13 areas. Deficiencies were found in nine areas: Financial Management and Capacity, Technical Capacity – Award Management, Technical Capacity – Program Management and Subrecipient Oversight, Transit Asset Management, Satisfactory Continuing Control, Maintenance, Procurement, Title VI, and Drug and Alcohol Program. One area was not applicable. The City had repeat deficiencies from the Fiscal Year 2018 Triennial Review in the areas of Technical Capacity – Award Management, Technical Capacity - Program Management and Subrecipient Oversight, and Satisfactory Continuing Control.

Subsequent to the site visit, the City provided corrective action responses to address and close deficiency P20-3 noted in the Procurement area of the report that follows.

Please review this draft report for accuracy and provide your comments to both the reviewer and your FTA Program Manager **within ten business days from the date of this letter**. A final report that incorporates your comments to the draft report will be provided to you within 14 business days of your response.

Thank you for your cooperation and assistance during this Triennial Review. If you need any technical assistance or have any questions, please do not hesitate to contact Mr. David Powell, General Engineer, at 404-865-5628 or by email at David.Powell@dot.gov, or Ms. Philippa Drew, your reviewer, at 857-576-1512 or by email at pdrew@tfcci.net.

Sincerely,

*Robert Buckley*

Robert Buckley, AICP  
Director, Office of Financial Management and Program Oversight

Enclosure

cc: Blanche Sherman, Deputy Director of Transit - CFO, CATS  
Crystal Givens, Grant Compliance Administrator, CATS  
David Powell, General Engineer, FTA Region IV  
Michele D. Foster, Regional Civil Rights Officer, FTA Region IV  
Tashu Trivedi, Technical Project Manager, Team TFC  
Philippa Drew, Lead Reviewer, Team TFC

**DRAFT REPORT**

**FISCAL YEAR 2022  
TRIENNIAL REVIEW  
of**

**City of Charlotte  
CATS  
Charlotte, NC  
ID: 1111**

*Performed for:*

**U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL TRANSIT ADMINISTRATION  
REGION IV**

*Prepared By:*

**TFC Consulting, Inc.**

**Scoping Meeting Date: March 8-10, 2022  
Site Visit Date: May 16 -18, 2022  
Draft Report Date: June 22, 2022**

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U.S. Department  
of Transportation  
**Federal Transit  
Administration**

REGION IV  
Alabama, Florida, Georgia,  
Kentucky, Mississippi,  
North Carolina, Puerto  
Rico, South Carolina,

230 Peachtree St., N.W.,  
Suite 1400  
Atlanta, GA 30303  
404-865-5600  
404-865-5605 (fax)

## I. Executive Summary

This report documents the Federal Transit Administration’s (FTA) Triennial Review of the City of Charlotte (“the City”), of Charlotte, NC. The FTA wants to ensure that awards are administered in accordance with the requirements of Federal public transportation law 49 U.S.C. Chapter 53. The review was performed by TFC Consulting, Inc. During the site visit, administrative and statutory requirements were discussed and documents were reviewed.

Due to the Coronavirus 2019 (COVID-19) Public Health Emergency, a virtual site visit was conducted for this Triennial Review. In addition, the review was expanded to address the City’s compliance with the administrative relief and flexibilities FTA granted and the requirements of the COVID-19 Relief funds received through the Coronavirus Aid, Relief, and Economic Security (CARES) Act, Coronavirus Response and Relief Supplemental Appropriations Act (CRRSAA) of 2021, and the American Rescue Plan (ARP) Act of 2021. The City was also requested to share if and/or how it suspended, deviated from, or significantly updated or altered its transit program due to the public health emergency.

The Triennial Review focused on the City’s compliance in 23 areas. Deficiencies related to the COVID-19 Relief funds have been clearly identified as part of the deficiency description in the respective review area.

Deficiencies were found in the areas listed below.

| Review Area  | Deficiencies |   |
|--|--------------|---|
|  | Code         | Description   |
| 2. Financial Management and Capacity (F)                       | F1-1         | Lacking/missing required written financial management policies and procedures |
|  | F4-1         | ECHO documentation deficient  |
| 3. Technical Capacity – Award Management (TC-AM)               | *TC-AM4-1    | POP Status Reports missing or lacking required information                    |
|  | TC-AM5-1     | Inactive award/untimely closeouts   |
| 4. TC – Program Management and Subrecipient Oversight (TC-PgM) | TC-PgM3-2    | Written agreements missing required elements                                  |
|  | TC-PgM6-1    | FFATA reporting deficiencies  |
|  | *TC-PgM7-1   | Inadequate oversight of subrecipients   |
| 6. Transit Asset Management (TAM)                              | TAM6-3       | Performance targets not approved by the accountable executive                 |
|  | *SCC8-3      | Inadequate equipment records  |

| Review Area                              | Deficiencies |   |
|--|--------------|---|
|  | Code         | Description   |
| 7. Satisfactory Continuing Control (SCC) | *SCC9-2      | Non-permitted use of equipment disposal proceeds  |
| 8. Maintenance (M)                       | M2-1         | Late vehicle/vessel preventive maintenance  |
| 9. Procurement (P)                       | P11-1        | Missing FTA clauses   |
|  | P10-2        | Lacking required cost or price analysis   |
|  | P12-2        | Lobbying certifications not included in procurement solicitations or signed by bidders                            |
|  | P12-4        | Contract files lacking signed Buy America certifications  |
|  | P19-2        | Missing documentation of bus model testing  |
|  | P20-3        | Pre-award and/or post-delivery certifications lacking   |
| 11. Title VI (TVI)                       | TVI8-1       | Impact of fare and/or service changes not adequately examined   |
|  | TVI6-2       | Insufficient oversight of subrecipients' Title VI programs  |
| 18. Drug and Alcohol Program (DA)        | DA2-1        | Employee training not provided/insufficient   |
|  | DA2-2        | Supervisor training not provided/insufficient   |
|  | DA3-1        | Deficiencies in process of checking previous drug and alcohol testing records                                     |
|  | DA5-1        | Insufficient oversight over drug & alcohol programs of subrecipients, contractors, subcontractors, and/or lessees |

\* Repeat deficiency

Subsequent to the site visit, the City provided corrective action responses to address the deficiency P20-3 noted in the Procurement area of this report. The deficiency in this area, as noted in the above table, is closed.



## II. Review Background and Process

### 1. Background

The United States Code, Chapter 53 of Title 49 (49 U.S.C. 5307(f)(2)) requires that “At least once every 3 years, the Secretary shall review and evaluate completely the performance of a recipient in carrying out the recipient’s program, specifically referring to compliance with statutory and administrative requirements...” This Triennial Review was performed in accordance with the FTA procedures (published in FTA Order 9010.1B, April 5, 1993).

The Triennial Review includes a review of the recipient’s compliance in 23 areas. The basic requirements for each of these areas are summarized in Section IV.

This report presents the findings from the Triennial Review of the City. The review concentrated on procedures and practices employed since the City’s previous Triennial Review; however, coverage was extended to earlier periods as needed to assess the policies in place and the management of award funds. The specific documents reviewed and referenced in this report are available at the FTA’s regional office or the recipient’s office.

### 2. Process

The Triennial Review includes a pre-review assessment, a desk review and scoping meeting with the FTA regional office, and a site visit to the recipient’s location. Due to the COVID-19 Public Health Emergency, a virtual site visit was conducted of each recipient. In addition, the review was expanded to address the recipient’s compliance with the administrative relief and flexibilities FTA granted and the requirements of the COVID-19 relief funds received through the CARES Act, CRRSAA of 2021, and the ARP Act of 2021. Recipients were also requested to share if and/or how it suspended, deviated from, or significantly updated or altered its transit program due to the public health emergency.

The fiscal year (FY) 2022 process began with the regional office transmitting, a recipient information request (RIR) to the City on November 29, 2021, indicating a review would be conducted. While the City prepared its response to the RIR, the regional office and review team conducted a desk review and scoping meeting on March 8 - 10, 2022. Necessary files retained by the regional office were sent to the reviewers electronically. Following the desk review and scoping meeting, the reviewers and the recipient corresponded and exchanged information and documentation in preparation for the virtual site visit. As a result of this review, an agenda package indicating the issues that would be discussed, records to be reviewed, and interviews to be conducted was then sent to the City on April 19, 2022. The virtual site visit to the City occurred on May 16 -18, 2022.

The site visit portion of the review began with an entrance conference, at which the purpose of the Triennial Review and the review process were discussed. The reviewers conducted additional interviews and reviewed documentation to evidence the City’s compliance with FTA requirements.

A Section 5307 and 5310 subrecipient, Iredell County Transit of Iredell County, North Carolina was reviewed virtually to provide an overview of activities related to the FTA-funded projects. The reviewers also examined a sample of procurement files during this review.

Upon completion of the site visit, the FTA and the reviewers provided a summary of preliminary findings to the City at an exit conference. Section VI of this report lists the individuals participating in the site visit.

### 3. Metrics

The metrics used to evaluate whether a recipient is meeting the requirements for each of the areas reviewed are:

- *Not Deficient*: An area is considered not deficient if, during the review, nothing came to light that would indicate the requirements within the area reviewed were not met.
- *Deficient*: An area is considered deficient if any of the requirements within the area reviewed were not met.
- *Not Applicable*: An area can be deemed not applicable if, after an initial assessment, the recipient does not conduct activities for which the requirements of the respective area would be applicable.

### III. Recipient Description

#### 1. Organization

The Charlotte Area Transit System, known as CATS, was established in 2000 as a division of the City of Charlotte. The City's Public Transit Department administers CATS. Described as the largest transit system between Washington, D.C. and Atlanta, Georgia, CATS' primary service to Mecklenburg County, including the City of Charlotte, and the towns of Pineville, Matthews, Davidson, Huntersville, Cornelius, Mint Hill, the City of Concord in Cabarrus County, the City of Gastonia in Gaston County, the City of Monroe in Union County, and the Town of Rock Hill in York County, SC. and serves a population of approximately 1,779,734 people.

The Metropolitan Transit Commission (MTC) is the CATS policy board. The MTC has responsibility for reviewing and recommending all long-range public transportation plans. The Board approves the transit system's operating and capital programs and makes recommendations to the Charlotte City Council. The MTC is composed of voting members from the cities and towns located in Mecklenburg County, and non-voting members from the surrounding counties. The voting members include the Mayors of Charlotte, Cornelius, Davidson, Huntersville, Matthews, Mint Hill, and Pineville; the Chairman of the Board of Mecklenburg County Commissioners; and the regional representative from the North Carolina Board of Transportation. The MTC also includes five non-voting members representing local governments outside Mecklenburg County to ensure regional involvement, including the South Carolina Department of Transportation. CATS provides bus and rail service through a combination of direct operation and third-party contracting. CATS contracts with RATP Dev USA, Inc. (d.b.a. Transit Management of Charlotte [TMOC]) to provide fixed-route bus service. CATS directly operates light rail, paratransit, and neighborhood-based shuttle services, as well as a multi-county vanpool program for work trips with origins and destinations in Mecklenburg County.

Bus service is provided on 68 routes weekdays and Saturdays from around 4:50 a.m. to 2:15 a.m., and Sundays from 4:55 a.m. to 1:35 a.m. 13 of these routes are Commuter Bus services. Three deviated fixed routes, known as the North Meck Village Rider, are operated in the northern portion of the CATS service area in the communities of Davidson, Cornelius, and Huntersville.

The CATS buses operate out of the South Tryon Street Maintenance Facility located at 3145 S. Tryon Street in Charlotte. This FTA-funded facility is 338,000 square feet in size and can support the daily operations of more than 250 buses. The centralized functions include the maintenance and body repair, paint, and warehousing for the entire CATS bus fleet.

The CATS light rail LYNX Blue Line is an 18.9-mile service operating between I-485 just north of Pineville and the University of North Carolina at Charlotte main campus, using a railroad right-of-way paralleling the entirety of South Boulevard. The LYNX Blue Line has 26 stops and operates 4:35 a.m. to 2:00 a.m. seven days a week. The LYNX Gold Line Streetcar opened for passenger service in August 2021. The 4-mile-long streetcar has 17 stops and connects the West End through Center City Charlotte to the Elizabeth neighborhood.

The Light Rail Maintenance Facility is located at 3200 South Boulevard in Charlotte. This FTA-funded multi-use facility is approximately 110,000 square feet in size and features maintenance areas, offices, and a control center. An additional rail facility is located at 1911 North Brevard Street.

Local bus and LYNX Blue Line services are \$2.20 adult and \$1.10 half fare for a one-way journey. Half fare is offered to seniors aged 62 and older, individuals with disabilities, and those with a Medicare card. LYNX Gold Line service operates from 5:00 a.m. to 2:00 a.m. seven days a week and is currently fare free.

CATS' ADA complementary paratransit service, known as Special Transportation Service (STS), provides door-to-door transit services within Charlotte's City limits, including the towns of Matthews and Pineville, on the same schedule as the fixed route bus service. CATS also provides demand responsive service for persons with disabilities known as STS II that operates beyond the ADA service area, providing trips to, from, and within the towns of Cornelius, Davidson, Huntersville, Mint Hill, and the unincorporated areas of Mecklenburg County. The North Davidson Bus Facility located at 901 N. Davidson Street in Charlotte houses STS Administration and Operations, Auxiliary Bus Operations, and Information Technology. The 194,000 square foot, FTA funded facility can support the operation of up to 200 buses.

CATS operates several transit centers, including the Charlotte Transportation Center located at 310 E. Trade Street in Charlotte. The Charlotte Transportation Center is the main connecting hub for CATS bus and rail routes. The bus side of the Transportation Center was a joint venture between the City of Charlotte and the Bank of America. The transit center's rail connection with the Lynx was funded by FTA. There are 26 additional facilities including, park and ride lots, stations and transit centers serving CATS customers.

## 2. Award and Project Activity

Below is a list of the City's open awards at the time of the review.

| <b>Award Number</b> | <b>Award Amount</b> | <b>Year Executed</b> | <b>Description</b>  |
|---------------------|---------------------|----------------------|---|
| NC-04-0018-00       | \$ 10,557,344       | 2010                 | FY2008/ 09 Bus - Charlotte Gateway Stn  |
| NC-04-0006-03       | \$ 11,326,917       | 2009                 | FY07 Bus Discretion & CGS TE and Const  |
| NC-90-X541-00       | \$ 17,193,080       | 2014                 | FY2013 Formula  |
| NC-90-X569-00       | \$ 16,779,047       | 2015                 | FY2014 Formula  |
| NC-2016-043-00      | \$ 18,205,206       | 2016                 | FFY2015 Formula   |
| NC-2017-009-00      | \$ 3,312,077        | 2017                 | FFY15 & FFY16 5337 State of Good Repair   |
| NC-2017-019-00      | \$ 17,254,083       | 2017                 | FFY 2016 5307 Formula   |
| NC-2017-030-00      | \$ 1,606,722        | 2017                 | FFY15 & FFY16 Section 5310 Enhanced Mobility of Seniors and Persons with Disabilities |

| <b>Award Number</b> | <b>Award Amount</b> | <b>Year Executed</b> | <b>Description</b>  |
|---------------------|---------------------|----------------------|---|
| NC-2016-018-02      | \$ 3,500,000        | 2017                 | FFY16 STP-DA Fare Box Replacement Project   |
| NC-2018-068-00      | \$ 17,508,348       | 2018                 | FFY 2017 (5307) Formula; CATS, Charlotte NC   |
| NC-2017-045-01      | \$3,452,759         | 2018                 | FFY14 & FFY17 5337 State of Good Repair   |
| NC-2019-004-00      | \$ 857,040          | 2019                 | FFY17 (5310) Enhanced Mobility of Seniors & Persons with Disabilities; Charlotte, NC  |
| NC-2018-049-00      | \$ 1,176,479        | 2018                 | FFY18 Bus and Bus Facilities  |
| NC-03-0082-08       | \$577,347,248       | 2019                 | FFGA - LYNX Blue Line Extension   |
| NC-2019-027-00      | \$ 920,000          | 2019                 | Pilot Program, Transit Oriented Development (TOD) Planning - LYNX Silver Line LRT; CATS: Charlotte, NC                      |
| NC-2020-030-00      | \$ 891,980          | 2020                 | 5310 Enhanced Mobility of Seniors and Persons with Disabilities; FFY 2018 Funds; CATS:                                      |
| NC-2019-050-00      | \$ 17,491,978       | 2019                 | 5307 & 5339 Multi-Source funding; Bus & Bus Facilities; CATS; Charlotte, NC   |
| NC-2021-041-00      | \$ 852,632          | 2021                 | FFY19 (5310) Enhanced Mobility of Seniors and Persons with Disabilities; CATS: City of Charlotte, NC                        |
| NC-2020-019-00      | \$ 112,000          | 2020                 | 5310 ICAM Pilot; C. W. Williams Community Health Center, Inc.: Purchase of Vehicles; CATS; Charlotte, NC                    |
| NC-2021-006-00      | \$ 3,723,712        | 2021                 | FFY2020 5339 Competitive, LO-NO; Charlotte Area Transit System (CATS) Inaugural Electric Bus Project; Charlotte, NC         |
| NC-2020-060-01      | \$ 23,826,191       | 2021                 | 5307, 5337 & 5339 Multi-Source Funding: Formula, State of Good Repair, and Bus & Bus Facilities   CATS; Charlotte, NC       |
| NC-2021-020-00      | \$ 56,080           | 2021                 | FY2020 Watch Out for CityLYNX! Be Streetcar Smart   |
| NC-2022-009-00      | \$ 11,122,146       | 2022                 | 5309 ARP CIG Act, CityLYNX Gold Line Phase II; CATS; Charlotte, NC  |
| NC-2022-008-00      | \$ 51,090,454       | 2022                 | Sec 5307 CRRSAA Silver Line Project Engineering & Vehicle Overhaul; Charlotte Area Transit System (CATS); Charlotte UZA, NC |
| NC-2022-010-00      | \$ 82,696,619       | 2022                 | Sec. 5307 ARP PM, Rail Vehicle Overhaul, & Operating Assistance; CATS, Charlotte UZA, NC                                    |
| NC-2016-001-02      | \$ 73,087,380       | 2022                 | CityLYNX Gold Line Phase 2  |
| NC-2020-031-03      | \$ 56,935,286       | 2022                 | FFY2020 Charlotte Area Transit System (5307) CARES Act Operating and Capital; Charlotte UZA, NC                             |

The City received Supplemental Funds for operating assistance in award numbers NC-2020-031 and NC-2022-010-00. This is not the City's first time receiving operating assistance from the FTA.

### **Projects Completed**

In the past few years, the City completed the following noteworthy projects:

- Opening of CityLYNX Streetcar Phase II in August 2021
  - The CityLYNX Goldline Phase II is a 2.5-mile extension of the original streetcar. The 4-mile-long streetcar line has 17 stops and connects the Historic West End through Center City Charlotte to the Elizabeth neighborhood.

### **Ongoing Projects**

The City is currently implementing the following noteworthy projects:

- Silverline Design
  - A 29-mile alignment that runs along US74 from the City of Belmont in Gaston County to the Charlotte Douglas International Airport and Center City Charlotte and then continues to the southeast connecting the Town of Matthews and Central Piedmont Community College (CPCC) Levine campus.
- Battery Electric Buses (BEB)
  - Charlotte City Council approved a pilot program and public-private partnership between CATS and eTransenergy, a subsidiary/affiliate of Duke Energy, to test the performance of BEB vehicles and accompanying charging infrastructure across the greater metro Charlotte area.
- Charlotte Gateway Station
  - The Charlotte Gateway Station (CGS) Project is a planned multi-modal transit center located in Center City Charlotte. The City of Charlotte and the North Carolina Department of Transportation (NCDOT) are partners in the phased implementation of this project which aims to improve both regional (Amtrak) passenger rail service and regional freight rail operations through the construction of track and bridge improvements. The project includes a future multi-modal passenger station facility, the completion of which will mark the return of Amtrak service to Uptown Charlotte, with supporting modal connections to CityLYNX GoldLine, regional bus connections and CATS local bus routes.
  - Design and engineering of the first phase of the Project is underway.

### **Future Projects**

The City plans to pursue the following noteworthy projects in the next three to five years:

- North Corridor Bus Rapid Transit (BRT)
  - The project aims to utilize the express lanes for significant transit mobility enhancements. The following improvements would be implemented as part of this phase of the project recommendations:

- All day service including nights and weekends;
  - Four new park and rides and two or three new express lane direct connects; and
  - Integrated BRT stations into mixed use developments that also incorporate emerging mobility technologies for first/last mile connections.
- Bus corridor Study (Envision my Ride)
    - As a continuation of the Envision My Ride (EMR) effort, the City began a Bus Priority study in 2021. This study will develop speed and reliability recommendations for the proposed EMR high frequency network.
    - The Bus Priority study will also add two additional tasks centered around the mobility hub program and first/last mile connectivity, along with a bus operation strategy for the main transit hub in Charlotte.

#### IV. Results of the Review

##### 1. Legal

**Basic Requirement:** The recipient must promptly notify the FTA of legal matters and additionally notify the U.S. Department of Transportation (US DOT) Office of Inspector General (OIG) of any instances relating to false claims under the False Claims Act or fraud. Recipients must comply with restrictions on lobbying requirements.

**Finding:** During this Triennial Review of the City, no deficiencies were found with the FTA requirements for Legal.

##### 2. Financial Management and Capacity

**Basic Requirement:** The recipient must have financial policies and procedures; an organizational structure that defines, assigns and delegates fiduciary authority; and financial management systems in place to manage, match, and charge only allowable costs to the award. The recipient must conduct required Single Audits, as required by 2 CFR part 200, and provide financial oversight of subrecipients.

**Finding:** During this Triennial Review of the City, deficiencies were found with the FTA requirements for Financial Management and Capacity.

The table below provides more details about the ECHO drawdowns reviewed.

| Award Number   | Financial Purpose Code | Transaction Date | Drawdown Amount | Deficiencies   |
|----------------|------------------------|------------------|-----------------|--|
| NC-03-0082-08  | 00                     | 11-Mar-21        | \$18,706,952    | • None   |
| NC-2020-060-01 | 00                     | 18-Mar-21        | \$7,177,809     | • None   |
| NC-2019-039-00 | 00                     | 12-Nov-19        | \$5,932,800     | • None   |
| NC-2016-001-01 | 00                     | 10-Aug-20        | \$4,118,519     | • None   |
| NC-2016-001-00 | 00                     | 10-Sep-19        | \$4,431,156     | • None   |
| NC-2018-076-01 | 00                     | 14-May-20        | \$3,562,915     | • None   |
| NC-2018-015-00 | 04                     | 18-Feb-19        | \$2,022,550     | • Errors documenting the dates of expenditures in supporting documentation |



| Award Number   | Financial Purpose Code | Transaction Date | Drawdown Amount | Deficiencies |
|----------------|------------------------|------------------|-----------------|--------------|
| NC-90-X569-00  | 00                     | 23-Sep-21        | \$325,949       | • None       |
| NC-2017-009-00 | 00                     | 12-Aug-19        | \$274,051       | • None       |
| NC-2020-031-01 | 04                     | 16-Nov-21        | \$13,825,274    | • None       |
| NC-2020-031-00 | 00                     | 30-Jun-21        | \$911,837       | • None       |

The City's award NC-2020-031 includes \$63,620,890 in FY2020 Section 5307 CARES Act funds and the award is still active as of the date of this review. The City has received FY2021 Section 5307 CRRSAA Act funds (NC-2022-008), FY2021 Section 5307 ARP Act funds (NC-2022-009 and NC-2022-010). No drawdowns had occurred on these awards at the time the ECHO sample was chosen.

Deficiency Description:

**F1-1: Lacking/missing required written financial management policies and procedures**

Recipients' financial procedures must include coverage of allowable costs in accordance with 2 CFR Part 200 Subpart E and cash management and payment in accordance with 2 CFR 200.305 Payment. The recipient provided various policies and procedures including project accounting, contract processing, journal entries, and grants management. The written procedures provided did not address allowable costs or cash management.

2 CFR Part 200.302 Financial management

*The financial management system of each non-Federal entity must provide for the following:*

*(4) Effective control over, and accountability for, all funds, property, and other assets. The non-Federal entity must adequately safeguard all assets and assure that they are used solely for authorized purposes.*

*(6) Written procedures to implement the requirements of §200.305 Payment.*

*(7) Written procedures for determining the allowability of costs in accordance with Subpart E—Cost Principles of this part and the terms and conditions of the Federal award.*

2 CFR Part 200.305 Payment

*(b) For non-Federal entities other than states, payment methods must minimize the time elapsing between the transfer of funds from the United States Treasury or the pass-through entity and the disbursement by the non-Federal entity whether the payment is made by electronic funds transfer, or issuance or redemption of checks, warrants, or payment by other means. See also*

*§200.302 Financial management paragraph (b)(6). Except as noted elsewhere in this part, Federal agencies must require recipients to use only OMB-approved standard government wide information collection requests to request payment.*

*2 CFR Part 200.403 Factors affecting allowability of costs*

*Except where otherwise authorized by statute, costs must meet the following general criteria in order to be allowable under Federal awards:*

- (a) Be necessary and reasonable for the performance of the Federal award and be allocable thereto under these principles.*
- (b) Conform to any limitations or exclusions set forth in these principles or in the Federal award as to types or amount of cost items.*
- (c) Be consistent with policies and procedures that apply uniformly to both federally-financed and other activities of the non-Federal entity.*
- (d) Be accorded consistent treatment. A cost may not be assigned to a Federal award as a direct cost if any other cost incurred for the same purpose in like circumstances has been allocated to the Federal award as an indirect cost.*
- (e) Be determined in accordance with generally accepted accounting principles (GAAP), except, for state and local governments and Indian tribes only, as otherwise provided for in this part.*
- (f) Not be included as a cost or used to meet cost sharing or matching requirements of any other federally-financed program in either the current or a prior period. See also §200.306 Cost sharing or matching paragraph (b).*
- (g) Be adequately documented. See also §§200.300 Statutory and national policy requirements through 200.309 Period of performance of this part.*
- (h) Cost must be incurred during the approved budget period. The Federal awarding agency is authorized, at its discretion, to waive prior written approvals to carry forward unobligated balances to subsequent budget periods pursuant to §200.308(e)(3).*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- Financial management policies and procedures for managing FTA award funds in compliance with Federal statutes, regulations, and the terms and conditions of the Federal award. This must include procedures for determining allowability of cost and timely distribution of funds.
- Documentation that it has trained appropriate staff on the new policies and procedures.

**F4-1: ECHO documentation deficient**

Recipients may only request necessary and eligible Federal funds through FTA's ECHO system. Drawdowns must be fully supported by backup documentation and the correct federal share must be drawn.

A drawdown from NC-2018-015 was made on February 18, 2019, including staff costs. The backup documentation initially provided by the recipient stated in several places that this drawdown covered staff costs for the period July 1, 2019, through December 31, 2019. This

indicated the drawdown had occurred prior to costs being incurred. The recipient stated the dates on the ECHO documentation are incorrect and provided a separate spreadsheet of payroll costs from 2018 to support the drawdown. The backup documentation that formed the CATS approved ECHO drawdown packet included errors that were not identified through the recipient's internal review.

The award NC-2019-027-00 Pilot Program for Transit Oriented Development (TOD) Planning includes in-kind contributions as part of the local share. This award was established at 57% Federal participation, 14% Local funding and 29% In-Kind match from local Commitment Partners (City of Charlotte and City of Gastonia as well as the Towns of Matthews, Stallings and Indian Trail, North Carolina). This award was not part of the ECHO drawdown sample but was discussed during the review interviews. During the interview the recipient provided documentation indicating that drawdowns had been made at an 80% federal and 20% local share. The City is currently gathering the documentation to support the in-kind contributions from its partners, but did not have documentation of the required in-kind contribution available at the time that drawdowns were made. The City does not have a practice to ensure the required in-kind local match has occurred at time of applicable drawdowns.

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- Procedures for documenting ECHO draws.
- The recipient must provide additional documentation relating to the ECHO draws identified and work with the FTA regional office to reimburse FTA for ineligible expenses charged to awards, if applicable.
- Documentation of training conducted of the appropriate staff on new policies and procedures.

### 3. Technical Capacity – Award Management

Basic Requirement: The recipient must report progress of projects in awards to the Federal Transit Administration (FTA) and close awards timely.

Finding: During this Triennial Review of the City, deficiencies were found with the FTA requirements for Technical Capacity – Award Management.

Deficiency Description:

**TC-AM4-1: POP Status Reports missing or lacking required information**

Designated recipients of Sections 5310 funds must submit Program of Projects (POP) Status Reports to FTA on the status of subrecipients' projects. Reports must include:

1. Updated POP for each approved award that contains active projects reflecting revised project descriptions, changes in projects from one category to another, and adjustments within budget categories.
2. Budget revisions for changes in line item budgets, if required by the regional office.
3. Significant civil rights compliance issues, such as legal action or litigation against the recipient or subrecipients under the Americans with Disabilities Act, Title VI of the Civil Rights Act of 1964, or Equal Employment Opportunity, or Disadvantaged Business Enterprise (DBE) requirements.
4. Notable accomplishments or problems involving subrecipients.

The NC-2017-030-00 application documents section of TrAMS shows submission of a FY18 Annual Program of Projects Status Report in December 12, 2018, but no reports were submitted in TrAMS since that date. The recipient stated that an updated POP is attached in TrAMS when updates are made but did not provide guidance about where the other information was reported.

FTA Circular 9070.1G, Chapter. VI, Section 23. Reporting Requirements

*a. Annual Program of Projects Status Reports. By October 31 each year, the state or designated recipient should submit to FTA a program status report for each active grant, covering the twelve-month period ending September 30. Designated recipients in large urbanized areas must submit quarterly status reports. The status reports should be submitted electronically and are intended to meet minimal program information needs at the regional and national levels. Reports should include an updated POP for each approved grant that contains active projects. The updated POP should reflect revised project descriptions, changes in projects from one category to another, and adjustments within budget categories, if applicable. The updated POP can be imported as text into the project summary section of the electronic status report.*

*If revisions to the POP result in changes to the line item budget for the grant, these changes should be submitted as budget revisions. Significant civil rights compliance issues occurring during the year (such as Title VI, Equal Employment Opportunity (EEO), or Disadvantaged Business Enterprise (DBE) complaints against the recipient or subrecipients), should be addressed in the annual status report. In addition, the recipient may report notable accomplishments or problems involving Section 5310 subrecipients.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- Procedures for submitting the reports with the required information at the required interval.
- Submit in TrAMS the POP Status Reports for the past year.
- Documentation of staff training.

**TC-AM5-1: Inactive award/untimely closeouts**

Awards that are more than three years old and have not had disbursement activity within the last 12 months are regarded as inactive. NC-2018-049-00 FFY18 Bus and Bus Facilities was awarded in September 2018 but had not had a drawdown at the time of this review. The recipient indicated that there was delay in the procurement process for paratransit and vanpool vehicles.

2 CFR 200.343 Closeout

*The Federal awarding agency or pass-through entity will close-out the Federal award when it determines that all applicable administrative actions and all required work of the Federal award have been completed by the non-Federal entity. This section specifies the actions the non-Federal entity and Federal awarding agency or pass-through entity must take to complete this process at the end of the period of performance.*

*(a) The non-Federal entity must submit, no later than 90 calendar days after the end date of the period of performance, all financial, performance, and other reports as required by the terms and conditions of the Federal award. The Federal awarding agency or pass-through entity may approve extensions when requested by the non-Federal entity*

FTA Circular 5010.1E, Chapter III: Administration of the Award

*5. AWARD CLOSEOUT. Closeout, in general, is the term used to signify the process by which the recipient and FTA agree that all activities approved for the Award have been completed and/or the federal assistance awarded has been expended for eligible costs. Recipients are required to close an Award 90 days after the end of the period of performance. FTA, or the recipient, may initiate the closeout process. Closeout, by either party, does not preclude FTA's ability to seek repayment or other remedies for a recipient's breach of the terms and conditions of the Grant or Cooperative Agreement.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- An award closeout plan.
- Updated procedures including a way of tracking the status of grants to ensure that they are not inactive.

4. Technical Capacity – Program Management & Subrecipient Oversight

Basic Requirement: States must document and follow a public involvement process for the development of the long-range statewide transportation plan and State Transportation Improvement Program (STIP). Designated recipients of Sections 5310, 5311, and 5339 funds must develop and submit a State Management/ Program Management Plan to the FTA for approval. Recipients must enter into an agreement with each subrecipient, obtain required certifications from subrecipients, report in the Federal Funding Accountability and Transparency Act Subaward Reporting System (FSRS) on subawards, and ensure subrecipients comply with the terms of the award.

Finding: During this Triennial Review of the City, deficiencies were found with the FTA requirements for Technical Capacity – Program Management & Subrecipient Oversight.

Deficiency Description:

**TC-PgM3-2: Written agreements missing required elements**

Recipients must enter into an agreement with each subrecipient. Agreements must state the terms and conditions of assistance and include information required by 2 CFR part 200 and FTA.

One subrecipient agreement was sampled. The FY2018 5310 agreement between the City and the subrecipient Iredell County was missing required elements, including:

- Federal award identification number (FAIN)
- Federal Award Date (of award to the recipient by the Federal agency)
- Assistance Listings number and Title.

The file name of the agreement indicated that it was fully executed, but the document had not been signed by a representative of the City of Charlotte.

2 CFR 200.332 Requirements for pass-through entities

*All pass-through entities must:*

*(a) Ensure that every subaward is clearly identified to the subrecipient as a subaward and includes the following information at the time of the subaward and if any of these data elements change, include the changes in subsequent subaward modification. When some of this information is not available, the pass-through entity must provide the best information available to describe the Federal award and subaward. Required information includes:*

*(1) Federal award identification.*

*(i) Subrecipient name (which must match the name associated with its unique entity identifier);*

*(ii) Subrecipient's unique entity identifier;*

*(iii) Federal Award Identification Number (FAIN);*

*(iv) Federal Award Date (see the definition of Federal award date in §200.1 of this part) of award to the recipient by the Federal agency;*

*(v) Subaward Period of Performance Start and End Date;*

*(vi) Subaward Budget Period Start and End Date;*

*(vii) Amount of Federal Funds Obligated by this action by the pass-through entity to the subrecipient;*

*(viii) Total Amount of Federal Funds Obligated to the subrecipient by the pass-through entity including the current financial obligation;*

*(ix) Total Amount of the Federal Award committed to the subrecipient by the pass-through entity;*

*(x) Federal award project description, as required to be responsive to the Federal Funding Accountability and Transparency Act (FFATA);*

- (xi) Name of Federal awarding agency, pass-through entity, and contact information for awarding official of the Pass-through entity;*
- (xii) Assistance Listings number and Title; the pass-through entity must identify the dollar amount made available under each Federal award and the Assistance Listings Number at time of disbursement;*
- (xiii) Identification of whether the award is R&D; and*
- (xiv) Indirect cost rate for the Federal award (including if the de minimis rate is charged) per §200.414.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- An amended subrecipient award document template that includes missing FTA requirements.
- The recipient must submit documentation to the regional office that the amended award document has been used in the next project application cycle.

#### **TC-PgM6-1: FFATA reporting deficiencies**

The Federal Funding Accountability and Transparency Act (FFATA) requires recipients to report subaward information to FSRS by the end of the month following the month in which the subaward was made.

FFATA reports were not submitted to FSRS for subrecipient awards during the review period. At the time of the review the recipient had drafted these reports but not submitted them. The City does not have a process in place to ensure FFATA reports are submitted timely.

*FTA Circular 5010.1E, Chapter III, Section 3.f Federal Funding Accountability and Transparency Act (FFATA) Subaward and Executive Compensation Reporting.*

*Recipients awarded new federal assistance greater than or equal to \$25,000 as of October 1, 2010, are subject to FFATA subaward and executive compensation reporting requirements as outlined in the Office of Management and Budget's guidance issued August 27, 2010. These recipients must file an FFATA subaward report by the end of the month following the month in which the recipient awards any subaward greater than or equal to \$25,000. Additionally, all recipients must report the names and compensation of their five most highly compensated officers, and first-tier subrecipients must report the names and compensation of their five most highly compensated officers, if in the preceding fiscal year they received 80 percent or more of their annual gross revenues in federal Awards; and \$25,000 or more in annual gross revenues from federal Awards; and the public does not have access to this information about the compensation of the senior executives of those recipients or subrecipients through periodic reports filed under Section 13(a) or 15(d) of the Securities Exchange Act of 1934, 15 U.S.C. § 78m(a), § 78o(d), or section 6104 of the Internal Revenue Code of 1986.*

*Instructions and the FFATA Subaward Reporting System (FSRS) can be found at: [www.fsrs.gov](http://www.fsrs.gov).*

*2 CFR 170 Appendix A to Part 170 - Award Term*

## *I. Reporting Subawards and Executive Compensation*

### *a. Reporting of first-tier subawards.*

*Applicability. Unless you are exempt as provided in paragraph d. of this award term, you must report each action that equals or exceeds \$30,000 in Federal funds for a subaward to a non-Federal entity or Federal agency (see definitions in paragraph e. of this award term).*

### *2. Where and when to report.*

*i. The non-Federal entity or Federal agency must report each obligating action described in paragraph a.1. of this award term to <http://www.fsrs.gov>.*

*ii. For subaward information, report no later than the end of the month following the month in which the obligation was made. (For example, if the obligation was made on November 7, 2010, the obligation must be reported by no later than December 31, 2010.)*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- Notification that all missing information has been reported to FSRS.
- Procedures for reporting future subawards to FSRS timely.

### **TC-PgM7-1: Inadequate oversight of subrecipients**

Recipients must 1) evaluate each subrecipient's risk of noncompliance with Federal statutes, regulations, and the terms and conditions of the subaward, and 2) develop a subrecipient monitoring program to ensure that the subaward is used for authorized purposes in compliance with Federal statutes, regulations, and the terms and conditions of the subaward, and that subaward performance goals are achieved.

The City has a detailed checklist that is completed during quarterly visits to its Section 5310 subrecipients. This checklist covers many FTA requirements, however oversight was lacking in several areas:

- There was no clear documentation of how subrecipient risk was evaluated during the application process or after subrecipient awards had been made.
- The list of subrecipient equipment did not include the Federal Award Information Number (FAIN) as required by 2 CFR 200.313 Equipment.
- Subrecipient Metrolina Association for the Blind (MAB) disposed of one vehicle in July and one in August 2021. Each sale was over \$5,000. The City indicated that the federal share was being held by the subrecipient to use on the next vehicle purchase, but there was no documentation of this. The City's process regarding disposal of subrecipient vehicles was not clear.
- MAB purchased a vehicle in 2021, but this vehicle procurement was not reported to FTA through the online Transit Vehicle Manufacturer (TVM) reporting form. During the interview, City staff were unsure if this vehicle met the requirement for reporting.



- During the review period the City provided Section 5307 funds to Iredell County. While there was documentation of oversight of the Iredell County Section 5310 projects, the City did not provide information about how oversight relating to Section 5307 funds occurred during the review period.

2 CFR 200.332 Requirement for pass-through entities

*All pass-through entities must:*

*(b) Evaluate each subrecipient's risk of noncompliance with Federal statutes, regulations, and the terms and conditions of the subaward for purposes of determining the appropriate subrecipient monitoring described in paragraphs (d) and (e) of this section, which may include consideration of such factors as:*

- (1) The subrecipient's prior experience with the same or similar subawards;*
- (2) The results of previous audits including whether or not the subrecipient receives a Single Audit in accordance with Subpart F of this part, and the extent to which the same or similar subaward has been audited as a major program;*
- (3) Whether the subrecipient has new personnel or new or substantially changed systems; and*
- (4) The extent and results of Federal awarding agency monitoring (e.g., if the subrecipient also receives Federal awards directly from a Federal awarding agency).*

*(c) Consider imposing specific subaward conditions upon a subrecipient if appropriate as described in §200.208.*

*(d) Monitor the activities of the subrecipient as necessary to ensure that the subaward is used for authorized purposes, in compliance with Federal statutes, regulations, and the terms and conditions of the subaward; and that subaward performance goals are achieved. Pass-through entity monitoring of the subrecipient must include:*

- (1) Reviewing financial and performance reports required by the pass-through entity.*
- (2) Following-up and ensuring that the subrecipient takes timely and appropriate action on all deficiencies pertaining to the Federal award provided to the subrecipient from the pass-through entity detected through audits, on-site reviews, and written confirmation from the subrecipient, highlighting the status of actions planned or taken to address Single Audit findings related to the particular subaward.*
- (3) Issuing a management decision for applicable audit findings pertaining only to the Federal award provided to the subrecipient from the pass-through entity as required by §200.521.*
- (4) The pass-through entity is responsible for resolving audit findings specifically related to the subaward and not responsible for resolving crosscutting findings. If a subrecipient*

*has a current Single Audit report posted in the Federal Audit Clearinghouse and has not otherwise been excluded from receipt of Federal funding (e.g., has been debarred or suspended), the pass-through entity may rely on the subrecipient's cognizant audit agency or cognizant oversight agency to perform audit follow-up and make management decisions related to cross-cutting findings in accordance with section §200.513(a)(3)(vii). Such reliance does not eliminate the responsibility of the pass-through entity to issue subawards that conform to agency and award-specific requirements, to manage risk through ongoing subaward monitoring, and to monitor the status of the findings that are specifically related to the subaward.*

*(e) Depending upon the pass-through entity's assessment of risk posed by the subrecipient (as described in paragraph (b) of this section), the following monitoring tools may be useful for the pass-through entity to ensure proper accountability and compliance with program requirements and achievement of performance goals:*

*(1) Providing subrecipients with training and technical assistance on program-related matters; and*

*(2) Performing on-site reviews of the subrecipient's program operations;*

*(3) Arranging for agreed-upon-procedures engagements as described in §200.425.*

*(f) Verify that every subrecipient is audited as required by Subpart F of this part when it is expected that the subrecipient's Federal awards expended during the respective fiscal year equaled or exceeded the threshold set forth in §200.501.*

*(g) Consider whether the results of the subrecipient's audits, on-site reviews, or other monitoring indicate conditions that necessitate adjustments to the pass-through entity's own records.*

*(h) Consider taking enforcement action against noncompliant subrecipients as described in §200.339 of this part and in program regulations.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- Procedures for evaluating subrecipient risk and a comprehensive program for monitoring subrecipients for compliance with Federal requirements.
- Updated review checklist that incorporates the areas identified during the review.
- Documentation of implementation.

## 5. Technical Capacity – Project Management

Basic Requirement: The recipient must be able to implement the Federal Transit Administration (FTA)-funded projects in accordance with the award application, the FTA Master Agreement, and applicable laws and regulations using sound management practices.

Finding: During this Triennial Review of the City, no deficiencies were found with the FTA requirements for Technical Capacity – Project Management.

## 6. Transit Asset Management

Basic Requirement: Recipients must comply with 49 CFR part 625 to ensure public transportation providers develop and implement transit asset management (TAM) plans.

Finding: During this Triennial Review of the City, one deficiency was found with the FTA requirements for Transit Asset Management.

### Deficiency Description:

#### **TAM6-3: Performance targets not approved by the accountable executive**

Recipient's must set annual performance targets to define the state of good repair goals in the following asset categories: equipment, rolling stock, infrastructure, and facilities. A recipient must set performance targets based on realistic expectations; up-to-date data; and financial resources from all sources that can be reasonably expected to be available during the TAM plan horizon period.

In interview, the recipient indicated that it establishes annual performance targets through the budget process, where the General Managers of the various CATS departments identify investment needs to maintain the level of service established in the TAM Plan. These budgets are reviewed by the budget committee and presented to the Accountable Executive (CATS Chief Executive Officer) for approval. The recipient provided evidence of annual performance target setting, but did not provide documentation that the Accountable Executive has approved the annual performance targets.

#### 49 CFR 625.45 Setting performance targets for capital assets

##### *(a) General.*

*(1) A provider must set one or more performance targets for each applicable performance measure.*

*(2) A provider must set a performance target based on realistic expectations, and both the most recent data available and the financial resources from all sources that the provider reasonably expects will be available during the TAM plan horizon period.*

##### *(b) Timeline for target setting.*

*(1) Within three months after the effective date of this part, a provider must set performance targets for the following fiscal year for each asset class included in its TAM plan.*

*(2) At least once every fiscal year after initial targets are set, a provider must set performance targets for the following fiscal year.*

*(c) Role of the accountable executive. A provider's Accountable Executive must approve each annual performance target.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- Evidence that the accountable executive approved the current year's performance targets

## 7. Satisfactory Continuing Control

Basic Requirement: The recipient must ensure that Federal Transit Administration (FTA)-funded property will remain available to be used for its originally authorized purpose throughout its useful life until disposition.

Finding: During this Triennial Review of the City, deficiencies were found with the FTA requirements for Satisfactory and Continuing Control.

Deficiency Description:

### **SCC8-3: Inadequate equipment records**

2 CFR 200.313 requires a recipient to maintain records of FTA funded equipment (over \$5,000 and one-year useful life) that includes specific information. The City's equipment records are missing the following required elements:

- Federal Award Information Number (FAIN)
- Federal Participation Percentage
- Useful Life

#### 2 CFR 200.313 Equipment

*(d) Management requirements. Procedures for managing equipment (including replacement equipment), whether acquired in whole or in part under a Federal award, until disposition takes place will, as a minimum, meet the following requirements:*

*(1) Property records must be maintained that include a description of the property, a serial number or other identification number, the source of funding for the property (including the FAIN), who holds title, the acquisition date, and cost of the property, percentage of Federal participation in the project costs for the Federal award under which the property was acquired, the location, use and condition of the property, and any ultimate disposition data including the date of disposal and sale price of the property.*

*(2) A physical inventory of the property must be taken and the results reconciled with the property records at least once every two years.*

*(3) A control system must be developed to ensure adequate safeguards to prevent loss, damage, or theft of the property. Any loss, damage, or theft must be investigated.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- Updated equipment records which include all of the required information.

### **SCC9-2: Non-permitted use of equipment disposal proceeds**

Equipment with a unit market value of \$5,000 or less that has reached the end of its useful life requires no FTA reimbursement. Equipment that has reached the end of its useful life and for which the unit market value exceeds \$5,000 requires reimbursement to FTA of the proportionate share of the fair market value or the net proceeds of the sale. Net proceeds are the amount realized from the sale of property no longer needed for transit purposes less allowable deductions for selling and handling expenses (i.e., the recipient may deduct and retain from the Federal share \$500 or ten percent of the proceeds, whichever is less, for its selling and handling expenses).

An Auction List 2018-2022 document was provided. This included several items that were disposed of after the end of their useful life, but with a market value greater than \$5,000. The City had not notified FTA of these disposals.

#### 2 CFR 200.313 Equipment

*(4) When acquiring replacement equipment, the non-Federal entity may use the equipment to be replaced as a trade-in or sell the property and use the proceeds to offset the cost of the replacement property....*

*(e) Disposition. When original or replacement equipment acquired under a Federal award is no longer needed for the original project or program or for other activities currently or previously supported by a Federal awarding agency, except as otherwise provided in Federal statutes, regulations, or Federal awarding agency disposition instructions, the non-Federal entity must request disposition instructions from the Federal awarding agency if required by the terms and conditions of the Federal award. Disposition of the equipment will be made as follows, in accordance with Federal awarding agency disposition instructions:*

*(1) Items of equipment with a current per unit fair market value of \$5,000 or less may be retained, sold, or otherwise disposed of with no further obligation to the Federal awarding agency.*

*(2) Except as provided in §200.312 Federally-owned and exempt property, paragraph (b), or if the Federal awarding agency fails to provide requested disposition instructions within 120 days, items of equipment with a current per-unit fair-market value in excess of \$5,000 may be retained by the non-Federal entity or sold. The Federal awarding agency is entitled to an amount calculated by multiplying the current market value or proceeds from sale by the Federal awarding agency's percentage of participation in the cost of the original purchase. If the equipment is sold, the Federal awarding agency may permit the non-Federal entity to deduct and retain from the Federal share \$500 or ten percent of the proceeds, whichever is less, for its selling and handling expenses.*

(3) *The non-Federal entity may transfer title to the property to the Federal Government or to an eligible third party provided that, in such cases, the non-Federal entity must be entitled to compensation for its attributable percentage of the current fair market value of the property.*

(4) *In cases where a non-Federal entity fails to take appropriate disposition actions, the Federal awarding agency may direct the non-Federal entity to take disposition actions.*

FTA Circular 5010.1E, Ch. IV, Section 4. Equipment and Supplies (Including Rolling Stock)

*o. Disposition of Equipment and Supplies. Disposition requirements apply to equipment that has met its useful life, as well as equipment that is prematurely withdrawn from service before its useful life has been ended. FTA retains financial interest in equipment with a unit value exceeding \$5000, and supplies with an aggregate value exceeding \$5000, even if useful life has been met.*

(4) *Disposition or Use of Assets for Other Than Purposes of the Award after the End of Their Useful Life.*

*(a) Retain and Use Elsewhere. After the minimum useful life of federally assisted property is reached or the property is no longer needed for the original Award, it may be used by the recipient for other transit projects or programs. FTA prior approval of this alternative is not required. FTA retains its interest in the federally assisted property if its fair market value exceeds \$5,000.*

*(b) Disposition of Property with a Fair Market Value of More Than \$5,000. After the useful life of federally assisted property is reached, or the property is no longer needed for the original Award, rolling stock and equipment with a current market value exceeding \$5,000 per unit, or unused supplies with a total aggregate fair market value of more than \$5,000, may be retained or sold. FTA is entitled to an amount calculated by multiplying the current market value, or proceeds from sale, by FTA's percentage of participation in the cost of the original purchase. Rolling stock and equipment that is sold may have the amount due FTA reduced by an amount of \$500 or ten percent of the proceeds, whichever is less, for its selling and handling expenses.*

*(c) Sell and Use the Proceeds for Other Capital Awards, 49 U.S.C. § 5334(h)(4). After the useful life is met, or the property is no longer needed, and with prior FTA approval, the recipient may sell its federally assisted property for which there is no longer any public transportation purposes and use the proceeds to reduce the gross project cost of other future FTA eligible capital transit Awards. The recipient is expected to record the receipt of the proceeds in the recipient's accounting system, showing that the funds are restricted for use in a future capital Award, and reduce the liability as the proceeds are applied to one or more FTA approved capital Awards. If new applications are not immediately anticipated, the recipient must inform the appropriate FTA contact of the disposition within a reasonable amount of time. Otherwise, the subsequent capital application should contain information showing FTA that the gross project cost has been reduced with proceeds from the earlier transaction. The proceeds cannot retroactively be applied to an existing Award or project unless the Award is still open.*

*(d) Disposition of Property with a Fair Market Value of \$5,000 or Less Value. After the useful life of its federally assisted property is reached, rolling stock and equipment with a unit market*

*value of \$5,000 or less, or supplies with a total aggregate market value of \$5,000 or less, may be retained, sold, or otherwise disposed of with no obligation to reimburse FTA. Records of this action must be retained. FTA approval of this action is not required.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- Reimbursement of FTA's share of proceeds from disposed property or obtain approval for retaining the proceeds to apply to another capital project.
- Procedures for reimbursing FTA for disposition proceeds or applying the proceeds to another capital project.

Subsequent to the virtual site visit, the City provided letters to FTA notifying them of a vehicle sold in 2021 and 6 vans disposed of in 2019 that had met their useful life and each had a market value of over \$5,000. The recipient must follow FTA's instruction following these letters and provide procedures for disposal of assets to close this finding.

## 8. Maintenance

Basic Requirement: Recipients must keep federally-funded vehicles, equipment, and facilities in good operating condition. Recipients must keep Americans with Disabilities Act (ADA) accessibility features on all vehicles, equipment, and facilities in good operating order.

Finding: During this Triennial Review of the City, one deficiency was found with the FTA requirements for Maintenance.

### Deficiency Description:

#### **M2-1: Late vehicle/vessel preventive maintenance**

Recipients must follow their maintenance program for FTA-funded assets to ensure FTA-funded assets are kept in good condition and good operating order.

A request was made for the 2021 preventive maintenance records for three light rail vehicles and three street cars. The vehicles requested for review were light rail vehicles 103, 204, and 312 and street cars SC91, SC92, and SC93. The recipient informed the review team that the street cars were out of service during this period because they are in the process of being disposed of. Light rail vehicle 103 was also out of service. Records of one preventive maintenance inspection were provided for each of the light rail vehicles 204 and 312, but it was not possible to determine the timeliness of inspections for these vehicles through this documentation. The City did not provide complete preventive maintenance records for the two sampled in-service light rail vehicles.

### 2 CFR 200.313, Equipment

*(b) General. A state must use, manage and dispose of equipment acquired under a Federal award by the state in accordance with state laws and procedures.*

FTA Circular 5010.1E, Ch. IV Management of the Award, Section 4. Equipment and Supplies (Including Rolling Stock)

*n. Management of Federally-Assisted Property*

*(4) Maintenance and Warranty*

- (a) Recipients must maintain federally-assisted property in good operating order and in compliance with any applicable Federal regulations that may be issued and follow applicable guidance that may be issued, except to the extent that FTA determines otherwise in writing.*
- (b) Recipients must keep satisfactory records pertaining to the use of federally-assisted property, and submit to FTA upon request such information as may be required to assure compliance with Federal requirements.*

Corrective Action and Schedule: By October 25, 2022, the City must submit to the FTA regional office:

- Procedures for completing preventive maintenance inspections on time.
- A monthly report signed by the chief executive officer or other senior management designee on preventive maintenance results until the data demonstrate the recipient has conducted 80 percent of its preventive maintenance on time for three consecutive months. For each light rail vehicle that received a preventive maintenance inspection during the month, the recipient must include with the submittal to the FTA regional office:
  - A report that lists the light rail vehicle number, date of the inspection, mileage of the current inspection, mileage of the previous inspection, and the mileage interval between the two inspections for each vehicle that received a preventive maintenance inspection during the month. List the percentage of the inspections performed on time.
  - Back-up documentation for each vehicle (e.g., copy of work order, printout from the maintenance management system) documenting the date and mileage of the inspection.

Subsequent to the virtual site visit, the City provided records of daily inspections on light rail vehicles 204 and 312. It was not possible to distinguish the daily inspections and preventive maintenance activities. The City must provide records of the preventive maintenance completed on these vehicles during 2021 or submit the corrective action to the FTA regional office.

9. Procurement

Basic Requirement: The non-Federal entity must use its own documented procurement procedures which reflect applicable State, local, and tribal laws and regulations, and conform to applicable Federal law and the standards identified in 2 CFR Part 200. State recipients can use the state's overall policies and procedures. When applied to Federal procurements, those policies and procedures must still be compliant with all Federal requirements as applied to non-



state recipients. The flexibility afforded by 2 CFR Part 200 should not be misconstrued as absolving a state from Federal requirements. For example, the FTA does not require each State DOT to have policies and procedures separate from the state education department.

Finding: During this Triennial Review of the City, deficiencies were found with the FTA requirements for Procurement.

Seven procurement files were reviewed. The table below provides more details about these procurements.

| <b>Contract/ Product</b>                                 | <b>Award Date</b> | <b>Method</b>      | <b>Amount</b> | <b>Deficiencies</b>  |
|--|-------------------|--------------------|---------------|--|
| CATS Bus Stop Improvements for FY19 and BLE Area         | 1/24/2019         | ITB                | \$199,413     | <ul style="list-style-type: none"> <li>• Missing clause</li> </ul>   |
| PHI Cells for CATS Fleet                                 | 9/21/2021         | Emergency Purchase | \$1,492,100   | <ul style="list-style-type: none"> <li>• Missing clauses</li> </ul>  |
| TOD Planning Service for LYNX Silver Line                | 10/21/2019        | RFQ                | \$1,150,000   | <ul style="list-style-type: none"> <li>• Missing clause</li> <li>• Lacking price analysis</li> </ul>   |
| Streetcar Gold Line Fare Collection Equipment            | 10/26/2020        | Sole Source        | \$307,155     | <ul style="list-style-type: none"> <li>• Missing clauses</li> </ul>  |
| Electric Bus Charging Station and Vehicle Sale Agreement | 7/23/2021         | RFP                | \$23,153,953  | <ul style="list-style-type: none"> <li>• Missing clauses</li> <li>• Lacking price analysis</li> <li>• Lacking Buy America certification</li> <li>• Lacking lobbying certification</li> <li>• Pre-award and post-delivery certifications not provided</li> <li>• Altoona Testing Report not provided</li> </ul> |
| S-70 Rail Car Truck Overhaul Services                    | 7/29/2020         | RFP                | 12,923,365    | <ul style="list-style-type: none"> <li>• Missing clause</li> <li>• Lacking price analysis</li> </ul>   |
| 03: Civil - Segments B and C 1400983 CO#00288            | 2/25/2019         | Change order       | \$431,686.72  | <ul style="list-style-type: none"> <li>• None</li> </ul>   |

Deficiency Description:

## **P11-1: Missing FTA clauses**

Recipients are required to include specific required clauses in FTA-funded procurements. The CATS Procurement Manual (revised 2015) and clause templates do not include clauses relating to 'Notice to FTA and U.S. DOT Inspector General of information related to fraud, waste, abuse, or other legal matters' and 'Prohibition on certain telecommunications and video surveillance services or equipment'. These clauses were missing from the applicable procurements reviewed.

### FTA Master Agreement (25), Section 16.d.

*Required Clauses in Third Party Contracts. In addition to other applicable provisions of federal law, regulations, requirements, and guidance, all third party contracts made by the Recipient under the Federal award must contain applicable provisions.*

### FTA Master Agreement, Section 39(b)

*If a current or prospective legal matter that may affect the Federal Government emerges, the Recipient must promptly notify the FTA Chief Counsel and FTA Regional Counsel for the Region in which the Recipient is located. The Recipient must include a similar notification requirement in its Third-Party Agreements and must require each Third-Party Participant to include an equivalent provision in its subagreements at every tier, for any agreement that is a "covered transaction" according to 2 C.F.R. §§180.220 and 1200.220.*

### 2 CFR 200.216 Prohibition on certain telecommunications and video surveillance services or equipment.

*(a) Recipients and subrecipients are prohibited from obligating or expending loan or grant funds to:*

- (1) Procure or obtain;*
- (2) Extend or renew a contract to procure or obtain; or*
- (3) Enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in Public Law 115-232, section 889, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).*

*(i) For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).*

*(ii) Telecommunications or video surveillance services provided by such entities or using such equipment.*

*(iii) Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.*

*(b) In implementing the prohibition under Public Law 115-232, section 889, subsection (f), paragraph (1), heads of executive agencies administering loan, grant, or subsidy programs shall*

*prioritize available funding and technical support to assist affected businesses, institutions and organizations as is reasonably necessary for those affected entities to transition from covered communications equipment and services, to procure replacement equipment and services, and to ensure that communications service to users and customers is sustained.*

**Corrective Action and Schedule:** By September 26, 2022, the City must submit to the FTA regional office:

- Revised procurement procedures that address inclusion of all FTA-required third-party contract clauses through use of a clause checklist or other mechanism.
- For the next procurement, submit documentation that the required process was implemented.
- Documentation of staff training.

**P10-2: Lacking required cost or price analysis**

A cost or price analysis must be completed prior to receiving bids or proposals for each procurement over the Federal Simplified Acquisition Threshold.

In three procurements reviewed the recipient compared the awarded bid to the Independent Cost Estimate (ICE), but did not provide a price analysis that compared all the prices of the vendors that bid/proposed. These procurements included price as an evaluation factor, but this was scored by the individual evaluation panel members rather than separate from the technical evaluation. These three procurements did not include a documented price analysis.

**2 CFR 200.324 Contract cost and price**

*(a) The non-Federal entity must perform a cost or price analysis in connection with every procurement action in excess of the Simplified Acquisition Threshold including contract modifications. The method and degree of analysis is dependent on the facts surrounding the particular procurement situation, but as a starting point, the non-Federal entity must make independent estimates before receiving bids or proposals.*

*(b) The non-Federal entity must negotiate profit as a separate element of the price for each contract in which there is no price competition and in all cases where cost analysis is performed. To establish a fair and reasonable profit, consideration must be given to the complexity of the work to be performed, the risk borne by the contractor, the contractor's investment, the amount of subcontracting, the quality of its record of past performance, and industry profit rates in the surrounding geographical area for similar work.*

*(c) Costs or prices based on estimated costs for contracts under the Federal award are allowable only to the extent that costs incurred or cost estimates included in negotiated prices would be allowable for the non-Federal entity under subpart E of this part. The non-Federal entity may reference its own cost principles that comply with the Federal cost principles.*

*(d) The cost plus a percentage of cost and percentage of construction cost methods of contracting must not be used.*

FTA Circular 4220.1F Chapter VI 6. b. Price Analysis

*If the recipient determines that competition was adequate, a price analysis, rather than a cost analysis, is required to determine the reasonableness of the proposed contract price.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- Documentation that it has updated its procurement procedures to include performing applicable cost or price analysis for procurements above the Federal Simplified Acquisition Threshold, including development of a checklist.
- For the next applicable procurement, submit to FTA regional office documentation that the required analysis was implemented.
- Documentation of staff training.

**P12-2: Lobbying certifications not included in procurement solicitations or signed by bidders**

A lobbying certification must be obtained from contractors that are awarded contracts that exceed \$100,000. No lobbying certification was provided relating to the Electric Bus Charging Station and Vehicle Agreement.

Appendix II to Part 200—Contract Provisions for Non-Federal Entity Contracts Under Federal Awards. (I) Byrd Anti-Lobbying Amendment (31 U.S.C. 1352)

*Contractors that apply or bid for an award exceeding \$100,000 must file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the non-Federal award.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- A copy of the lobbying certification for the Electric Bus Charging Station and Vehicle Agreement.
- Procedures for obtaining signed lobbying certifications.
- Documentation of staff training.
- For the next applicable procurement, submit to FTA regional office a copy of the signed lobbying certification.

Subsequent to the virtual site visit, the City provided a signed lobbying certification for the Electric Bus Charging Station and Vehicle Agreement, signed May 25, 2022. The recipient must

provide updated procedures, evidence of staff training, and a copy of the lobbying certification for the next applicable procurement to close this finding.

**P12-4: Contract files lacking signed Buy America certifications**

For all purchases of steel, iron, and manufactured products greater than \$150,000 inclusive of labor and options, a signed Buy America certification must be received from vendors as part of the vendor's bid or proposal. The Electric Bus Charging Station and Vehicle solicitation document included a brief reference to Buy America compliance and the Agreement included a clause relating to Buy America, but no certification from the vendor was provided.

49 CFR 661.6

*Certification requirements for procurement of steel or manufactured products. If steel, iron, or manufactured products (as defined in §§661.3 and 661.5 of this part) are being procured, the appropriate certificate as set forth below shall be completed and submitted by each bidder or offeror in accordance with the requirement contained in §661.13(b) of this part.*

49 CFR 661.12

*Certification requirement for procurement of buses, other rolling stock and associated equipment. If buses or other rolling stock (including train control, communication, and traction power equipment) are being procured, the appropriate certificate as set forth below shall be completed and submitted by each bidder in accordance with the requirement contained in §661.13(b) of this part.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- For the Electric Bus Charging Station and Vehicle Agreement, documentation that the agreement complies with the Buy America provisions.
- Revised procurement procedures that require the recipient to obtain signed certifications from vendors when procuring steel, iron, or manufactured products not subject to a general waiver.
- For the next applicable procurement, submit documentation that the required process was implemented.

Subsequent to the virtual site visit, the City provided a Buy America certification completed by the Electric Bus Charging Station and Vehicle Agreement vendor, signed May 25, 2022. The recipient must provide updated procedures and documentation showing implementation in the next applicable procurement to close this finding.

**P19-2: Missing documentation of bus model testing**

The recipient must have in its possession a copy of the Altoona Bus Testing Report before final acceptance of the first vehicle. The Electric Bus Charging Station and Vehicle Agreement has involved delivery of vehicles from Gillig and New Flyer. The Altoona Bus Testing Reports for these vehicles was not provided.

49 CFR 665.7 Certification of compliance

*(a) In each application to FTA for the purchase or lease of any new bus model, or any bus model with a major change in configuration or components to be acquired or leased with funds obligated by the FTA, the recipient shall certify that the bus was tested at the Bus Testing Facility and that the bus received a passing test score as required in this part. The recipient shall receive the appropriate full Bus Testing Report and any applicable partial testing report(s) before final acceptance of the first vehicle.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- The Altoona Bus Test Report for the specific makes/models purchased
- Procedures for obtaining the report for future bus purchases.

**P20-3: Pre-award and/or post-delivery certifications lacking**

A recipient purchasing revenue service rolling stock with Federal funds must conduct pre-award and post-delivery audits verifying compliance with Buy America provisions, purchaser's requirements, and FMVSS. The recipient is required to keep records, including pre-award and post-delivery certifications, which show that the regulations have been followed. The audits require the recipient to complete two certifications (Buy America and Purchaser's Requirements) at the pre-award stage and three certifications (Buy America, Purchaser's Requirements, and FMVSS) at the post-delivery stage.

No pre-award or post-delivery certifications were provided for the Gillig and New Flyer buses purchased under the Electric Bus Charging Station and Vehicle Agreement.

49 CFR 663 Pre-award and Post-delivery Audits of Rolling Stock Purchases "Subpart B—Pre-Award Audits"

49 CFR 663.21 Pre-award audit requirements

*A recipient purchasing revenue service rolling stock with FTA funds must ensure that a pre-award audit under this part is complete before the recipient enters into a formal contract for the purchase of such rolling stock.*

49 CFR 663.23 Description of pre-award audit

*A pre-award audit under this part includes—(a) A Buy America certification as described in §663.25 of this part; (b) A purchaser's requirements certification as described in §663.27 of this part; and (c) Where appropriate, a manufacturer's Federal Motor Vehicle Safety Standards certification information as described in §663.41 or §663.43 of this part.*

49 CFR 663.25 Pre-award Buy America certification

*For purposes of this part, a pre-award Buy America certification is a certification that the recipient keeps on file that—(a) There is a letter from FTA which grants a waiver to the rolling*

stock to be purchased from the Buy America requirements under section 165(b)(1), (b)(2), or (b)(4) of the Surface Transportation Assistance Act of 1982, as amended; or (b) The recipient is satisfied that the rolling stock to be purchased meets the requirements of section 165(a) or (b)(3) of the Surface Transportation Assistance Act of 1982, as amended, after having reviewed itself or through an audit prepared by someone other than the manufacturer or its agent documentation provided by the manufacturer which lists—(1) Component and subcomponent parts of the rolling stock to be purchased identified by manufacturer of the parts, their country of origin and costs; and (2) The location of the final assembly point for the rolling stock, including a description of the activities that will take place at the final assembly point and the cost of final assembly.

#### 49 CFR 663.27 Pre-award purchaser's requirements certification

For purposes of this part, a pre-award purchaser's requirements certification is a certification a recipient keeps on file that— (a) The rolling stock the recipient is contracting for is the same product described in the purchaser's solicitation specification; and (b) The proposed manufacturer is a responsible manufacturer with the capability to produce a vehicle that meets the recipient's specification set forth in the recipient's solicitation. Subpart C—Post-Delivery Audits

#### 49 CFR 663.31 Post-delivery audit requirements

A recipient purchasing revenue service rolling stock with FTA funds must ensure that a post-delivery audit under this part is complete before title to the rolling stock is transferred to the recipient.

#### 49 CFR 663.33 Description of post-delivery audit

A post-delivery audit under this part includes—(a) A post-delivery Buy America certification as described in §663.35 of this part; (b) A post-delivery purchaser's requirements certification as described in §663.37 of this part; and (c) When appropriate, a manufacturer's Federal Motor Vehicle Safety Standards self-certification information as described in §663.41 or §663.43 of this part.

#### 49 CFR 663.35 Post-delivery Buy America certification

For purposes of this part, a post-delivery Buy America certification is a certification that the recipient keeps on file that—(a) There is a letter from FTA which grants a waiver to the rolling stock received from the Buy America requirements under sections 165 (b)(1), or (b)(4) of the Surface Transportation Assistance Act of 1982, as amended; or (b) The recipient is satisfied that the rolling stock received meets the requirements of section 165 (a) or (b)(3) of the Surface Transportation Assistance Act of 1982, as amended, after having reviewed itself or by means of an audit prepared by someone other than the manufacturer or its agent documentation provided by the manufacturer which lists—(1) Components and subcomponent parts of the rolling stock identified by manufacturer of the parts, their country of origin and costs; and (2) The actual location of the final assembly point for the rolling stock including a description of the activities which took place at the final assembly point and the cost of the final assembly.

#### 49 CFR 663.37 Post-delivery purchaser's requirements certification

*For purposes of this part, a post-delivery purchaser's requirements certification is a certification that the recipient keeps on file that—(a) Except for procurements covered under paragraph (c) in this section, a resident inspector (other than an agent or employee of the manufacturer) was at the manufacturing site throughout the period of manufacture of the rolling stock to be purchased and monitored and completed a report on the manufacture of such rolling stock. Such a report, at a minimum, shall—(1) Provide accurate records of all vehicle construction activities; and (2) Address how the construction and operation of the vehicles fulfills the contract specifications. (b) After reviewing the report required under paragraph (a) of this section, and visually inspecting and road testing the delivered vehicles, the vehicles meet the contract specifications. (c) For procurements of: (1) Ten or fewer buses; or (2) Procurements of twenty vehicles or fewer serving rural (other than urbanized) areas, or urbanized areas of 200,000 people or fewer; or (3) Any number of primary manufacturer standard production and unmodified vans, after visually inspecting and road testing the vehicles, the vehicles meet the contract specifications.*

49 CFR 663.39 Post-delivery audit review

*(a) If a recipient cannot complete a post-delivery audit because the recipient or its agent cannot certify Buy America compliance or that the rolling stock meets the purchaser's requirements specified in the contract, the rolling stock may be rejected and final acceptance by the recipient will not be required. The recipient may exercise any legal rights it has under the contract or at law. (b) This provision does not preclude the recipient and manufacturer from agreeing to a conditional acceptance of rolling stock pending manufacturer's correction of deviations within a reasonable period. Subpart D—Certification of Compliance with or Inapplicability of Federal Motor Vehicle Safety Standards.*

49 CFR 663.41 Certification of compliance with Federal motor vehicle safety standards

*If a vehicle purchased under this part is subject to the Federal Motor Vehicle Safety Standards issued by the National Highway Traffic Safety Administration in part 571 of this title, a recipient shall keep on file its certification that it received, both at the pre-award and post-delivery stage, a copy of the manufacturer's self-certification information that the vehicle complies with relevant Federal Motor Vehicle Safety Standards.*

49 CFR 663.43 Certification that Federal motor vehicle standards do not apply

*(a) Except for rolling stock subject to paragraph (b) of this section, if a vehicle purchased under this part is not subject to the Federal Motor Vehicle Safety Standards issued by the National Highway Traffic Safety Administration in part 571 of this title, the recipient shall keep on file its certification that it received a statement to that effect from the manufacturer. (b) This subpart shall not apply to rolling stock that is not a motor vehicle.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- The certifications and documentation for the procurement reviewed.
- Procedures for completing the applicable pre-award and post-delivery audits and certifications for future revenue rolling stock procurements.



Subsequent to the virtual site visit, the City provided pre-award and post-delivery certifications for the applicable Gillig and New Flyer vehicles. These had been completed prior to the review but had not been submitted to the review team prior to the Triennial Review exit conference. This finding is closed.

10. Disadvantaged Business Enterprise (DBE)

Basic Requirement: Recipients must comply with 49 CFR Part 26 to ensure nondiscrimination in the award and administration of US Department of Transportation (US DOT)-assisted contracts. Recipients also must create a level playing field on which DBEs can compete fairly for US DOT-assisted contracts.

Finding: During this Triennial Review of the City, no deficiencies were found with the US DOT requirements for DBE.

11. Title VI

Basic Requirement: The recipient must ensure that no person shall, on the grounds of race, color, or national origin, be excluded from participating in, or be denied the benefits of, or be subject to discrimination under any program or activity receiving Federal financial assistance without regard to whether specific projects or services are federally funded. The recipient must ensure that all transit services and related benefits are distributed in an equitable manner.

Finding: During this Triennial Review of the City, deficiencies were found with the FTA requirements for Title VI.

Deficiency Description:

**TVI8-1: Impact of fare and/or service changes not adequately examined**

If the recipient is a transit provider that operates 50 or more fixed-route vehicles in peak service and is located in an Urbanized Area (UZA) of 200,000 or more in population, it must evaluate fare and major service changes and monitor transit service. An equity analysis must be completed for any major service change that lasts more than 12 months. The recipient has initiated the equity analysis and public involvement process relating to service changes because of COVID-19, but this has not been completed.

FTA Circular 4702.1B Chapter IV 7. Requirement to Evaluate Service and Fare Changes

*This requirement applies only to transit providers that operate 50 or more fixed route vehicles in peak service and are located in a UZA of 200,000 or more in population or that otherwise meet the threshold in the Introduction section of this chapter. These transit providers are required to prepare and submit service and fare equity analyses as described below. Transit providers not subject to this requirement are responsible for complying with the DOT Title VI regulations which prohibit disparate impact discrimination, and therefore should review their policies and practices to ensure their service and fare changes do not result in disparate impacts on the basis*

*of race, color, or national origin. To further ensure compliance with 49 CFR Section 21.5(b)(2), 49 CFR Section 21.5(b)(7), and Appendix C to 49 CFR part 21, all providers of public transportation to which this Section applies shall develop written procedures consistent with this Section to evaluate, prior to implementation, any and all service changes that exceed the transit provider's major service change threshold, as well as all fare changes, to determine whether those changes will have a discriminatory impact based on race, color, or national origin. The written procedures and results of service and/or fare equity analyses shall be included in the transit provider's Title VI Program.*

*FTA Frequently Asked Questions from FTA Grantees Regarding Coronavirus Disease 2019 (COVID-19), CR2*

*Under FTA's Title VI Circular 4702.1B, transit providers that operate 50-or-more fixed route vehicles in peak service and are located in an urbanized area (UZA) with a population of 200,000 or more, must perform a service equity analysis whenever they make a major service change. The service equity analysis evaluates the impacts of the proposed service changes on Title VI-protected populations and low-income populations. Temporary service changes in response to an emergency do not rise to the level of a major service change, so a service equity analysis is not required. Similarly, FTA exempts all temporary fare changes enacted as a result of an emergency from the fare equity analysis requirement. However, if a transit agency chooses to make permanent any changes made during an emergency, or if changes last longer than 12 months (service) or 6 months (fare), then the transit agency must perform a service or fare equity analysis.*

*Corrective Action and Schedule:* By September 26, 2022, the City must submit to the FTA regional office and Regional Civil Rights Officer (RCRO):

- An equity analysis for the major service changes implemented due to COVID-19.
- Revised procedures implemented to ensure that future equity analyses will be conducted as required.

**TVI6-2: Insufficient oversight of subrecipients' Title VI programs**

A recipient is responsible for ensuring that its subrecipients comply with Title VI requirements. A Title VI notice should include the following three elements:

- A statement that the agency operates programs without regard to race, color, or national origin,
- A description of the procedures that members of the public should follow in order to request additional information on the recipient's Title VI obligations, and
- A description of the procedures that members of the public shall follow in order to file a Title VI discrimination complaint against the recipient.

The recipient's quarterly site visit checklist includes oversight of some Title VI program requirements. One subrecipient was sampled during the Triennial Review. The subrecipient's Title VI program and publicly available Title VI notice included more discrimination areas than

just the required Title VI elements: race, color, and national origin. The recipient did not provide adequate oversight of the Title VI program for this sampled subrecipient.

FTA Circular 4702.1B Chapter III 12. Monitoring Subrecipients

*In accordance with 49 CFR 21.9(b), and to ensure that subrecipients are complying with the DOT Title VI regulations, primary recipients must monitor their subrecipients for compliance with the regulations. Importantly, if a subrecipient is not in compliance with Title VI requirements, then the primary recipient is also not in compliance. a. In order to ensure the primary and subrecipient are in compliance with Title VI requirements, the primary recipient shall undertake the following activities: (1) Document its process for ensuring that all subrecipients are complying with the general reporting requirements of this circular, as well as other requirements that apply to the subrecipient based on the type of entity and the number of fixed route vehicles it operates in peak service if a transit provider. (2) Collect Title VI Programs from subrecipients and review programs for compliance. Collection and storage of subrecipient Title VI Programs may be electronic at the option of the primary recipient. b. When a subrecipient is also a direct recipient of FTA funds, the entity reports directly to FTA and the primary recipient is not responsible for monitoring compliance of that subrecipient. The supplemental agreement signed by both entities in their roles as designated recipient and direct recipient relieves the primary recipient/designated recipient of this oversight responsibility [with a special caveat for MPOs receiving planning funds through State DOTs as discussed in Chapter VI.3].*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office and RCRO:

- A schedule for, and description of, oversight monitoring for subrecipients' implementation of Title VI requirements
- Evidence of its implementation.

12. Americans with Disabilities Act (ADA) – General

Basic Requirement: Titles II and III of the Americans with Disabilities Act of 1990 provide that no entity shall discriminate against an individual with a disability in connection with the provision of transportation service. The law sets forth specific requirements for vehicle and facility accessibility and the provision of service, including complementary paratransit service.

Finding: During this Triennial Review of the City, no deficiencies were found with the US DOT requirements for ADA – General.

13. ADA – Complementary Paratransit

Basic Requirement: Under 49 CFR 37.121(a), each public entity operating a fixed-route system shall provide paratransit or other special service to individuals with disabilities that is comparable to the level of service provided to individuals without disabilities who use the fixed-route system. “Comparability” is determined by 49 CFR 37.123-37.133. Requirements for

complementary paratransit do not apply to commuter bus, commuter rail, or intercity rail systems.

Finding: During this Triennial Review of the City, no deficiencies were found with US DOT requirements for ADA – Complementary Paratransit.

#### 14. Equal Employment Opportunity

Basic Requirement: The recipient must ensure that no person in the United States shall on the grounds of race, color, religion, national origin, sex, age or disability be excluded from participating in, or denied the benefits of, or be subject to discrimination in employment under any project, program or activity receiving Federal financial assistance under the Federal transit laws.

Finding: During this Triennial Review of the City, no deficiencies were found with the FTA requirements for Equal Employment Opportunity.

#### 15. School Bus

Basic Requirement: Recipients are prohibited from providing school bus service in competition with private school bus operators unless the service qualifies and is approved by the Federal Transit Administration (FTA) Administrator under an allowable exemption. Federally-funded equipment or facilities cannot be used to provide exclusive school bus service.

Finding: During this Triennial Review of the City, no deficiencies were found with the FTA requirements for School Bus.

#### 16. Charter Bus

Basic Requirement: Recipients are prohibited from using the FTA-funded equipment and facilities to provide charter service that unfairly competes with private charter operators. Recipient may operate charter only when the service meets a specified exception defined in rule.

Finding: During this Triennial Review of the City, no deficiencies were found with the FTA requirements for Charter Bus.

#### 17. Drug Free Workplace Act

Basic Requirement: Recipients are required to maintain a drug free workplace for all award-related employees; report any convictions occurring in the workplace timely; and have an ongoing drug free awareness program.

Finding: During this Triennial Review of the City, no deficiencies were found with the FTA requirements for Drug-Free Workplace Act.

## 18. Drug and Alcohol Program

Basic Requirement: Recipients receiving Section 5307, 5309, 5311, or 5339 funds that have safety-sensitive employees must have a drug and alcohol testing program in place for such employees.

Finding: During this Triennial Review of the City, deficiencies were found with the FTA requirements for Drug and Alcohol Program.

### Deficiency Description:

#### **DA2-1: Employee training not provided/insufficient**

Recipients are required to provide at least 60 minutes of training for covered safety sensitive employees on the effects and consequences of prohibited drug use.

The City stated that new hires receive one hour of awareness/training during new hire orientation and awareness training of Substance Abuse Policy and the Employee Assistance Program (EAP). A sample of three safety sensitive employees was chosen. No documentation was provided that these employees received drug training as required by 49 CFR 655.14. No example training materials were provided.

#### 49 CFR 655.14 Education and training programs

*Each employer shall establish an employee education and training program for all covered employees, including:*

*(b) Training— (1) Covered employees. Covered employees must receive at least 60 minutes of training on the effects and consequences of prohibited drug use on personal health, safety, and the work environment, and on the signs and symptoms that may indicate prohibited drug use.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- Documentation that covered employees placed in safety-sensitive positions within the past two years have received at least 60 minutes of training on the effects and consequences of prohibited drug use on personal health, safety, and the work environment, and on the signs and symptoms that may indicate prohibited drug use,
- Procedures for ensuring covered employees receive the training.

#### **DA2-2: Supervisor training not provided/insufficient**

Recipients are required to provide at least 120 minutes of training for supervisors and other officers authorized by the employer to make reasonable suspicion determinations. Training must cover at least 60 minutes on the physical, behavioral, and performance indicators of probable drug use and 60 minutes on the physical, behavioral, speech, and performance indicators of probable alcohol misuse.

A sample of two supervisors was chosen. No documentation was provided that these employees received the drug and alcohol training required by 49 CFR 655.14. No example training materials were provided.

49 CFR 655.14 Education and training programs

*Each employer shall establish an employee education and training program for all covered employees, including:*

*(b) Training - (2) Supervisors. Supervisors and/or other company officers authorized by the employer to make reasonable suspicion determinations shall receive at least 60 minutes of training on the physical, behavioral, and performance indicators of probable drug use and at least 60 minutes of training on the physical, behavioral, speech, and performance indicators of probable alcohol misuse.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- Documentation that supervisors and other officials designated within the past two years to make reasonable suspicion determinations have received the required training.
- Procedures for ensuring covered employees receive the training.

**DA3-1: Deficiencies in process of checking previous drug and alcohol testing records**

Recipients must attempt to obtain previous drug and alcohol testing program records from applicable prior employers for employees performing safety-sensitive functions. The recipient must not allow employees to perform safety-sensitive functions for more than 30 days, before obtaining, or making a good faith effort to obtain, the drug and alcohol information from prior employers.

During the interview the recipient stated that they do not have a process in place to request this information from prior employers. No documentation was provided of this process being implemented.

49 CFR 40.25 Must an employer check on the drug and alcohol testing record of employees it is intending to use to perform safety-sensitive duties?

*(a) Yes, as an employer, you must, after obtaining an employee's written consent, request the information about the employee listed in paragraph (b) of this section. This requirement applies only to employees seeking to begin performing safety-sensitive duties for you for the first time (i.e., a new hire, transfers into a safety-sensitive position). If the employee refuses to provide this written consent, you must not permit the employee to perform safety-sensitive functions.*

*(d) If feasible, you must obtain and review this information before the employee first performs safety-sensitive functions. If this is not feasible, you must obtain and review the information as soon as possible. However, you must not permit the employee to perform safety-sensitive functions after 30 days from the date on which the employee first performed safety-sensitive*

*functions, unless you have obtained or made and documented a good faith effort to obtain this information.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- A process for ensuring that the previous drug and alcohol testing records for employees are reviewed, and/or demonstrate a process for documenting the recipient's good faith efforts to obtain the records, before allowing employees to perform safety-sensitive functions for more than 30 days.

**DA5-1: Insufficient oversight over drug & alcohol programs of subrecipients, contractors, subcontractors, and/or lessees**

A recipient must ensure that subrecipients, contractors, subcontractors, and lessees with safety-sensitive employees who receive 49 U.S.C. 5307, 5309, 5311, or 5339 funds directly from the recipient administer their drug and alcohol programs in accordance with the requirement in 49 CFR parts 40 and 655. Certificates of service agents that support the drug and alcohol testing program must be in date.

Certificates of the service agents that support the operating contractor's drug and alcohol testing program were requested, including Medical Review Officer (MRO), Substance Abuse Professionals (SAP), Breath Alcohol Technicians (BAT) and Collectors. The recipient indicated that their contractor uses the same MRO as the City. The other applicable certificates were not provided. The City does not have a process in place to request and review the certificates of service agents that support their contractor's drug and alcohol testing program.

49 CFR 655.81 Grantee oversight responsibility

*A recipient shall ensure that a subrecipient or contractor who receives 49 U.S.C. 5307, 5309, or 5311 funds directly from the recipient complies with this part.*

Corrective Action and Schedule: By September 26, 2022, the City must submit to the FTA regional office:

- The qualifications of the substance abuse professionals, breath alcohol technicians, and collectors that support the program of its operating contractor
- Procedures for ensuring that the service agents that support the drug and alcohol programs of contractors, subcontractors, and lessees have current qualifications.

19. Section 5307 Program Requirements

Basic Requirement: The recipient must participate in the transportation planning process in accordance with Federal Transit Administration (FTA) requirements and the metropolitan and statewide planning regulations.

Recipients shall develop, publish, afford an opportunity for a public hearing on, and submit for approval, a program of projects (POP).

Recipients are expected to have a written, locally developed process for soliciting and considering public comment before raising a fare or carrying out a major transportation service reduction.

For fixed-route service supported with Section 5307 assistance, fares charged seniors, persons with disabilities or an individual presenting a Medicare card during off peak hours will not be more than one half the peak hour fares.

Finding: During this Triennial Review of the City, no deficiencies were found with the FTA requirements for Section 5307 Program Requirements.

## 20. Section 5310 Program Requirements

Basic Requirement: Recipients must expend Section 5310 funds on eligible projects that meet the specific needs of seniors and individuals with disabilities. Projects selected for funding must be included in a locally developed, coordinated public transit-human services transportation plan. Recipients must approve all subrecipient leases of Section 5310-funded vehicles. Leases of Section 5310-funded vehicles must include required terms and conditions. Either the recipient or subrecipient must hold title to the leased vehicles.

Finding: During this Triennial Review of the City, no deficiencies were found with the FTA requirements for Section 5310 Program Requirements.

## 21. Section 5311 Program Requirements

Basic Requirement: States must expend Section 5311 funds on eligible projects to support rural public transportation services and intercity bus transportation.

This section only applies to recipients that receive Section 5311 funds directly from FTA; therefore, the related requirements are not applicable to the review of the City.

## 22. Public Transportation Agency Safety Plan (PTASP)

Basic Requirement: Recipients must comply with the Public Transportation Agency Safety Plan (PTASP) regulation (49 CFR Part 673) to ensure public transportation providers develop and implement an Agency Safety Plan (ASP).

Finding: During this Triennial Review of the City, no deficiencies were found with the FTA requirements for Public Transportation Agency Safety Plan Requirements.



## 23. Cybersecurity

Basic Requirement: Recipients that operate rail fixed guideway public transportation systems must certify compliance with the requirements for establishing a cybersecurity process under 49 U.S.C. § 5323(v), a new subsection added by the National Defense Authorization Act for Fiscal Year 2020, Pub. L. 116-92, § 7613 (Dec. 20, 2019).

Finding: During this Triennial Review of the City, no deficiencies were found with the FTA requirements for Cybersecurity Requirements.

## V. Summary of Findings

| Review Area   | Finding | Deficiency Code(s)  | Corrective Action(s)   | Response Due Date  | Date Closed |
|---|---------|---|--|--------------------|-------------|
| 1. Legal  | ND      |   |  |                    |             |
| 2. Financial Management and Capacity                                  | D       | F1-1: Lacking/missing required written financial management policies and procedures | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>Financial management policies and procedures for managing FTA award funds in compliance with Federal statutes, regulations, and the terms and conditions of the Federal award. This must include procedures for determining allowability of cost and timely distribution of funds.</li> <li>Documentation that it has trained appropriate staff on the new policies and procedures.</li> </ul> | September 26, 2022 |             |
|   |         | F4-1: ECHO documentation deficient  | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>Procedures for documenting ECHO draws.</li> <li>The recipient must provide additional documentation relating to the ECHO draws identified and work with the FTA regional office to reimburse FTA for ineligible expenses charged to awards, if applicable.</li> <li>Documentation of training conducted of the appropriate staff on new policies and procedures.</li> </ul>                    | September 26, 2022 |             |
| 3. Technical Capacity – Award Management                              | D       | TC-AM4-1: POP Status Reports missing or lacking required information                | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>Procedures for submitting the reports with the required information at the required interval.</li> <li>Submit in TrAMS the POP Status Reports for the past year</li> <li>Documentation of staff training.</li> </ul>   | September 26, 2022 |             |
|   |         | TC-AM5-1: Inactive award/untimely closeouts   | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>An award closeout plan</li> <li>Updated procedures including a way of tracking the status of grants to ensure that they are not inactive.</li> </ul>   | September 26, 2022 |             |
| 4. Technical Capacity – Program Management and Subrecipient Oversight | D       | TC-Pgm3-2: Written agreements missing required elements                             | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>An amended subrecipient award document template that includes missing FTA requirements.</li> <li>The recipient must submit documentation to the regional office that the amended award document has been used in the next project application cycle.</li> </ul>  | September 26, 2022 |             |

| Review Area                                | Finding | Deficiency Code(s)   | Corrective Action(s)  | Response Due Date  | Date Closed |
|--|---------|--|---|--------------------|-------------|
|  |         | TC-PgM6-1:<br>FFATA reporting deficiencies                               | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>Notification that all missing information has been reported to FSRS.</li> <li>Procedures for reporting future subawards to FSRS timely.</li> </ul>  | September 26, 2022 |             |
|  |         | TC-PgM7-1:<br>Inadequate oversight of subrecipients                      | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>Procedures for evaluating subrecipient risk and a comprehensive program for monitoring subrecipients for compliance with Federal requirements.</li> <li>Updated review checklist that incorporates the areas identified during the review.</li> <li>Documentation of implementation.</li> </ul> | September 26, 2022 |             |
| 5. Technical Capacity – Project Management | ND      |  |   |                    |             |
| 6. Transit Asset Management                | D       | TAM6-3:<br>Performance targets not approved by the accountable executive | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>Evidence that the accountable executive approved the current year’s performance targets</li> </ul>  | September 26, 2022 |             |
| 7. Satisfactory Continuing Control         | D       | SCC8-3: Inadequate equipment records                                     | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>Updated equipment records which include all of the required information.</li> </ul>   | September 26, 2022 |             |
|  |         | SCC9-2: Non-permitted use of equipment disposal proceeds                 | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>Reimbursement of FTA’s share of proceeds from disposed property or obtain approval for retaining the proceeds to apply to another capital project.</li> <li>Procedures for reimbursing FTA for disposition proceeds or applying the proceeds to another capital project.</li> </ul>             | September 26, 2022 |             |

| Review Area    | Finding | Deficiency Code(s)                               | Corrective Action(s)  | Response Due Date  | Date Closed |
|----------------|---------|--|---|--------------------|-------------|
| 8. Maintenance | D       | M2-1: Late vehicle/vessel preventive maintenance | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>• Procedures for completing preventive maintenance inspections on time.</li> <li>• A monthly report signed by the chief executive officer or other senior management designee on preventive maintenance results until the data demonstrate the recipient has conducted 80 percent of its preventive maintenance on time for three consecutive months. For each light rail vehicle that received a preventive maintenance inspection during the month, the recipient must include with the submittal to the FTA regional office:               <ul style="list-style-type: none"> <li>○ A report that lists the light rail vehicle number, date of the inspection, mileage of the current inspection, mileage of the previous inspection, and the mileage interval between the two inspections for each vehicle that received a preventive maintenance inspection during the month. List the percentage of the inspections performed on time.</li> <li>○ Back-up documentation for each vehicle (e.g., copy of work order, printout from the maintenance management system) documenting the date and mileage of the inspection.</li> </ul> </li> </ul> | October 25, 2022   |             |
| 9. Procurement | D       | P11-1: Missing FTA clauses                       | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>• Revised procurement procedures that address inclusion of all FTA-required third-party contract clauses through use of a clause checklist or other mechanism.</li> <li>• For the next procurement, submit documentation that the required process was implemented.</li> <li>• Documentation of staff training.</li> </ul>  | September 26, 2022 |             |

| Review Area | Finding | Deficiency Code(s)  | Corrective Action(s)   | Response Due Date  | Date Closed  |
|-------------|---------|---|--|--------------------|--------------|
|             |         | P10-2: Lacking required cost or price analysis  | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>Documentation that it has updated its procurement procedures to include performing applicable cost or price analysis for procurements above the Federal Simplified Acquisition Threshold, including development of a checklist.</li> <li>For the next applicable procurement, submit to FTA regional office documentation that the required analysis was implemented.</li> <li>Documentation of staff training.</li> </ul>   | September 26, 2022 |              |
|             |         | P12-2: Lobbying certifications not included in procurement solicitations or signed by bidders | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>A copy of the lobbying certification for the Electric Bus Charging Station and Vehicle Agreement.</li> <li>Procedures for obtaining signed lobbying certifications.</li> <li>Documentation of staff training.</li> <li>For the next applicable procurement, submit to FTA regional office a copy of the signed lobbying certification.</li> </ul>  | September 26, 2022 |              |
|             |         | P12-4: Contract files lacking signed Buy America certifications                               | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>For the Electric Bus Charging Station and Vehicle Agreement, documentation that the agreement complies with the Buy America provisions.</li> <li>Revised procurement procedures that require the recipient to obtain signed certifications from vendors when procuring steel, iron, or manufactured products not subject to a general waiver.</li> <li>For the next applicable procurement, submit documentation that the required process was implemented.</li> </ul> | September 26, 2022 |              |
|             |         | P19-2: Missing documentation of bus model testing   | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>The Altoona Bus Test Report for the specific makes/models purchased</li> <li>Procedures for obtaining the report for future bus purchases.</li> </ul>  | September 26, 2022 |              |
|             |         | P20-3: Pre-award and/or post-delivery certifications lacking                                  | Submit to the FTA regional office: <ul style="list-style-type: none"> <li>The certifications and documentation for the procurement reviewed.</li> <li>Procedures for completing the applicable pre-award and post-delivery audits and certifications for future revenue rolling stock procurements.</li> </ul>   | September 26, 2022 | May 27, 2022 |

| Review Area   | Finding | Deficiency Code(s)  | Corrective Action(s)   | Response Due Date  | Date Closed |
|---|---------|---|--|--------------------|-------------|
| 10. Disadvantaged Business Enterprise               | ND      |   |  |                    |             |
| 11. Title VI  | D       | TVI8-1: Impact of fare and/or service changes not adequately examined | Submit to the FTA regional office and RCRO: <ul style="list-style-type: none"> <li>An equity analysis for the major service changes implemented due to COVID-19.</li> <li>Revised procedures implemented to ensure that future equity analyses will be conducted as required.</li> </ul>   | September 26, 2022 |             |
|   |         | TVI6-2: Insufficient oversight of subrecipients' Title VI programs    | Submit to the FTA regional office and RCRO: <ul style="list-style-type: none"> <li>A schedule for, and description of, oversight monitoring for subrecipients' implementation of Title VI requirements</li> <li>Evidence of its implementation.</li> </ul>   | September 26, 2022 |             |
| 12. Americans with Disabilities Act (ADA) – General | ND      |   |  |                    |             |
| 13. ADA – Complementary Paratransit                 | ND      |   |  |                    |             |
| 14. Equal Employment Opportunity                    | ND      |   |  |                    |             |
| 15. School Bus                                      | ND      |   |  |                    |             |
| 16. Charter Bus                                     | ND      |   |  |                    |             |
| 17. Drug-Free Workplace                             | ND      |   |  |                    |             |
| 18. Drug and Alcohol Program                        | D       | DA2-1: Employee training not provided/insufficient                    | The recipient must submit to the FTA regional office: <ul style="list-style-type: none"> <li>Documentation that covered employees placed in safety-sensitive positions within the past two years have received at least 60 minutes of training on the effects and consequences of prohibited drug use on personal health, safety, and the work environment, and on the signs and symptoms that may indicate prohibited drug use.</li> <li>Procedures for ensuring covered employees receive the training.</li> </ul> | September 26, 2022 |             |

| Review Area  | Finding | Deficiency Code(s)   | Corrective Action(s)  | Response Due Date  | Date Closed |
|--|---------|--|---|--------------------|-------------|
|  |         | DA2-2: Supervisor training not provided/insufficient   | The recipient must submit to the FTA regional office: <ul style="list-style-type: none"> <li>Documentation that supervisors and other officials designated within the past two years to make reasonable suspicion determinations have received the required training</li> <li>Procedures for ensuring covered employees receive the training.</li> </ul>  | September 26, 2022 |             |
|  |         | DA3-1: Deficiencies in process of checking previous drug and alcohol testing records                                     | The recipient must submit to the FTA regional office: <ul style="list-style-type: none"> <li>A process for ensuring that the previous drug and alcohol testing records for employees are reviewed and for documenting the recipient's good faith efforts to obtain the records, before allowing employees to perform safety-sensitive functions for more than 30 days.</li> </ul>   | September 26, 2022 |             |
|  |         | DA5-1: Insufficient oversight over drug & alcohol programs of subrecipients, contractors, subcontractors, and/or lessees | The recipient must submit to the FTA regional office: <ul style="list-style-type: none"> <li>The qualifications of the substance abuse professionals, breath alcohol technicians, and collectors that support the program of its operating contractor</li> <li>Procedures for ensuring that the service agents that support the drug and alcohol programs of contractors, subcontractors, and lessees have current qualifications.</li> </ul> | September 26, 2022 |             |
| 19. Section 5307 Program Requirements                | ND      |  |   |                    |             |
| 20. Section 5310 Program Requirements                | ND      |  |   |                    |             |
| 21. Section 5311 Program Requirements                | NA      |  |   |                    |             |
| 22. Public Transportation Agency Safety Plan (PTASP) | ND      |  |   |                    |             |
| 23. Cybersecurity                                    | ND      |  |   |                    |             |

The metrics used to evaluate whether a recipient is meeting the requirements for each of the areas reviewed are: Deficient (D)/Not Deficient (ND)/Not Applicable (NA)

VI. Attendees

| Name                  | Title  | Phone Number | E-mail Address                          |
|-----------------------|--|--------------|---|
| <b>CATS</b>           |  |              |   |
| John Lewis            | Chief Executive Officer                                    | 704-336-3855 | John.lewis@charlottenc.gov              |
| Blanche Sherman       | Deputy Director of Transit<br>- Chief Financial Officer    | 704-564-9295 | Blanche.Sherman@charlotten<br>c.gov     |
| Crystal Givens        | Grant Compliance<br>Administrator                          | 980-867-2373 | Crystal.givens@charlottenc.gov          |
| Evelyn Russik         | Capital Finance Analyst                                    | 704-336-2681 | Evelyn.Russik@charlottenc.gov           |
| Phillipa Hazel-Jacobs | Supervisor of Financial<br>Reporting & Grant<br>Accounting | 704-432-6257 | phillipa.hazelyates@charlotte<br>nc.gov |
| Allen C. Smith III    | Deputy Director of Transit<br>- Chief Operating Officer    | 980-279-1163 | Allen.Smith@charlottenc.gov             |
| Deltrin Harris        | General Manager of Rail<br>Operations and Facilities       | 980-310-7186 | Deltrin.Harris@charlottenc.gov          |
| Jennifer Fehribach    | General Manager of Bus<br>Operations Division              | 704-336-2801 | Jennifer.Fehribach@charlotte<br>nc.gov  |
| Edwin Johnson         | Sr. Manager of Bus &<br>Paratransit Operations             | 704-578-0584 | edwin.johnson@charlottenc.gov           |
| Thurston Davis        | Facilities Manager   | 704-962-4776 | Thurston.Davis@charlottenc.gov          |
| Tina Hall             | Division Manager,<br>Training & Instruction                | 980-475-4367 | Tina.Hall@charlottenc.gov               |
| Gary Lee              | Manager Rail Car<br>Maintenance                            | 704-999-8210 | Gary.lee@charlottenc.gov                |
| Arlanda Rouse         | Civil Rights Officer                                       | 704-432-2566 | Arlanda.rouse@charlottenc.gov           |
| Lashima Tate          | Civil Rights Specialist –<br>ADA Coordinator               | 704-336-2233 | lashima.tate@charlottenc.gov            |
| Nicki Galloway        | CATS HR Manager  | 980-579-6440 | Christine.galloway@charlotte<br>nc.gov  |
| Thomas Bradley        | Senior Assistant City<br>Attorney                          | 704-280-7846 | bradley.thomas@charlottenc.gov          |
| Kay Elmore            | Chief Procurement Officer                                  | 980-308-5334 | kay.elmore@charlottenc.gov              |
| Nicole Hatch          | Transit Procurement<br>Manager                             | 704-388-8343 | Nicole.hatch@charlottenc.gov            |



|   |  |              |                                  |
|---|--|--------------|----------------------------------|
| Marcy Mars                                | Strategic Compliance Manager   | 980-260-9396 | Marcy.mars@charlottenc.gov       |
| Bruce Erckson                             | Construction Contracts Admin Coordinator                                   | 704-336-8994 | Bruce.erickson@charlottenc.gov   |
| David Moskowitz                           | General Manager Office of Safety and Security CATS<br>Chief Safety Officer | 704-336-7661 | david.moskowitz@charlottenc.gov  |
| Kelly Goforth                             | Director, Development Division   | 704-999-1994 | Kelly.goforth@charlottenc.gov    |
| Jason Lawrence                            | Director of Planning   | 704-330-3428 | Jason.Lawrence@charlottenc.gov   |
| Rachel Gragg                              | Business Systems Manager, Senior   | 704-605-4858 | Rachel.gragg@charlottenc.gov     |
| <b>City of Charlotte</b>                  |  |              |                                  |
| Gisa Smith                                | Director of HR, Transit Management of Charlotte                            | 704-336-4055 | Gisa.smith@charlottenc.gov       |
| <b>Iredell County Area Transit System</b> |  |              |                                  |
| Bradley Johnson                           | Transit Director, Iredell County Area Transit System                       | 704-832-2343 | Bradley.johnson@co.iredell.nc.us |
| <b>FTA</b>                                |  |              |                                  |
| D. Michele Foster                         | Regional Civil Rights Officer  | 404-865-5633 | DMichele.Foster@dot.gov          |
| David Powell                              | General Engineer   | 404-865-5628 | David.Powell@dot.gov             |
| Guanying (George) Lei                     | General Engineer   | 404-865-5615 | guanying.lei@dot.gov             |
| Parris Orr                                | Community Planner  | 404-865-5600 | elizabeth.Orr@dot.gov            |
| <b>TFC Consulting, FTA Contractor</b>     |  |              |                                  |
| Philippa Drew                             | Lead Reviewer  | 857-576-1512 | pdrew@tfcci.net                  |
| Joni Roeseler                             | Reviewer   | 816-560-5827 | jroeseler@tfcci.net              |
| Philip A. Sherer                          | Reviewer   | 732-598-7749 | psherer@tfci.net                 |

## VII. Appendices

No appendices included in this report.





U.S. Department  
of Transportation  
**Federal Transit  
Administration**

REGION IV  
Alabama, Florida, Georgia,  
Kentucky, Mississippi,  
North Carolina, Puerto  
Rico, South Carolina,  
Tennessee, Virgin Islands

230 Peachtree St., N.W.,  
Suite 1400  
Atlanta, GA 30303  
404-865-5600  
404-865-5605 (fax)

December 19, 2022

Mr. Brent Cagle  
Interim Chief Executive Officer  
Charlotte Area Transit System (CATS)  
City of Charlotte  
600 East 4<sup>th</sup> Street, 7<sup>th</sup> Floor  
Charlotte, NC 28202

Re: City of Charlotte FY2022 Comprehensive Review Open Finding Extension Request

Dear Mr. Cagle:

FTA would like to acknowledge receipt of the CATS' extension request, dated December 15, 2022, to extend the due date on the CATS' open FY2022 Drug & Alcohol Comprehensive Review Findings. This is CATS' first request for additional time to address these open findings. FTA understands the CATS is requesting the due date extension on these findings in order to finalize procedures and to conduct staff training to address the corrective actions on the below open findings. Based on this request, FTA grants the extension request as follows:

| Review Area            | Finding  | Original Due Date | Revised Due Date |
|------------------------|--|-------------------|------------------|
| Drug & Alcohol Program | DA2-1: Employee training not provided/insufficient   | 09/26/2022        | 03/31/2023       |
|                        | DA2-2: Supervisor training not provided/insufficient |                   |                  |

CATS must be in regulatory compliance in order to receive FTA financial assistance; therefore, please take immediate action to address these findings and provide the necessary documentation prior to or by the revised due date. FTA may not grant additional due date extensions; therefore, please provide the adequate documentation to address these findings. If you have any questions, please contact David Powell by email at [david.powell@dot.gov](mailto:david.powell@dot.gov) or by phone at (404) 865-5628.

Sincerely,

Robert Buckley, AICP  
Director, Office of Financial Management and Program Oversight

cc: Chad Howell, Interim Deputy Director/Chief Financial Officer, CATS  
David Powell, P.E., General Engineer, FTA Region IV

## Second FTA Letter



U.S. Department  
of Transportation  
**Federal Transit  
Administration**

REGION IV  
Alabama, Florida, Georgia,  
Kentucky, Mississippi,  
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Sincerely,

Robert Buckley, AICP  
Director, Office of Financial Management and Program Oversight

cc: Chad Howell, Interim Deputy Director/Chief Financial Officer, CATS  
David Powell, P.E., General Engineer, FTA Region IV



Item 3: Requested Scope of Work for Transpro Survey



**Objective 2: Community Research** *In terms of creating a positive image for transit and adding value to the Charlotte region, CATS realizes that non-rider opinions are equally as important as current customer opinions. Non-riders are an integral part of CATS market research, in that they provide general public responses and observer perceptions.*

*Surveying of the community, including non-riders should include Mecklenburg and surrounding counties. Once the number of non-riders to be surveyed is determined, the number of those surveyed within Mecklenburg should be based on the percentage of CATS riders that originate in Mecklenburg County. The balance of non-riders surveyed would then be the percent of riders originating outside Mecklenburg County and should come from the five counties adjacent to Mecklenburg: Union, Iredell, Gaston, Cabarrus, and York. The total number of surveyed non-riders should be statistically significant at the 95% confidence level. It is not necessary that individual county data be statistically significant.*

**Schedule.** *Community surveys shall be conducted once a year, preferably in the Fall.*

*Community research should include focus groups of key community stakeholders to identify issues and opportunities for CATS to examine with quantitative research. CATS understands its perception and support is important, even from those who may never use its services and these focus groups are important to understanding the underlying concepts of those perceptions.*

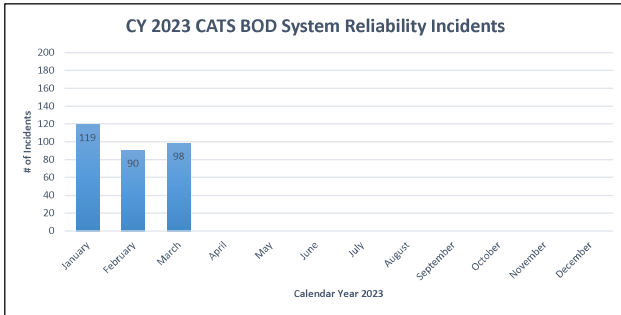
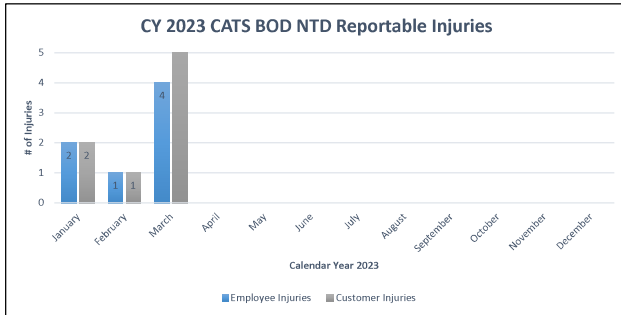
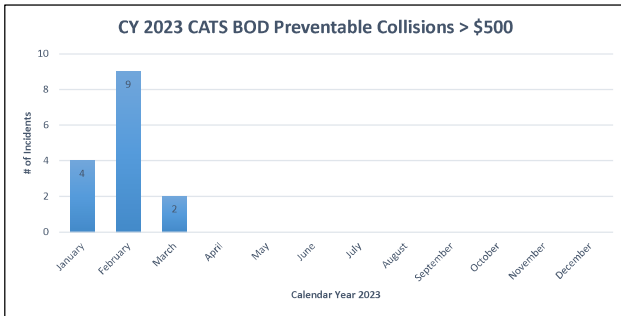
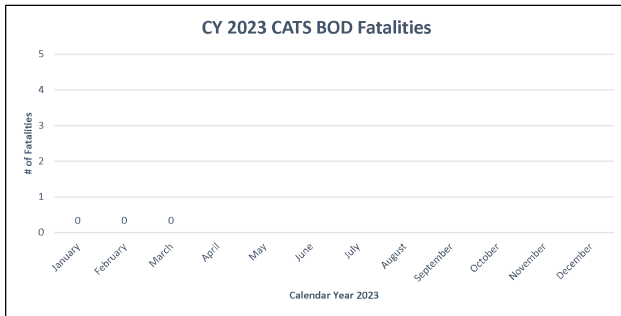
**Focus groups.** *In addition to quantitative surveys, TransPro will conduct 5 focus groups with key community stakeholders. TransPro will work with CATS to identify potential participants in each of the following focus groups:*

- Business and Economic Development - understanding CATS community value to businesses including its value and promoting job growth, economic diversity, and business development.*
- Educational Institutions- understanding caps value to educational institutions including value to staff and students.*
- Civic Organizations- understanding CATS values to civic organizations.*
- Medical Community- understanding CATS value to the medical community, including hospitals and other medical institutions.*
- Advocacy Groups- understanding CATS value to advocacy groups.*

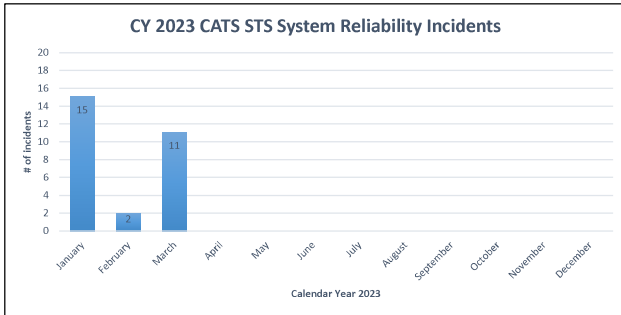
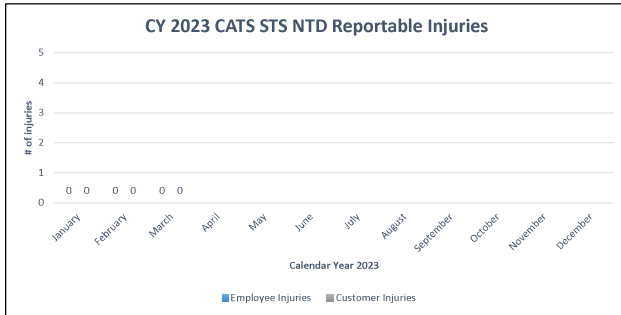
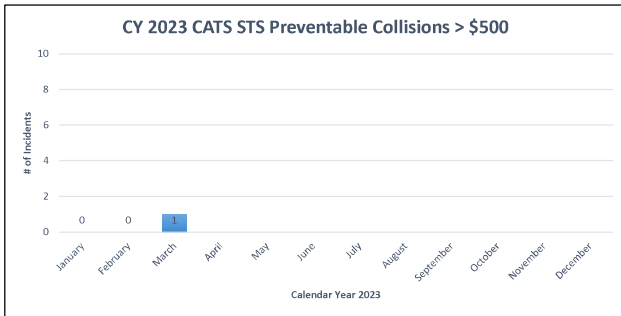
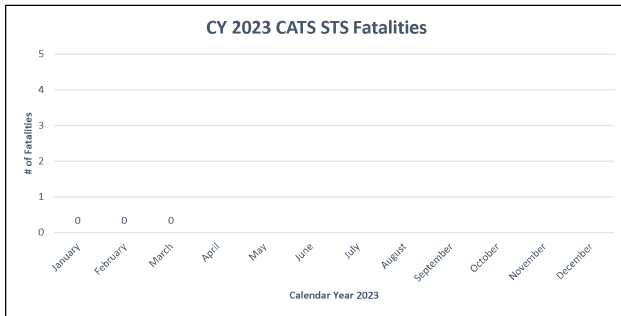
**Deliverables.** *Community Value Survey Instrument; Focus group instrument; Metric population and CATS tracks performance scorecard; Comprehensive report and presentation of CATS results to CATS management*



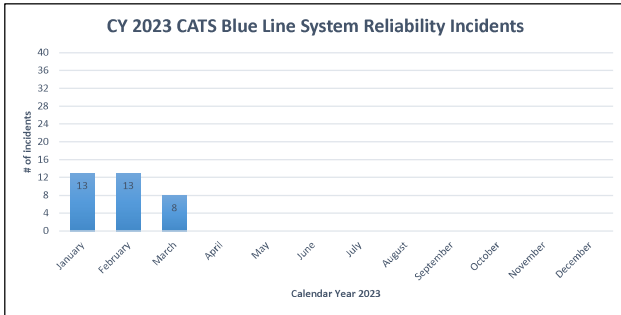
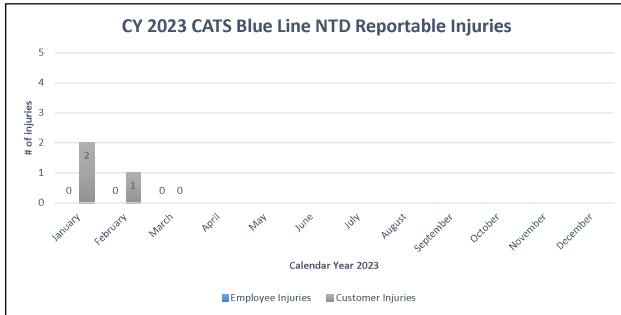
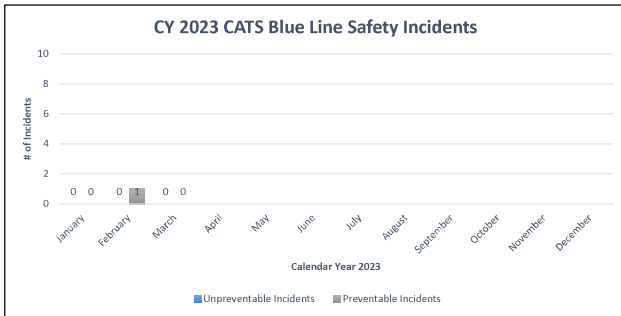
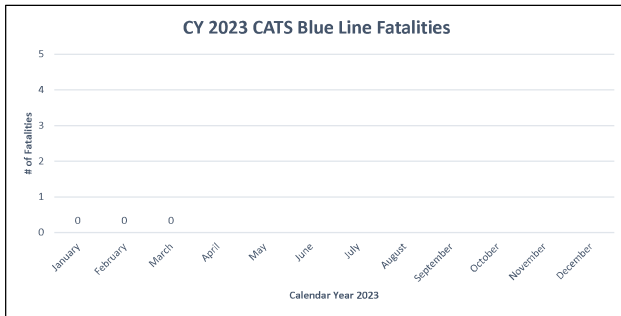
## Bus Operations Division Safety Performance Measures



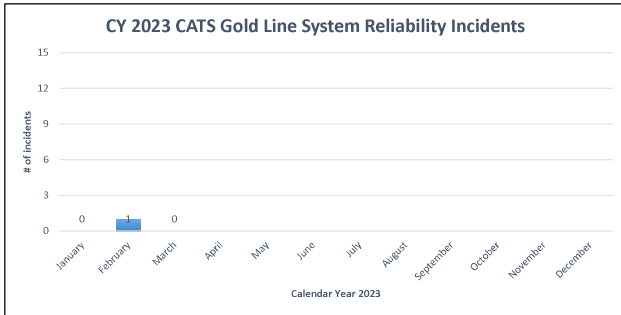
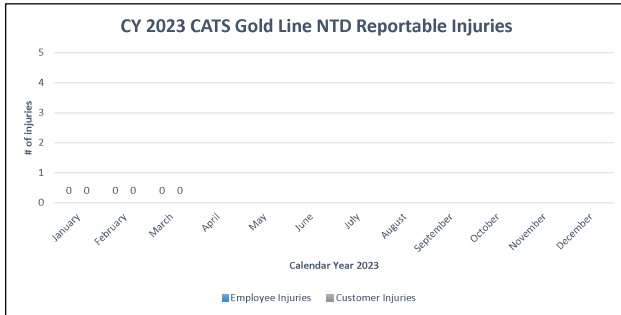
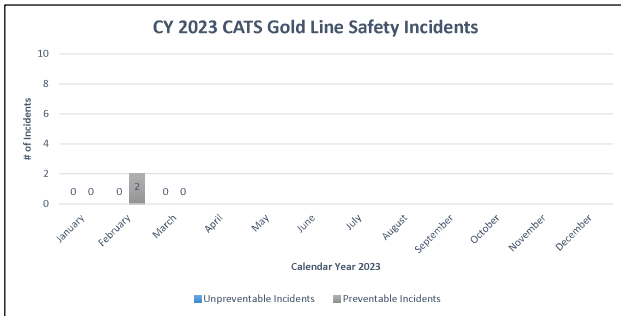
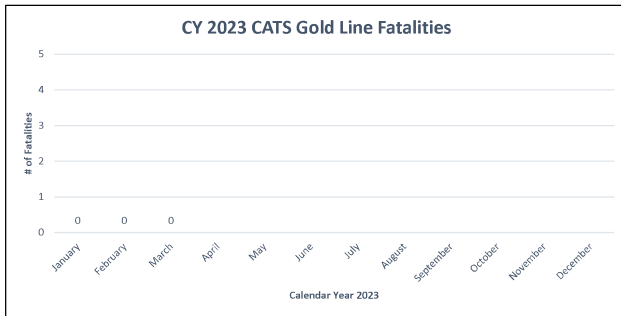
## Special Transportation Service Safety Performance Measures



## Rail Operations Blue Line Safety Performance Measures



## Rail Operations Gold Line Safety Performance Measures





**Metropolitan Transit Commission**  
**Charlotte Area Transit System Ridership Report**  
**Mar-23**

| Mode / Service                       | Percent        |                |                   | YTD              |                  | Percent Increase/Decrease | Avg Daily Ridership per Month |               |              |
|--------------------------------------|----------------|----------------|-------------------|------------------|------------------|---------------------------|-------------------------------|---------------|--------------|
|                                      | Mar-23         | Mar-22         | Increase/Decrease | FY 2023          | FY 2022          |                           | WeekDay                       | Saturday      | Sunday       |
| <b>Local</b>                         |                |                |                   |                  |                  |                           |                               |               |              |
| BOD Local                            | 518,884        | 478,630        | 8.4 %             | 4,147,785        | 4,154,488        | -0.2 %                    | 18,423                        | 14,408        | 9,380        |
| <b>Subtotal</b>                      | <b>518,884</b> | <b>478,630</b> | <b>8.4 %</b>      | <b>4,147,785</b> | <b>4,154,488</b> | <b>-0.2 %</b>             | <b>18,423</b>                 | <b>14,408</b> | <b>9,380</b> |
| <b>Local Express</b>                 |                |                |                   |                  |                  |                           |                               |               |              |
| Arboretum Express                    | 846            | -              | n/a               | 2,192            | -                | n/a                       | 37                            | -             | -            |
| Harrisburg Road Express              | 1,009          | 652            | 54.8 %            | 8,001            | 4,959            | 61.3 %                    | 44                            | -             | -            |
| Northcross Express                   | 2,704          | 1,946          | 39.0 %            | 21,179           | 5,749            | 268.4 %                   | 118                           | -             | -            |
| Idlewild Road Express                | 874            | 836            | 4.5 %             | 6,524            | 4,990            | 30.7 %                    | 38                            | -             | -            |
| Independence Blvd Express            | 2,069          | 1,766          | 17.2 %            | 14,563           | 5,993            | 143.0 %                   | 90                            | -             | -            |
| Lawyers Road Express                 | 977            | 849            | 15.1 %            | 7,328            | 3,989            | 83.7 %                    | 42                            | -             | -            |
| Mountain Island Express              | 124            | -              | n/a               | 400              | -                | n/a                       | 5                             | -             | -            |
| Northlake Express                    | 2,021          | 1,434          | 40.9 %            | 13,016           | 4,595            | 183.3 %                   | 88                            | -             | -            |
| North Mecklenburg Express            | 4,137          | 3,214          | 28.7 %            | 28,469           | 11,158           | 155.1 %                   | 180                           | -             | -            |
| Huntersville Express                 | 3,424          | 2,720          | 25.9 %            | 22,938           | 9,871            | 132.4 %                   | 149                           | -             | -            |
| Rea Road Express                     | 1,400          | 1,162          | 20.5 %            | 9,436            | 5,293            | 78.3 %                    | 61                            | -             | -            |
| Steele Creek Express                 | 251            | -              | n/a               | 808              | -                | n/a                       | 11                            | -             | -            |
| Huntersville Greenhouse Express      | 73             | 302            | -75.8 %           | 953              | 1,233            | -22.7 %                   | 3                             | -             | -            |
| <b>Subtotal</b>                      | <b>19,909</b>  | <b>14,881</b>  | <b>33.8 %</b>     | <b>135,807</b>   | <b>57,830</b>    | <b>134.8 %</b>            | <b>866</b>                    | <b>-</b>      | <b>-</b>     |
| <b>Regional Express</b>              |                |                |                   |                  |                  |                           |                               |               |              |
| Gastonia Express                     | 914            | 983            | -7.0 %            | 6,139            | 5,891            | 4.2 %                     | 40                            | -             | -            |
| Rock Hill Express                    | 899            | 897            | 0.2 %             | 5,938            | 3,968            | 49.6 %                    | 39                            | -             | -            |
| Union County Express                 | 693            | 664            | 4.4 %             | 5,883            | 3,109            | 89.2 %                    | 30                            | -             | -            |
| <b>Subtotal</b>                      | <b>2,506</b>   | <b>2,544</b>   | <b>-1.5 %</b>     | <b>17,960</b>    | <b>12,968</b>    | <b>38.5 %</b>             | <b>109</b>                    | <b>-</b>      | <b>-</b>     |
| <b>Community Circulator</b>          |                |                |                   |                  |                  |                           |                               |               |              |
| Neighborhood Shuttles                | 16,859         | 12,745         | 32.3 %            | 131,104          | 111,045          | 18.1 %                    | 634                           | 436           | 136          |
| Eastland Neighborhood Shuttle        | 9,604          | 7,926          | 21.2 %            | 74,533           | 65,138           | 14.4 %                    | 317                           | 341           | 236          |
| Pineville-Matthews Road              | 1,782          | 1,322          | 34.8 %            | 14,808           | 11,225           | 31.9 %                    | 68                            | 52            | -            |
| Village Rider                        | 3,828          | 3,553          | 7.7 %             | 34,383           | 29,051           | 18.4 %                    | 135                           | 120           | 58           |
| <b>Subtotal</b>                      | <b>32,073</b>  | <b>25,546</b>  | <b>25.5 %</b>     | <b>254,828</b>   | <b>216,459</b>   | <b>17.7 %</b>             | <b>1,154</b>                  | <b>949</b>    | <b>430</b>   |
| <b>Human Services Transportation</b> |                |                |                   |                  |                  |                           |                               |               |              |
| Special Transportation Services      | 17,767         | 14,008         | 26.8 %            | 140,445          | 120,609          | 16.4 %                    | 683                           | 304           | 214          |
| DSS                                  | 1,755          | 298            | 488.9 %           | 8,505            | 19,115           | -55.5 %                   | 73                            | 16            | 1            |
| <b>Subtotal</b>                      | <b>19,522</b>  | <b>14,306</b>  | <b>36.5 %</b>     | <b>148,950</b>   | <b>139,724</b>   | <b>6.6 %</b>              | <b>756</b>                    | <b>320</b>    | <b>215</b>   |
| <b>Rideshare Services</b>            |                |                |                   |                  |                  |                           |                               |               |              |
| Vanpool                              | 4,276          | 3,741          | 14.3 %            | 34,657           | 28,000           | 23.8 %                    | 169                           | 44            | 54           |
| <b>Subtotal</b>                      | <b>4,276</b>   | <b>3,741</b>   | <b>14.3 %</b>     | <b>34,657</b>    | <b>28,000</b>    | <b>23.8 %</b>             | <b>169</b>                    | <b>44</b>     | <b>54</b>    |





**Metropolitan Transit Commission  
Charlotte Area Transit System Ridership Report**

**Mar-23**

| Mode / Service     | Percent          |                |                   | YTD              |                  | Percent Increase/Decrease | Avg Daily Ridership per Month |               |               |
|--------------------|------------------|----------------|-------------------|------------------|------------------|---------------------------|-------------------------------|---------------|---------------|
|                    | Mar-23           | Mar-22         | Increase/Decrease | FY 2023          | FY 2022          |                           | WeekDay                       | Saturday      | Sunday        |
| <b>Rail</b>        |                  |                |                   |                  |                  |                           |                               |               |               |
| LYNX Blue Line     | 458,092          | 389,434        | 17.6 %            | 3,786,115        | 2,692,200        | 40.6 %                    | 15,429                        | 17,633        | 8,172         |
| CityLynx Gold Line | 55,749           | 41,849         | 33.2 %            | 448,310          | 223,151          | 100.9 %                   | 1,922                         | 1,756         | 1,130         |
| <b>Subtotal</b>    | <b>513,841</b>   | <b>431,283</b> | <b>19.1 %</b>     | <b>4,234,425</b> | <b>2,915,351</b> | <b>45.2 %</b>             | <b>17,351</b>                 | <b>19,389</b> | <b>9,302</b>  |
| <b>Total</b>       | <b>1,111,011</b> | <b>970,931</b> | <b>14.4 %</b>     | <b>8,974,412</b> | <b>7,524,820</b> | <b>19.3 %</b>             | <b>38,828</b>                 | <b>35,110</b> | <b>19,381</b> |



Metropolitan Transit Commission  
Charlotte Area Transit System Ridership Report  
Mar-23

Source:  
Fixed Route Bus - Automatic Passenger Counts  
Rail - Automatic Passenger Counts

| Mode / Service            | Average Daily Ridership |                |                             |               |               |               |
|---------------------------|-------------------------|----------------|-----------------------------|---------------|---------------|---------------|
|                           | Mar-23                  | Mar-22         | Percent Increase / Decrease | Weekday       | Saturday      | Sunday        |
| <b>Local</b>              |                         |                |                             |               |               |               |
| BOD Local                 | 688,014                 | 654,852        | 5.1%                        | 24,923        | 17,286        | 11,653        |
| <b>Subtotal</b>           | <b>688,014</b>          | <b>654,852</b> | <b>5.1%</b>                 | <b>24,923</b> | <b>17,286</b> | <b>11,653</b> |
| <b>Local Express</b>      |                         |                |                             |               |               |               |
| Arboretum Express         | 947                     | -              | -                           | 41            | -             | -             |
| Harrisburg Road Express   | 1,176                   | 990            | 18.8%                       | 51            | -             | -             |
| Northcross Express        | 1,477                   | 1,694          | -12.8%                      | 64            | -             | -             |
| Idlewild Express          | 1,140                   | 1,053          | 8.3%                        | 50            | -             | -             |
| Independence Blvd Express | 1,412                   | 1,656          | -14.7%                      | 61            | -             | -             |
| Lawyers Road Express      | 1,329                   | 1,148          | 15.7%                       | 58            | -             | -             |
| Steele Creek Express      | 466                     | -              | -                           | 20            | -             | -             |
| Northlake Express         | 1,642                   | 1,845          | -11.0%                      | 71            | -             | -             |
| North Mecklenburg Express | 1,609                   | 1,977          | -18.6%                      | 70            | -             | -             |
| Huntersville Express      | 1,528                   | 1,889          | -19.1%                      | 66            | -             | -             |
| Rea Road Express          | 1,358                   | 1,344          | 1.1%                        | 59            | -             | -             |
| Mountain Island Express   | 328                     | -              | -                           | 14            | -             | -             |
| Huntersville Greenhouse   | 164                     | 158            | 3.8%                        | 7             | -             | -             |
| <b>Subtotal</b>           | <b>14,576</b>           | <b>13,753</b>  | <b>6.0%</b>                 | <b>634</b>    | <b>-</b>      | <b>-</b>      |
| <b>Regional Express</b>   |                         |                |                             |               |               |               |
| Gastonia Express          | 1,233                   | 1,263          | -2.4%                       | 54            | -             | -             |
| Rock Hill Express         | 1,071                   | 1,299          | -17.6%                      | 47            | -             | -             |
| Union County Express      | 1,031                   | 1,072          | -3.8%                       | 45            | -             | -             |
| <b>Subtotal</b>           | <b>3,334</b>            | <b>3,634</b>   | <b>-8.3%</b>                | <b>145</b>    | <b>-</b>      | <b>-</b>      |

|                                      |                  |                  |               |               |               |               |
|--------------------------------------|------------------|------------------|---------------|---------------|---------------|---------------|
| <b>Community Circulator</b>          |                  |                  |               |               |               |               |
| Neighborhood Shuttles                | 23,105           | 19,262           | <b>20.0%</b>  | 845           | 645           | 274           |
| Eastland Neighborhood Shuttle        | 11,973           | 10,405           | <b>15.1%</b>  | 406           | 401           | 257           |
| Pineville-Matthews Road              | 2,715            | 2,385            | <b>13.9%</b>  | 103           | 90            | -             |
| Village Rider                        | 7,270            | 6,915            | <b>5.1%</b>   | 245           | 229           | 178           |
| <b>Subtotal</b>                      | <b>45,064</b>    | <b>38,967</b>    | <b>15.6%</b>  | <b>1,598</b>  | <b>1,109</b>  | <b>709</b>    |
| <b>Human Services Transportation</b> |                  |                  |               |               |               |               |
| Special Transportation Services      | 17,767           | 14,008           | <b>26.8%</b>  | 683           | 304           | 214           |
| DSS                                  | 1,755            | 298              | <b>488.9%</b> | 73            | -             | -             |
| <b>Subtotal</b>                      | <b>19,522</b>    | <b>14,306</b>    | <b>36.5%</b>  | <b>756</b>    | <b>304</b>    | <b>214</b>    |
| <b>Rideshare Services</b>            |                  |                  |               |               |               |               |
| Vanpool                              | 4,276            | 3,741            | <b>14.3%</b>  | 169           | 44            | 40            |
| <b>Subtotal</b>                      | <b>4,276</b>     | <b>3,741</b>     | <b>14.3%</b>  | <b>169</b>    | <b>44</b>     | <b>40</b>     |
| <b>Rail</b>                          |                  |                  |               |               |               |               |
| LYNX Blue Line                       | 458,092          | 389,434          | <b>12.9%</b>  | 15,429        | 17,633        | 8,172         |
| CityLynx Gold Line                   | 55,749           | 41,849           | <b>33.2%</b>  | 1,922         | 1,756         | 1,130         |
| <b>Subtotal</b>                      | <b>513,841</b>   | <b>431,283</b>   | <b>19.1%</b>  | <b>17,351</b> | <b>19,389</b> | <b>9,302</b>  |
| <b>Total</b>                         | <b>1,288,628</b> | <b>1,160,536</b> | <b>11.0%</b>  | <b>45,576</b> | <b>38,132</b> | <b>21,918</b> |



# MARCH | CATS Sales Tax Report FY2023

## November Receipts

### Sales Tax Collections and Distribution – December 2022

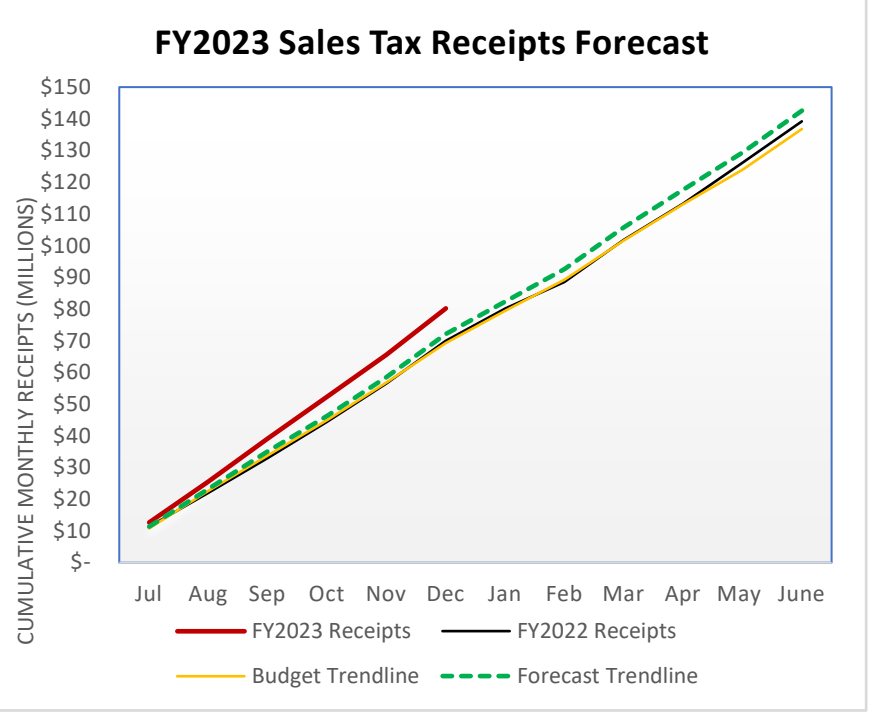
- The December 2022 receipts of \$14,644,501 were \$2,244,570 (18.1%) above budget target for the month
- The December 2022 receipts were \$1,014,509 (7.4%) above forecast for the month
- The December 2022 receipts were \$1,142,933 (8.5%) above December 2021

### Sales Tax Budget Data

- FY2023 sales tax budget is \$136,807,021
- The FY23 model forecasts year-end receipts of \$150,670,165 which is \$13,863,143 (10%) above the FY23 budget target of \$136,807,021
- FY2022 actual sales tax was \$139,225,568

### Local Government Sales and Use Tax Distribution

- Source: North Carolina Department of Revenue Sales & Use Distribution Report for the month January 31, 2023
- Published by NC Secretary of Revenue on 03/10/2023 with actual receipts through January 2023.
- CATS sales tax report only includes Mecklenburg County Article 43 sales tax



## FY2023 Budget Sales Tax Receipts (Actuals and Forecasts)

| Jurisdiction | Population       | % of Total    | Jul 22 Actuals      | Aug 22 Actuals       | Sep 22 Actuals      | Oct 22 Actuals       | Nov 22 Actuals       | Dec 22 Actuals       | Jan 23 Forecasts    | Feb 23 Forecasts    | Mar 23 Forecasts     | April 23 Forecasts   | May 23 Forecasts    | Jun 23 Forecasts     | Total                 |                      |
|--------------|------------------|---------------|---------------------|----------------------|---------------------|----------------------|----------------------|----------------------|---------------------|---------------------|----------------------|----------------------|---------------------|----------------------|-----------------------|----------------------|
| Charlotte    | 878,778          | 40.4%         | \$ 5,125,892        | \$ 5,204,877         | \$ 5,465,688        | \$ 5,366,667         | \$ 5,313,561         | \$ 5,916,721         | \$ 4,088,403        | \$ 4,197,849        | \$ 5,288,458         | \$ 4,809,052         | \$ 4,717,794        | \$ 5,379,312         | \$ 60,874,274         |                      |
| Cornelius    | 31,442           | 1.4%          | \$ 183,400          | \$ 186,227           | \$ 195,558          | \$ 192,015           | 190,115              | 211,696              | 146,280             | 150,196             | \$ 189,217           | 172,064              | 168,799             | 192,468              | 2,178,035             |                      |
| Davidson     | 14,907           | 0.7%          | \$ 86,952           | \$ 88,292            | \$ 92,716           | \$ 91,037            | 90,136               | 100,367              | 69,353              | 71,209              | \$ 89,710            | 81,578               | 80,029              | 91,251               | 1,032,630             |                      |
| Huntersville | 61,840           | 2.8%          | \$ 360,711          | \$ 366,270           | \$ 384,623          | \$ 377,655           | 373,918              | 416,362              | 287,703             | 295,405             | \$ 372,151           | 338,415              | 331,993             | 378,545              | 4,283,750             |                      |
| Matthews     | 29,502           | 1.4%          | \$ 172,084          | \$ 174,736           | \$ 183,492          | \$ 180,168           | 178,385              | 198,634              | 137,254             | 140,929             | \$ 177,542           | 161,448              | 158,384             | 180,592              | 2,043,648             |                      |
| Mint Hill    | 26,465           | 1.2%          | \$ 154,370          | \$ 156,748           | \$ 164,603          | \$ 161,621           | 160,022              | 178,186              | 123,125             | 126,421             | \$ 159,266           | 144,828              | 142,080             | 162,002              | 1,833,270             |                      |
| Pineville    | 10,651           | 0.5%          | \$ 62,127           | \$ 63,084            | \$ 66,245           | \$ 65,045            | 64,402               | 71,712               | 49,552              | 50,879              | \$ 64,097            | 58,287               | 57,181              | 65,199               | 737,811               |                      |
| Meck. County | 1,121,482        | 51.6%         | \$ 6,541,578        | \$ 6,642,379         | \$ 6,975,221        | \$ 6,848,852         | 6,781,079            | 7,550,822            | 5,217,553           | 5,357,226           | \$ 6,749,042         | 6,137,232            | 6,020,771           | 6,864,990            | 77,686,746            |                      |
| <b>Total</b> | <b>2,175,067</b> | <b>100.0%</b> | <b>\$12,687,115</b> | <b>\$ 12,882,613</b> | <b>\$13,528,146</b> | <b>\$ 13,283,060</b> | <b>\$ 13,151,617</b> | <b>\$ 14,644,501</b> | <b>\$10,119,224</b> | <b>\$10,390,113</b> | <b>\$ 13,089,483</b> | <b>\$ 11,902,903</b> | <b>\$11,677,031</b> | <b>\$ 13,314,358</b> | <b>\$ 150,670,165</b> |                      |
|              |                  |               |                     |                      |                     |                      |                      |                      |                     |                     |                      |                      |                     |                      | <b>YTD Budget</b>     | <b>\$ 69,274,186</b> |
|              |                  |               |                     |                      |                     |                      |                      |                      |                     |                     |                      |                      |                     |                      | <b>Variance (YTD)</b> | <b>\$ 10,902,867</b> |

## FY2023 Budget Sales Tax Comparison Year over Year

| Year-over-Year Comparison (FY23-FY22) | Jul          | Aug           | Sep          | Oct           | Nov           | Dec           | Jan          | Feb          | Mar           | Apr           | May          | June          | YTD Total      |
|---------------------------------------|--------------|---------------|--------------|---------------|---------------|---------------|--------------|--------------|---------------|---------------|--------------|---------------|----------------|
| Year-over-Year Comparison (FY23-FY22) | 12.3%        | 20.9%         | 22.2%        | 17.1%         | 8.6%          | 8.5%          | -1.0%        | 25.0%        | -2.0%         | 4.7%          | -9.7%        | 2.1%          | 8.2%           |
| FY23 Budget Target                    | \$10,837,385 | \$ 11,730,084 | \$11,265,334 | \$ 11,050,554 | \$ 11,990,897 | \$ 12,399,931 | \$10,211,129 | \$ 9,806,473 | \$ 12,405,318 | \$ 11,428,653 | \$10,914,935 | \$ 12,766,327 | \$ 136,807,021 |
| % of FY23 Budget Achieved             | 9.3%         | 18.7%         | 28.6%        | 38.3%         | 47.9%         | 58.6%         | 66.0%        | 73.6%        | 83.2%         | 91.9%         | 100.4%       | 110.1%        | 110.1%         |

## FY2023 Budget Tax Receipts: FY2019 - FY2022

| Fiscal Year | Jul           | Aug           | Sep           | Oct           | Nov           | Dec           | Jan           | Feb          | Mar           | Apr           | May           | June          | Total          |
|-------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|---------------|---------------|---------------|---------------|----------------|
| FY2022      | \$ 11,298,388 | \$ 10,659,682 | \$ 11,073,183 | \$ 11,342,634 | \$ 12,115,265 | \$ 13,501,568 | \$ 10,221,788 | \$ 8,315,108 | \$ 13,351,825 | \$ 11,369,039 | \$ 12,932,254 | \$ 13,044,834 | \$ 139,225,568 |
| FY2021      | \$ 8,921,474  | \$ 9,466,946  | \$ 9,245,058  | \$ 9,317,741  | \$ 9,964,913  | \$ 11,402,907 | \$ 9,134,772  | \$ 6,785,996 | \$ 11,253,531 | \$ 10,287,447 | \$ 8,942,957  | \$ 11,945,450 | \$ 116,669,192 |
| FY2020      | \$ 9,683,570  | \$ 9,787,973  | \$ 8,671,558  | \$ 9,890,136  | \$ 9,858,570  | \$ 9,800,116  | \$ 8,278,036  | \$ 8,606,547 | \$ 8,735,473  | \$ 7,635,380  | \$ 6,997,727  | \$ 9,833,896  | \$ 107,778,982 |
| FY2019      | \$ 7,708,503  | \$ 9,621,386  | \$ 9,103,726  | \$ 8,067,019  | \$ 9,425,129  | \$ 8,906,774  | \$ 8,195,787  | \$ 7,918,012 | \$ 10,155,891 | \$ 9,880,419  | \$ 9,435,500  | \$ 9,117,052  | \$ 107,535,197 |



**METROPOLITAN TRANSIT COMMISSION  
INFORMATION ITEM  
STAFF SUMMARY**

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**SUBJECT: Transit Services Update**

**DATE: April 26, 2023**

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**1.0 PURPOSE/SCOPE:** Staff will provide update on current service levels, proposed service changes to the CityLYNX Gold Line and current status on the Microtransit initiative.

**BACKGROUND/JUSTIFICATION:** On August 15, 2022, CATS implemented service changes to Rail and Bus schedules to improve reliability. The recommendation was based upon ridership levels and operator availability. CATS staff has continued to monitor both variables as well route performance levels to inform future service level recommendations.

CATS has conducted stakeholder and public meetings to receive feedback on the implementation of Microtransit services. Microtransit was a key staff Envision My Ride recommendation that was adopted by the MTC in May 2022.

**2.0 PROCUREMENT BACKGROUND:** N/A

**3.0 POLICY IMPACT:** N/A

**4.0 ECONOMIC IMPACT:** N/A

**5.0 ALTERNATIVES:** N/A

**6.0 RECOMMENDATION:** N/A

**7.0 ATTACHMENT(S):** N/A

**SUBMITTED AND RECOMMENDED BY:**



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**Brent Cagle  
Interim CEO, Charlotte Area Transit System  
Assistant City Manager, City of Charlotte**

# Service Levels Update

Metropolitan Transit Commission  
April 26, 2023



1

## Presentation Topics

- ▶ Bus Service Levels
- ▶ CityLYNX Gold Line
- ▶ Microtransit Status



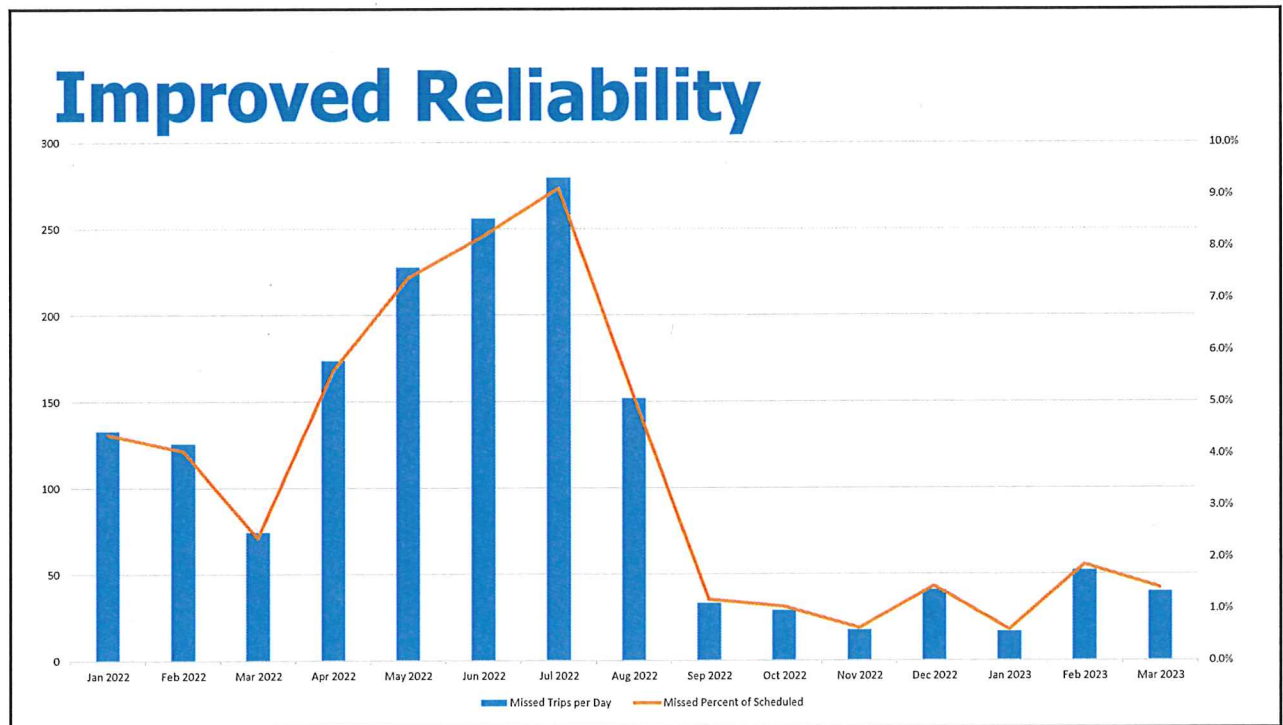
2



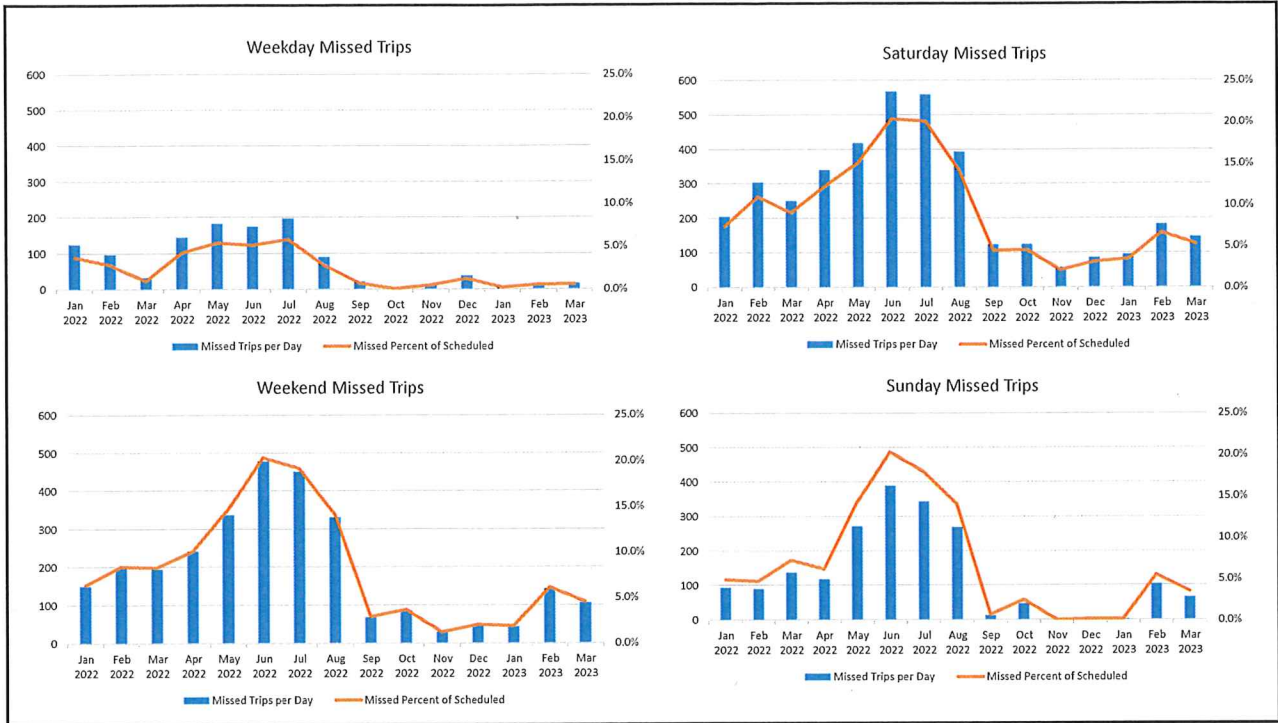
# Bus Service Levels



3



4



5

## Look Ahead

- ▶ Retain August 2022 adjustment to 20% of local and express routes to ensure improved service reliability.
- ▶ Continue evaluating ridership and operator levels to improve reliability and efficiency.
- ▶ Title VI evaluation and public outreach



6

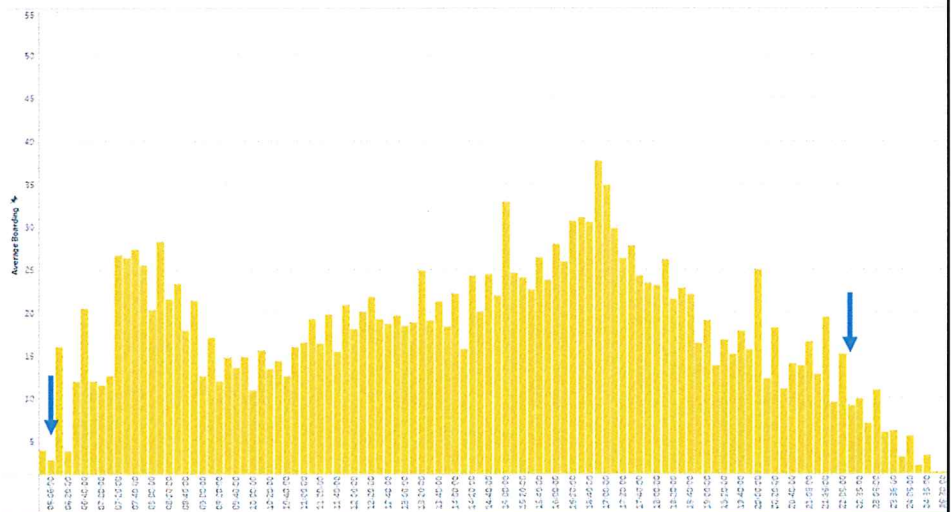
# CityLYNX Gold Line



7

## Proposed Gold Line Changes

- ▶ Evaluating service changes to early morning and evening trips.
- ▶ Boardings are much less after 10pm.
- ▶ Initial proposal would trim 1 hour in the morning and 2 hours in the evening



8

# Microtransit Status

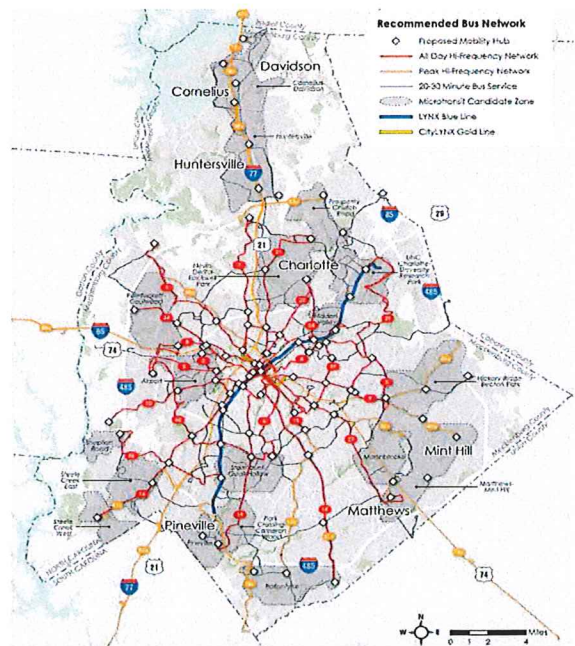


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## Envision My Ride

Adopted by MTC in May 2022

- **Improving time**
  - More frequent service
  - Consistent schedules
  - Priority bus treatments
- **Enhancing experience**
  - Bus stop, amenity, and ADA improvements
  - Mobility hubs
- **Increasing access**
  - New crosstown connections
  - First / last mile & On-demand solutions



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# Bus Service must adapt to a changed mobility landscape

**Old Model** 

**New Vision**

**Hub and spoke** structure that requires riders to travel to uptown Charlotte regardless of their destination.

Limited crosstown connections that lengthen commute times for many riders.

Favors peak-hour, weekday trips at the expense of other time periods, particularly weekends

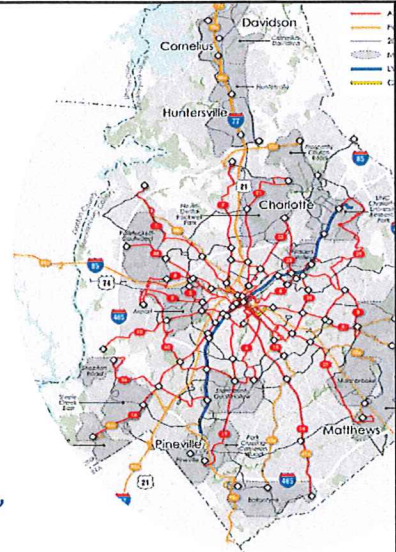
Lacks modern infrastructure like comfortable waiting areas and tools to communicate information to passengers

**Mobility Hubs**

**Microtransit Hub to Hub**

**High Frequency Network, Bus Priority Corridors**

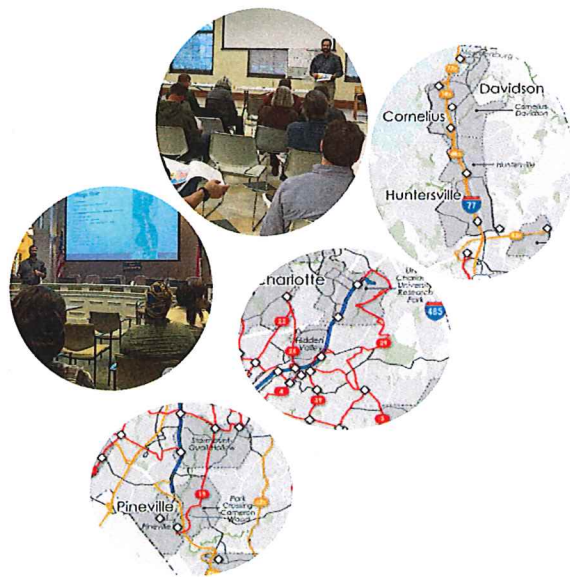
**Mobility Hubs connecting to first/last mile on-demand Service + CATS Pass App**



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## Microtransit Status

- ▶ Held public meetings in Huntersville, Cornelius, and Davidson
- ▶ Pilot evaluation with ridesharing companies ongoing, but experiencing difficulties with ADA comparable service.
- ▶ Developing Microtransit RFP for 2024 implementation
- ▶ Title VI Service and Fare Equity Analysis is required



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# Questions?





**METROPOLITAN TRANSIT COMMISSION  
INFORMATION ITEM  
STAFF SUMMARY**

---

**SUBJECT: LYNX Silver Line Refined Locally  
Preferred Alternative (LPA) Potential Amity Gardens  
Station Removal**

**DATE: April 26, 2023**

---

**1.0 PURPOSE/SCOPE:** To purpose of this Information item is to provide an overview to the MTC about the potential removal of the Amity Gardens Stations, based on staff recommendations and community engagement.

**2.0 BACKGROUND/JUSTIFICATION:**

As part of continued refinements to the Silver Line project definition, CATS is evaluating the removal of the Amity Gardens Station. Removing this station will achieve several overall project benefits, while reducing the potential for negative community impacts. Oakhurst and Amity Gardens neighborhood access to the Silver Line would be maintained at the proposed Sharon Amity station and parking garage.

This potential change to the LPA was presented to the following community groups. The presentations included a general project update, the summary of the benefits and risks associated with the potential Amity Gardens Station removal along with appropriate time for Q&A.

- 3/7 – CharlotteEAST meeting via Zoom
- 3/14 – Oakhurst in-person meeting at Common Market
- 4/4 – Amity Gardens in-person meeting at Eastern Hills Baptist Church

**3.0 PROCUREMENT BACKGROUND:** N/A

**4.0 POLICY IMPACT:** N/A

**4.0 ECONOMIC IMPACT:** N/A

**5.0 ALTERNATIVES:** N/A

**6.0 RECOMMENDATION:** This item is presented as information in preparation for action at the May 26, 2023 MTC meeting.



7.0 **ATTACHMENT(S):**

**Attachment A:** LYNX Silver Line Refined Locally Preferred Alternative with potential refinement

**Attachment B:** LYNX Silver Line Locally Preferred Alternative Potential Refinement

**SUBMITTED AND RECOMMENDED BY:**

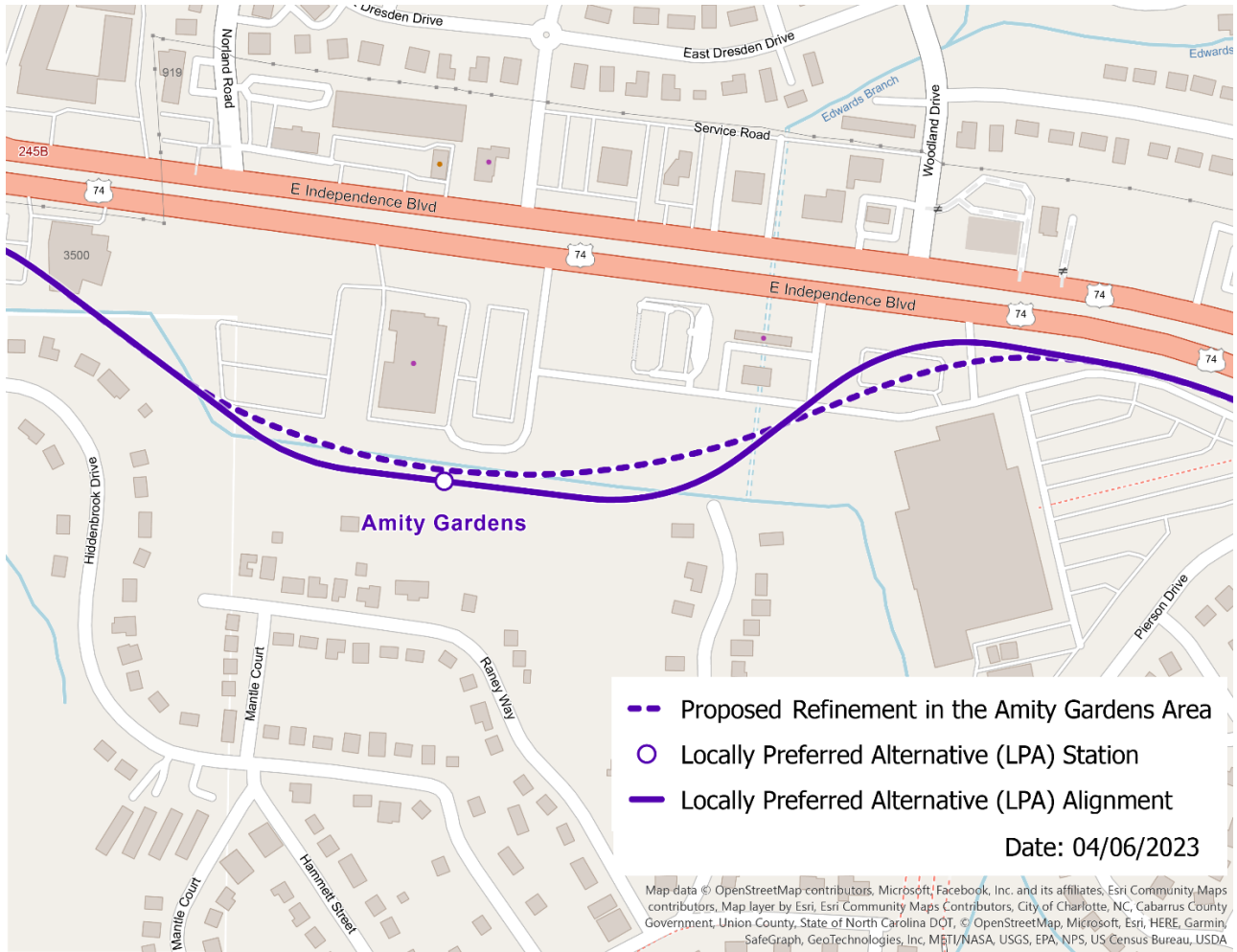
A handwritten signature in black ink that reads "Brent Cagle". The signature is written in a cursive, flowing style.

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**Brent Cagle**  
**Interim Chief Executive Officer, Charlotte Area Transit System**  
**Assistant City Manager, City of Charlotte**



# LYNX Silver Line Locally Preferred Alternative Potential Refinement



# LYNX SILVER LINE LIGHT RAIL

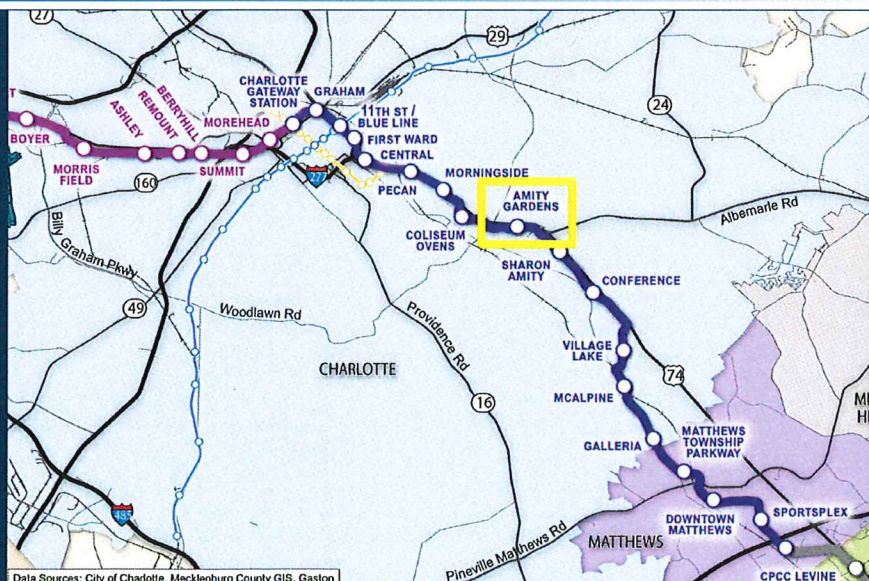
## Metropolitan Transit Commission (MTC) Potential Amity Gardens Station Removal

April 26, 2023



1

## Amity Gardens Station

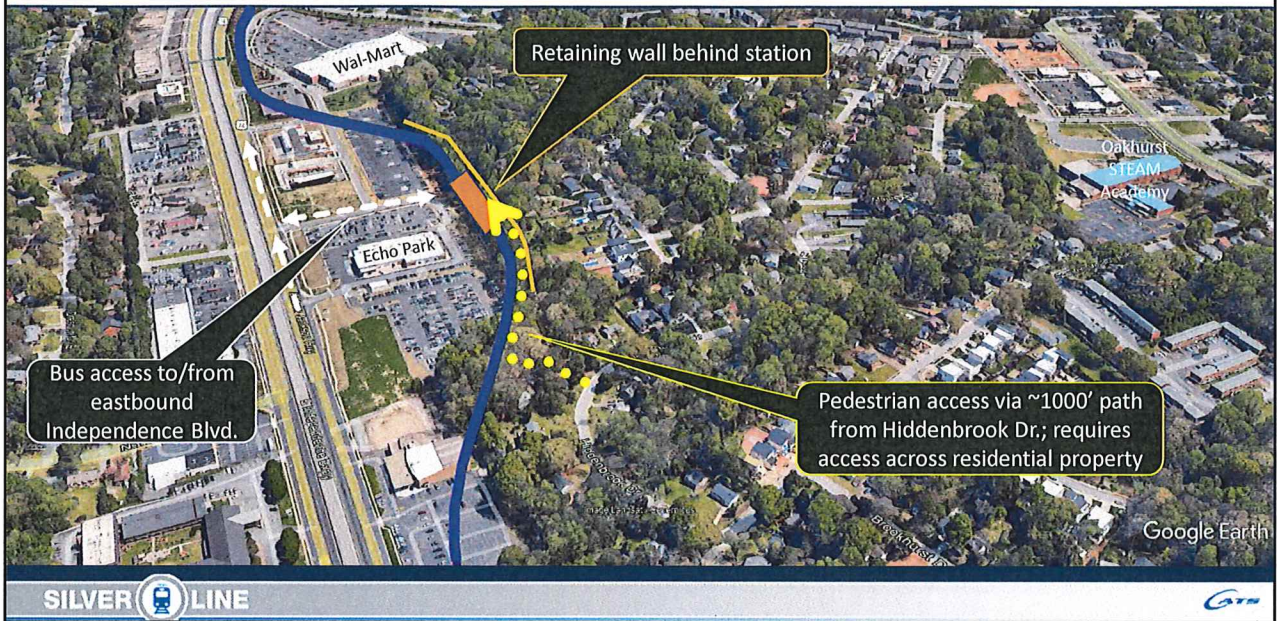


Data Sources: City of Charlotte, Mecklenburg County GIS, Gaston



2

# Amity Gardens Station



3

# Benefits and Risks

## BENEFITS



### TRAVEL TIME



### LOCAL CONNECTIVITY



### DEVELOPMENT OPPORTUNITIES

- Approx. 2 minutes corridor travel time savings by removing station
- Pedestrian access is limited from Oakhurst and bus and vehicle access is only available from eastbound US 74; Sharon Amity station is close by
- Limited transit-oriented redevelopment opportunity fronting US 74

SILVER LINE

GTW

4

# Benefits and Risks

## RISKS

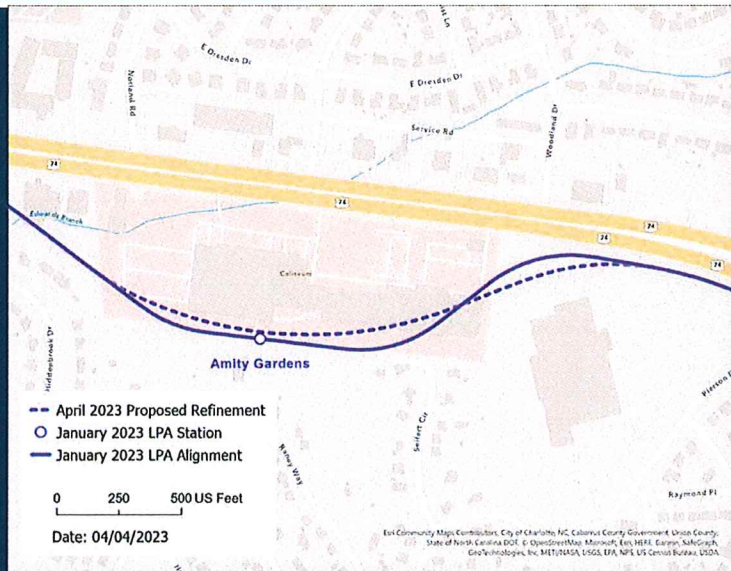
|    |                                     |
|----|-------------------------------------|
| \$ | <b>COST</b>                         |
| 🌿  | <b>ENVIRONMENTAL CONSIDERATIONS</b> |
| 👥  | <b>COORDINATION WITH OTHERS</b>     |

- Approx. \$10-15M savings (year of expenditure) by removing station
- Removing station results in less potential for residential property acquisition on Hiddenbrook Dr., Raney Way, and Seifert Cir.
- Not a distinguishing factor

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# April 26, 2023 – MTC Information Item

## 1. Potential Amity Gardens Station Removal



6

## Engagement Summary

|                |   |
|----------------|---|
| March 7        | Charlotte East  |
| March 14       | Oakhurst Neighborhood Meeting   |
| April 4        | Amity Gardens Neighborhood Meeting  |
| April 18       | Citizens Transit Advisory Group (CTAG)  |
| April 26       | Metropolitan Transit Commission- Information  |
| May 24         | Metropolitan Transit Commission- Action   |
| September 2023 | -Progress Design and Environmental Analysis-<br>Environmental Scoping Public Meetings |

SILVER  LINE



7

# Thank you!



8





**METROPOLITAN TRANSIT COMMISSION  
INFORMATION ITEM  
STAFF SUMMARY**

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**SUBJECT: Fare Equity Analysis CATS Fare Capping**

**DATE: April 26, 2023**

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- 1.0 PURPOSE/SCOPE:** Presentation on the process, observations, comments and conclusions of the fare equity analysis for the Fare Capping. The MTC vote on the analysis is scheduled for the April 2023 MTC meeting.
- 2.0 BACKGROUND/JUSTIFICATION:** As a recipient of federal funding CATS/City of Charlotte must conduct a fare equity analysis whenever a change in fares or fare media is due to occur. Some customers CATS do not have the funds to purchase a monthly pass at the beginning of the month, and Fare Capping was introduced to reward customers with a monthly pass once they have paid the equivalent value of \$88 in any combination of eligible fares through the CATS Pass mobile app.
- 3.0 RECOMMENDATION:** The MTC should approve the analysis as the Fare Capping expands fares and provides benefits to both low income and minority customers.

**Impacts:** The analysis concluded that minority and low income riders will not be limited or denied the benefits of the proposed fare changes. The data indicated that a higher proportional benefit to minority customers due to the implementation of Fare Capping.

- 4.0 ATTACHMENT(S):** 2023 CATS Fare Capping Analysis

**SUBMITTED AND RECOMMENDED BY:**



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**Brent Cagle  
Interim Chief Executive Officer, Charlotte Area Transit System  
Assistant City Manager, City of Charlotte**



# Fare Capping Policy Financial & Equity Assessment

February 2023



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## 1 INTRODUCTION

Charlotte Area Transit System (CATS) implemented a fare capping policy on September 21, 2022, to reward customers with a monthly pass once they have paid the equivalent value (\$88) in any combination of eligible fares through the CATS-Pass mobile app. When customers reach this threshold, a monthly pass is automatically added to their CATS-Pass wallet, enabling them to ride local bus and light rail for free for the remainder of that month. The goal of this policy is to both improve customer experience and ensure CATS services are affordable and accessible to all, especially for customers who ride frequently but cannot afford the upfront cost of a monthly pass.

The fare capping policy is currently implemented as a pilot to evaluate success over an approximate six-month period. During this time, a financial analysis was completed to estimate both the cost savings to CATS-Pass customers under the new policy. An assessment of the corresponding reduction in fare revenue collections resulting from customers being awarded a monthly pass, rather than paying fares for the remainder of the month, was also completed.

As a transit agency receiving federal funding through the Federal Transit Administration (FTA), CATS must conduct an equity assessment to evaluate the potential for impacts of any fare policy change on minority and low-income populations using guidance found in FTA Circular 4702.1B.

This report documents the results of the financial assessment and fare equity assessment for the CATS fare capping policy.

## 2 FARE CAPPING POLICY FINANCIAL ANALYSIS

### 2.1 Financial Analysis Assumptions

An analysis of fares purchased by customers through their CATS-Pass mobile app leading up to the implementation of the new fare capping policy was completed to estimate the customer benefits and corresponding monthly fare revenue reductions. The dataset included all CATS-Pass mobile fare purchases over the four-month period of April-July 2022. The parameters of this analysis include:

- The fare cap is based on the full fare monthly pass (\$88) for the Local Bus and LYNX service.
- Reduced fares for Local Bus and LYNX or other services, or fares for other services such as Express Bus, Express Bus Regional, etc., are not counted toward the fare cap.
- Only tickets/passes activated via a CATS-Pass account within a calendar month are eligible toward the fare cap. Tickets purchased are not counted toward the fare cap until activated within the CATS-Pass app.
- CATS-Pass accounts with multiple monthly passes activated within a calendar month were excluded from the analysis as the purchase of a secondary monthly pass would not apply toward the fare cap under the current policy. The analysis otherwise assumes that any combination of tickets/passes activated within a calendar month counts toward the fare cap as intended under the current policy.

### 2.2 Financial Analysis Results

This section presents the methodology used to review and calculate the potential financial impacts of the fare capping policy from both the customer and agency perspectives. Table 2-1 summarizes the dataset of activated fares by type during each month of the analysis period.

TABLE 2-1: SUMMARY OF TICKET COUNT BY ACTIVATION MONTH

| Activation Period | Fare Type & Value       |                        |                    |                          | Total Activated Ticket Count |
|-------------------|-------------------------|------------------------|--------------------|--------------------------|------------------------------|
|                   | Monthly Pass<br>\$88.00 | Weekly Pass<br>\$30.80 | Day Pass<br>\$6.60 | One-Way Ticket<br>\$2.20 |                              |
| April 2022        | 97                      | 126                    | 1,166              | 16,181                   | 17,570                       |
| May 2022          | 169                     | 125                    | 944                | 15,831                   | 17,069                       |
| June 2022         | 225                     | 124                    | 954                | 14,861                   | 16,164                       |
| July 2022         | 177                     | 251                    | 1,902              | 40,117                   | 42,447                       |
| <b>Total</b>      | <b>668</b>              | <b>626</b>             | <b>4,966</b>       | <b>86,990</b>            | <b>93,250</b>                |

Source: CATS Mobile Ticket Purchases (April-July 2022)

The 93,250 activated fares were each linked to a distinct CATS-Pass account and summarized based on the month activated (Table 2-2).

**TABLE 2-2: # OF UNIQUE MOBILE ACCOUNTS & FARE COUNT BY ACTIVATION MONTH**

| Activation Period | Total Fare Count | # of Individual Mobile Accounts |
|-------------------|------------------|---------------------------------|
| April 2022        | 17,570           | 4,969                           |
| May 2022          | 17,069           | 5,069                           |
| June 2022         | 16,164           | 5,113                           |
| July 2022         | 42,447           | 8,368                           |
| <b>Total</b>      | <b>93,250</b>    | <b>23,519</b>                   |

Source: CATS Mobile Ticket Purchases (April-July 2022)

The fares activated under each CATS-Pass account were then analyzed to determine if the combined value exceeded the equivalent value of a monthly pass (\$88) for the month. As shown in Table 2-3, less than 1% of the CATS-Pass accounts activated eligible fares that exceeded the \$88 fare cap, equating to an average savings of approximately \$17 per customer each month. From the agency’s perspective, this corresponds to an estimated fare revenue reduction of \$679 per month.

**TABLE 2-3: # OF MOBILE ACCOUNTS WITH FARE CAP REACHED BY ACTIVATION MONTH**

| Activation Month       | Total # of Mobile Accounts | Mobile Accounts Where Fare Cap Reached |             | Total Fare Value for Month | \$ / % of Total Fare Value Exceeding Monthly Fare Cap (\$88) |             |
|------------------------|----------------------------|--|-------------|----------------------------|--|-------------|
|                        |                            | #                                      | %           |                            |  |             |
| April 2022             | 4,969                      | 23                                     | 0.5%        | \$111,421                  | \$436  | 0.4%        |
| May 2022               | 5,069                      | 26                                     | 0.5%        | \$119,561                  | \$385  | 0.3%        |
| June 2022              | 5,113                      | 29                                     | 0.6%        | \$62,610                   | \$422  | 0.7%        |
| July 2022              | 8,368                      | 78                                     | 0.9%        | \$124,117                  | \$1,472  | 1.2%        |
| <b>Total</b>           | <b>23,519</b>              | <b>156</b>                             | <b>--</b>   | <b>\$417,710</b>           | <b>\$2,715</b>   | <b>--</b>   |
| <b>Monthly Average</b> | <b>--</b>                  | <b>--</b>                              | <b>0.6%</b> | <b>\$104,427</b>           | <b>\$679</b>   | <b>0.6%</b> |

CATS 2022 Customer Survey; total and monthly percentages reflect weighted averages for the four month period.

Appendix A details the tickets/passes purchased under the 156 CATS-Pass accounts, along with the total fare value and estimated fare cap benefit (amount of the total fare value exceeding the \$88 monthly pass cost for each month).

### 3 FARE CAPPING POLICY EQUITY ASSESSMENT

In accordance with Title VI of the Civil Rights Act of 1964 and FTA Circular 4702.1B, CATS conducts an equity assessment any time a change is proposed to its fare structure to ensure that changes do not unfairly impact persons of color or who are low-income. For proposed changes that will increase or decrease fares system-wide, on certain transit modes, or by fare payment type or fare media, CATS shall analyze available customer data to understand whether the change will result in a disparate impact (when minorities are disproportionately represented) or disproportionate burden (when the low-income community is disproportionately impacted). If disparate impacts or disproportionate burdens are identified, an analysis will be performed to determine the effect on the impacted population(s).

For purposes of this assessment and consistent with FTA Circular 4702.1B, the following definitions apply:

- **Minority** is defined as a person who identifies being part of one or more racial/ethnic groups besides White, non-Hispanic. Customer responses during survey questions regarding their race and Hispanic ethnicity were used to determine minority status.
- **Low-Income** is defined as a person whose median household income is at or below the U.S. Department of Health and Human Services (HHS) poverty guidelines. Customer responses during survey questions regarding their annual household income and number of people living in their household were used to determine low-income status.<sup>1</sup>

#### 3.1 Equity Assessment (Current Fare Capping Policy)

##### 2022 Customer Survey Data

To conduct this equity assessment, weekday data collected during the most recent CATS customer survey (August–October 2022) were used to determine whether enacting the fare capping policy indicates a disparate impact or disproportionate burden.

The fare capping policy applies to a subset of customers who use the CATS-Pass mobile app to purchase any combination of eligible full fares, including one-way tickets, day passes, weekly passes, and monthly passes. Although the purchase of a monthly pass automatically equals the fare cap, there is nothing to preclude the purchase of individual tickets prior to the purchase of a monthly pass that would still provide the cost savings benefit of the fare cap. The type of fare a customer indicated for the surveyed trip was used to determine eligibility under the fare cap.

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<sup>1</sup> The mid-point of the income range provided by the customer was used as the proxy for the customer's annual household income amount. This, along with the persons per household response, was used to determine whether the customer is low-income based on the 2022 HHS poverty guidelines.

Although customers were asked where they purchased the fare used, there was not a sufficient response rate to further separate customers who purchased fares eligible toward the fare cap through the CATS-Pass mobile app versus other venues. Therefore, for purposes of this analysis, eligible tickets/passes purchased by customers via CATS-Pass or other venues are considered equal.

CATS implemented the fare capping policy as a key strategy to improve rider experience and ensure its service is affordable and accessible to all, especially those who cannot afford the upfront cost of a monthly pass. The fare capping policy involves no change (increase or decrease) to the fare structure itself but may affect how much a customer pays for fares within a calendar month. For customers eligible for the fare cap there are no adverse impacts to the policy, only benefits in terms of cost savings once the fare cap is met in a calendar month.

For this proposed change, the analysis examined whether minority or low-income customers may experience a lesser share of the positive impacts due to the implementation of this policy.

### Customer Demographic Profile

Table 3-1 compares the percentage of minority and low-income customers for all surveyed (systemwide) to the subset of customers using a fare eligible toward the fare cap policy. The percentage of minority customers using an eligible fare is 18% higher than the systemwide dataset, while the percentages of low-income customers are similar across both datasets. This indicates that minority customers are more likely to purchase a fare type eligible toward the fare cap policy compared to all available fare types.

**TABLE 3-1: DISTRIBUTION OF WEEKDAY MINORITY & LOW-INCOME CUSTOMERS**

| CATS Customers (weekday)                     | Minority Customers | Low-Income Customers |
|--|--------------------|----------------------|
| Systemwide                                   | 62.6%              | 21.8%                |
| Fare Type Eligible for Fare Cap <sup>1</sup> | 74.1%              | 22.4%                |

Source: CATS 2022 Customer Survey

<sup>1</sup>Includes full fare one-way ticket, day pass, weekly pass, or monthly pass.

For reference, Table 3-2 provides the percentage of minority and low-income populations for CATS' overall service area, as documented in the agency's 2020 Title VI Program.

**TABLE 3-2: DISTRIBUTION OF WEEKDAY MINORITY & LOW-INCOME CUSTOMERS**

| Service Area                 | Minority Population | Low-Income Population |
|------------------------------|---------------------|-----------------------|
| CATS Service Area Population | 49.0%               | 15.9%                 |

Source: CATS 2020 Title VI Program—Table 13 (minority) and Table 14 (low-income); data in the source document from the U.S. Census Bureau, 2011-2015 American Community Survey.



## Equity Assessment

The customer survey data were filtered based on fare types eligible toward the fare cap, then analyzed to understand the correlation between usage and fare price by demographic group.

As shown in Table 3-3, the data indicate that minority customers are more likely to purchase lower-cost one-way tickets and less likely to purchase higher-cost multi-trip passes. This suggests that a higher proportion of minority customers could benefit from the fare capping policy by eliminating the up-front cost of purchasing a calendar month pass and enabling customers to purchase a monthly pass in smaller increments.

**TABLE 3-3: DISTRIBUTION OF TICKET PURCHASES BY TICKET TYPE – MINORITY CUSTOMERS**

| Fare Type    | Amount  | All Customers |     | Minority Customers |     | Non-Minority Customers |     |
|--------------|---------|---------------|-----|--------------------|-----|------------------------|-----|
| One-Way      | \$2.20  | 2,173         | 63% | 1,668              | 65% | 505                    | 56% |
| Day Pass     | \$6.60  | 211           | 6%  | 150                | 6%  | 61                     | 7%  |
| Weekly Pass  | \$30.80 | 451           | 13% | 287                | 11% | 164                    | 18% |
| Monthly Pass | \$88.00 | 626           | 18% | 459                | 18% | 167                    | 19% |
| <b>Total</b> |         | <b>3,461</b>  |     | <b>2,564</b>       |     | <b>897</b>             |     |

Source: CATS 2022 Customer Survey

A similar assessment for low-income customers was undertaken. As shown in Table 3-4, low-income customers are more likely to purchase higher-cost multi-trip passes. However, it is important to note that, of the fare types listed in the table, a higher proportion of low-income customers purchase discounted tickets/pass options (23%) compared to higher-income customers (12%). Further, there is a higher percentage of low-income customers that ride CATS frequently (86%), defined as riding three to seven days per week on average, compared to higher-income customers (82%).

**TABLE 3-4: DISTRIBUTION OF TICKET PURCHASES BY TICKET TYPE – LOW-INCOME CUSTOMERS**

| Fare Type    | Amount  | All Customers |     | Low-Income Customers |     | Higher Income Customers |     |
|--------------|---------|---------------|-----|----------------------|-----|-------------------------|-----|
| One-Way      | \$2.20  | 2,173         | 63% | 435                  | 58% | 1,738                   | 64% |
| Day Pass     | \$6.60  | 211           | 6%  | 35                   | 5%  | 176                     | 7%  |
| Weekly Pass  | \$30.80 | 451           | 13% | 144                  | 19% | 307                     | 11% |
| Monthly Pass | \$88.00 | 626           | 18% | 142                  | 19% | 484                     | 18% |
| <b>Total</b> |         | <b>3,461</b>  |     | <b>756</b>           |     | <b>2,705</b>            |     |

Source: CATS 2022 Customer Survey

## Summary

The proposed fare policy changes required a fare equity assessment to identify any potential disparate impact on minority riders and/or disproportionate burden on low-income riders. The technical analysis using survey data found:

- No potential disparate impact/disproportionate representation on minority riders associated with the introduction of a fare capping policy.
- No potential disproportionate burden on low-income riders associated with the introduction of the fare capping policy.

- The result of this equity assessment concludes that minority and low-income riders will not be limited or denied the benefits of the proposed fare changes. The data indicate a higher proportional benefit to minority customers because of the new policy.

### 3.2 Other Considerations

The findings of this analysis do not prompt CATS to consider possible measures to avoid, minimize, and/or mitigate adverse impacts on minority or low-income riders within the parameters of the current fare capping policy. Albeit, there were no adverse impacts presented, as customers who reach the cap will benefit from this policy by paying less for fares over the course of a calendar month compared to if the policy were not in place. Other considerations related to fare capping and CATS’ specific policy are discussed below.

#### Barriers to Fare Capping Benefits

Although the intention of fare capping is to provide equity in fare cost versus trips taken among transit customers, there are potential barriers to accessing the benefits of fare capping, particularly for vulnerable users. These barriers primarily include the need for both a smartphone (mobile device with internet) and credit/debit card to pay for fares via the mobile account.

An analysis of smartphone and credit access was undertaken for those customers surveyed and using a fare type eligible towards the cap. As shown in Table 3-5, a higher percentage of minority customers (13%) do not have access to a smartphone and a credit card compared to non-minority customers (7%).

**TABLE 3-5: DISTRIBUTION OF CUSTOMER SMARTPHONE & CREDIT CARD ACCESS (MINORITY STATUS)**

| Access to Both Smartphone & Card | Fare Cap Eligible Ticket Purchases by: |     |                    |     |                        |     |
|----------------------------------|--|-----|--------------------|-----|------------------------|-----|
|                                  | Systemwide Customers                   |     | Minority Customers |     | Non-Minority Customers |     |
| No                               | 386                                    | 11% | 327                | 13% | 59                     | 7%  |
| Yes                              | 3,075                                  | 89% | 2,237              | 87% | 838                    | 93% |
| <b>Total</b>                     | <b>3,461</b>                           |     | <b>2,564</b>       |     | <b>897</b>             |     |

Source: CATS 2022 Customer Survey

Similarly, a higher percentage of low-income customers (14%) do not have access to a smartphone and a credit card compared to higher-income customers (10%), as shown in Table 3-6.

**TABLE 3-6: DISTRIBUTION OF CUSTOMER SMARTPHONE & CREDIT CARD ACCESS (INCOME STATUS)**

| Access to Both Smartphone & Card | Fare Cap Eligible Ticket Purchases by: |     |                      |     |                         |     |
|----------------------------------|--|-----|----------------------|-----|-------------------------|-----|
|                                  | Systemwide Customers                   |     | Low-Income Customers |     | Higher-Income Customers |     |
| No                               | 386                                    | 11% | 104                  | 14% | 282                     | 10% |
| Yes                              | 3,075                                  | 89% | 652                  | 86% | 2,423                   | 90% |
| <b>Total</b>                     | <b>3,461</b>                           |     | <b>756</b>           |     | <b>2,705</b>            |     |

Source: CATS 2022 Customer Survey

To help improve access to mobile fares, CATS advertises the Federal Communications Commission's income-based Affordable Connectivity Program (ACP) through which qualifying households can receive one free smartphone and free monthly service.

### Discounted Fare Cap Policy Consideration

CATS' current fare capping policy applies only to full fare options as there is not currently a way to verify customer eligibility for discounted fares through purchases in the CATS-Pass app. Should this verification mechanism be added, CATS could then explore implementing a discounted fare cap policy.

Under a proportional fare cap approach, customers eligible for discounted fares would reach a monthly cap based on the cost of the discounted monthly fare (\$44). This would provide a proportional benefit after the same number of trips as a regular-fare rider, and both regular-fare riders and discounted-fare riders would experience similar percentage discounts for any number of trips. As noted previously, a higher proportion of CATS' low-income customers use discounted tickets/pass options, but do not benefit from a fare cap on the discounted monthly pass value and must, therefore, purchase twice the equivalent fare value to gain benefit of the fare cap.

An analysis of the customer mobile ticket purchases for the April-July dataset used in the financial analysis was undertaken to understand the extent of customers who purchase discounted fares and may benefit from a proportional discounted fare capping policy (Table 3-7). Using the \$44 discounted monthly pass as the cap, a significantly higher percentage of customer mobile accounts that purchase discounted tickets would likely benefit from the discounted fare cap – 4.8% on average compared to 0.6% of mobile accounts purchasing full fare tickets (from Table 2-3).

**TABLE 3-7: # OF REDUCED TICKET MOBILE ACCOUNTS WITH FARE CAP REACHED BY ACTIVATION MONTH**

| Activation Month       | Total # of Mobile Accounts* | Mobile Accounts Where Discounted Fare Cap Reached* |             | Total Fare Value* | \$ / % of Total Fare Value Exceeding Monthly Fare Cap (\$44)* |             |
|------------------------|-----------------------------|--|-------------|-------------------|---|-------------|
|                        |                             | #  | %           |                   |   |             |
| April 2022             | 709                         | 34   | 4.7%        | \$9,304           | \$916   | 9.8%        |
| May 2022               | 660                         | 21   | 3.2%        | \$8,538           | \$586   | 6.9%        |
| June 2022              | 712                         | 24   | 3.3%        | \$8,720           | \$736   | 8.4%        |
| July 2022              | 1,254                       | 81   | 6.4%        | \$19,937          | \$2,270   | 11.4%       |
| <b>Total</b>           | <b>3,336</b>                | <b>159</b>   | <b>--</b>   | <b>\$46,499</b>   | <b>\$4,509</b>  | <b>--</b>   |
| <b>Monthly Average</b> | <b>--</b>                   | <b>--</b>  | <b>4.8%</b> | <b>\$11,625</b>   | <b>\$1,127</b>  | <b>9.7%</b> |

CATS 2022 Customer Survey; total and monthly percentages reflect weighted averages for the four month period.

\*Includes CATS-Pass accounts with only discounted eligible tickets. Customers that purchased both full fare and discounted fare ticket options within a month are not included in this analysis.

## Appendix A: Financial Analysis Detail

TABLE A-1: ANALYSIS OF MOBILE ACCOUNTS WITH FARE CAP REACHED – APRIL 2022

| Mobile Account Sequence* | Fare Type & Amount      |                        |                    |                          | Total Ticket Count | Total Fare Value  | Estimated Fare Cap Benefit |
|--------------------------|-------------------------|------------------------|--------------------|--------------------------|--------------------|-------------------|----------------------------|
|                          | Monthly Pass<br>\$88.00 | Weekly Pass<br>\$30.80 | Day Pass<br>\$6.60 | One-Way Ticket<br>\$2.20 |                    |                   |                            |
| 1                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 2                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 3                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 4                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 5                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 6                        |                         |                        | 13                 | 3                        | 16                 | \$92.40           | \$4.40                     |
| 7                        |                         | 3                      |                    |                          | 3                  | \$92.40           | \$4.40                     |
| 8                        |                         | 3                      |                    |                          | 3                  | \$92.40           | \$4.40                     |
| 9                        | 1                       |                        | 1                  |                          | 2                  | \$94.60           | \$6.60                     |
| 10                       |                         | 3                      |                    | 1                        | 4                  | \$94.60           | \$6.60                     |
| 11                       |                         |                        |                    | 43                       | 43                 | \$94.60           | \$6.60                     |
| 12                       |                         |                        | 6                  | 26                       | 32                 | \$96.80           | \$8.80                     |
| 13                       |                         | 3                      | 1                  |                          | 4                  | \$99.00           | \$11.00                    |
| 14                       |                         | 3                      | 1                  |                          | 4                  | \$99.00           | \$11.00                    |
| 15                       |                         |                        |                    | 49                       | 49                 | \$107.80          | \$19.80                    |
| 16                       |                         |                        |                    | 50                       | 50                 | \$110.00          | \$22.00                    |
| 17                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 18                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 19                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 20                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 21                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 22                       |                         | 5                      |                    |                          | 5                  | \$154.00          | \$66.00                    |
| 23                       |                         |                        |                    | 75                       | 75                 | \$165.00          | \$77.00                    |
| <b>Total</b>             | <b>6</b>                | <b>40</b>              | <b>22</b>          | <b>252</b>               | <b>320</b>         | <b>\$2,459.60</b> | <b>\$435.60</b>            |

Source: CATS Mobile Ticket Purchases (April-July 2022)

\*For privacy purposes, individual mobile account #s not shown.

**TABLE A-2: ANALYSIS OF MOBILE ACCOUNTS WITH FARE CAP REACHED – MAY 2022**

| Mobile Account Sequence* | Fare Type & Amount      |                        |                    |                          | Total Ticket Count | Total Fare Value  | Estimated Fare Cap Benefit |
|--------------------------|-------------------------|------------------------|--------------------|--------------------------|--------------------|-------------------|----------------------------|
|                          | Monthly Pass<br>\$88.00 | Weekly Pass<br>\$30.80 | Day Pass<br>\$6.60 | One-Way Ticket<br>\$2.20 |                    |                   |                            |
| 1                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 2                        |                         |                        |                    | 41                       | 41                 | \$90.20           | \$2.20                     |
| 3                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 4                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 5                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 6                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 7                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 8                        |                         | 3                      |                    |                          | 3                  | \$92.40           | \$4.40                     |
| 9                        |                         | 3                      |                    |                          | 3                  | \$92.40           | \$4.40                     |
| 10                       | 1                       |                        |                    | 2                        | 3                  | \$92.40           | \$4.40                     |
| 11                       | 1                       |                        |                    | 2                        | 3                  | \$92.40           | \$4.40                     |
| 12                       | 1                       |                        |                    | 2                        | 3                  | \$92.40           | \$4.40                     |
| 13                       | 1                       |                        |                    | 2                        | 3                  | \$92.40           | \$4.40                     |
| 14                       |                         | 3                      |                    |                          | 3                  | \$92.40           | \$4.40                     |
| 15                       |                         | 3                      |                    |                          | 3                  | \$92.40           | \$4.40                     |
| 16                       | 1                       |                        | 1                  |                          | 2                  | \$94.60           | \$6.60                     |
| 17                       | 1                       |                        | 1                  |                          | 2                  | \$94.60           | \$6.60                     |
| 18                       |                         |                        |                    | 43                       | 43                 | \$94.60           | \$6.60                     |
| 19                       |                         | 3                      | 2                  |                          | 5                  | \$105.60          | \$17.60                    |
| 20                       |                         | 3                      | 3                  |                          | 6                  | \$112.20          | \$24.20                    |
| 21                       |                         | 3                      |                    | 11                       | 14                 | \$116.60          | \$28.60                    |
| 22                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 23                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 24                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 25                       |                         | 5                      |                    |                          | 5                  | \$154.00          | \$66.00                    |
| 26                       |                         |                        |                    | 73                       | 73                 | \$160.60          | \$72.60                    |
| <b>Total</b>             | <b>12</b>               | <b>38</b>              | <b>7</b>           | <b>182</b>               | <b>239</b>         | <b>\$2,673.00</b> | <b>\$385.00</b>            |

Source: CATS Mobile Ticket Purchases (April-July 2022)

\*For privacy purposes, individual mobile account #s not shown.

**TABLE A-3: ANALYSIS OF MOBILE ACCOUNTS WITH FARE CAP REACHED – JUNE 2022**

| Mobile Account Sequence* | Fare Type & Amount      |                        |                    |                          | Total Ticket Count | Total Fare Value  | Estimated Fare Cap Benefit |
|--------------------------|-------------------------|------------------------|--------------------|--------------------------|--------------------|-------------------|----------------------------|
|                          | Monthly Pass<br>\$88.00 | Weekly Pass<br>\$30.80 | Day Pass<br>\$6.60 | One-Way Ticket<br>\$2.20 |                    |                   |                            |
| 1                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 2                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 3                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 4                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 5                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 6                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 7                        | 1                       |                        |                    | 1                        | 2                  | \$90.20           | \$2.20                     |
| 8                        | 1                       |                        |                    | 2                        | 3                  | \$92.40           | \$4.40                     |
| 9                        |                         | 3                      |                    |                          | 3                  | \$92.40           | \$4.40                     |
| 10                       |                         | 3                      |                    |                          | 3                  | \$92.40           | \$4.40                     |
| 11                       | 1                       |                        |                    | 2                        | 3                  | \$92.40           | \$4.40                     |
| 12                       | 1                       |                        |                    | 2                        | 3                  | \$92.40           | \$4.40                     |
| 13                       | 1                       |                        |                    | 2                        | 3                  | \$92.40           | \$4.40                     |
| 14                       | 1                       |                        |                    | 2                        | 3                  | \$92.40           | \$4.40                     |
| 15                       |                         | 3                      |                    |                          | 3                  | \$92.40           | \$4.40                     |
| 16                       |                         | 3                      |                    |                          | 3                  | \$92.40           | \$4.40                     |
| 17                       |                         | 3                      |                    | 1                        | 4                  | \$94.60           | \$6.60                     |
| 18                       |                         | 3                      |                    | 1                        | 4                  | \$94.60           | \$6.60                     |
| 19                       | 1                       |                        |                    | 4                        | 5                  | \$96.80           | \$8.80                     |
| 20                       |                         |                        | 14                 | 4                        | 18                 | \$101.20          | \$13.20                    |
| 21                       | 1                       |                        | 2                  |                          | 3                  | \$101.20          | \$13.20                    |
| 22                       |                         | 3                      |                    | 6                        | 9                  | \$105.60          | \$17.60                    |
| 23                       |                         | 3                      | 2                  | 2                        | 7                  | \$110.00          | \$22.00                    |
| 24                       |                         | 2                      | 9                  |                          | 11                 | \$121.00          | \$33.00                    |
| 25                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 26                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 27                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 28                       |                         | 5                      |                    |                          | 5                  | \$154.00          | \$66.00                    |
| 29                       |                         |                        |                    | 74                       | 74                 | \$162.80          | \$74.80                    |
| <b>Total</b>             | <b>14</b>               | <b>43</b>              | <b>27</b>          | <b>109</b>               | <b>193</b>         | <b>\$2,974.40</b> | <b>\$422.40</b>            |

Source: CATS Mobile Ticket Purchases (April-July 2022)

\*For privacy purposes, individual mobile account #s not shown.

TABLE A-4: ANALYSIS OF MOBILE ACCOUNTS WITH FARE CAP REACHED – JULY 2022

| Mobile Account Sequence* | Fare Type & Amount      |                        |                    |                          | Total Ticket Count | Total Fare Value | Estimated Fare Cap Benefit |
|--------------------------|-------------------------|------------------------|--------------------|--------------------------|--------------------|------------------|----------------------------|
|                          | Monthly Pass<br>\$88.00 | Weekly Pass<br>\$30.80 | Day Pass<br>\$6.60 | One-Way Ticket<br>\$2.20 |                    |                  |                            |
| 1                        | 1                       |                        |                    | 1                        | 2                  | \$90.20          | \$2.20                     |
| 2                        | 1                       |                        |                    | 1                        | 2                  | \$90.20          | \$2.20                     |
| 3                        | 1                       |                        |                    | 1                        | 2                  | \$90.20          | \$2.20                     |
| 4                        | 1                       |                        |                    | 1                        | 2                  | \$90.20          | \$2.20                     |
| 5                        | 1                       |                        |                    | 1                        | 2                  | \$90.20          | \$2.20                     |
| 6                        | 1                       |                        |                    | 1                        | 2                  | \$90.20          | \$2.20                     |
| 7                        | 1                       |                        |                    | 1                        | 2                  | \$90.20          | \$2.20                     |
| 8                        | 1                       |                        |                    | 1                        | 2                  | \$90.20          | \$2.20                     |
| 9                        | 1                       |                        |                    | 1                        | 2                  | \$90.20          | \$2.20                     |
| 10                       |                         |                        | 14                 |                          | 14                 | \$92.40          | \$4.40                     |
| 11                       |                         | 3                      |                    |                          | 3                  | \$92.40          | \$4.40                     |
| 12                       |                         | 3                      |                    |                          | 3                  | \$92.40          | \$4.40                     |
| 13                       |                         | 3                      |                    |                          | 3                  | \$92.40          | \$4.40                     |
| 14                       |                         |                        |                    | 42                       | 42                 | \$92.40          | \$4.40                     |
| 15                       | 1                       |                        |                    | 2                        | 3                  | \$92.40          | \$4.40                     |
| 16                       |                         |                        |                    | 42                       | 42                 | \$92.40          | \$4.40                     |
| 17                       | 1                       |                        |                    | 2                        | 3                  | \$92.40          | \$4.40                     |
| 18                       |                         |                        |                    | 42                       | 42                 | \$92.40          | \$4.40                     |
| 19                       | 1                       |                        |                    | 2                        | 3                  | \$92.40          | \$4.40                     |
| 20                       |                         | 3                      |                    |                          | 3                  | \$92.40          | \$4.40                     |
| 21                       | 1                       |                        |                    | 2                        | 3                  | \$92.40          | \$4.40                     |
| 22                       | 1                       |                        | 1                  |                          | 2                  | \$94.60          | \$6.60                     |
| 23                       |                         |                        |                    | 43                       | 43                 | \$94.60          | \$6.60                     |
| 24                       |                         | 3                      |                    | 1                        | 4                  | \$94.60          | \$6.60                     |
| 25                       |                         |                        | 1                  | 41                       | 42                 | \$96.80          | \$8.80                     |
| 26                       | 1                       |                        |                    | 4                        | 5                  | \$96.80          | \$8.80                     |
| 27                       | 1                       |                        | 1                  | 1                        | 3                  | \$96.80          | \$8.80                     |
| 28                       |                         |                        |                    | 44                       | 44                 | \$96.80          | \$8.80                     |
| 29                       |                         |                        | 2                  | 38                       | 40                 | \$96.80          | \$8.80                     |
| 30                       |                         |                        | 14                 | 3                        | 17                 | \$99.00          | \$11.00                    |
| 31                       |                         | 3                      |                    | 3                        | 6                  | \$99.00          | \$11.00                    |
| 32                       |                         | 3                      | 1                  |                          | 4                  | \$99.00          | \$11.00                    |
| 33                       |                         |                        |                    | 45                       | 45                 | \$99.00          | \$11.00                    |
| 34                       |                         | 3                      | 1                  | 1                        | 5                  | \$101.20         | \$13.20                    |
| 35                       |                         | 1                      | 11                 |                          | 12                 | \$103.40         | \$15.40                    |
| 36                       |                         | 3                      |                    | 5                        | 8                  | \$103.40         | \$15.40                    |
| 37                       |                         | 3                      |                    | 5                        | 8                  | \$103.40         | \$15.40                    |
| 38                       |                         | 3                      |                    | 5                        | 8                  | \$103.40         | \$15.40                    |
| 39                       |                         |                        | 3                  | 38                       | 41                 | \$103.40         | \$15.40                    |
| 40                       |                         |                        | 16                 |                          | 16                 | \$105.60         | \$17.60                    |
| 41                       |                         |                        | 1                  | 45                       | 46                 | \$105.60         | \$17.60                    |
| 42                       |                         | 3                      | 2                  |                          | 5                  | \$105.60         | \$17.60                    |

| Mobile Account Sequence* | Fare Type & Amount      |                        |                    |                          | Total Ticket Count | Total Fare Value  | Estimated Fare Cap Benefit |
|--------------------------|-------------------------|------------------------|--------------------|--------------------------|--------------------|-------------------|----------------------------|
|                          | Monthly Pass<br>\$88.00 | Weekly Pass<br>\$30.80 | Day Pass<br>\$6.60 | One-Way Ticket<br>\$2.20 |                    |                   |                            |
| 43                       |                         | 3                      | 2                  |                          | 5                  | \$105.60          | \$17.60                    |
| 44                       |                         | 1                      |                    | 34                       | 35                 | \$105.60          | \$17.60                    |
| 45                       |                         | 1                      | 5                  | 20                       | 26                 | \$107.80          | \$19.80                    |
| 46                       |                         | 2                      | 7                  |                          | 9                  | \$107.80          | \$19.80                    |
| 47                       | 1                       |                        | 3                  |                          | 4                  | \$107.80          | \$19.80                    |
| 48                       |                         | 3                      |                    | 7                        | 10                 | \$107.80          | \$19.80                    |
| 49                       |                         |                        |                    | 49                       | 49                 | \$107.80          | \$19.80                    |
| 50                       |                         |                        |                    | 49                       | 49                 | \$107.80          | \$19.80                    |
| 51                       |                         | 3                      |                    | 7                        | 10                 | \$107.80          | \$19.80                    |
| 52                       |                         | 3                      | 2                  | 1                        | 6                  | \$107.80          | \$19.80                    |
| 53                       |                         | 3                      | 2                  | 1                        | 6                  | \$107.80          | \$19.80                    |
| 54                       |                         | 1                      | 11                 | 3                        | 15                 | \$110.00          | \$22.00                    |
| 55                       |                         |                        |                    | 51                       | 51                 | \$112.20          | \$24.20                    |
| 56                       |                         |                        | 5                  | 38                       | 43                 | \$116.60          | \$28.60                    |
| 57                       |                         |                        | 18                 |                          | 18                 | \$118.80          | \$30.80                    |
| 58                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 59                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 60                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 61                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 62                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 63                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 64                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 65                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 66                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 67                       | 1                       |                        |                    | 16                       | 17                 | \$123.20          | \$35.20                    |
| 68                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 69                       |                         | 4                      |                    |                          | 4                  | \$123.20          | \$35.20                    |
| 70                       |                         |                        | 17                 | 6                        | 23                 | \$125.40          | \$37.40                    |
| 71                       |                         | 4                      |                    | 1                        | 5                  | \$125.40          | \$37.40                    |
| 72                       | 1                       | 1                      |                    | 5                        | 7                  | \$129.80          | \$41.80                    |
| 73                       |                         |                        |                    | 59                       | 59                 | \$129.80          | \$41.80                    |
| 74                       |                         | 4                      |                    | 4                        | 8                  | \$132.00          | \$44.00                    |
| 75                       |                         |                        |                    | 60                       | 60                 | \$132.00          | \$44.00                    |
| 76                       |                         |                        | 21                 |                          | 21                 | \$138.60          | \$50.60                    |
| 77                       |                         | 2                      |                    | 37                       | 39                 | \$143.00          | \$55.00                    |
| 78                       |                         |                        |                    | 65                       | 65                 | \$143.00          | \$55.00                    |
| <b>Total</b>             | <b>19</b>               | <b>112</b>             | <b>161</b>         | <b>978</b>               | <b>1270</b>        | <b>\$8,335.80</b> | <b>\$1,471.80</b>          |

Source: CATS Mobile Ticket Purchases (April-July 2022)

\*For privacy purposes, individual mobile account #s not shown.





# Title VI Fare Equity Analysis Fare Capping

Presented to:  
**Metropolitan Transit Commission**

Arlanda Rouse  
CATS Civil Rights Officer

April 26, 2023

1



## Title VI Definition

No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance



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- **Minority** is defined as a person who identifies being part of one or more racial/ethnic groups besides White, non-Hispanic. Customer responses during survey questions regarding their race and Hispanic ethnicity were used to determine minority status.
- **Low-Income** is defined as a person whose median household income is at or below the U.S. Department of Health and Human Services (HHS) poverty guidelines. Customer responses during survey questions regarding their annual household income and number of people living in their household were used to determine low-income status.

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- CATS CivR01:** A fare change review will be conducted anytime
- Any change to the passenger fare charged by the organization for service
  - Any change to the type of media used for consideration of for fare



4



## Fare Capping

- Fare Capping is the rewarding of a CATS Monthly pass for the remainder of the calendar month after a passenger's monthly spend total reaches the fare equivalent of a **local Monthly pass** (\$88) through purchases on the Mobile App
- Implemented to assist customers who ride frequently but cannot afford the upfront cost of a monthly pass and improve the rider experience
- Pilot program started September 21, 2022



## Assumptions

- Fares counted toward the fare cap are; Regular one way, Regular day pass, Regular weekly, and Regular monthly
- Fare cap based upon cost of a full fare monthly pass
- Reduced fares for local bus, and other fares such as Express bus, Express Regional are not counted toward cap

| Pass Type             | Cost    |
|-----------------------|---------|
| Regular One Way       | \$2.20  |
| Regular Day Pass      | \$6.60  |
| Regular Weekly        | \$30.80 |
| Regular Local Monthly | \$88.00 |

- Analyzed fares purchased by customers through the CATS mobile App from April – July 2022.
- Only passes activated during the calendar month were analyzed and counted toward the fare cap

Table 2-1 Summary of Ticket Count by Activation Month

| Activation Period | Fare Type & Value       |                        |                    |                          | Total Activated Ticket Count |
|-------------------|-------------------------|------------------------|--------------------|--------------------------|------------------------------|
|                   | Monthly Pass<br>\$88.00 | Weekly Pass<br>\$30.80 | Day Pass<br>\$6.60 | One-Way Ticket<br>\$2.20 |                              |
| April 2022        | 97                      | 126                    | 1,166              | 16,181                   | 17,570                       |
| May 2022          | 169                     | 125                    | 944                | 15,831                   | 17,069                       |
| June 2022         | 225                     | 124                    | 954                | 14,861                   | 16,164                       |
| July 2022         | 177                     | 251                    | 1,902              | 40,117                   | 42,447                       |
| <b>Total</b>      | <b>668</b>              | <b>626</b>             | <b>4,966</b>       | <b>86,990</b>            | <b>93,250</b>                |

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- A higher percentage of minority customers use a fare type which is eligible for the Fare Cap
- Minorities eligible fare usage is 18% higher than Systemwide usage
- Low income is 0.6% higher than Systemwide usage

Table 3-1 Distribution of Weekday Minority & Low Income Customers

| CATS Customers (weekday)                     | Minority Customers | Low-Income Customers |
|--|--------------------|----------------------|
| Systemwide                                   | 62.6%              | 21.8%                |
| Fare Type Eligible for Fare Cap <sup>1</sup> | 74.1%              | 22.4%                |

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- Minority customers are more likely to purchase lower cost one-way tickets and less likely to purchase higher cost multi-trip passes

Table 3-3 Distribution of Ticket Purchases by Ticket Type

| Fare Type    | Amount  | All Customers |     | Minority Customers |     | Non-Minority Customers |     |
|--------------|---------|---------------|-----|--------------------|-----|------------------------|-----|
| One-Way      | \$2.20  | 2,173         | 63% | 1,668              | 65% | 505                    | 56% |
| Day Pass     | \$6.60  | 211           | 6%  | 150                | 6%  | 61                     | 7%  |
| Weekly Pass  | \$30.80 | 451           | 13% | 287                | 11% | 164                    | 18% |
| Monthly Pass | \$88.00 | 626           | 18% | 459                | 18% | 167                    | 19% |
| <b>Total</b> |         | <b>3,461</b>  |     | <b>2,564</b>       |     | <b>897</b>             |     |



- Low income customers are more likely to purchase higher cost multi-trip passes. and less likely to purchase higher cost multi-trip passes
  - ❖ A higher percentage of low income customers purchase discounted tickets/passes compared to higher income customers
  - ❖ Lower income customers ride more frequently 86% compared to 82% for higher income

Table 3-4 Distribution of Ticket Purchases by Ticket Type

| Fare Type    | Amount  | All Customers |     | Low-Income Customers |     | Higher Income Customers |     |
|--------------|---------|---------------|-----|----------------------|-----|-------------------------|-----|
| One-Way      | \$2.20  | 2,173         | 63% | 435                  | 58% | 1,738                   | 64% |
| Day Pass     | \$6.60  | 211           | 6%  | 35                   | 5%  | 176                     | 7%  |
| Weekly Pass  | \$30.80 | 451           | 13% | 144                  | 19% | 307                     | 11% |
| Monthly Pass | \$88.00 | 626           | 18% | 142                  | 19% | 484                     | 18% |
| <b>Total</b> |         | <b>3,461</b>  |     | <b>756</b>           |     | <b>2,705</b>            |     |

**Summary**

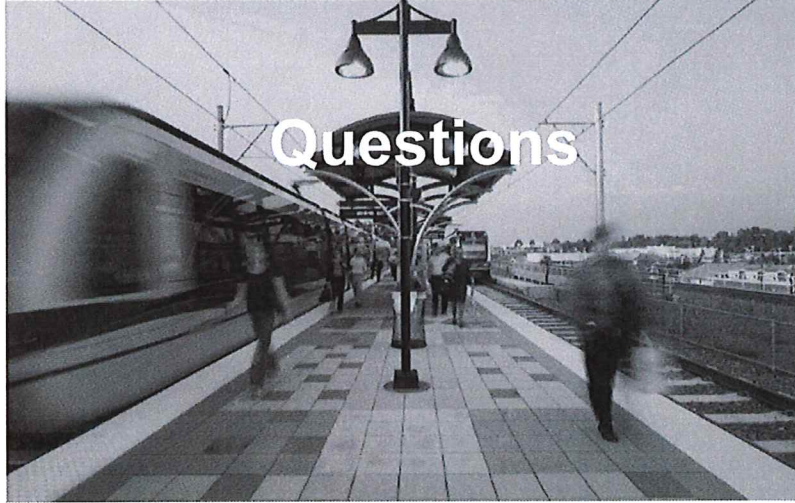
- No potential disparate impact / disproportionate representation on minority riders associated with the introduction of a fare capping policy
- No potential disproportionate burden on low income riders associated with the introduction of the fare capping policy
- The findings found that customers who reach the cap will benefit from this policy by paying less in fares over the course of the calendar month
- The findings do not prompt CATS to consider measures to avoid, minimize, and/or mitigate adverse impacts on minority or low income riders within the parameters of the current analysis.

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**Other Considerations**

- A higher percentage of minority and low income customers do not have access to credit cards and smartphones.
- CATS does advertise the FCC income based Affordable Connectivity Program (One free smartphone and monthly service)
- Only full fare options available for the fare cap. CATS does not currently have a way to verify customer eligibility for discounted fares through the App.

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**METROPOLITAN TRANSIT COMMISSION  
ACTION ITEM  
STAFF SUMMARY**

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**SUBJECT: MTC Approval  
FY2024 Transit Operating Budget & Debt Services Budget  
FY2024-2028 Transit Capital Investment Plan (CIP)**

**DATE: April 26, 2023**

---

**1.0 ACTION:**

In compliance with the Transit Governance Interlocal Agreement, the Metropolitan Transit Commission is required to act on CATS' operating budgets and capital improvement plans by April 30 of each year.

MTC Action is included in Resolution **2023-03**

**2.0 BACKGROUND:**

On January 31, 2023, CATS presented the CEO's preliminary FY2024 Operating Budget, FY2024 Debt Service Budget, and FY2024-2028 Capital Investment Plan (CIP) to the Metropolitan Transit Commission.

Key elements of the Operating Budgets are:

- Safety and Security:
  - Additional funds budgeted for safety and security improvements for riders and staff. These include increased funding for our security services contract and security improvements to our facilities.
- Valuing Employees:
  - Funding added to continue addressing short-term compensation and staffing issues. Additional funds also added to start the eServe Academy, fund a comprehensive rate and compensation study, and right-size CATS' workforce based on business needs, operational tempo, and other requirements.
- Maintenance and Asset Preservation:
  - Increased maintenance funding for facilities, bus, and rail.

Key elements of the Capital Budgets are:

- State of Good Repair:
  - Priorities including accelerated replacement of fixed route buses with hybrid and fully electric buses, Special Transportation Services (STS) buses, and Vanpool Vehicles. Additional funding has also been programed to ensure buses, rail vehicles, and supporting facilities are maintained at acceptable levels.
- Transit Safety & Security:
  - Upgrading cameras, replacing mobile video systems, and replacing access control systems are included in this category.
- Long-Range Capital Improvements:
  - Includes funding for an ADA Transition Plan, Silverline Design, and Platform Extensions.
- Technology Upgrades:
  - Focuses on enhancing delivery of transit services, asset & financial management, including replacing the City's Enterprise System,

**3.0 RECOMMENDATION:**

CATS Chief Executive Officer recommends approval of the following budgets:  
FY2024 Operating Budget  
FY2024 Debt Service Budget  
FY2024-2028 Capital Investment Plan

**4.0 ATTACHMENT(S):** CATS FY2024 Proposed Operating and Debt Service Budget and FY2024-2028 Proposed Capital Investment Plan Information Booklet (Submitted separately prior to meeting)

**SUBMITTED AND RECOMMENDED BY:**



---

**Brent Cagle**  
**Interim Chief Executive Officer, Charlotte Area Transit System**  
**Assistant City Manager, City of Charlotte**

**RESOLUTION**

**No. 2023-03**

**ADOPTION OF THE FY2024 TRANSIT OPERATING BUDGET, FY2024 TRANSIT DEBT SERVICE BUDGET AND FY2024-2028 CAPITAL INVESTMENT PLAN**

A motion was made by \_\_\_\_\_ (\_\_\_\_\_) and seconded by \_\_\_\_\_ (\_\_\_\_\_) for the adoption of the following resolution, and upon being put to a vote was duly adopted by the Metropolitan Transit Commission (MTC).

WHEREAS, The Amended Transit Governance Interlocal Agreement (11-28-2005) provides that the Chief Transit Official shall submit to the MTC by January 30 of each year a proposed transit budget and program delineating the public transit services, activities and programs to be undertaken in the upcoming fiscal year starting July 1, and the financial resources required to carry out the services, activities and programs, and

WHEREAS, the Chief Transit Official provided preliminary budget and program recommendations to the MTC on January 31, 2023, which have been developed in compliance with CATS Mission, Vision, Strategic Goals and Financial and Fare Policies, and

WHEREAS, the Chief Transit Official's recommended budgets and programs have been reviewed by the Citizens Transit Advisory Group and the Transit Services Advisory Committee in accordance with the provisions of the Transit Governance Interlocal Agreement and the Metropolitan Transit Commission Rules of Procedures, and

WHEREAS the Metropolitan Transit Commission has reviewed the recommended FY2024 Transit Operating and Debt Service Budgets and Programs and the FY2024-2028 Capital Investment Plan and Projects to determine the transit program plans for meeting transportation needs of the Charlotte-Mecklenburg community,

NOW THEREFORE, be it resolved that the Metropolitan Transit Commission hereby

1. Approves the FY2024 Transit Operating Budget, the FY2024 Transit Debt Service Budget and the FY2024-2028 Transit Capital Investment Plan (attached to this Resolution)
2. Authorizes Chief Transit Official to present the FY2024 Transit Operating Budget, the FY2024 Debt Service Budget and the FY2024-2028 Capital Investment Plan to the Charlotte City Council for their review, approval, and inclusion in the City of Charlotte's FY2024 Budget Ordinance.

This resolution shall take effect immediately upon its adoption.

---

I, **City of Charlotte Mayor Vi Lyles, Chairwoman of the Metropolitan Transit Commission** do hereby certify that the above Resolution is a true and correct documentation of the MTC's action from their meeting duly held on April 26, 2023.

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Signature of MTC Chairwoman

# FY 2024 Preliminary Operating Budget & FY 2024 – FY 2028 Capital Improvement Plan For Metropolitan Transit Commission Approval

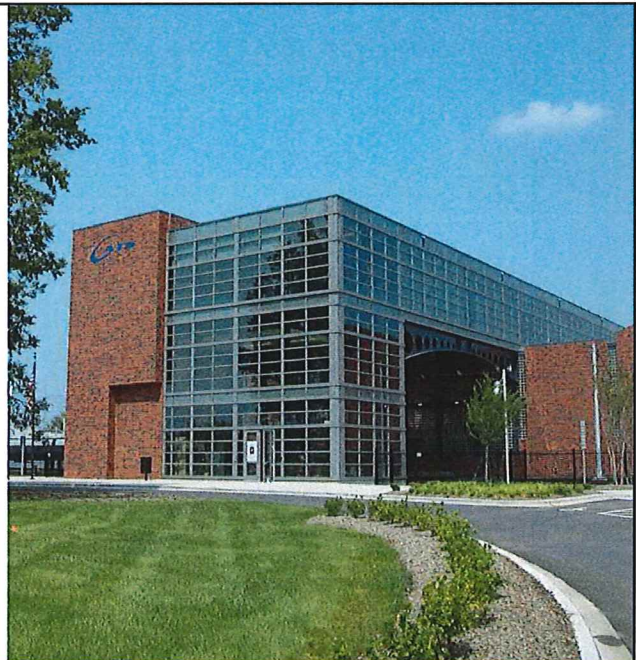
Presentation to Metropolitan Transit Commission  
April 26, 2023



1

## Discussion

- ▶ Budget Process
- ▶ CEO Focus Areas
- ▶ Operating Budget
- ▶ Debt Service Budget
- ▶ Capital Investment Program

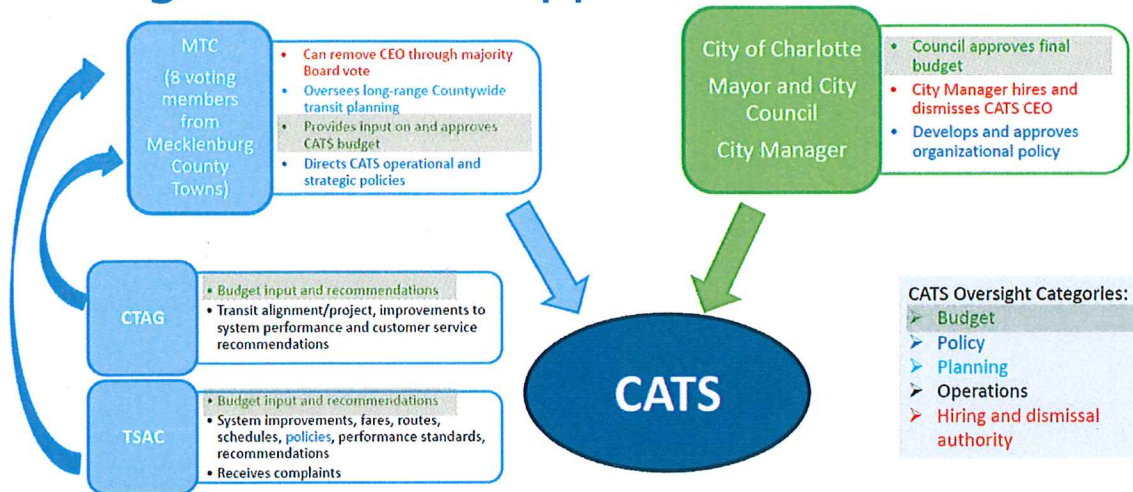


2



2

# Budget Review & Approval Process



Source: Management Partners CATS Management Roadmap

3



3

## CEO Focus Areas

- ▶ Balanced Budget
- ▶ Safety and Security
- ▶ Valuing Employees
- ▶ Maintenance & Asset Preservation



4



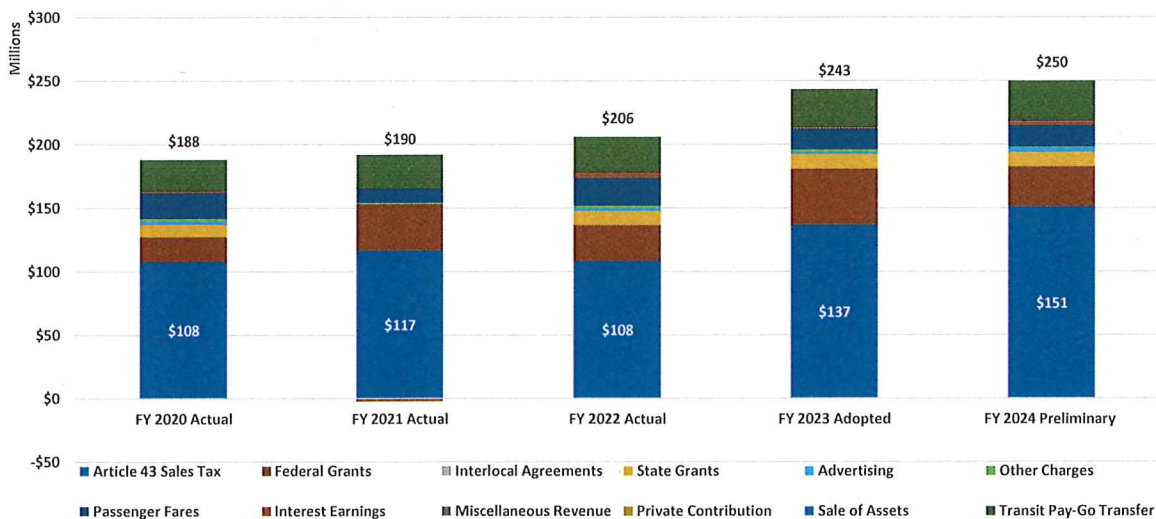
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# Preliminary Operating & Debt Service



5

## Preliminary Operating Revenues

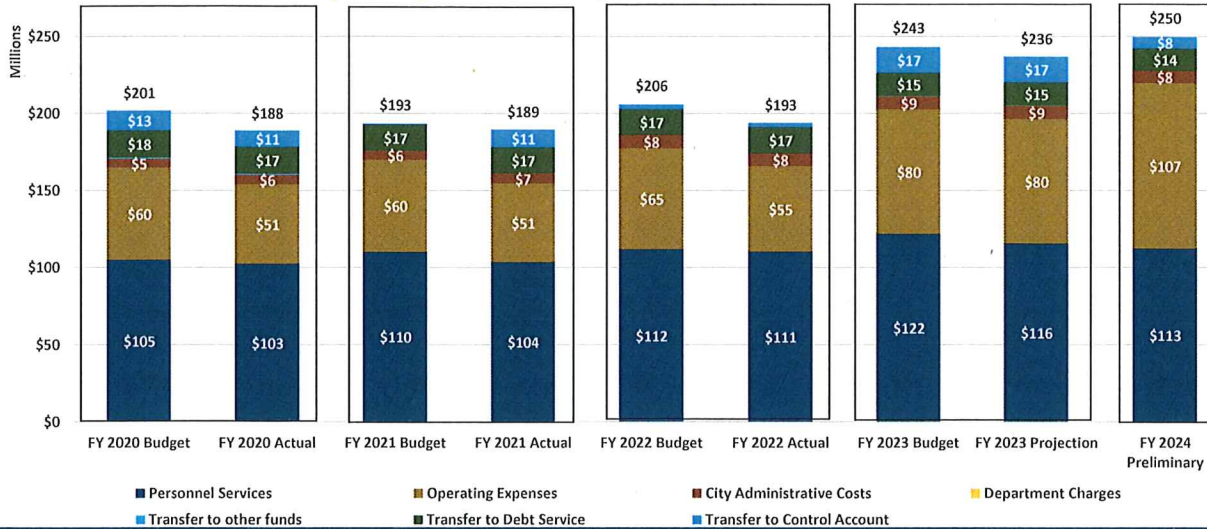


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6

# Preliminary Operating Expenses



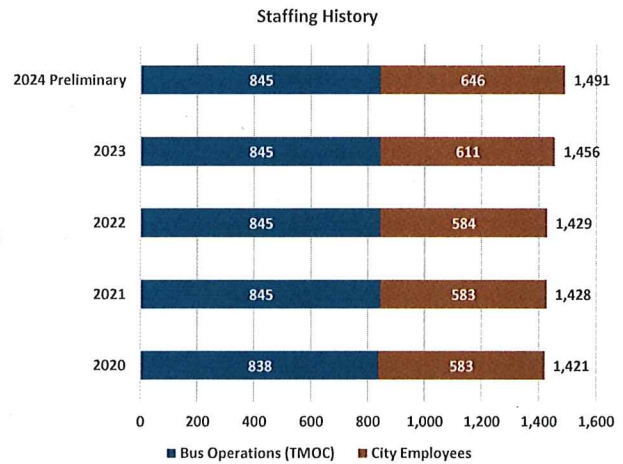
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7

# Enhancements

- ▶ Safety and Security
  - Funding for expanded security contract
  - Funding for operators and employee training
  - Expand the transit ambassador program
- ▶ Valuing Employees
  - eServe Academy – 4 program staff plus funding for 14 apprentices and 10 interns
  - Rate & Compensation Study
  - Right sizing workforce based on operational tempo and current needs – 30 FTEs
- ▶ Maintenance & Asset Preservation
  - Increased preventative maintenance for facilities, bus, and rail



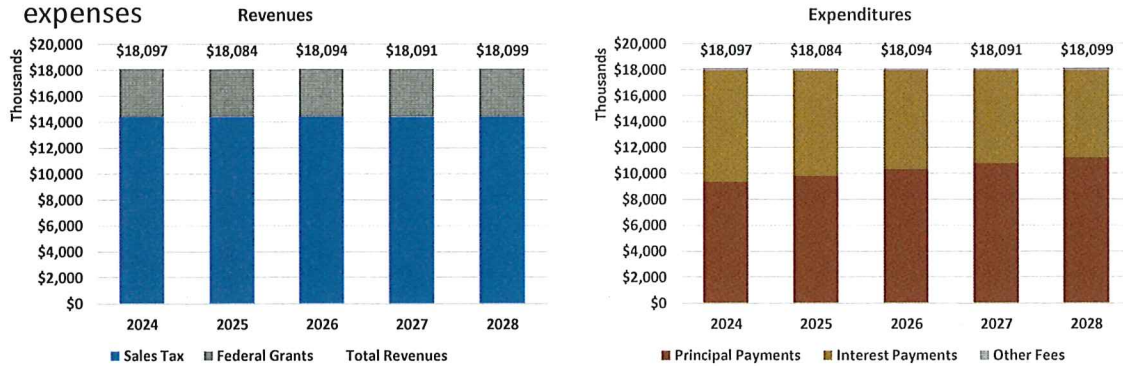
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# FY 2024 Debt Service

- ▶ FY2024 Debt Service Budget ~\$18.1 million
- ▶ Transit Sales Tax, Federal and State grant funds pay annual principal and interest expenses



- ▶ No new debt issuance programed for FY 2024



# Preliminary Capital Investment Plan

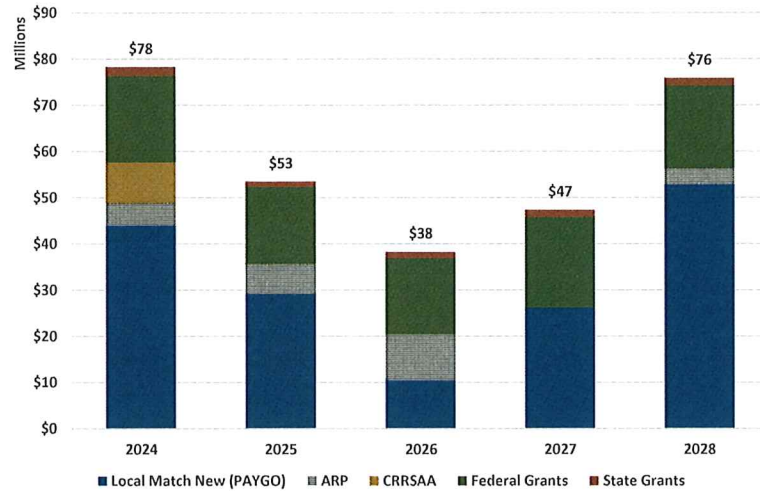




# FY 2024 – FY 2028 CIP Sources of Funds

## FY 2024 Highlights

- ▶ Utilizes ~\$27 million in reserve funds to increase bus purchases
- ▶ Utilizes ~\$10 million in reserve funds for other projects and equipment purchases
- ▶ Working with City Finance to develop a long-term funding strategy for future revenue vehicle purchases



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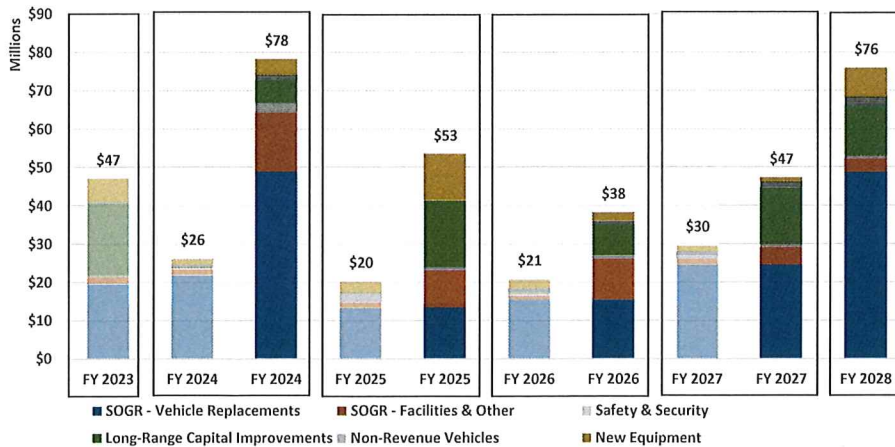


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# FY 2024 – FY 2028 CIP Expenditures

## FY 2024 Highlights

- ▶ 37 Replacement Buses
- ▶ 19 Replacement STS Vehicles
- ▶ Transit Planning
- ▶ ADA Improvements
- ▶ Security Improvements
- ▶ Continues prior-year initiatives

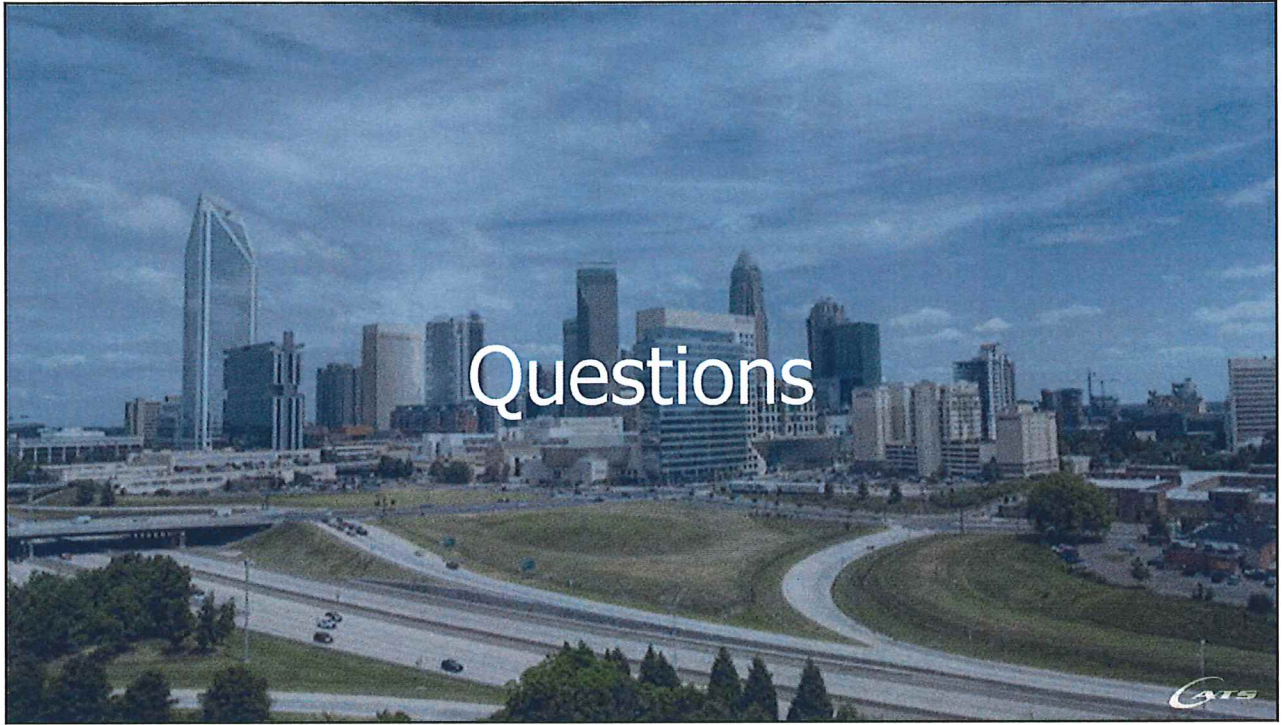


Notes:  
 1. Shaded columns represent FY 2023 to FY 2027 CIP  
 2. FY2024 Preliminary Capital Budget excludes carry over amounts  
 3. Excludes Grant-Funded Operating Projects

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