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**New York State Office of the State Comptroller**  
Thomas P. DiNapoli

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Division of State Government Accountability

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# **Train On-Time Performance**

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## **Metropolitan Transportation Authority: New York City Transit**

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Report 2014-S-56

August 2015

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# Executive Summary

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## Purpose

To determine whether the Metropolitan Transportation Authority's New York City Transit trains run on time, and whether actions are taken to address recurring problems that reduce on-time performance. The audit covers the period March 1, 2013 to January 23, 2015.

## Background

The Metropolitan Transportation Authority's (MTA) New York City Transit (Transit) provides rapid transit services in New York City, 24 hours a day, 7 days a week. The MTA's website lists schedules for each of the subways' 20 interconnected lines and three shuttles.

Sometimes, a subway train is canceled (i.e., does not depart from the terminal, or departs later than half the headway time), or is abandoned en route (i.e., skips any scheduled station stops or fails to operate on its scheduled route in accordance with the timetable). Transit's Department of Subways (Subways) considers a train on time when it is not canceled or abandoned en route, and it arrives at the end terminal not more than five minutes after its scheduled arrival time.

Subways' Department of Rapid Transit Operations uses its Rail Control Center's Performance Reporting and Operations Analysis Group to report train delay percentages for each line, delays by categories, and on-time performance (OTP) statistics to management and the MTA Board's Transit and Bus Committee (Committee). The information is provided on a two-month delay.

Subways collects information of its daily operations pertaining to delays and distributes it the next day, via the Statistical Transportation Analysis and Reporting System (STARS), to its district managers and Transit support units, such as Maintenance of Way, Division of Car Equipment, and Operations Planning. OTP statistics are reported separately for weekdays and weekends. For calendar years 2013 and 2014, Subways OTP goal was 91.9 percent.

## Key Findings

- For calendar years 2013 and 2014, Subways' reports show actual OTP was well below the goal of 91.9 percent. For 2013, weekday OTP averaged 80.5 percent and weekend OTP averaged 85.4 percent. For 2014, weekday OTP averaged 74.0 percent and weekend OTP averaged 81.2 percent. On balance, there has been a persistent decline in OTP during the period.
- For the period March 2013 through March 2014, Subways reported 498,889 total delays. We reviewed four categories of delays (Right of Way, Employee, Track Gangs, and Car Equipment) that resulted in 269,008 (or 53.9 percent) of the delays to determine the actions Subways took to address their causes and reduce their occurrence. In most cases, Subways took appropriate actions to address individual incidents as they occurred. However, Subways lacked a formal process to assess the underlying causes of the delays and develop comprehensive corrective action plans to help minimize them.
- According to Subways officials, there are multiple workgroups and committees (including a Delay Management Workgroup) dedicated to improving service and reducing delays. In addition, there are monthly reviews of operational performance performed by the Office of the Senior

Vice President. Yet, there was no evidence that any workgroup, committee, or office developed formal plans or programs to communicate initiatives to address the root causes of delays and improve OTP.

### **Key Recommendations**

- Identify the underlying causes of recurring train delays and develop corrective action plans to proactively address those causes. Such plans should address the effectiveness of workgroup efforts, identify responsible parties, and require written feedback and measurable solutions.
- Require monthly feedback from Subways managers on the action taken to address recurring categories of train delays.

**State of New York  
Office of the State Comptroller**

**Division of State Government Accountability**

August 12, 2015

Mr. Thomas F. Prendergast  
Chairman and Chief Executive Officer  
Metropolitan Transportation Authority  
347 Madison Avenue  
New York, NY 10017

Dear Mr. Prendergast:

The Office of the State Comptroller is committed to helping State agencies, public authorities, and local government agencies manage their resources efficiently and effectively. By so doing, it provides accountability for tax dollars spent to support government operations. The Comptroller oversees the fiscal affairs of State agencies, public authorities, and local government agencies, as well as their compliance with relevant statutes and their observance of good business practices. This fiscal oversight is accomplished, in part, through our audits, which identify opportunities for improving operations. Audits can also identify strategies for reducing costs and strengthening controls that are intended to safeguard assets.

Following is a report of our audit of New York City Transit, entitled *Train On-Time Performance*. This audit was performed pursuant to the State Comptroller's authority under Article X, Section 5 of the State Constitution and Section 2803 of the Public Authorities Law.

This audit's results and recommendations are resources for you to use in effectively managing your operations and in meeting the expectations of taxpayers. If you have any questions about this report, please feel free to contact us.

Respectfully submitted,

*Office of the State Comptroller  
Division of State Government Accountability*

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This report is also available on our website at: [www.osc.state.ny.us](http://www.osc.state.ny.us)

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## Background

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The Metropolitan Transportation Authority's (MTA) New York City Transit (Transit) provides rapid transit services. Transit's Department of Subways (Subways) operates New York City's (City) subway lines, 24 hours a day, seven days a week. The MTA's website lists schedules for each of Subways' 20 interconnected lines and three shuttles.

Sometimes, a subway train is canceled (i.e., does not depart from the terminal, or departs later than half the headway time), or is abandoned en route (i.e., skips any scheduled station stops or fails to operate on its scheduled route in accordance with the timetable). Subways considers a train on time when it is not canceled or abandoned en route, and it arrives at the end terminal not more than five minutes after its scheduled arrival time.

Subways' Department of Rapid Transit Operations (RTO), the unit responsible for the day-to-day train operations, divides the system into the #7 train and five districts, each comprising several train lines. RTO uses its Rail Control Center's (RCC) Performance Reporting and Operations Analysis Group to report train delay percentages for each line, delays by categories, and on-time performance (OTP) statistics to management and the MTA Board's Transit and Bus Committee (Committee). The information is provided on a two-month delay.

Subways collects information of its daily operations pertaining to delays and distributes it the next day, via the Statistical Transportation Analysis and Reporting System (STARS), to its district managers and Transit support units, such as Maintenance of Way (MOW), Division of Car Equipment (DCE), and Operations Planning (OP). Subways' OTP for a month is calculated as the number of on-time trains divided by the total number of scheduled trains. Statistics are reported separately for weekdays and weekends. For calendar years 2013 and 2014, Subways OTP goal was 91.9 percent. Subways practice is to set the goal based on a three-year average with a 5 percent improvement, but no lower than the previous year's goal.

MTA constituent agencies have established Key Performance Indicators (KPI), which are important metrics for determining whether overall service meets the agencies' performance goals. Terminal On-Time Performance accounts for 30 percent of Subways' KPI for its rail service (known as Service – KPI), which also includes Wait Assessment (60 percent) and Mean Distance Between Failures (10 percent).

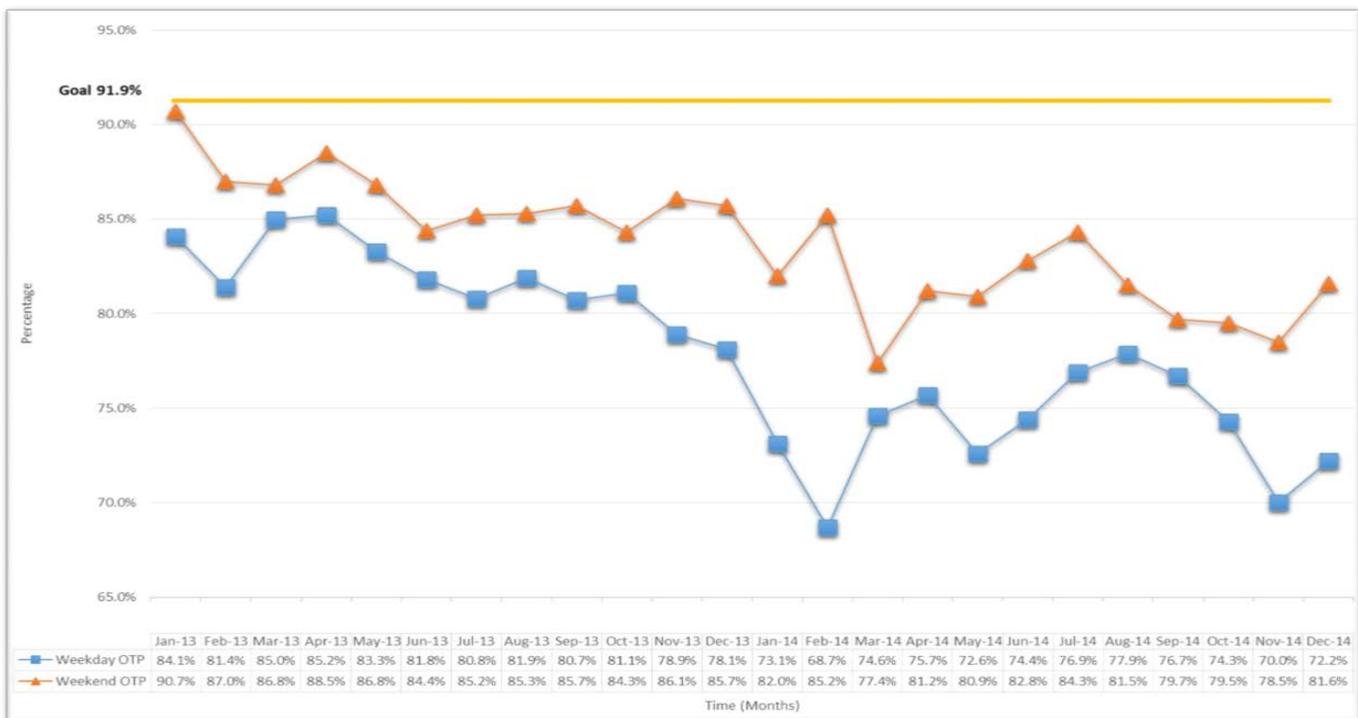
# Audit Findings and Recommendations

Subways did not meet its OTP goals during calendar years 2013 and 2014. For 2013, average OTP was 80.5 percent for weekdays and 85.4 percent for weekends. For 2014, weekday OTP averaged 74.0 percent, and weekend OTP averaged 81.2 percent. Graph 1 shows Subways’ actual OTP from January 2013 to December 2014. In late March 2015, we noted that statistical reports on MTA’s website indicate the OTP goal was lowered to 75.0 percent, despite Subways’ goal-setting policy. We reviewed the OTP goals for other major transportation agencies in the U.S., and none had an OTP goal below 90 percent. Further, on balance, there has been a persistent decline in OTP rates during this two-year period.

We found that Subways reports late or canceled trains and tracks the reasons for the delays. In addition, Subways staff makes substantive efforts to address delays as they occur and keep the trains moving. However, these efforts did not improve OTP over the two years of our review. Subways’ senior management advised us that a Delay Management Workgroup has been meeting since September 2013. Yet, there was no evidence that Transit has developed formal plans or comprehensive programs to address the root causes of train delays and improve OTP.

Given the importance of OTP in its performance metrics, Subways should conduct a root cause analysis to identify the underlying reasons for delays, then reassess its practices and processes to proactively address the root causes and substantially improve OTP.

**Graph 1 – Monthly Percentages of On-Time Performance**



\*Data Source: MTA’s Transit and Bus Committee Minutes from March 2013 to February 2015

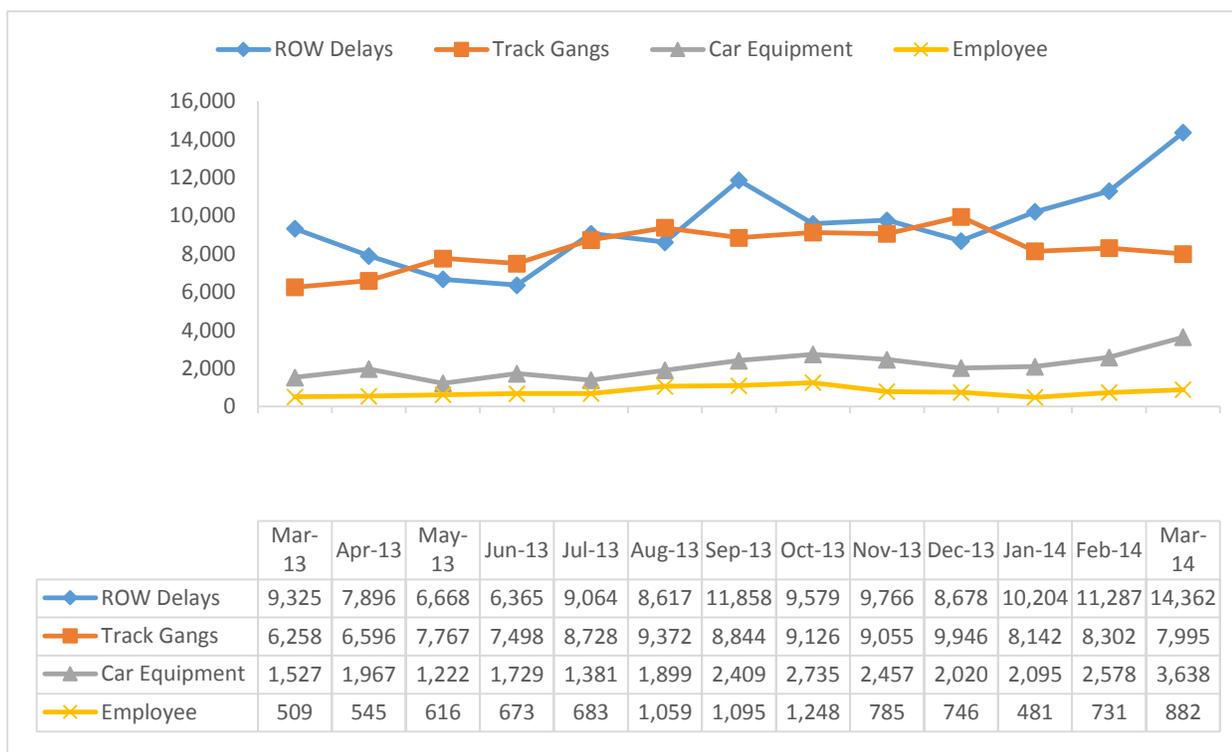
## Nature of Delays

From March 1, 2013 through March 31, 2014, Subways reported a total of 498,889 train delays. Of these, 406,797 took place on a weekday, and about 24.9 percent of those occurred during the morning rush hour (from 6:00 a.m. to 9:59 a.m.). (See Exhibits A-1 and A-2 for summaries of delays by hour for the A and B Divisions from March 2013 through March 2014).

In addition, Subways reports train delays in 15 categories. (See Exhibit B for a summary of delays by category from March 2013 through March 2014). We placed each of the 15 categories under one of two classifications - controllable and uncontrollable. A category was considered controllable if Subways management could influence the frequency of such delays and take steps to minimize their occurrence. The controllable categories of delays include: Car Equipment, Collision/Derailment, Employee, Infrastructure, Operational Divisions, Right Of Way (ROW), Track Gangs, and Work Equipment/General Order. These categories accounted for almost 316,000 delays (or about 63.3 percent of total system delays). Uncontrollable delays are those that Subways management cannot directly influence and include External, Fire, Inclement Weather, Over Crowding, Police, Sick Customer, and Unruly Customer.

To determine whether individual units/departments could demonstrate their efforts to improve OTP, we selected four controllable categories (ROW, Track Gangs, Car Equipment, and Employee) and reviewed the actions Subways officials took to address them. In that period, Subways reported a total of 269,008 delays (or 53.9 percent of total delays) in those four categories to the Committee, as illustrated by Graph 2.

**Graph 2 – Selected Categories of Train Delays**



\*Data source: MTA's Transit and Bus Committee monthly meetings from March 2013 to March 2014.

We interviewed officials in each of the four areas, the five district managers, and the #7 line manager, and we reviewed prescribed procedures and relevant reports to determine how staff responded to delays. In addition, we reviewed a sample of 60 incident reports (15 for each of the four delay categories). Since one delay can cause many trains to be late, canceled, or abandoned en route, our sampled reports corresponded to thousands of individual delays. Officials explained how they addressed individual delays, and they provided documentation supporting the actions taken to remediate the delays corresponding to our 60 sampled incident reports. Generally, Transit employees responded timely to the specific incidents that led to the delays. However, Transit officials had no formal corrective action plans or programs to minimize the chronic underlying problems that caused delays.

Additionally, we heard many different opinions from the Subways officials we interviewed as to the cause of delays, but they did not produce any evidence or formal analysis to support those opinions. It was, therefore, unclear if the root cause(s) of the problem had been identified. Examples of what we found are summarized as follows for certain categories of delays:

- **Car Equipment:** Three district managers said Car Equipment problems (which accounted for 6 percent of the delays from March 2013 to March 2014) can be attributed to older trains and a lack of repair parts for them. We requested evidence of this purported problem; however, none was provided. Therefore, we reviewed the “rolling stock” of trains assigned to 20 lines (excluding the three shuttles) and analyzed the relationship between the age of the train cars and the OTP of the lines. As shown in Exhibit C, a comparatively high OTP was achieved with the oldest car class on the C line, and comparatively low OTP occurred on lines with some of the newer cars, such as the F line. Consequently, it was not clear that car age and/or parts shortages increased risk of delays.
- **Track Gangs:** One district official said delays attributed to Track Gangs are the result of changes in the flagging procedures introduced around 2009 that have impeded timely service because trains are required to run at a slower speed for an extended distance of track. We were provided documentation to support changes in the flagging procedures, but nothing pertaining to their impact on train delays.
- **Employee:** Other officials attributed delays to new employees’ inexperience with maintaining scheduled operations. Subways officials provided a report, “RTO Train Operator and Conductor Headcount Projections,” which showed there were 1,173 new hires from January 2013 to November 2014. However, officials could not provide us with evidence of any analysis of delay categories by employee or employee type (e.g., probationary, less than five years of service, more than five years of service). We determined that 8 of the 15 Employee train incident reports we sampled involved a probationary train operator and/or train conductor, so further analysis in this area may be productive.

## Preventing Future Delays

Throughout our audit, we sought to determine what, if anything, was being done to address the underlying root causes of train delays. On March 2, 2015, Subways’ senior management told us that many workgroups and committees were formed in recent years to address OTP. Subways officials added that the district managers and other officials we met with might not be aware of the projects, campaigns, etc., that those groups have worked on.

At the MTA's request, we met with senior management of Subways also on March 13, 2015. The officials provided a package of materials related to the Delay Management Workgroup (Workgroup) that has been meeting since September 2013. The package included lists of the attendees of the Workgroup meetings, as well as e-mail communication related to delay management from the initial meeting (on September 3, 2013) to April 18, 2014. The package also included agendas for other meetings and some handwritten notes. The agenda from the April 18, 2014 meeting (see Exhibit D) lists various issues, such as the "flagging data base" and "maintenance general orders." However, we found no documentation of campaign trends mentioned by Subways' officials at our meeting on March 2, 2015.

During the course of our audit, we met with 12 of the Workgroup's 17 members. Although we asked each of the 12 members about efforts to reduce delays, none of them mentioned the Workgroup or any projects discussed at the meetings.

In Subways officials' response to our preliminary findings, they reiterated that a number of workgroups and committees are dedicated to improving service and reducing delays across the system. These include the RTO Performance Reporting and Operations Analysis Group and DCE Communications Based Train Control Incident Review, as well as monthly reviews of operational performance at the Senior Vice President level. Subways officials also stated they have adjusted scheduled running times on some lines to more closely reflect actual operating performance and to allow for the impact of various maintenance activities.

At the audit's closing conference, Subways officials indicated that OTP is just one aspect of service, and officials continue to face challenges in improving the OTP rates given increases in ridership and the volume of maintenance and capital work necessary to maintain the system. We acknowledge that Subways has many issues to address to keep trains operating on time every day. However, their efforts have not reversed the continual decline in OTP, which was 72.2 percent for weekdays in the December 2014 monthly report.

Thus, Subways needs to reassess its practices and processes to identify what needs to be done to substantially improve OTP. Because OTP is impacted by many different units/divisions of Transit, senior management needs to conduct a root cause analysis to identify the underlying reasons for recurring train delays and develop corrective action plans to proactively address those causes. Such an analysis will enable officials to identify which delay categories and/or subway lines they should address in order to have the greatest impact on OTP and improve operations. Responsible Transit operating units should be required to report not only the immediate corrective actions taken, but also plans to reduce future recurrences of the same problems. To that end, Transit needs to develop formal guidance (such as bulletins, policies, instructions, etc.) that will help middle managers improve their area of responsibility for OTP.

Providing formal written plans, programs, or other related documents is critical to ensure the efforts of the MTA management to improve on-time performance are successful. Further, a formal document facilitates a periodic assessment of the activities, including methods to evaluate what was successful or not, the costs of proposed actions, and how long they will take to implement.

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## Recommendations

1. Identify the underlying causes of recurring train delays and develop corrective action plans to proactively address those causes. Such plans should address the effectiveness of workgroup efforts, identify responsible parties, and require written feedback and measurable solutions.
2. Require monthly feedback from Subways managers on the actions taken to address recurring categories of train delays.

## Audit Scope and Methodology

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We audited on-time performance by Transit to determine whether trains run on time and actions are taken to address recurring problems that reduce on-time performance. The audit covers the period March 1, 2013 to January 23, 2015.

To accomplish our objective, we reviewed policies, procedures, and guidelines related to OTP. We also reviewed documents and reports supplied to support Transit's efforts to manage delays. We performed analyses of data and conducted observations of train operations at the RCC and line terminals. We obtained reports listing the counts of delays by category for the period March 1, 2013 to March 31, 2014. We selected a judgmental sample of 60 incident reports in four specific categories from 9,683 incidents in three sampled months (March 2013, September 2013, and March 2014). We interviewed the #7 line manager and the five district managers covering all of the subway lines to obtain information about the actions they had taken to monitor train delays and to improve OTP. In addition, we interviewed Transit officials to obtain an understanding of the internal controls related to OTP. We also reviewed their compliance with their internal control program at the operation planning level.

We conducted our performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

In addition to being the State Auditor, the Comptroller performs certain other constitutionally and statutorily mandated duties as the chief fiscal officer of New York State. These include operating the State's accounting system; preparing the State's financial statements; and approving State contracts, refunds, and other payments. In addition, the Comptroller appoints members to certain boards, commissions, and public authorities, some of whom have minority voting rights. These duties may be considered management functions for purposes of evaluating organizational independence under generally accepted government auditing standards. In our opinion, these functions do not affect our ability to conduct independent audits of program performance.

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## Authority

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The audit was performed pursuant to the State Comptroller's authority as set forth in Article X, Section 5 of the State Constitution and Section 2803 of the Public Authorities Law.

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## Reporting Requirements

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We provided a draft copy of this report to MTA officials for their review and comments. Their comments were considered in preparing this final report and are attached in their entirety at the end of the report. MTA officials did not agree with our findings and conclusions, yet they could not provide any concrete examples where the actions they claim to have taken resulted in a measurable improvement in on-time performance. It is encouraging that the closing statement in the response is "We have carefully reviewed the findings and recommendations in the Draft Audit Report and continue to aim for improvement in processes and Procedures that will make the most effective and efficient use of our resources." Our rejoinders to comments in the MTA's response are included in the report's State Comptroller's Comments.

Within 90 days after final release of this report, as required by Section 170 of the Executive Law, the Chairman and Chief Executive Officer of the Metropolitan Transportation Authority shall report to the Governor, the State Comptroller, and the leaders of the Legislature and fiscal committees, advising them what steps were taken to implement the recommendations contained herein, and where recommendations were not implemented, the reasons why.

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## Contributors to This Report

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### Vision

A team of accountability experts respected for providing information that decision makers value.

### Mission

To improve government operations by conducting independent audits, reviews and evaluations of New York State and New York City taxpayer financed programs.

## Exhibit A-1

### Weekday Delays by Line March 2013–March 2014 A Division (IRT)

Time		Line							
From	To	1	2	3	4	5	6	7	GCT-TSQ Shuttle
0:00	0:59	665	874	165	1,249	442	1,225	209	68
1:00	1:59	471	843	175	1,016	384	1,301	218	59
2:00	2:59	372	724	184	896	343	1,016	167	48
3:00	3:59	225	506	146	691	265	641	151	37
4:00	4:59	165	575	111	736	279	398	230	42
5:00	5:59	211	891	389	1,095	777	524	278	70
6:00	6:59	325	1,720	575	1,532	1,602	954	898	91
7:00	7:59	1,009	2,761	1,573	4,136	3,250	2,012	2,892	170
8:00	8:59	1,749	3,759	2,529	5,055	4,038	4,340	3,761	276
9:00	9:59	1,921	2,397	1,765	3,157	2,779	4,161	2,192	250
10:00	10:59	1,547	1,791	695	1,929	1,973	2,430	949	125
11:00	11:59	1,122	1,604	495	1,380	1,625	2,311	578	102
12:00	12:59	602	1,138	412	966	1,115	1,996	363	66
13:00	13:59	480	1,173	384	1,035	1,120	1,667	236	75
14:00	14:59	762	1,775	987	1,695	1,742	1,740	217	109
15:00	15:59	1,386	2,989	1,646	3,352	4,311	2,526	444	196
16:00	16:59	1,572	4,079	2,784	4,911	4,792	4,506	779	280
17:00	17:59	1,810	3,487	3,170	4,256	4,120	5,283	1,564	263
18:00	18:59	1,440	2,501	1,967	2,764	2,646	3,165	988	206
19:00	19:59	999	2,109	1,676	2,329	1,959	2,430	728	200
20:00	20:59	983	1,526	1,763	2,053	1,075	1,903	411	142
21:00	21:59	920	1,361	1,089	1,592	1,084	1,406	332	120
22:00	22:59	1,112	989	1,008	1,426	790	1,089	545	111
23:00	23:59	529	774	352	1,061	467	920	94	66
Time Not Noted		4	13	2	14	12	15	1	2
<b>Totals</b>		<b>22,381</b>	<b>42,360</b>	<b>26,042</b>	<b>50,328</b>	<b>42,988</b>	<b>49,959</b>	<b>19,226</b>	<b>3,175</b>

Note: Totals may vary due to rounding.

# Exhibit A-2

## Weekday Delays by Line March 2013–March 2014 B Division

Time		Line											Line					Total All Sub-way Lines
From	To	A	B	C	D	E	F	G	Rock-away Shuttle	J	L	M	N	Q	R	Franklin Av Shuttle	Total All Sub-way Lines	
0:00	0:59	855	34	29	950	1,397	956	273	27	74	267	34	643	263	86	2	10,786	
1:00	1:59	904	27	25	908	1,297	1,082	320	23	72	295	24	701	278	66	5	10,496	
2:00	2:59	576	24	17	787	1,126	816	310	24	64	236	21	614	308	79	2	8,755	
3:00	3:59	430	18	12	396	583	521	224	23	51	211	20	339	169	60	1	5,718	
4:00	4:59	351	21	14	313	235	503	185	21	58	94	33	219	129	35	1	4,750	
5:00	5:59	347	133	76	328	266	480	215	41	50	173	185	360	196	229	2	7,316	
6:00	6:59	712	388	214	471	386	805	192	43	136	245	318	454	425	397	7	12,888	
7:00	7:59	1,656	680	327	820	769	1,714	394	30	431	394	767	616	409	704	14	27,531	
8:00	8:59	1,844	1,033	506	981	1,490	2,281	721	83	624	927	1,311	711	598	857	14	39,488	
9:00	9:59	988	843	434	550	1,190	2,202	884	75	405	655	672	716	760	766	11	29,774	
10:00	10:59	1,037	1,084	372	539	1,349	2,390	1,252	155	531	375	991	1,181	1,404	942	10	25,050	
11:00	11:59	639	1,103	376	526	1,308	1,828	1,353	235	614	391	1,172	933	1,252	969	8	21,923	
12:00	12:59	514	799	269	437	638	1,031	933	198	399	327	674	537	817	598	5	14,854	
13:00	13:59	551	435	278	289	309	611	461	98	153	220	329	371	451	408	5	11,139	
14:00	14:59	825	400	287	455	447	969	253	49	116	243	308	331	359	341	9	14,418	
15:00	15:59	964	425	379	611	716	1,058	210	56	155	212	356	450	349	431	19	23,241	
16:00	16:59	1,300	695	440	971	1,324	2,060	205	71	287	214	470	478	334	588	17	33,157	
17:00	17:59	1,211	573	439	797	1,290	2,174	275	83	361	265	591	790	455	610	9	33,875	
18:00	18:59	826	451	346	479	1,083	2,255	337	74	194	300	667	459	439	569	7	24,164	
19:00	19:59	878	402	292	411	1,242	2,778	335	136	189	296	604	497	389	769	6	21,654	
20:00	20:59	786	511	288	483	1,394	2,100	568	82	217	281	893	873	449	1,115	4	19,899	
21:00	21:59	673	424	196	583	877	953	348	36	151	269	703	1,082	435	1,174	3	15,812	
22:00	22:59	1,479	68	68	1,009	1,783	2,013	392	61	160	303	745	1,703	566	924	6	18,350	
23:00	23:59	110	33	22	234	194	223	14	6	29	21	49	221	129	122	2	5,673	
Time Not Noted		4	1	1	2	3	4	0	0	0	0	4	4	1	1	0	89	
<b>Totals</b>		<b>20,462</b>	<b>10,603</b>	<b>5,705</b>	<b>14,329</b>	<b>22,697</b>	<b>33,808</b>	<b>10,676</b>	<b>1,729</b>	<b>5,522</b>	<b>7,215</b>	<b>11,941</b>	<b>15,281</b>	<b>11,363</b>	<b>12,842</b>	<b>168</b>	<b>440,800</b>	

Note: Totals may vary due to rounding.

## Exhibit B

### Delays by Category (Weekday and Weekend)

Categories	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Total
Car Equipment	1,527	1,967	1,222	1,729	1,381	1,899	2,409	2,735	2,457	2,020	2,095	2,578	3,638	27,657
Collision/ Derailment	0	0	0	41	263	0	0	5	3	0	0	0	0	312
Employee	509	545	616	673	683	1,059	1,095	1,248	785	746	481	731	882	10,053
External	5	18	9	117	37	472	274	338	297	323	266	316	190	2,662
Fire	334	817	763	564	1,034	453	986	299	927	585	1,224	936	864	9,786
Indement Weather	537	1,759	500	87	274	494	63	63	36	68	320	2,156	7,020	13,377
Infrastructure	408	1,120	792	212	295	537	313	1,115	263	397	85	590	1,235	7,362
Operational Divisions	269	240	267	299	406	306	304	262	363	443	630	757	905	5,451
Over Crowding	5,050	5,759	5,023	5,029	5,090	5,384	5,892	5,823	6,374	7,225	7,419	7,883	8,665	80,616
Police	2,187	2,046	2,343	2,430	1,873	1,668	1,738	1,514	1,595	3,571	1,998	2,247	2,381	27,591
ROW Delays	9,325	7,896	6,668	6,365	9,064	8,617	11,857	9,580	9,766	8,678	10,204	11,287	14,362	123,669
Sick Customer	2,548	2,196	2,617	2,374	2,695	2,373	2,283	2,041	2,500	2,455	2,785	3,066	2,935	32,868
Track Gangs	6,258	6,596	7,767	7,498	8,728	9,372	8,844	9,126	9,055	9,946	8,142	8,302	7,995	107,629
Unruly Customer	1,090	1,035	1,209	1,104	1,122	905	1,036	1,184	1,499	1,275	1,694	1,557	1,289	15,999
Work Equipment/ G.O.	1,423	1,664	1,797	1,739	1,878	2,968	2,954	3,730	3,083	3,793	3,631	1,845	3,352	33,857
<b>Total</b>	<b>31,470</b>	<b>33,658</b>	<b>31,593</b>	<b>30,261</b>	<b>34,823</b>	<b>36,507</b>	<b>40,048</b>	<b>39,063</b>	<b>39,003</b>	<b>41,525</b>	<b>40,974</b>	<b>44,251</b>	<b>55,713</b>	<b>498,889</b>

## Exhibit C

### OTP Performance, Car Class, and Fleet Age, by Line

Line	OTP	OTP Rank	Car Class	Total Cars	Fleet Age	Age Rank
<b>Division A</b>						
<b>1</b>	81.5%	9	R62-GE	10	28.69	4
			R62A	310	27.69	5
<b>2</b>	51.2%	18	R142	340	11.76	9
<b>3</b>	68.2%	15	R62-GE	250	28.69	4
<b>4</b>	49.2%	20	R142	220	11.76	9
			R142A	130	12.51	8
<b>5</b>	51.1%	19	R142	340	11.76	9
<b>6</b>	66.9%	16	R62A	90	27.69	5
			R142A	300	12.51	8
<b>7</b>	88.2%	5	R62A	240	27.69	5
			R62A	35	27.69	5
			R188	77	0.15	14
<b>S (42nd St)</b>	97.9%	N/A	R62A	3	27.69	5
			R62A	7	27.69	5
<b>Division B</b>						
<b>A</b>	79.1%	13	R46-GE	304	37.69	3
<b>B</b>	79.5%	11	R68-WH	48	26.69	6
			R68A-WH	152	24.68	7
<b>C</b>	88.9%	3	R32-GE	144	48.7	1
<b>D</b>	80.4%	10	R68-WH	240	26.69	6
<b>E</b>	77.9%	14	R160A	240	5.23	11
			R160B1	20	5.23	12
<b>F</b>	66.1%	17	R46-GE	32	37.69	3
			R160A	290	5.23	11
			R160B1	110	5.23	12
<b>S (Franklin)</b>	98.9%	N/A	R68-WH	4	26.69	6
<b>G</b>	85.4%	6	R68-WH	52	26.69	6
<b>S (Rockaway)</b>	95.9%	N/A	R46-GE	12	37.69	3
<b>J, Z</b>	92.1%	2	R32-GE	8	48.7	1
			R42-GE	40	44.7	2
			R160A	112	5.23	11
<b>L</b>	93.7%	1	R143	160	11.51	10
			R160A	32	5.23	11
<b>M</b>	82.5%	8	R160A	184	5.23	11
<b>N</b>	79.2%	12	R160B1	10	5.23	12
			R160B2	230	5.23	13
<b>Q</b>	83.9%	7	R160A	20	5.23	11
			R160B1	210	5.23	12
<b>R</b>	88.7%	4	R46-GE	232	37.69	3

N/A = Not Applicable (rankings exclude shuttles)

Data source: OTP - May 2014 Transit and Bus Committee meeting; Fleet Age – March 2014 (fleet age report); and Car Class and Total Cars for Division A and B are from June 16, 2014 and September 28, 2014, respectively.

## Exhibit D

### Delay Management Workgroup Meeting Agenda

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#### **SERVICE DELIVERY**

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#### **DELAY MANAGEMENT MEETING APRIL 18, 2014**

The purpose of the meeting is to review the status of each of the following program initiatives:

1. Flagging Data Base
2. Maintenance General Orders
3. Update Joint Subways – OP Delay Initiatives
4. ERO/Incident Commander Enhancements
5. MOW/Field Communications Protocol
6. Improved Data Collection from Field (I-Rail)
7. Enhanced MOW and DCE RCC Managerial Coverage
8. CAT Teams
9. Barometer/Dash Board
10. IRT Schedule Update (OP)
11. Open Discussion

# Agency Comments

2 Broadway  
New York, NY 10004  
212-878-7000 Tel

**Thomas F. Prendergast**  
Chairman and Chief Executive Officer



## Metropolitan Transportation Authority

State of New York

June 19, 2015

Ms. Carmen Maldonado  
Audit Director  
The Office of the State Comptroller  
Division of State Government Accountability  
123 William Street – 21<sup>st</sup> Floor  
New York, NY 10038

**Re: Draft Report #2014-S-56 (Train On-Time Performance)**

Dear Ms. Maldonado:

This is in reply to your letter requesting a response to the above-referenced draft report.

I have attached for your information the comments of Carmen Bianco, President, New York City Transit, which address this report.

Sincerely,

A handwritten signature in black ink, appearing to read "T. F. Prendergast".

Thomas F. Prendergast  
Chairman and Chief Executive Officer

cc: Donna M. Evans, MTA Chief of Staff  
Michael J. Fucilli, Auditor General, MTA Audit Services

### Attachments

*The agencies of the MTA*

MTA New York City Transit  
MTA Long Island Rail Road

MTA Metro-North Railroad  
MTA Bridges and Tunnels

MTA Capital Construction  
MTA Bus Company

# Memorandum



## Metropolitan Transportation Authority

State of New York

**Date** June 18, 2015

**To** Thomas F. Prendergast, Chairman and Chief Executive Officer

**From**  Carmen Bianco, President, NYC Transit

**Re** New York State Comptroller's Request for Response to the audit report  
"Train On Time Performance" 2014-S-56

New York City Transit has reviewed the Office of the State Comptroller's Draft Audit Report on Subway On-Time Performance. The stated purpose of the report is "to determine whether the Metropolitan Transportation Authority's New York City Transit trains run on time, and whether actions are taken to address recurring problems that reduce On-Time Performance."

New York City Transit On-Time Performance goals – as well as performance against those goals – is a matter of public record. We set aggressive targets for ourselves annually and report on our performance against those targets every month. We explain variances and discuss corrective actions that have been taken or that will be taken in the future. In fact, as recently as last month, we outlined the results of a full analysis of subway performance to our governing board. This presentation illustrated the cause of delays and detailed a number of corrective actions. It also reinforced that the best way to measure customer experience with respect to service reliability is to measure the time a customer has to wait for a train at his/her station not when that train arrives at the end of the line. Based on several major delay studies, ongoing analyses, and other research, we have identified that the great majority of delays can be attributed to three main causes—crowding and ridership, ongoing maintenance needs, and unplanned work on the right of way. These are discussed more in detail below.

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Therefore, while your audit reiterates the statistics we have already publicly disclosed, we strongly disagree with the audit's assertion that New York City Transit lacks 1) formal processes to explain the underlying causes of delay and (2) formal corrective action plans and programs to address the causes of delays and improve On-Time Performance.

Below is a summary of the New York City Transit response to the Office of State Comptroller's draft audit findings and recommendations.

### General Comments

As an initial matter, it is important to consider that while On-Time Performance is an important management measure for Subways, our primary service delivery focus is on evenness of service, not on schedule adherence at the arriving terminal location. This is our focus because, generally speaking, our customers—relatively few of whom travel all the way to a terminal

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\*See State Comptroller's Comments, page 31.

station—are more significantly affected by the time they wait for a train at a station along the route rather than the difference between the actual and scheduled arrival time at terminal stations. For example, a train that arrives seven minutes late at its terminal is considered late and this is reflected in On-Time Performance statistics. However, that same train may have been consistently three minutes behind the preceding train, providing evenly spaced and frequent service to customers along the route. The degree to which the intervals between trains conform to our scheduled intervals between trains is captured in our Wait Assessment indicator. For this reason, Wait Assessment, not On-Time Performance, is our primary customer service indicator.

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Moreover, our service management strategy to maintain evenness and improve customer service, as measured by Wait Assessment, often reduces On-Time Performance. This is not a new issue, but it has become increasingly important as the subway continues to break ridership records. On May 18, 2015, New York City Transit management once again brought this issue to the attention of the MTA Transit and Bus Committee, and we presented it in great detail. That presentation is attached.

That presentation also included a summary of our root cause delay analyses and corresponding action plans to provide more reliable service, which are discussed in greater detail throughout this response. These efforts were underway during the audit period. In fact, on December 15, 2014, during the audit fieldwork, New York City Transit management gave a special report to MTA Transit and Bus Committee outlining our latest delay analyses and action plans.

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Thus, contrary to the Draft Audit Report, New York City Transit is fully aware of both (1) the root causes of subway delays and of (2) the causes of the increase in subway delays experienced during the last few years. This is based on several major delay studies, ongoing analyses, and other research. Broadly speaking, the great majority of delays can be attributed to three main causes—crowding and ridership, ongoing maintenance needs, and unplanned work on the right of way—and most of the increase in delays is due to changes in subway operating conditions that affect these three areas.

First, crowding and ridership caused approximately 40% of subway delays in 2014. Ridership has been growing steadily since 2010, at all times of day, and we continue to reach new ridership records. Ridership growth accelerated in 2014, and the weekday peak period saw the greatest increase. Ridership during the peak period has a disproportionate impact on delays, as 15 out of 20 lines are now at track capacity during the peak hour. Even an extremely short interruption of service, such as door holding by passengers, can grow into a major incident because of the self-reinforcing effect of platform crowding and close train spacing.

Second, ongoing maintenance needs caused approximately 26% of subway delays in 2014. As our infrastructure ages, critical maintenance is more important than ever, and there's been a significant increase in work on the right of way over the past two years. Much of this was driven by increasing Sandy and capital work. In addition, we have aggressively stepped up our rail defect monitoring efforts, which means we are replacing more early defects before they cause incidents, but as a result, we spend more time on the tracks to identify and repair these early defects. In addition, procedural changes at the Rail Control Center streamlined and sped up the process for safely getting workers onto the right of way to do critical routine maintenance

and inspection work. Much of this work is done while trains are running. New York City Transit has a complex roadway worker protection system (“flagging rules”) to ensure the safety of employees working under traffic. These flagging rules are critical for our system and have in many cases been incrementally augmented and improved over the past 10 years to enhance safety and add additional protection, while worker compliance with the rules has increased in the same time period. This level of protection comes at a cost to service, not only on the tracks where workers are maintaining or inspecting equipment, but in many cases on adjacent tracks as well. Even one small work zone requires more than 1/3 of a mile of slow train speed. A typical slow speed zone reduces track capacity from 28 to 18 trains per track per hour. This has a significant impact on service, especially on weekends and in the off peak, where most of our planned work occurs.

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Third, unplanned work on the right of way caused approximately 22% of subway delays in 2014. This includes events like water main breaks, signal failures, and power outages. Although such incidents occur relatively infrequently, when they do happen they can significantly impact service. The expansion of roadway worker protection rules has also increased the number of delays due to unplanned events on the right-of-way, for the same reasons it has increased delays caused by ongoing maintenance needs.

These three causes represent the major root causes of subway delays. The remaining 12% of subway delays in 2014 were caused by a number of smaller factors such as Car Equipment failures and weather events.

In addition to changes in subway operating conditions, better data recording on Subdivision B led to an increase in reported delays—of all causes. In 2013 and 2014, we phased in an electronic train tracking system called I-TRAC, which replaced manual delay recording on paper sheets. The improved recording methodology has increased the number of reported delays by at least 5,000 delays per month, and the impact was especially pronounced on the A, B, C, D, E, F, and G Lines. This increase in delays does not reflect a deterioration in actual service. Rather, it is merely a more accurate reflection of actual system performance.

New York City Transit’s action plans and initiatives are in direct response to these changes in operating conditions discussed above. Delays caused by crowding and ridership are addressed by several initiatives to reduce dwell times such as additional platform controllers, step aside boxes, and revising door announcements to speed door closing. Other initiatives include monitoring platform crowding conditions via cameras, staging personnel to respond to real-time conditions, improving communications during service disruptions, and formalizing a partnership with NYPD to assist with platform metering during incidents.

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Delays caused by planned and unplanned work on the right of way are addressed by several initiatives to prevent incidents, respond to incidents more quickly, and improve coordination of planned work. To prevent incidents, New York City Transit is targeting highest incident locations by enhancing inspections, increasing ultrasonic testing, and aggressively installing Continuous Welded Rail. To respond more quickly to incidents, we are strategically deploying mobile teams comprised of Signals, Track and Third Rail personnel, adding signal maintenance staff coverage on the Lexington Corridor, and adding other multi-discipline response personnel.

These efforts are being carefully monitored and rolled out in a phased approach after their effectiveness has been determined and modified for the unique operating characteristics of the other lines.

The above are some specific examples of efforts underway, and numerous New York City Transit senior level task forces are continually working on ways to improve the level of service to customers and reduce delays. In particular, the Division of Operations Planning and the Department of Subways, prior to and during the audit period, already had several service performance work groups, committees, and initiatives established that were charged with developing action plans and initiatives based on analyses of delay causes. These efforts continue to the present day. These groups include:

- Department of Subways Senior Vice President Monthly Operational Performance Reviews—examine trends in service performance indicators
- Department of Subways/Operations Planning Delay Management Committee—coordinate key service improvement initiatives and studies, especially those spanning multiple New York City Transit departments
- Department of Subways Rapid Transit Operations Weekly and Bi-weekly Service Performance Meetings—review On-Time Performance and operational infractions for the week in question where each District General Superintendent explains reasons for negative performance and discusses strategies and initiatives to mitigate problems
- Division of Car Equipment Communications Based Train Control Incident Review Task Force—review and classify equipment failures and identify steps to reduce incidents
- Division of Car Equipment/Rapid Transit Operations Monthly Delay Committee Meetings—to reduce incidents and minimize delays to service through a wide range of issues that affect car reliability, road operations, and incident response and handling
- Division of Car Equipment R-188 Train Incident Meetings—monthly review of new equipment issues with Kawasaki Management to identify corrective actions
- Operations Planning Running Time Revisions—in-depth analyses of individual line running times undertaken by OP's System Data & Research and Subways Schedules units, using Automatic Train Supervision - A Division and Integrated Train Register Activity Console/Programmable Logic Controller data, leading to incorporation of revised running times in subway timetables
- Rail Control Center-System Data & Research String Line and Gap Table Working Group—pilot programs and formal training on the use of string lines and gap tables by console dispatchers to visualize gaps in service and achieve more even headways
- Rail Control Center Efficiency Study—improvements to train monitoring processes developed by System Data & Research

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- Department of Subways Performance Analysis Unit—ongoing analyses of delay root causes and development of a comprehensive subway performance database
- Rapid Transit Operations Performance Reporting and Operations Analysis Group—the statistical reporting, analysis and operational support generated by this unit provides the Department of Subways and Rapid Transit Operations management the ability to measure the success of efforts to provide premium transportation service to our customers
- Division of Car Equipment Central Electronics Shop Task Force—develop electronic component design modifications by Car Equipment Engineering
- Division of Car Equipment Door Task Force—strategic upgrades to door components identified by Car Equipment Engineering to reduce failures

All of the above groups actively pursue many different formal programs, initiatives, and corrective action plans to improve service and reduce delays. The Delay Management Committee, for instance, has been working on an evolving list of service improvement initiatives, based on ongoing analyses of the major underlying causes of delays. These initiatives include a new flagging database (to plan maintenance work under traffic in advance and reduce the service impact of such work), Combined Action Teams (mobile Maintenance of Way teams with dedicated vehicles to provide a rapid response to right-of-way failure incidents during the p.m. rush, to reduce the duration and delay impact of such incidents), timetable revisions (to adjust running times system-wide to reflect actual performance and accommodate off-peak maintenance and inspection work on the right-of-way), etc.

Contrary to the Draft Audit Report, many of these efforts were discussed with the auditors on multiple occasions during their fieldwork, the auditors attended several committee meetings, and New York City Transit provided all supporting documentation they requested.

Note that during the entire course of the audit we were asked to limit our response to activities that occurred from March 1, 2013 to March 31, 2014. The preliminary On-Time Performance findings issued on March 4, 2015 also stated that the audit scope covered March 1, 2013 to March 31, 2014. However, the Draft Audit Report, which we received in May 2015, extended the audit period to January 23, 2015. A considerable amount of additional effort has been made towards improving service from April 1, 2014 to January 23, 2015. Therefore, this response covers additional content that we were unable to include in our previous response to the March 4, 2015 preliminary findings.

Response to Key Findings

*Comptroller Key Finding 1: For calendar years 2013 and 2014, Subways' reports show actual OTP was well below the goal of 91.9 percent. For 2013, weekday OTP averaged 80.5 percent and weekend OTP averaged 85.4 percent. For 2014, weekday OTP averaged 74.0 percent and weekend OTP averaged 81.2 percent. On balance, there has been a persistent decline in OTP during the period.*

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We agree that On-Time Performance declined during the audit period. This is due to changes in operating conditions and more accurate delay data. This is explained in the General Comments section above.

*Comptroller Key Finding 2: For the period March 2013 through March 2014, Subways reported 498,889 total delays. We reviewed four categories of delays (Right of Way, Employee, Track Gangs, and Car Equipment) that resulted in 269,008 (or 53.9 percent) of the delays to determine the actions Subways took to address their causes and reduce their occurrence. In most cases, Subways took appropriate actions to address individual incidents as they occurred. However, Subways lacked a formal process to assess the underlying causes of the delays and develop comprehensive corrective action plans to help minimize them.*

We strongly disagree with the assertion that New York City Transit failed to identify the underlying causes of delays and that we did not have a plan in place to improve On-Time Performance. See also our response in the General Comments section above.

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*Comptroller Key Finding 3: According to Subways officials, there are multiple workgroups and committees (including a Delay Management Workgroup) dedicated to improving service and reducing delays. In addition, there are monthly reviews of operational performance performed by the Office of the Senior Vice President. Yet, there was no evidence that any workgroup, committee, or office developed formal plans or programs to communicate initiatives to address the root causes of delays and improve OTP.*

These service performance work groups and committees report back to executive leadership on a regular basis, albeit in different formats. For example, many groups have a standing agenda, and the project managers are responsible for reporting on the status of initiatives for which they are responsible. In addition to the ongoing taskforces with respect to managing and improving subway performance, executive leadership periodically meets with the top two to three levels of the organization (referred to as "Top 50" meetings) to communicate and discuss key initiatives. For instance, the June 27, 2014 Top 50 meeting topic was subway performance and included a special discussion around performance challenges and corrective actions.

#### Response to Key Recommendations

*Comptroller Recommendation 1: Identify the underlying causes of recurring train delays and develop corrective action plans to proactively address those causes. Such plans should address the effectiveness of workgroup efforts, identify responsible parties, and require written feedback and measurable solutions.*

We strongly disagree with the assertions that New York City Transit failed to identify the underlying causes of delays and that we did not have a plan in place to improve On-Time Performance. See also our response in the General Comments section above.

Since 2009, Operations Planning has been reviewing train performance, particularly running times, and revising timetables based on data analysis. During the period reviewed by the auditors (March 2013-March 2014), for example, Operations Planning was actively reviewing

2/3/4/5 line running times for implementation of revised timetables based on actual running times. These timetable revisions were phased in from April through July 2014. Additional timetable revisions on other lines based on more recent data have continued since the revisions to the 2/3/4/5. In addition, as noted above, Subways regularly reviews On-Time Performance in performance reviews at senior management and operating manager levels. It is a key internal service management tool.

As discussed above, New York City Transit does not concur with the findings concerning on-time performance. Our programs, initiatives, Policy Instructions and day to day operating practices deem the premise that New York City Transit does not have anything in place to provide direction to managers totally inaccurate and false. To reiterate, numerous senior level task forces are continually working on ways to improve the level of service to customers and reduce delays.

New York City Transit does not have a single policy or directive on reducing delays and improving on-time performance, nor should we. Providing high-quality service is our central objective, and it is inherent in everything we do. It is embodied in the job descriptions of many staff in Operations Planning and in Subways' Rapid Transit Operations and Operations Support Divisions, but—directly or indirectly—it is the responsibility of all of our (non-bus) employees. We do not wish to compartmentalize responsibility for improving service performance. Therefore, it is neither practical nor desirable to condense our performance related activities into one policy (or even several policies).

*Comptroller Recommendation 2: Require monthly feedback from Subways managers on the action taken to address recurring categories of train delays.*

New York City Transit's service performance workgroups and committees discussed above meet regularly to review the effectiveness of their programs, and they generally require updates from managers on the progress of initiatives for which they are responsible. We are well aware that an essential element of improving performance is not only identifying the cause of a delay but also identifying the party responsible for correcting the delay in both short- and long-term. New York City Transit management has been working on delay management for years, striving to improve service performance through weekly and bi-weekly service performance meetings, Department of Subways and Operations Planning joint task forces and numerous initiatives to implement delay management strategies in the field as well as the Rail Control Center.

#### Response to Other Findings

The Draft Audit Report states "In late March 2015, we noted that statistical reports on MTA's website indicate the OTP goal was lowered to 75.0 percent, despite Subways' goal-setting policy."

New York City Transit's traditional On-Time Performance target setting methodology resulted in keeping the Terminal On-Time Performance target at an unrealistic level. Three-year average actual delays were compared with the previous year's goal, and the higher of the two percentages determined the new goal. This methodology inherently prevented setting a target that was less than the previous year, regardless of changes in operating conditions. The 2015

target was set based on a revised methodology, in order to set a target that is both challenging and achievable, especially given the more accurate delay data and recent changes in operating conditions, as discussed above.

This issue was discussed with the auditors in great detail. We provided documents justifying why we were reassessing our target setting methodology and explained how we were working on a proposal to change the policy.

The Draft Audit Report states “We reviewed the OTP goals for other major transportation agencies in the U.S., and none had an OTP goal below 90 percent.”

The report does not specify which agencies or which modes they are comparing, so we can only provide a general response. First, the New York City Subway faces much more challenging operating conditions than other U.S. systems (more passengers with little excess capacity during the peak periods). Second, the definitions of On-Time Performance vary widely, and the New York City Subway frequently has stricter performance indicator definitions than other U.S. systems, due to our more demanding operating conditions. Finally, it is more meaningful to compare actual performance with other systems, rather than targets. Targets are more a reflection of agencies’ policies than of performance.

The Draft Audit Report states the following:

*Subways staff makes substantive efforts to address delays as they occur and keep the trains moving. However, these efforts did not improve OTP over the two years of our review. Subways’ senior management advised us that a Delay Management Workgroup has been meeting since September 2013. Yet, there was no evidence that Transit has developed formal plans or comprehensive programs to address the root causes of train delays and improve OTP.*

*Given the importance of OTP in its performance metrics, Subways should conduct a root cause analysis to identify the underlying reasons for delays, then reassess its practices and processes to proactively address the root causes and substantially improve OTP...*

*...Generally, Transit employees responded timely to the specific incidents that led to the delays. However, Transit officials had no formal corrective action plans or programs to minimize the chronic underlying problems that caused delays.*

*Additionally, we heard many different opinions from the Subways officials we interviewed as to the cause of delays, but they did not produce any evidence or formal analysis to support those opinions. It was, therefore, unclear if the root cause(s) of the problem had been identified.*

Again, we strongly disagree with the assertions that New York City Transit failed to identify the underlying causes of delays and that we did not have a plan in place to improve On-Time Performance. For details, see the General Comments section above.

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The Draft Audit Report states the following:

*Car Equipment: Three district managers said Car Equipment problems (which accounted for 6 percent of the delays from March 2013 to March 2014) can be attributed to older trains and a lack of repair parts for them. We requested evidence of this purported problem; however, none was provided. Therefore, we reviewed the “rolling stock” of trains assigned to 20 line (excluding the three shuttles) and analyzed the relationship between the age of the train cars and the OTP of the lines. As shown in Exhibit C, a comparatively high OTP was achieved with the oldest car class on the C line, and comparatively low OTP occurred on lines with some of the newer cars, such as the F line. Consequently, it was not clear that car age and/or parts shortages increased risk of delays.*

The examination of Car Equipment delays appears to be based on a misunderstanding of subway car reliability and its relationship with On-Time Performance. The key performance indicator primarily used to measure the subway fleet reliability is Mean Distance Between Failure, which is defined as the total revenue mileage of a particular type of equipment divided by the number of delay-causing failures of said equipment during a specified time period.

Mean Distance Between Failure is the key indicator of overall fleet performance and is used to assess the performance of individual car classes, subway lines, and car systems. There is a direct correlation between the age of a railcar and the Mean Distance Between Failure. The official Mean Distance Between Failure for the audit period for the Legacy Fleet versus the New Millennium Fleet is as follows:

<u>Car Type</u>	<u>12-Month Moving Average Mean Distance Between Failure</u>
R32-R68A	112,061
R142-R188	170,901

Bear in mind, however, that Car Equipment delays comprise only a small fraction of total delays (less than 7% during the audit period). Thus, although fleet age does impact reliability and contribute to delays, it is a relatively minor contributor to overall On-Time Performance, on average contributing no more than 2% to the metric. There are many other variables which can have a much greater impact, such as right-of-way failures, the amount of planned work, and the nature of the service. For instance, the C Line had relatively high On-Time Performance compared with other lines, despite the assignment of older R32 cars partly because it operates on longer headways and is less crowded than many other lines. The relatively infrequent service means that there is less likelihood for a minor incident to delay multiple trains. Also, the C does not operate overnight when a significant amount of maintenance and inspection work on the right-of-way takes place.

On the other hand, the F Line had relatively low On-Time Performance compared with other lines, despite the assignment of many newer cars. This is partly because it operates on shorter headways and is more crowded than many other lines. The relatively frequent service means that there is a greater likelihood that a minor incident will delay multiple trains. Also, unlike the C, the F Line operates overnight when a significant amount of maintenance and inspection work on the right-of-way takes place.

The Division of Car Equipment analyzes and addresses root causes of delays on a regular basis. This is evidenced by the various monthly reliability reports that are produced and distributed to Division of Car Equipment management. The Division of Car Equipment also leads several of the service performance groups listed above.

The Draft Audit Report states the following:

*Track Gangs: One district official said delays attributed to Track Gangs are the result of changes in the flagging procedures introduced around 2009 that have impeded timely service because trains are required to run at a slower speed for an extended distance of track. We were provided documentation to support changes in the flagging procedures, but nothing pertaining to their impact on train delays.*

We have looked at the effects of flagging on running time and found certain categories of maintenance work contribute to slower trains which in turn results in lower On-Time Performance. As discussed above, New York City Transit has a complex roadway worker protection system to ensure the safety of employees working under traffic. This system is critical for our system and have in many cases been incrementally augmented and improved over the past 10 years to enhance safety and add additional protection. This level of protection comes at a cost to service, not only on the tracks where workers are maintaining or inspecting equipment, but in many cases on adjacent tracks as well. Even one small work zone requires more than 1/3 of a mile of slow train speed. A typical slow speed zone reduces track capacity from 28 to 18 trains per track per hour. This has a significant impact on service, especially on weekends and in the off peak, where most of our planned work occurs.

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The Draft Audit Report states the following:

*Employee: Other officials attributed delays to new employees' inexperience with maintaining scheduled operations. Subways officials provided a report, "RTO Train Operator and Conductor Headcount Projections," which showed there were 1,173 new hires from January 2013 to November 2014. However, officials could not provide us with evidence of any analysis of delay categories by employee or employee type.*

New York City Transit disagrees with this statement. The operating infraction data critiqued at the Bi-Weekly Service Performance meetings, one of which was attended by the auditors, includes delay cause breakdowns for both probationary (less than one year, and categorized under "Workforce Development") and non-probationary employees, in order to determine their impact on incidents and general operations. Copies of these documents were provided to the auditors. These meetings are attended by Subways Operation Training's Service Delivery Unit, to address staffing issues identified at these meetings, especially those related to probationary employees.

As a result of these meetings, which focused on analysis of the delay categories by employee type, the Subways Operation Training changed the Train Operator Induction Training Program in March 2013 to better prepare new employees for road service. Consequently, just a year after, the additional training in the new Program contributed to a 41% reduction in the rate of operational incidents per new operator.

The Draft Audit Report states the following:

*At the MTA's request, we met with senior management of Subways also on March 13, 2015. The officials provided a package of materials related to the Delay Management Workgroup (Workgroup) that has been meeting since September 2013. The package included lists of the attendees of the Workgroup meetings, as well as e-mail communication related to delay management from the initial meeting (on September 3, 2013) to April 18, 2014. The package also included agendas for other meetings and some handwritten notes. The agenda from the April 18, 2014 meeting (see Exhibit D) lists various issues, such as the "flagging data base" and "maintenance general orders." However, we found no documentation of campaign trends mentioned by Subways' officials at our meeting on March 2, 2015.*

As discussed, there are numerous ongoing initiatives, and these are generally reported on each month. In addition, New York City Transit gave special reports on our delay reduction action plans to the MTA Transit and Bus Committee at both the December 15, 2014 and May 18, 2015 public meetings.

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The Draft Audit Report states the following:

*During the course of our audit, we met with 12 of the Workgroup's 17 members. Although we asked each of the 12 members about efforts to reduce delays, none of them mentioned the Workgroup or any projects discussed at the meetings.*

This finding might be due to a general misunderstanding of our operations. Providing high-quality service is our central objective, and it is inherent in everything we do. New York City Transit pursues countless programs and initiatives to improve service and reduce delays, regardless of whether or not the term "delay" or "on-time performance" is not stated in the title.

The Draft Audit Report states the following:

*We acknowledge that Subways has many issues to address to keep trains operating on time every day. However, their efforts have not reversed the continual decline in OTP, which was 72.2 percent for weekdays in the December 2014 monthly report.*

*Thus, Subways needs to reassess its practices and processes to identify what needs to be done to substantially improve OTP. Because OTP is impacted by many different units/divisions of Transit, senior management needs to conduct a root cause analysis to identify the underlying reasons for recurring train delays and develop corrective action plans to proactively address those causes. Such an analysis will enable officials to identify which delay categories and/or subway lines they should address in order to have the greatest impact on OTP and improve operations. Responsible Transit operating units should be required to report not only the immediate corrective actions taken, but also plans to reduce future recurrences of the same problems. To that end, Transit needs to develop formal guidance (such as bulletins, policies, instructions, etc.) that will help middle managers improve their areas of responsibility for OTP.*

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On-Time Performance remains an important performance indicator for operations, but disproportionate emphasis on On-Time Performance would conflict with New York City Transit's larger priorities, such as safety, efficiency, and maintenance needs. As discussed above, disproportionate emphasis on On-Time Performance would even conflict with our objective of providing the best possible service. This is another reason why Wait Assessment is our most important service performance indicator.

Conclusion

We have carefully reviewed the findings and recommendations in the Draft Audit Report and continue to aim for improvements in processes and procedures that will make the most effective and efficient use of our resources.

Enclosure

cc: P. Cafiero  
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## State Comptroller's Comments

1. Many of the "causes" for delays identified by MTA are not new. For example, in 2012 the MTA in its Supplementary Information for Public Authorities Law §1269(d) stated:

"Subway Weekday Terminal On-Time Performance (OTP) evaluates the level of service provided to our customers based on the schedule or service plan in effect at the time and includes all delays. Actual OTP in 2011 was 6.5 percentage points below goal due to a continuing initiative to allow increased access to the right-of-way in order to affect the need for critical maintenance and capital improvements. The tradeoff for the enhanced program however, has been incremental increases in delays and a corresponding decrease in OTP."

Similarly in 2007, the MTA reported that there was little room to accommodate more riders. At that time the MTA provided a chart (similar to the one in its [May 18, 2015 Power Point presentation](#)) that showed that many lines were at peak track capacity. In view of the fact that the identified conditions have existed for a number of years, it is not unreasonable to expect that the MTA would have more to show for its "full analysis" and planning efforts than a 17-slide Power Point that was done after the audit's field work was completed.

At a minimum, we would expect a business action plan would have documented: the goal(s) for the plan, the steps to be taken to achieve the specific goal(s), a clear statement of what resources are required to reach the goal(s), a formal timeline for when tasks need to be implemented and completed, and a statement of when the customers will benefit from the expected outcome. The Power Point lacked many of these key elements.

2. Based on a study published by MTA staff in 2013 for the Transportation Research Board, the MTA developed the components and weightings of its Operations Key Performance Indicator from customer survey data. Based on these surveys, customers ranked both reasonable wait times (reflected by wait assessment) and minimal delays during trips (reflected by OTP) at the highest levels of importance. While wait times were ranked higher in concern, minimal delays were only slightly less important to customers. The MTA states that customer experience is now best reflected by wait times. However, it has presented no analysis or additional customer survey data to establish that customers no longer place an importance on minimal delays during trips (i.e., OTP). Further, customer experience is based on the customer's perception, not the MTA's.
3. MTA indicates that wait assessment is its critical indicator, yet wait assessment has also been on the decline. Actual wait assessment was 80.3 percent for 2013 and 78.8 percent for 2014. For 2014, wait assessment was as low as 67.4 percent on the number 5 and 69.6 percent on the A train.
4. The audit recommends a root cause analysis and a corrective action plan to proactively address those causes. Transit has not performed such an analysis. According to the American Quality Center, "A root cause is a factor that caused a nonconformance and should be permanently eliminated through process improvement." The MTA in its analysis has identified the visible problems (e.g., overcrowding and heavy ridership) and has tried to eliminate some of the associated symptoms, but has not identified the root cause.

For example, although additional platform controllers, step aside boxes, and revised door announcements can help alleviate the symptoms of overcrowding and heavy ridership, they do not eliminate either.

5. We were aware of this meeting and on January 7, 2015, the auditors met with one of Subway's key officials to obtain information about such plans, but no information was provided. We note that no information was provided on March 5, 2015 and March 13, 2015 when we met with several key Subway officials.
6. Supplemental schedules are prepared to address this work. If done correctly, it should not impact on-time performance.
7. The use of additional platform controllers is not a new approach. It was used several years ago for a similar purpose. The step aside boxes are used at subway stations such as 42nd Street – Grand Central and announcements on many of the trains in the A Division (numbered lines) tell riders to step aside.
8. This list of work groups was previously provided, but there was no information about actual actions taken and any improvements made. In addition, five of the work groups focused on car equipment which, according to MTA's response, is not a major factor.
9. MTA officials are correct that many of the "efforts" were discussed with the auditors. However, outside of these discussions, officials provided very little in terms of documentation of the results of the "efforts."
10. We did not ask MTA officials to limit their response to any period of time. In fact, we asked MTA officials to provide all information they have to support the efforts made to improve OTP. MTA officials had ample opportunity to provide the information, but did not. Instead, it provided a Power Point presentation made to the Board in May 2015 after the audit was completed.
11. This is a false statement. MTA officials did not share any information about decreasing the OTP goal from 91.9 percent to 75 percent.
12. It is unclear why the MTA finds it appropriate to refer to a 2009 change in flagging procedures as a reason for late trains. It has been six years, and MTA should have determined how to build this into schedules, so that there is less impact on OTP.