Metropolitan Transportation Authority Defined Benefit Pension Plan

(A Fiduciary Component Unit of the Metropolitan Transportation Authority)

Financial Statements as of and for the Years Ended December 31, 2019 and 2018, Supplemental Schedules, and Independent Auditors' Report

METROPOLITAN TRANSPORTATION AUTHORITY
DEFINED BENEFIT PENSION PLAN

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INDEPENDENT AUDITORS' REPORT

To the Board of Managers of Pensions
Metropolitan Transportation Authority Defined Benefit Pension Plan

Report on the Financial Statements

We have audited the accompanying statements of plan net position of the Metropolitan Transportation Authority Defined Benefit Pension Plan (the "Plan") as of December 31, 2019 and 2018, and the related statements of changes in plan net position for the years then ended, and the related notes to the financial statements, which collectively comprise the Plan's basic financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Plan's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Plan's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the plan net position as of December 31, 2019 and 2018, and the respective changes in plan net position for the years then ended in accordance with accounting principles generally accepted in the United States of America.

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the Management's Discussion and Analysis on pages 3 through 9 and the Schedule of Changes in the Employers' Net Pension Liability and Related Ratios-Schedule I on page 51; Schedule of Employer Contributions-Schedule II on page 52-53; and Schedule of Investment Returns-Schedule III on page 54 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Deloitte & Touche LLP

July 22, 2020

This management's discussion and analysis of the Metropolitan Transportation Authority Defined Benefit Pension Plan (the "Plan") financial performance provides an overview of the Plan's financial activities for the years ended December 31, 2019 and 2018. It is meant to assist the reader in understanding the Plan's financial statements by providing an overall review of the financial activities during the two years and the effects of significant changes, as well as a comparison with the prior year's activity and results. This discussion and analysis may contain opinions, assumptions, or conclusions by the MTA's management that should not be considered a replacement for, and is intended to be read in conjunction with the Plan's financial statements which begin on page 10.

Overview of Basic Financial Statements

The following discussion and analysis is intended to serve as an introduction to the Plan's financial statements. The basic financial statements are:

- **The Statements of Plan Net Position —** presents the financial position of the Plan at fiscal year-end. It provides information about the nature and amounts of resources with present service capacity that the Plan presently controls (assets), consumption of net assets by the Plan that is applicable to a future reporting period (deferred outflow of resources), present obligations to sacrifice resources that the Plan has little or no discretion to avoid (liabilities), and acquisition of net assets by the Plan that is applicable to a future reporting period (deferred inflow of resources) with the difference between assets/deferred outflow of resources and liabilities/deferred inflow of resources being reported as net position. Investments are shown at fair value. All other assets and liabilities are determined on an accrual basis.

- **The Statements of Changes in Plan Net Position** - present the results of activities during the year. All changes affecting the assets and liabilities of the Plan are reflected on an accrual basis when the activity occurred regardless of the timing of the related cash flows. In that regard, changes in the fair values of investments are included in the year's activity as net appreciation (depreciation) in fair value of investments.

- **The Notes to Financial Statements** - provides additional information that is essential to a full understanding of the data provided in the financial statements. The notes present information about the Plan's accounting policies, significant account balances and activities, material risks, obligations, contingencies, and subsequent events, if any.

- **Required Supplementary Information** - as required by the Government Accounting Standards Board ("GASB") includes the Schedule of Changes in the Employer's Net Pension Liability and Related Ratios, Schedule of Employer Contributions, and Schedule of Investment returns.

The accompanying financial statements of the Plan are presented in conformity with accounting principles generally accepted in the United States of America as prescribed by the GASB.

CONDENSED FINANCIAL INFORMATION AND ANALYSIS

Plan Net Position
December 31, 2019, 2018 and 2017
(Dollars in thousands)

				Increase / Decrease			
				2019-2018		2018-2017	
	2019	**2018**	**2017**	**$**	**%**	**$**	**%**
Cash and investments	$ 4,782,648	$ 4,028,634	$ 4,056,780	$ 754,014	18.7%	$ (28,146)	-0.7%
Receivables and other assets	5,098	4,590	3,778	508	11.1	812	21.5
Total assets	**$ 4,787,746**	**$ 4,033,224**	**$ 4,060,558**	**$ 754,522**	**18.7**	**$ (27,334)**	**(0.7)**
Due to broker for securities purchased	3,594	2,699	3,575	895	33.2	(876)	(24.5)
Other liabilities	4,583	6,045	5,449	(1,462)	(24.2)	596	10.9
Total liabilities	**8,177**	**8,744**	**9,024**	**(567)**	**(6.5)**	**(280)**	**(3.1)**
Plan net position restricted for pensions	**$ 4,779,569**	**$ 4,024,480**	**$ 4,051,534**	**$ 755,089**	**18.8%**	**$ (27,054)**	**-0.7%**

December 31, 2019 versus December 31, 2018

Cash and investments at December 31, 2019 were $4,782.6 million representing an increase of $754.0 million or 18.7% from 2018. This increase is a result of investment activity and plan contributions net of benefit payments and expenses during 2019.

Receivables and other assets net of liabilities at December 31, 2019 decreased by $0.02 million or 1.5% from 2018. The is due primarily to an increase in interest and dividend receivables in the amount of $0.5 million, offset by a decrease in liabilities of $0.5 million related to amount due to broker for securities purchased of $0.9 million, administrative expenses $0.3million, other liabilities $0.2 million offset by a decrease of investment management fees of $1.9 million.

The plan net position held in trust for pension benefits increased by $755.1 million or 18.8% in 2019 as a result of the changes noted above.

December 31, 2018 versus December 31, 2017

Cash and investments at December 31, 2018 were $4,028.6 million representing a decrease of $28.1 million or 0.7% from 2017. This decrease is a result of weak investment activity in the fourth quarter of 2018 and plan contributions net of benefit payments and expenses during 2018.

Receivables and other assets net of liabilities at December 31, 2018 decreased by $1.1 million or 13.8% from 2017. The is due primarily to an increase in interest and dividend receivables in the amount of $0.8 million, offset by a decrease in other liabilities of $0.2 million.

The plan net position held in trust for pension benefits decreased by $27.0 million or 0.7% in 2018 as a result of the changes noted above.

Changes in Plan Net Position
For the Years Ended December 31, 2019, 2018 and 2017
(Dollars in thousands)

				Increase / Decrease			
				2019-2018		2018-2017	
	2019	2018	2017	$	%	$	%
Additions:							
Net investment income/(loss)	$ 647,264	$ (150,422)	$ 516,153	$ 797,686	503.3%	$ (666,575)	-129.1%
Contributions	376,217	368,869	352,855	7,348	2.0	16,014	4.5
Total net additions	**1,023,481**	**218,447**	**869,008**	**805,034**	**368.5**	**(650,561)**	**(74.9)**
Deductions:							
Benefit payments	264,878	242,149	231,321	$ 22,729	9.4	$ 10,828	4.7
Tranfer to NYSLERs	106	200	1,622	(94)	(47.0)	(1,422)	(87.7)
Administrative expenses	3,408	3,152	4,502	256	8.1	(1,350)	(30.0)
Total deductions	**268,392**	**245,501**	**237,445**	**22,891**	**9.3**	**8,056**	**3.4**
Net increase / (decrease) in Plan net position	**755,089**	**(27,054)**	**631,563**	**782,143**	**2891.0**	**(658,617)**	**(104.3)**
Plan net position restricted for pensions:							
Beginning of year	4,024,480	4,051,534	3,419,971	(27,054)	(0.1)	631,563	18.5
End of year	**$ 4,779,569**	**$ 4,024,480**	**$ 4,051,534**	**$ 755,089**	**18.8%**	**$ (27,054)**	**-0.7%**

December 31, 2019 versus December 31, 2018

Net investment income increased by $516.1 million in 2019 due to net investment gains of $647.3 million in 2019 versus net loss of $150.4 million experienced in 2018.

Contributions increased by $7.3 million or 2.0% in 2019 compared to 2018 as required by the Actuarial Determined Contributions (“ADC”) and member contributions from 2018 to 2019.

Benefit payments increased by $22.7 million or 9.4% over the prior year due to a continuing trend of increases in the number of retirees and cost-of-living adjustments provided to retirees and beneficiaries.

Administrative expenses increased by $0.3 million, or 8.1% over 2018. This increase is due primarily to expenses charged in 2019 for various services provided to the Plan.

In 2019 and 2018, the Plan transferred $0.1 million and $0.2 million to New York State and Local Police and Fire Retirement System as required by New York State law due to transfers of membership.

December 31, 2018 versus December 31, 2017

Net investment income decreased by $666.6 million in 2018 due to net investment loss of $150.4 million in 2018 versus net gains of $516.2 million experienced in 2017.

Contributions increased by $16.0 million or 4.5% in 2018 compared to 2017 as required by the Actuarial Determined Contributions (“ADC”) and member contributions from 2017 to 2018.

Benefit payments increased by $10.8 million or 4.7% over the prior year due to a continuing trend of increases in the number of retirees and cost-of-living adjustments provided to retirees and beneficiaries.

Administrative expenses decreased by $1.3 million, or 30.0% over 2017. The decrease is due primarily to non-recurring expenses charged in 2017 for various services provided to the Plan.

In 2017 and 2018, the Plan transferred $1.6 million and $0.2 million to New York State and Local Police and Fire Retirement System as required by New York State law due to transfers of membership.

Economic Factors

Market Overview and Outlook – 2019

In 2019 international markets turned cautiously optimistic, in contrast to 2018, when stocks were buffeted by uncertainty surrounding United States ("U.S.")-China trade negotiations. Equity markets ended a remarkable 2019 rally on a strong note, with major stock indexes reaching new all-time highs. Among growth assets, global equities outperformed high yield and emerging market debt. The U.S. dollar weakened broadly, most significantly against the Swiss franc, British pound and emerging market currencies. Equity, bond and currency volatility continued to ease in December to historically low levels. Investors favored riskier assets following declining trade tensions and easing geo-political headwinds. United Kingdom ("UK") and emerging markets, specifically China, Russia and Latin American, led the December rally, while the U.S. along with other developed markets lagged the Morgan Stanley Capital International All Country World Index ("MSCI ACWI"). Developed markets outperformed emerging markets overall in 2019.

The global economy slowed in 2019 and is now growing below trend. This was primarily driven by the trade war weighing on capital spending and the lagging effect from monetary tightening in 2018. While monetary policies were generally left unchanged in December-- which partly accounts for the stellar returns to both equities and bonds in 2019—further impetus to economic growth may have to come from fiscal measures: policy makers have recently paused easing efforts to evaluate the effect of prior rate cuts, and officials have indicated that monetary policy may have reached its limits. They are therefore considering greater use of fiscal tools to manage business cycles and to support economic growth. A recession in the U.S. appears unlikely in the near term while low interest rates and tame inflation levels continue to power higher equity valuations

Geo-political risks faded after the U.S. and China reached a preliminary trade agreement. Also, Brexit uncertainties fell after Prime Minister Boris Johnson's Conservative Party obtained a solid majority in Parliament. The UK parliament has passed a withdrawal agreement and will start the exit process at the end of January 2020. Markets looked past the political turmoil in the U.S., where a deeply divided House of Representatives passed two articles of impeachment against President Trump. However, macroeconomic stress related to tighter financial conditions in Argentina, geo-political tensions in Iran, and social unrest in Hong Kong, Venezuela, Libya, and Yemen still persisted. Additionally, climate concerns took center stage amid extreme weather around the globe, and protests against the political establishment reverberated through Hong Kong, Lebanon, Chile, Ecuador and many other places.

While current market dynamics may appear to favor equities over fixed income, one should be cognizant that valuations have been trending higher, creating limited attractive investment opportunities. To this end, many long-term forecasts for investment return, encompassing a 10-year time horizon, remain relatively muted. To prepare portfolios for this new decade, it may be essential for investors to start the year with a renewed emphasis on strategic asset allocation, heeding geo-political and portfolio risks to ensure that their investment horizon and governance structure are aligned with portfolio mission statements and return objectives. Even if the investment landscape encourages risk taking, uncertainties remain, making it critical for investors to reassess and rebalance their portfolio holdings considering their robust gains in 2019.

Macro Themes

- Asset allocation and portfolio implementation.
- Late stage of a market cycle.
- China's complex transition into a service and consumption-oriented economy from the manufacturing behemoth.
- The backlash against globalization—expressed through populism and trade wars—is here to stay.
- Central banks permanent interventions have created a new normal, where accommodative monetary policies and fiscal debt growth appear to exist in perpetuity, supporting equities relative to fixed income.

United States

2019 represented a triumphant year the U.S. capital markets compared to 2018 underperformance. Accommodative monetary policies, falling interest rates and subdued inflation helped investors not only to meet their return objectives, but, in many instances, to exceed them. Adding to this impressive string of wins: the U.S. economy completed a calendar decade without a recession—a historical first. While investors would love more of the same, it is unlikely this period of windfall gains and low market volatility will persist for the next decade.

Large Cap stocks were strongly positive, with the S&P 500 and Russell 1000 indices posting returns of (+31.5%) and (+31.3%), respectively. Small Cap and Mid Cap indices underperformed large cap. Small Cap, as measured by the Russell 2500 Index, returned (+27.6%). The Russell Mid Cap Index measured by the Russell 2000 Index lagged the Small Cap and posted a return of (+25.4%). Of note, growth-oriented investments outperformed the value counterpart with the Russell 1000 Growth (+36.2%) outpacing the Russell 1000 Value (+26.4%).

Fixed income securities markets ended 2019 in the black, reversing declines experienced in 2018. Treasuries returned (+14.8%) for the year, with the assets strongest quarter coming in the first and second quarters of 2019. Municipal credit posted a return of (+7.5%) while the Bloomberg Barclays High Yield Index gained (+14.3%) in 2019. Spreads on high-yield credit narrowed for most part of 2019, but segments in the high-yield and bank loan markets showed signs of stress towards the end of 2019. On the other hand, the S&P LSTA Leveraged Loan Index returned (+10.6%) during the same period.

International Developed

International equity markets posted very strong results in 2019 and lagged behind U.S. equity markets, returning (+26.5%) as measured by the MSCI. In U.S. dollars, both Europe and Japan equities posted positive performance in 2019 with MSCI Europe returning (+23.7%) and MSCI Japan returning (+19.5%). Very strong returns in Europe were driven by the global positive market performance during 2019 unlike 2018 when Europe returned (-14.9%). The Small Cap portion of international developed markets posted even stronger returns in 2019, (+24.9%) compared with 2018, (-17.9%).

Fixed income markets in Europe and Japan are largely centered on government bonds, with corporate and asset-backed issuance making up a fraction of the overall markets. Global Treasuries were positive in 2019, following a negative year in 2018.

Emerging Markets

Emerging markets posted very strong returns in 2019, with performance lower than both U.S. and international developed markets across equity and debt. The broad MSCI emerging markets index returned (+18.3%) for the year. Emerging markets gained sharply in December, driven by hopes that the People's Bank of China will continue to ease its monetary policy to support growth.

The bond markets of emerging markets performed well in 2019 compared to its underperformance in 2018. Both hard currency and local currency bond posted a very strong year in performance. Hard currency bonds, which are predominately issued in U.S. dollars, returned (+12.6%) in 2019. Local currency bonds, which are issued in the local currency, returned (+13.5%) for the year.

Commodities
The Bloomberg Commodity Index rose (+7.7%) for the year while the New York Mercantile Exchange West Texas Index Crude Spot rose (+35.3%) and Midstream energy ended the year up more than (+24.0%). Residential gas prices in the Midwest are forecast to be nearly (+8.0%) higher this winter than last, and prices in the South and West are seen about (+5.0%) and (+3.0%) higher, respectively, while Northeast prices are forecast to decline (6.0%), helped by relatively low global prices for Liquefied Natural Gas and lower household natural gas consumption. The overall slight decline in heating expenses is aided by generally declining commodity prices.

Market Outlook
Central banks and governments have demonstrated, to varying degrees, their willingness to administer monetary and fiscal stimulus. That accommodative stance should continue in 2020. The U.S. Federal Reserve has already signaled its intention to keep interest rates on hold, providing more certainty for businesses. The re-convergence of U.S. interest rates with other developed markets will reduce upward pressure on the dollar. In addition, the impact of looser monetary policy, combined with a better trade backdrop, could spur the necessary investment and reform to fuel increased labor force participation and renewed productivity improvements.

Political risk, both at national and international levels, remains the great unknown. The long-term path of U.S.-China trade and cooperation is uncertain. A damaging “no-deal Brexit” is not entirely off the table. Tensions in the Middle East could risk sparking full-blown conflict. At the same time, 2020 primaries and Presidential elections in the U.S. will create uncertainty and could cause volatility as markets react to the policies and promises of the various candidates. Notwithstanding all of this, however, the current improvement in geo-political backdrop as compared with 2018, together with stimulus measures should support a modest acceleration in global growth in 2020. That growth, in turn, should lead to a moderate increase in demand for oil, putting a floor under the price, especially when global demand is met with sensible supply-side control from Organization of the Petroleum Exporting Countries.

Many analysts continue to believe emerging markets offer the most investment value, especially following the recent truce in trade relations between the U.S. and China. Furthermore, the opportunities for active management and excess returns appear more abundant in emerging economies. As a result, investors may be encouraged to overweight emerging market equities relative to developed market stocks. They may also opt to reduce exposure to high-yield and return-seeking credit in 2020, since market returns do not offer adequate compensation for the risk they hold. Safe-haven fixed income for instance, Treasuries and core bonds, despite low yields—remain vital for balancing risks within a diversified portfolio.

Impact of Covid-19
Covid-19 has continued to spread at a rapid pace around the world and has now been declared a global pandemic by the World Health Organization. This has caused a severe shock to the global economy pushing it into a deep and far reaching recession. Financial markets have responded with a huge drop in equities values, a rise in credit spreads and a flight to the safety of governments bonds.

In anticipation of the economic growth fallout, Standards & Poor’s Global ratings lowered its forecast for global growth to just (+0.4%) this year and predicts a rebound to (+) in 2021. According to Bloomberg, the current second Quarter Gross Domestic Product average estimate of (-11.2%) annualized would be the worst post World War II quarter on record. However, worldwide central banks and governments announced fiscal and monetary rescue packages to soften the economic impact of the virus and the associated business disruptions. Geo-political tensions such as the trade war issues between the U.S. and China have moved into the background.

The Covid-19 outbreak has resulted in a significant decline in ridership and vehicle crossings. The decline in ridership and vehicle crossings have caused a material impact on the Metropolitan Transportation Authority’s (“MTA”) results of operations, financial position, and cash flows in fiscal 2020. In response to the adverse conditions, the MTA has secured funding under the “Coronavirus Aid, Relief and Economic Security Act” or

“CARES Act”; received State of New York authorization to increase debt issuing capacity, including $10 billion in deficit bonds; received State of New York authorization to use the Central Business District Tolling lockbox monies to fund COVID-19 operating costs; and has been granted flexibility to apply existing FTA grant program proceeds to operating costs or other purposes to address COVID-19 impacts. In addition, the volatility and uncertainty of the financial market have negatively affected the investment earnings of retirement plans. Although the long-term impact of the Covid-19 outbreak on the financial market is still unpredictable, it could have a negative impact on the market value of the Plan in future years.

Contact Information

This financial report is designed to provide a general overview of the Metropolitan Transportation Authority Defined Benefit Pension Plan’s finances. Questions concerning any data provided in this report or requests for additional information should be directed to the Comptroller, Metropolitan Transportation Authority, 2 Broadway, 16th Floor, New York, NY 10004.

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METROPOLITAN TRANSPORTATION AUTHORITY
DEFINED BENEFIT PENSION PLAN

STATEMENTS OF PLAN NET POSITION
AS OF DECEMBER 31, 2019 AND 2018
(In tnousands)

	2019	2018
ASSETS:		
Cash	$ 6,892	$ 13,224
Investments at fair value (Notes 2 and 3):		
Investments measured at readily determined fair value	999,705	787,191
Investments measured at net asset value	3,776,051	3,228,219
Total investments	4,775,756	4,015,410
Receivables:		
Accrued interest and dividends	2,949	2,745
Other receivable	2,149	1,845
Total receivables	5,098	4,590
Total assets	4,787,746	4,033,224
LIABILITIES:		
Due to broker for securities purchased	3,594	2,699
Due to broker for investment fee	717	2,667
Due to broker for administrative expenses	220	267
Due to MTA for administrative expenses	3,130	2,818
Other liabilities	516	293
Total liabilities	8,177	8,744
PLAN NET POSITION RESTRICTED FOR PENSIONS	$ 4,779,569	$ 4,024,480

See notes to financial statements.

METROPOLITAN TRANSPORTATION AUTHORITY
DEFINED BENEFIT PENSION PLAN

STATEMENTS OF CHANGES IN PLAN NET POSITION
FOR THE YEARS ENDED DECEMBER 31, 2019 AND 2018
(In thousands)

	2019	2018
ADDITIONS:		
Investment (loss) / income:		
Net realized and unrealized gains / (losses)	$ 608,991	$ (169,255)
Dividends	48,512	56,670
Interest	12,628	9,254
Total investment income / (loss)	670,131	(103,331)
Less:		
Investment expenses	(22,867)	(47,091)
Net investment income / (loss)	647,264	(150,422)
Contributions:		
Employer:		
Metro-North Commuter Railroad Company	123,663	116,005
Long Island Rail Road Company	121,740	114,854
Metropolitan Transportation Authority Headquarters	32,299	42,967
MTA Bus Company	59,768	57,264
Staten Island Rapid Transit Operating Authority	7,244	7,877
Employee	31,503	29,902
Total contributions	376,217	368,869
Total additions	1,023,481	218,447
DEDUCTIONS:		
Benefits paid to participants	264,878	242,149
Transfer of MTA Police Employer & Employee Contributions to NYSLERS	106	200
Administrative expenses	3,408	3,152
Total deductions	268,392	245,501
NET INCREASE / (DECREASE) IN PLAN NET POSITION	755,089	(27,054)
PLAN NET POSITION RESTRICTED FOR PENSIONS		
Beginning of year	4,024,480	4,051,534
End of year	$ 4,779,569	$ 4,024,480

See notes to financial statements.

1. PLAN DESCRIPTION

The following brief description of the Metropolitan Transportation Authority (the "Authority") Defined Benefit Pension Plan (the "Plan") is provided for general information purposes only. Participants should refer to the Plan document for more complete information.

General — The Plan represents a cost-sharing employer defined benefit pension plan sponsored by the Authority and administered by the Board of Managers of Pensions, covering:

(a) management employees of the Long Island Rail Road Company ("MTA Long Island Rail Road") hired after January 1, 1988 not governed by collective bargaining agreements;

(b) management employees of the Metro-North Commuter Railroad Company ("MTA Metro-North Railroad") not governed by collective bargaining agreements;

(c) represented MTA Long Island Rail Road employees hired after January 1, 1988, covered by collective bargaining agreements which provide for participation in the plan effective January 1, 2004;

(d) certain represented MTA Metro-North Railroad employees covered by collective bargaining agreements which provide for participation in the plan effective on or after January 1, 2004;

(e) represented and non-represented MTA Long Island Rail Road employees hired prior to January 1, 1988;

(f) Metropolitan Suburban Bus Authority ("MTA Long Island Bus") provided public service in Nassau and Queens Counties. The Authority's Lease and Operating Agreement with Nassau County, dated January 15, 1973, as amended, was terminated effective December 31, 2011. As of January 1, 2012, the MTA Long Island Bus is no longer a member of the MTA Group. Represented and management Metropolitan Suburban Bus Authority ("MTA Long Island Bus") employees hired prior to January 24, 1983 and any MTA Long Island Bus person employed by the MSBA Employees' Pension Trust prior to July 29, 1998 under the MSBA Employees' Pension Plan remained vested employees in the plan;

(g) represented and management employees of the Staten Island Rapid Transit Operating Authority ("MTA Staten Island Railway") effective January 1st, 2005;

(h) certain represented and management employees of MTA Bus Company ("MTA Bus"), including represented and non-represented employees who were formerly employed by Liberty Lines Express, Inc., New York Bus Tours, Inc., Command Bus Company, Green Bus Lines Inc., Jamaica Buses Inc., Triboro Coach Corporation and represented and most non-represented employees formerly employed by Queens Surface Corporation; and

(i) participants in the MTA Defined Benefit Pension Plan 20 Year Police Retirement program ("MTA Police").

The Plan contains multiple and distinct benefit structures for MTA Metro-North Railroad and MTA Long Island Rail Road management employees, for MTA Metro-North Railroad and MTA Long Island

Rail Road represented employees, MTA Police, MTA Long Island Bus employees and MTA Staten Island Railway employees. In addition, there are multiple but distinct benefit structures for the employees of MTA Bus which are based on the plans covering those employees prior to their becoming MTA Bus employees. MTA Bus non-represented employees and employees represented by the UTLO are covered by separate programs. Assets and liabilities are pooled and a single cash contribution amount and annual pension cost is determined. The Plan is designed to satisfy the applicable requirements for governmental plans under Section 401(a) and 501(b) of the Internal Revenue Code. Accordingly, the Plan is tax-exempt and is not subject to the provisions of the Employee Retirement Income Security Act ("ERISA") of 1974.

Membership of the Plan consisted of the following as of January 1, 2019 and 2018, respectively, the date of the latest actuarial valuations:

	2019	2018
Active Plan Members	19,074	18,631
Retirees and beneficiaries receiving benefits	11,249	11,132
Vested formerly active members not yet receiving benefits	1,481	1,472
Total	31,804	31,235

Funding for the Plan is provided by the Authority, MTA Metro-North Railroad, MTA Long Island Rail Road, MTA Bus and MTA Staten Island Railway which are public benefit corporations that receive a significant portion of their operating and capital financing requirements from New York City, New York State, federal and regional governmental units and from the sale of bonds to the public. Certain funding is made on a discretionary basis. The continuance of funding for the Plan has been, and will continue to be, dependent upon the receipt of adequate funds.

Plan Administration – The Defined Benefit Plan is administered by the Board of Managers of Pensions which is comprised of:

(a) the persons holding the following positions:
   (j) the Chairman of the MTA;
   (ii) the MTA Chief Financial Officer;
   (iii) the MTA Director of Labor Relations; and
   (iv) the agency head of each participating Employer.

(b) Designation of Others – Any member of the Board of Managers, serving as such by virtue of holding a position described in (a) of this section, may, by written authorization filed with the Secretary who shall notify the other members of the Board of Managers, designate another individual, not then a member of the Board of Managers, to serve in that member's stead, in accordance with procedures established with the approval of the Executive Director. Any such authorization may be revoked by the designating member at any time in writing filed in the same manner.

(c) The Board of Managers shall be the agent for the service of legal process with respect to the Plan. No bond or other security is required in any jurisdiction of the Board of Managers or any member thereof except as required by law.

Pension Benefits — Retirement benefits are paid from the Plan to covered MTA Metro-North Railroad, MTA Staten Island Railway and post —1987 MTA Long Island Rail Road employees as service retirement allowances or early retirement allowances. A participant is eligible for a service retirement allowance upon termination if the participant satisfied both age and service requirement. A participant is eligible for an early retirement allowance upon termination if the participant has attained age 55 and completed at least 10 years of credited service. Terminated participants with 5 or more years of credited service who are eligible for a deferred vested benefit are not eligible to receive a service retirement allowance or early retirement allowance. Deferred vested benefits are payable on an unreduced basis on the first day of the month following the participant sixty-second birthday. Effective in 2007, members and certain former members who become (or became) employed by another MTA agency which does not participate in the Plan continue to accrue service credit based on such other employment. Upon retirement, the member's vested retirement benefit from the Plan will be calculated on the final average salary of the subsequent MTA agency, if higher. Moreover, the Plan benefit will be reduced by the benefit, if any, payable by the other plan based on such MTA agency employment. Such member's disability and ordinary death benefit will be determined in the same way.

Retirement benefits are paid from the Plan under the MTA 20-Year Police Retirement Program. A participant is eligible for service retirement at the earlier of completing 20 years of credited Police service or attainment of age 62. Terminated participants with five years of credited police service, who are not eligible for retirement, are eligible for a deferred benefit. Deferred vested benefits are payable on the first of the month following the participant's attainment of age 55.

Retirement benefits paid from the Plan to covered represented MTA Bus employees include service retirement allowances or early retirement allowances. Under the programs covering all represented employees at Baisley Park, Eastchester, La Guardia, Spring Creek, and Yonkers Depots and the represented employees at College Point Depot, JFK, Far Rockaway a participant is eligible for a service retirement allowance upon termination if the participant has attained age 65 and completed at least 5 years of credited service or if the participant has attained age 57 and completed at least 20 years of credited service. A participant hired prior to June 2009 from Baisley Park, College Point, and La Guardia Depots is eligible for an early retirement allowance if the participant has attained age 55 and completed 20 years of credited service. Terminated participants with 5 or more years of credited service who are not eligible to receive a service retirement allowance or early retirement allowance are eligible for a deferred vested benefit. Deferred vested benefits are payable on an unreduced basis on or after the participant attains age 65.

The MTA Bus retirement programs covering TWU, ATU and TSO represented employees are fixed dollar plans, i.e., the benefits are a product of credited service and a specific dollar amount.

The retirement benefits for certain former employees of the Alliance Companies are based on a participant's service and final average salary. A normal retirement benefit is payable when the participant attains age 62 with 5 years of service. An early retirement benefit is payable when the participant attains age 55 with 15 years of service. The retirement benefit is payable as a single life annuity or, for married participants, as an unreduced 75% joint and survivor annuity.

MTA Bus non-represented employees and employees represented by the UTLO as of January 1, 2017 will earn benefits under a new set of programs. For service prior to 2017, a component calculated by a flat monthly dollar rate multiplied by years of credited service will be added to a final average salary (FAS) component, based on the platforms provided to similarly situated MaBSTOA Pension Plan members. For service on or after January 1, 2017, the final average salary component platform will be based on date of hire, years of credited service and whether the participant holds an operating or non-operating title. Certain former Liberty Lines employees assigned to the former Liberty Lines bus routes also are eligible for a supplemental plan benefit of 0.75% of final average salary per year of Plan service. TWU Local 100 has been certified as the collective bargaining representative for certain titles previously not represented at MTA Bus. Affected employees will participate in these programs, as set forth in the relevant collective bargaining agreement.

An MTA Bus non-represented or UTLO operating employee hired prior to April 1, 2012 participates in a Tier 4 25/55 operating retirement platform. A Tier 4 25/55 operating retirement platform participant with 25 years of Allowable Service receives upon retirement at age 55 a flat rate benefit equal to $1,380.00 ($115 x 12) for each year of service prior to January 1, 2017, plus a FAS benefit equal to 2% multiplied by FAS multiplied by service accrued after January 1, 2017, up to 30 years of total service, plus 1.5% multiplied by FAS multiplied by service accrued after January 1, 2017 in excess of 30 years of total service.

An MTA Bus non-represented non-operating employee hired prior to April 1, 2012 participates in a Tier 4 57/5 non-operating retirement platform. A Tier 4 57/5 non-operating retirement platform participant receives upon retirement at age 57 a flat rate benefit equal to $1,380.00 ($115 x 12) for each year of service prior to January 1, 2017, plus a FAS benefit equal to, for those with less than 20 years of total service, 1 2/3% multiplied by FAS multiplied by total service accrued after January 1, 2017, or, for those with 20 or more years of total service, 2% multiplied by FAS multiplied by total service accrued after January 1, 2017, up to 30 years of total service, plus 1.5% multiplied by FAS multiplied by total service accrued after January 1, 2017 in excess of 30 years of total service.

An MTA Bus non-represented or UTLO operating employee hired on or after April 1, 2012 participates in a Tier 6 25/55 operating retirement platform. A Tier 6 25/55 operating retirement platform participant with 25 years of Allowable Service receives upon retirement at age 55 a flat rate benefit equal to $1,380.00 ($115 x 12) for each year of service prior to January 1, 2017, plus a FAS benefit equal to 2% multiplied by FAS multiplied by service accrued after January 1, 2017 up to 30 years of total service, plus 1.5% multiplied by FAS multiplied by service accrued after January 1, 2017 in excess of 30 years of total service. The flat rate benefit is vested after the completion of five years of total service and the FAS benefit is vested after the completion of ten years of total service.

An MTA Bus non-represented non-operating employee hired on or after April 1, 2012 participates in a Tier 6 63/10 non-operating retirement platform. A Tier 6 63/10 non-operating retirement platform participant receives upon retirement at age 63 a flat rate benefit equal to $1,380.00 ($115 x 12) for each year of service prior January 1, 2017, plus a FAS benefit equal to, for those with less than 20 years of total service, 1.67% multiplied by FAS multiplied by total service accrued after January 1, 2017, or, for those with 20 or more years of total service, 1.75% multiplied by FAS multiplied by total service accrued after January 1, 2017, up to 20 years of such service, plus 2% multiplied by FAS multiplied by total service accrued after January 1, 2017 in excess of 20 years of total service. The flat rate benefit is vested after the completion of five years of total service and the FAS benefit is vested after the completion of ten years of total service.

Reduced early retirement benefits are payable under all platforms. The Tier 6 definition of wages includes an overtime ceiling which limits overtime compensation for pension purposes to no more than $16,406 for 2018 and $16,779 for 2019, indexed annually thereafter. Any overtime compensation earned in excess of the overtime ceiling is excluded from the final average salary calculation. The Tier 6 definition of wages also excludes wages in excess of the annual salary paid to the New York State Governor, lump-sum payments for deferred compensation, sick leave, accumulated vacation or other credits for time not worked.

TWU, ATU and TSO members who retire after November 16, 2016, and UTLO members and non-represented employees who retire after January 1, 2017 will have their pension benefit increased by a Cost of Living Adjustment (COLA). The COLA is an annual adjustment to the retirement benefit based on the Consumer Price Index (CPI). The following retirees are eligible to receive a COLA: disability retirees, regardless of age, who have been retired for at least 5 years; retirees who are at least age 62 and have been retired for at least 5 years; and retirees who are at least age 55 and have been retired for at least 10 years. Surviving spouses receiving a joint-and-survivor option benefit are eligible to receive 50% of the monthly COLA that would have been paid to the retiree. For TWU, ATU and TSO members, the COLA calculation is based on the first $18,000 of the retiree's normal retirement benefit. For UTLO members and non-represented employees, the COLA calculation is based on the first $18,000 of the retiree's final average salary benefit component. The COLA amount may not be less than 1% nor more than 3% in any year. Once COLA payments begin, they continue automatically and increase each September.

Certain MTA Bus employees represented by TWU Local 100 were granted pension service credit for periods of employment at Liberty Lines Express, Inc. prior to January 3, 2005, with the increase in the Plan benefit offset by the benefit accrued under the TWU-Westchester Private Bus Lines Pension Plan.

Pre-1988 MTA Long Island Rail Road participants are eligible for a service retirement allowance upon termination if the participants have either: (a) attained age 65 and completed at least 5 years of credited service, or if an employee on January 1, 1988 completed at least 10 years of credited service, or (b) attained age 50 and has completed at least 20 years of credited service. Terminated participants who were not employees on January 1, 1988 with 5 or more years of credited service are eligible for a deferred vested benefit. Pension benefits payable to age 65, where eligible, are calculated as 2% of the employee's applicable final average earnings for each year of qualifying service up to 25 years plus 1.5% of applicable final average earning of each year of qualifying service in excess of 25 years. For pension benefits payable at and after age 65 regardless of whether benefits commenced before or after the employee attained age 65, benefits are calculated in the same manner as pension benefits payable prior to age 65 except that the amount so determined is reduced by a percentage of the employee's annuity (not including supplemental annuity) value at age 65 under the Federal Railroad Retirement Act.

The reduction of pension benefits for amounts payable under the Federal Railroad Retirement Act is 50%.

Death and Disability Benefits — In addition to service retirement benefits, participants of the Plan are eligible to receive disability retirement allowances and death benefits. Participants who become disabled may be eligible to receive disability retirement allowances after 10 years of covered MTA Bus service; 10 years of credited service for covered MTA Metro-North Railroad and MTA Long Island Rail Road management and represented employees, covered MTA Staten Island Railway employees and covered MTA police participants.

The disability retirement allowance for covered MTA Metro-North Railroad and MTA Long Island Rail Road management and represented covered MTA Staten Island Railway employees is calculated based on the participant's credited service and final average salary ("FAS") but not less than ⅓ of FAS. Under the MTA 20 Year Police Retirement Program, a disabled participant may be eligible for one of three forms of disability retirement: (a) ordinary disability which is payable if a participant has 10 years of credited Police service and is calculated based on the participant's credited Police service and FAS but not less than ⅓ of FAS; (b) performance of duty, which is payable if a participant is disabled in the performance of duty and is ½ of FAS, and (c) accidental disability, which is payable if a participant is disabled as the result of an on-the-job accidental injury and is ¾ of FAS subject to an offset of Workers' Compensation benefits. Pursuant to the MTA Bus programs, the disability benefit is the same as the service retirement benefit.

Pre-1988 MTA Long Island Rail Road participants who become disabled after accumulating 10 years of credited service and who meet the requirements as described in the Plan may be eligible to receive a disability benefit. Disability pension benefits are calculated based on the participant's qualified service and a percentage of final average compensation reduced by the full amount of the disability benefit under the Federal Railroad Retirement Act.

Survivorship benefits for pre-1988 MTA Long Island Rail Road participants are paid to the spouse when a survivorship option is elected or when an active participant has not divested their spouse of benefits. The survivorship benefit is payable at the time of death or when the vested participant would have attained an eligible age. The amount payable is in the form of an annuity. A lump sum death benefit no greater than $5,000 is payable upon death on behalf of a non-vested participant or vested participant whose pension rights were waived.

Death benefits are paid to the participant's beneficiary in the event of the death of a covered MTA Metro-North Railroad, post-1987 MTA Long Island Rail Road or MTA Staten Island Railway employee after completion of one year of credited service. The death benefit payable is calculated based on a multiple of a participant's salary based on years of credited service up to three years and is reduced beginning at age sixty-one. There is also a post-retirement death benefit which, in the 1st year of retirement, is equal to 50% of the pre-retirement death benefit amount, 25% the 2nd year and 10% of the death benefit payable at age 60 for the 3rd and later years. For the Police 20 Year Retirement Program, the death benefit is payable after ninety days of credited MTA Police service, and is equal to three times their salary. For non-Police groups, this death benefit is payable in a lump sum distribution while for Police, the member or the beneficiary can elect to have it paid as an annuity. The MTA Police do not have a post retirement benefit.

In the MSBA Employees' Pension Plan, there are special spousal benefits payable upon the death of a participant who is eligible for an early retirement benefit, or a normal service retirement benefit, or who is a vested participant or vested former participant. To be eligible, the spouse and participant must have been married at least one year at the time of death. Where the participant was eligible for an early service retirement benefit or was a vested participant or former participant, the benefit is a pension equal to 40% of the benefit payable to the participant as if the participant retired on the date of death. Where the participant was eligible for a normal service retirement benefit, the eligible spouse can elect either the benefit payable as a pension, as described in the prior sentence, or a lump sum payment based on an actuarially determined pension reserve. If there is no eligible spouse for this pension reserve benefit, a benefit is payable to the participant's beneficiary or estate.

Moreover, an accidental death benefit is payable for the death of a participant who is a covered MTA Metro-North Railroad or post-1987 MTA Long Island Rail Road employee, a covered MTA Staten Island Railway employee or a covered MTA Police member and dies as the result of an on-the-job accidental injury. This death benefit is paid as a pension equal to 50% of the participant's salary and is payable to the spouse for life, or, if none, to children until age 18 (or 23, if a student), or if none, to a dependent parent.

For MTA Bus employees, there is varied death benefit coverage under the Plan. For all represented and non-represented MTA Bus employees at Eastchester and Yonkers Depots and represented MTA Bus employees at Baisley Park, College Point, Far Rockaway, JFK, La Guardia and Spring Creek Depots, if a participant dies prior to being eligible for a retirement benefit, the participant's beneficiary may elect to receive a refund of the participant's contributions plus interest.

Moreover, the spouses of the above employees who are vested are entitled to a presumed retirement survivor annuity which is based on a 50% Joint and Survivor annuity. The date as of which such annuity is determined and on which it commences varies among the different programs depending on whether the participants are eligible for retirement and for payment of retirement benefits.

In addition, the spouse of a non-represented MTA Bus employee at Spring Creek, JFK, La Guardia, Baisley Park and Far Rockaway, if such employee is age 55 and has 15 years of service and is a terminated member with a vested benefit which is not yet payable, may elect the presumed retirement survivor annuity or 1/2 the participant's accrued benefit paid monthly and terminating on the 60th payment or the spouse's death. The spouse of a non-represented MTA Bus employee at Yonkers Depot may also receive a pre-retirement survivor annuity from the supplemental plan. If there is no such spouse, the actuarial equivalent of such annuity is payable.

The dependent children of MTA Bus TWU employees of College Point, Baisley Park, and La Guardia hired prior to June 9, 2009 are also entitled to an annuity based on the spouse's pre-retirement survivor annuity (1/2 of the spouse's annuity is payable to each child, but no more than 100% of the spouse's annuity is payable). In addition, the dependent children of retirees who were MTA Bus employees at these Depots are entitled to an annuity based on the presumed retirement survivor's annuity (25% of the spouse's annuity; but no more than 50% of the spouse's annuity is payable).

Retirement benefits establishment and changes for represented employees are collectively bargained and must be ratified by the respective union and the MTA Board. For non-represented employees, retirement benefit adopted and modifications thereto, are presented to the MTA Board and must be accepted and approved by the MTA Board.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Accounting — The Plan's financial statements are prepared on the accrual basis of accounting under which deductions are recorded when the liability is incurred and additions are recognized in the accounting period in which they are earned. Benefits and refunds are recognized when due and payable in accordance with the terms of the Plan. Contributions from members are recorded when the employer makes payroll deductions from plan members. Employer contributions are recognized when due in accordance with the terms of the Plan. Additions to the Plan consist of contributions (member and employer) and net investment income. Investment purchases and sales are recorded as of trade date.

The accounting and reporting policies of the Plan conform to accounting principles generally accepted in the United States of America (GAAP).

New Accounting Standards Adopted – The Plan adopted GASB Statement No. 84, *Fiduciary Activities.* This Statement establishes criteria for identifying fiduciary activities of all state and local governments. The focus of the criteria generally is on (1) whether a government is controlling the assets of the fiduciary activity and (2) the beneficiaries with whom a fiduciary relationship exists. Separate criteria are included to identify fiduciary component units and postemployment benefit arrangements that are fiduciary activities.

A fiduciary component unit, when reported in the fiduciary fund financial statements of a primary government, should combine its information with its component units that are fiduciary component units and aggregate that combined information with the primary government's fiduciary funds. This Statement also provides for recognition of a liability to the beneficiaries in a fiduciary fund when an event has occurred that compels the government to disburse fiduciary resources. Events that compel a government to disburse fiduciary resources occur when a demand for the resources has been made or when no further action, approval, or condition is required to be taken or met by the beneficiary to release the assets. There was no material impact on the Program's financial statements as a result of the implementation of GASB Statement No. 84.

GASB Statement No. 95, *Postponement of Effective Dates of Certain Authoritative Guidance,* provides temporary relief to government and other stakeholders in light of the COVID-19 pandemic. This objective is accomplished by postponing the effective dates of certain accounting and financial reporting provisions in Statements and Implementation Guides that first became effective for periods beginning after June 15, 2018 and later. GASB Statement No. 95 is effective immediately. The adoption of this Statement had no impact on the Plan's financial statements. However, the Plan did update the required year of adoption for GASB Statement No. 92. Refer to Accounting Standards Issued but Not Yet Adopted for further details.

Recent Accounting Pronouncements — Not yet adopted but currently being evaluated

GASB Statement No.	GASB Accounting Standard	MTA Pension Plan Required Year of Adoption
92	*Omnibus 2020*	2022

Use of Estimates — The preparation of the Plan's financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates. Estimates include fair market value of investments, the annual required contribution and the unfunded actuarial accrued liability.

Benefits — Benefits are recorded when paid.

Contributions - As a condition of participation in the MTA Defined Benefit Pension Plan ("MTADBPP" or the "Plan"), employers and employees are required to contribute to the Plan. The amount of the employer contributions is determined by the Plan actuaries. Employee contribution rates for represented employees are determined by collective bargaining. Employee contribution rates for non-represented employees are set forth in the Plan document as adopted by the MTA Board. If an employee terminates employment with less than 10 (ten) years of credited service in the Plan, the employee may request a refund of his employee contributions with interest. Upon receipt of this refund of contributions, the employee has no claim on any future benefit from the Plan. Employees with more than 10 years of credited service, except for a small group of MTA Bus participants, cannot withdraw their contributions.

Members of the MTA Police Program who have transferred pursuant to Retirement and Social Security Law Section 343 and have not been employed in the MTA Police Program for 15 years may, upon termination of employment, withdraw member contributions. The withdrawal of such transferred police service member contributions shall not terminate membership and rights in the MTA Police Program attributable to Credited Police Service.

Income - Dividend and interest income are recorded when earned.

Securities - Purchases and sales of securities are recorded on a trade-date basis.

Asset Transfers — No assets were transferred to the MTA Defined Benefit Pension Plan for the years 2019 and 2018 respectively.

Administrative Expenses — Administrative expenses of the Plan are paid for by the Plan.

3. CASH AND INVESTMENTS

Investment Policy – The Plan's policy statement is issued for the guidance of fiduciaries, including the members of the Board and investment managers, in the course of investing the assets of the Trust. The investments of the Trust will be made for the exclusive benefit of the Plan participants and their beneficiaries. Policy guidelines may be amended by the Board upon consideration of the advice and recommendations of investment professionals.

In order to have a reasonable probability of achieving the target return at an acceptable risk level, the Board has adopted the asset allocation policy outlined below. The actual asset allocation will be reviewed on, at least, a quarterly basis and will be readjusted when an asset class weighting is outside its target range. The following was the MTA Defined Benefit Pension Plan Board adopted asset allocation policy as at December 31, 2019.

Asset Class	Target Allocation (%)	Target Range (%)	Policy Benchark
Equities	**29.0**	**24-34**	
Domestic Large Cap	10.0	5-15	S&P 500
Domestic Small Cap	5.5	2-10	Russell 2000
International Developed Markets Equities	10.0	5-15	MSCI EAFE
Emerging Markets Equities	3.5	2-6	MSCI Emerging Markets
Fixed Income	**15.0**	**9-21**	Manager Specific
Global Asset Allocation*	**20.0**	**15-33**	50% World Equity/ 50% Citigroup WGBI unhedged
Opportunistic Investments	**6.0**	**0-15**	Manager Specific
Absolute Return	**15.0**	**10-22**	Manager Specific
Real Assets	**5.0**	**0-10**	Manager Specific
Real Estate	**3.0**	**0-10**	Manager Specific
Private Equity	**7.0**	**0-10**	Venture Economics
Total	**100.0**		

* The Global Asset Allocation managers will invest across numerous liquid asset classes including: stocks, bonds, commodities, TIPS and REITs.

Investment Objective — The investment objective of the Plan is to achieve the actuarial return target with an appropriate risk position.

Investment Guidelines — The Board of Pension Managers executes investment management agreements with professional investment management firms to manage the assets of the Plan. The fund managers must adhere to guidelines that have been established to limit exposure to risk. The overall capital structure targets and permissible ranges for eligible asset classes of the Trust are detailed within the Investment Policy Statement. Full discretion, within the parameters of the guidelines described herein and in any individual investment policy associated with that allocation, is granted to the investment managers regarding the asset allocation, the selection of securities, and the timing of transactions. It is anticipated that the majority of investment managers will be funded through commingled funds, however, in some cases (likely equity and fixed income mandates) separate account vehicles may be utilized. For separate accounts, individual manager guidelines and/or exemptions are specified in each approved investment management agreement ("IMA"). Should there be conflicts, the individual manager guidelines set forth in the IMA supersede the general guidelines in the Investment Policy Statement. For commingled funds, investment guidelines and/or exemptions are specified in such vehicle's offering documents. Should there be conflicts, the individual vehicle's investment guidelines supersede the general guidelines in the Investment Policy Statement.

Individual investment manager benchmarks and performance requirements are specified within the Investment Policy Statement. Performance of the Trust will be evaluated on a regular basis. Evaluation will include the degree to which performance results meet the goals and objectives as herewith set forth. Toward that end, the following standards will be used in evaluating investment performance:

1. The compliance of each investment manager with the guidelines as expressed herein, and
2. The extent to which the total rate of return performance of the Trust achieves or exceeds the targeted goals.

Fixed Income Investment Managers

- Domestic fixed income investments are permitted, subject to the guidelines reflected in Investment Policy Statement. Yankee bonds, which are dollar denominated foreign securities, may be held by each domestic manager in proportions which each manager shall deem appropriate.

- International fixed income securities are permitted, subject to the guidelines reflected in Investment Policy Statement. Generally defined, the Citigroup World Government Bond Index represents the opportunity set for international developed markets. The J.P. Morgan Emerging Markets Bond Index-Global represents the opportunity set for international emerging markets denominated in USD. The J.P. Morgan GBI-EM Global Diversified Index represents the opportunity set for international emerging markets denominated in local currency. These index references are guidelines and do not prohibit investment in securities outside those indexes.

- Investment managers are responsible for making an independent analysis of the credit worthiness of securities and their suitability as investments regardless of the classifications provided by rating agencies.

- The average duration (interest rate sensitivity) of an actively managed fixed income portfolio shall range within two years of the benchmark's duration.

- For domestic fixed income portfolios, individual manager account for the securities of an individual issuer, excepting the U.S. government and U.S. government agencies, shall not constitute more than 5% at market at any time.

- For international bond portfolios, individual manager account for the securities of any non-governmental issuer shall not constitute more than 5% at market at any time.

Equity Investment Managers

- Domestic equity investments are permitted, subject to the guidelines. American Depository Receipts (ADRs), which are dollar denominated foreign securities traded on the domestic U.S. stock exchanges (e.g., Reuters, Nestle, Sony) may be held by each domestic stock manager in proportions which each manager shall deem appropriate.

- International equities are permitted, subject to the guidelines. Generally defined, the Morgan Stanley EAFE (Europe, Australasia and the Far East) Index represents the opportunity set for international developed markets. The Morgan Stanley Emerging Markets Free Index represents the opportunity set for international emerging markets. These index references are guidelines and do not prohibit investment in securities outside those indexes.

- The equity specialists may vary equity commitment from 90% to 100% of assets under management.

- Individual manager account may hold no more than 8% at market or 1.5x the manager's benchmark weight (whichever is greater) of any single company's stock.

Overlay Manager(s).

- For a variety of reasons, the investment program may carry large amounts of cash throughout the year. In order to achieve the actuarial assumed returns on the total investment program, the Board may retain a futures overlay manager. The overlay manager shall use exchange traded futures contracts to expose the cash to the long-term target asset allocation.

- n addition, the overlay manager may be utilized for the following:
    a) Expose un-invested assets of domestic and international equity investment managers to their respective equity benchmarks through the use of futures contracts,
    b) Assist the Board in rebalancing, transitions, and/or gaining exposure to approved asset classes,
    c) Provide the market (or "beta") exposures in a portable alpha program,
    d) The overlay manager shall ensure that all futures positions are fully collateralized and the manager is prohibited from leveraging any portion of the portfolio.

Alternative Investments Managers

Alternative investments are broadly categorized into the following categories:
- Opportunistic
- Real assets
- Real estate
- Absolute return
- Private equity

Common features of alternative investments are limited liquidity, the use of derivatives, leverage and shorting, lower regulatory oversight, limited transparency, and high fees. Compensating for these risks, these investments offer the potential of diversification and/or higher rates of return over time

Derivatives Policy

Where appropriate, investment managers may use derivative securities for the following reasons:

- Hedging. To the extent that the portfolio is exposed to clearly defined risks and there are derivative contracts that can be used to reduce those risks, the investment managers are permitted to use such derivatives for hedging purposes, including cross-hedging of currency exposures.

- Creation of Market Exposures. Investment managers are permitted to use derivatives to replicate the risk/return profile of an asset or asset class provided that the guidelines for the investment manager allow for such exposures to be created with the underlying assets themselves.

- Management of Country and Asset Allocation Exposure. Investment managers charged with tactically changing the exposure of their portfolio to different countries and/or asset classes are permitted to use derivative contracts for these purposes.

- Additional uses of derivatives shall be approved by the Board or set forth in the individual investment guidelines or the offering documents prior to implementation and shall be restricted to those specific investment managers.

Ineligible Investments (Separately Managed Accounts)

Unless specifically approved by the Board or set forth in the individual investment guidelines, certain securities, strategies and investments are ineligible for inclusion within separately managed accounts. Among these are:

- Privately-placed or other non-marketable debt, except securities issued under Rule 144a,
- Lettered, legend or other so-called restricted stock,
- Commodities
- Short sales, and,
- Direct investments in private placements, real estate, oil and gas and venture capital, or funds comprised thereof.

Exceptions:

The Board of Managers, in recognition of the benefits of commingled funds as investment vehicles (i.e., the ability to diversify more extensively than in a small, direct investment account and the lower costs which can be associated with these funds) may, from time to time, allow investment in such funds. The Board recognizes that it cannot give specific policy directives to a fund; therefore, the Board, with the assistance of the investment advisor, will assess and monitor the investments of any funds used by the Plan to ascertain whether they are appropriate.

Investment Valuation and Income Recognition — Investments are presented at fair value based on information provided by JP Morgan Chase (the "trustee"), NEPC, and the investment managers. The fair value of investments is based on published market prices and quotations from major investment brokers at current exchange rates, as available, or net asset value, which is determined to be a practical expedient for measuring fair value. Many factors are considered in arriving at that value. All investments are registered, with securities held by the Plan's trustee, in the name of the Plan. Gains and losses on investments that were sold during the year are included in in the statement of plan net position.

Risks and Uncertainties — The Plan's investments are exposed to various risks, such as interest rate, market, and credit risk. Due to the level of risk associated with certain investment securities and level of uncertainty related to changes in the value of investment securities, it is possible that changes in risks in the near term would materially affect the amounts reported in the Plan's financial statements.

The financial markets, both domestically and internationally, have demonstrated significant volatility on a daily basis, which affects the valuation of investments. The Plan utilizes asset allocation strategies that are intended to optimize investment returns over time in accordance with investment objectives and with acceptable levels of risk.

Investments measured at readily determined fair value (FV)
(In Thousands)

	December 31, 2019	Quoted Price in Active Markets for Identical Assets Level 1	Significant Other Observable Inputs Level 2	Significant Unobservable Inputs Level 3
Equity Securities:				
Separate account large-cap equity funds	$ 360,913	$ 360,913	$ -	$ -
Separate account small-cap equity funds	255,571	255,571	-	-
Separate account small-Real Estate Investments Trusts	53,086	53,086	-	-
Total equity investments	669,570	669,570	-	-
Debt Securities				
Separate account debt funds	330,135	-	330,135	-
Total debt investments	330,135	-	330,135	-
Total investments by fair value	$ 999,705	$ 669,570	$ 330,135	$ -

Investments measured at the net asset value (NAV)
(In Thousands)

	December 31, 2019	Unfunded Commitments	Redemption Frequency	Redemption Notice Period
Equity Securities:				
Commingled large cap equity funds	$ 185,366	$ -	Daily	None
Commingled international equity funds	613,397	-	Daily	None
Commingled emerging market equity funds	203,682	-	Daily, monthly	None
Total equity investments measured at the NAV	1,002,445	-		
Debt Securities				
Commingled debt funds	305,240	-	Daily, monthly, quarterly	None
Mutual fund	82,159	-	Daily	None
Total debt investments measured at the NAV	387,399	-		
Absolute return:				
Directional	165,071	-	Monthly	3-60 days
Direct lending	204,243	40,187	Bi-annually	60 plus days
Distressed securities	58,015	-	Not eligible	N/A
Credit long	56,797	-	Quarterly	3-30 days
Credit long/short	88,312	-	Quarterly	3-60 days
Equity long/short	60,924	-	Quarterly	3-60 days
Event driven	95,069	1,952	Quarterly, Bi-annually	60-120 days
Global macro	96,210	-	Monthly	3-30 days
Global tactical asset allocation	113,122	-	Daily, monthly	3-30 days
Multistrategy	127,579	-	Monthly	3-30 days
Risk parity	406,121	-	Not eligible	N/A
Structured credit	2,865	-	Not eligible	N/A
Total absolute return measured at the NAV	1,474,328	42,139	Not eligible	N/A
Private equity - private equity partnerships	353,064	214,168		
Real assets				
Commingled real estate funds	222,588	-	Not eligible	N/A
Energy	123,991	71,555	Not eligible	N/A
Infrastructure	28,839	4,550	Not eligible	N/A
Total real assets measured at the NAV	375,418	76,105		
Short term investments measured at the NAV	183,397			
Total investments measured at the NAV	3,776,051	$ 332,412		
Total investments at fair value	$ 4,775,756			

Investments measured at readily determined fair value (FV)
(In Thousands)

	December 31, 2018	Quoted Price in Active Markets for Identical Assets Level 1	Significant Other Observable Inputs Level 2	Significant Unobservable Inputs Level 3
Equity Securities:				
Separate account large-cap equity funds	$ 261,396	$ 261,396	$ -	$ -
Separate account small-cap equity funds	197,302	197,302	-	-
Separate account small-Real Estate Investments Trusts	40,313	40,313	-	-
Total equity investments	499,011	499,011	-	-
Debt Securities				
Separate account debt funds	288,180	-	288,180	-
Total debt investments	288,180	-	288,180	-
Total investments by fair value	$ 787,191	$ 499,011	$ 288,180	$ -

Investments measured at the net asset value (NAV)
(In Thousands)

	December 31, 2018	Unfunded Commitments	Redemption Frequency	Redemption Notice Period
Equity Securities:				
Commingled large cap equity funds	$ 121,990	$ -	Daily	None
Commingled international equity funds	475,092	-	Daily	None
Commingled emerging market equity funds	113,333	-	Daily, monthly	None
Total equity investments measured at the NAV	710,415	-		
Debt Securities				
Commingled debt funds	244,072	-	Daily, monthly, quarterly	None
Mutual fund	74,270	-	Daily	None
Total debt investments measured at the NAV	318,342	-		
Absolute return:				
Directional	111,125	-	Monthly	3-60 days
Direct lending	180,185	52,294	Bi-annually	60 plus days
Distressed securities	61,410	-	Not eligible	N/A
Credit long	51,543	-	Quarterly	3-30 days
Credit long/short	80,745	-	Quarterly	3-60 days
Equity long/short	55,452	-	Quarterly	3-60 days
Event driven	86,900	1,909	Quarterly, Bi-annually	60-120 days
Global macro	94,438	-	Monthly	3-30 days
Global tactical asset allocation	243,938	-	Daily, monthly	3-30 days
Multistrategy	109,236	-	Monthly	3-30 days
Risk parity	337,396	-	Not eligible	N/A
Structured credit	7,404	-	Not eligible	N/A
Total absolute return measured at the NAV	1,419,772	54,203	Not eligible	N/A
Private equity - private equity partnerships	294,568	168,787		
Real assets				
Commingled real estate funds	209,041	-	Not eligible	N/A
Energy	89,905	63,140	Not eligible	N/A
Infrastructure	28,306	7,449	Not eligible	N/A
Total real assets measured at the NAV	327,252	70,589		
Short term investments measured at the NAV	157,870			
Total investments measured at the NAV	3,228,219	$ 293,579		
Total investments at fair value	$ 4,015,410			

Concentration of Credit Risk – Individual investments held by the Plan that represents 5.0% or more of the Plan's net assets available for benefits at December 31, 2019 and 2018 are as follows:

(In Thousands)	2019	2018
Investments at fair value as determined by quoted market prices:		
Robert W. Baird and Company	$ 274,254	$ 239,340

Credit Risk — At December 31, 2019 and 2018, the following credit quality rating has been assigned by a nationally recognized rating organization:

(In Thousands) Quality Rating	2019 Fair Value	Percentage of Fixed Income Portfolio	2018 Fair Value	Percentage of Fixed Income Portfolio
AAA	$ 338,946	21.09 %	$ 123,123	19.05 %
AA	126,878	7.89	180,474	3.37
A	124,722	7.76	66,304	10.32
BBB	125,274	7.79	102,332	14.41
BB	134,434	8.36	99,366	11.21
B	99,195	6.17	82,629	7.29
CCC	26,941	1.68	18,733	0.90
CC	6,201	0.39	143	0.11
C	3,951	0.25	1,376	0.01
D	7,219	0.45	6,375	-
Not Rated	344,148	21.41	368,472	16.64
Credit risk debt securities	1,337,909	83.24	1,049,327	83.31
U.S. Government bonds	269,394	16.76	276,776	16.69
Total fixed income securities	1,607,303	100.00 %	1,326,103	100.00 %
Other securities not rated — equity, international funds and foreign corporate bonds	3,168,453		2,689,307	
Total investments	$ 4,775,756		$ 4,015,410	

Interest Rate Risk Exceptions — Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. Duration is a measure of sensitivity to interest rate risk. The greater the duration of a bond or portfolio of bonds, the greater its price volatility will be in response to a change in interest rate risk and vice versa. Modified duration is an indicator of bond price's sensitivity to a parallel 100 basis point change in interest rates.

Investment Fund (In Thousands)	2019 Fair Value	2019 Duration	2018 Fair Value	2018 Duration
Chase	$ 330,135	6.35	$ 288,180	12.90
Allianz Structured Alpha Fund	165,071	0.13	111,125	0.13
Wellington Blended Emerging Market Debt Fund	77,360	6.44	68,370	5.44
Bridgewater All Weather Fund	177,791	5.60	95,896	8.30
Wellington Opportunistic Fund	-	-	54,070	1.52
Wellington Fixed Income Fund	2,490	5.80	-	-
Bridgewater Pure Alpha Fund	35,698	1.30	142,098	(0.90)
Bridgewater Pure Alpha Markets Fund	(6,885)	(2.90)	(16,455)	(7.10)
GAM Unconstrained Bond Fund	-	-	34,810	0.10
Northern Trust William Capital Fund	9,073	-	8,651	-
Park Square Capital Credit Opportunities Fund II	36,561	0.18	32,238	-
Park Square Capital Credit Opportunities Fund III	30,088	0.13	14,156	-
Libremax Partners Fund	136,293	2.82	80,745	2.63
Gramercy Distressed Opportunistic Fund	41,694	(0.07)	22,474	0.26
Makuria Credit Fund	19,559	5.38	17,666	5.38
Crescent Capital High Income Fund	40,188	2.92	51,516	2.56
Orchard Landmark Fund	106,272	1.18	95,495	1.44
PIMCO Distressed Credit Opportunities Fund	56,797	2.83	51,543	2.18
Wellington Global Managed Risk Fund	231,000	10.70	73,571	6.20
State Stree Real Asset Fund	27,962	4.67	24,062	5.84
State Stree Long US Treasury Index Fund	33,095	18.06	28,183	17.35
EIG Energy Fund XV	1,793	-	3,487	-
EIG Energy Fund XVI	5,181	-	4,878	-
Riverstone Credit Partners Fund	24,442	4.00	17,408	4.00
NEPC Syndication Partners Fund	5,282	4.00	1,723	4.00
Canyon Value Realization Fund	20,363	2.44	20,213	3.26
Total fixed income securities	1,607,303		1,326,103	
Portfolio modified duration		4.95		5.20
Investments with no duration reported	$ 3,168,453		$ 2,689,307	
Total investments	$ 4,775,756		$ 4,015,410	

Foreign Currency Risk — Foreign currency risk is the risk that changes in exchange rates will adversely affect the fair value of an investment. Some of the Plan's investment managers will have foreign currency exposure through holdings of foreign securities, currency derivatives or private investments whose revenue will be non-USD based. The Plan also holds investments in American Depository Receipts ("ADRs") which are not included in the below schedule since they are denominated in U.S. dollars and accounted for at fair market value.

The Plan's foreign currency exposures as of December 31, 2019 and 2018 are as follows (amounts in U.S. dollars, in thousands):

Foreign Currency Holdings in US $ (In Thousands)	**December 31, 2019**	**December 31, 2018**
Argentina Peso	$ 814	$ 16,926
Dollar (Australian)	33,857	22,656
Bahraini Dinar		400
Bangladesh (Taka)	582	384
Bermuda Dollar		2,943
Botswana Pula	713	170
Brazil Cruzeiro Real	47,494	31,211
Bulgarian Lev	31	15
Dollar (Canadian)	25,509	34,720
Cayman Island dollar	321	829
Chilean Peso	5,766	7,423
China (Yuan Renminbi)	15,461	17,250
Colombian Peso	2,721	4,274
Croatia Kuna	687	516
Czech Koruna	67	1,286
Krone (Danish)	10,119	6,926
Dominican Peso	314	10
Egyptian Pound	1,906	1,195
Euro	107,917	99,097
Ghanaian Cedi	158	187
Geogian Lari	1,197	962
Dollar (Hong Kong)	20,275	13,112
Hungary (Forint)	3,392	4,141
Icelandic Krona	1,772	2,907
Indian Rupee	29,144	23,127
Indonesia Rupiah	18,501	7,496
Israeli (Shekel)	641	1,427
Yen (Japan)	14,907	11,952
Jordanian Dinar	667	382
Kazakhstani Tenge	47	432
Kenyan Shilling	711	400
Kuwait Dinar	1,986	808
Lebanese Pound		50
Laos Kip	181	466
Malaysian (Ringgit)	6,489	4,438
Mauritius (Rupee)	689	946
Mexican New Peso	10,467	3,744
Morocco Dirham	713	370
Dollar (New Zealand)	3,456	(518)
Nigerian Naira	1,151	414
Krone (Norwegian)	8,765	2,265
Omanian Rial	654	332
Pakistani Rupee	1,538	1,030
Panama Balboa	39	159
Peru Sol	1,012	1,888
Philippines Peso	7,785	3,278
Polish (New Zloty)	(9)	(91)
Pound (Sterling)	72,738	45,323
Qatar Riyal	1,510	1,002
Romanian Leu	1,445	1,728
Russian Federation Rouble	15,325	132
Saudi Riyal	3,046	818
Singapore Dollar	10,933	(4,147)
South African Rand	11,468	11,592
South Korean Won	36,006	21,130
Sri Lankan Rupee	653	334
Krona (Swedish)	6,811	6,416
Franc (Swiss)	7,693	15,406
Thai (Bhat)	7,449	5,550
Dollar (Taiwan, New)	23,632	10,695
Tunisian Dinar	366	150
Turkish Lira	(1,306)	50
Ukraine Hryvnia	409	69
UAE Dirham	1,808	1,252
Uruguayan Pesos	8	20
Vietnam Dong	486	739
Other	86	9,934
Total	$ 591,173	$ 462,528

Additional Information — The Plan holdings are part of the MTA Master Trust of which the MTA Defined Benefit Plan participates on a percentage basis. The percentage of the Plan ownership for the year ended December 31, 2019 and December 31, 2018 was 86.09% and 84.19% respectively.

	Master Trust Total Plan	MTA Defined Benefit Plan	Master Trust Total Plan	MTA Defined Benefit Plan
	December 31, 2019		December 31, 2018	
	(In thousands)			
Total Investments:				
Investments measured at readily determined fair value	$ 1,161,288	$ 999,705	$ 935,046	$ 787,191
Investments measured at the NAV	4,386,375	3,776,051	3,898,121	3,228,219
Total investments measured at fair value	$ 5,547,663	$ 4,775,756	$ 4,833,167	$ 4,015,410

4. NET PENSION LIABILITY

The components of the net pension liability of the Plan at December 31, 2019 and 2018 were as follows (in thousands):

	December 31, 2019	December 31, 2018
Total pension liability	$ 6,510,686	$ 5,488,490
Fiduciary net position	4,779,569	4,024,480
Net pension liability	$ 1,731,117	$ 1,464,010
Fiduciary net position as a percentage of the total pension liability	73.41%	73.33%

Actuarial Methods and Assumptions

The total pension liability as of December 31, 2019 was determined by an actuarial valuation date of January 1, 2019, that was updated to roll forward the total pension liability to the respective year-end. Actuarial valuations are performed annually as of January 1.

Discount Rate

The discount rate used to measure the total liability as of December 31, 2019 and 2018 was 6.50% and 7.0%. The projection of cash flows used to determine the discount rate assumed that plan contributions will be made in accordance with the Employer funding policy as projected by the Plan's actuary. Based on those assumptions, the Plan's fiduciary net position was projected to be available to make all projected future benefit payments of current and inactive plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all projected benefit payments to determine the total pension liability.

Sensitivity of the Net Pension Liability to Changes in the Discount Rate

The following presents the 2019 net pension liability of the Plan, calculated using the discount rate of 6.50%; as well as what the Plan's net pension would be if it were calculated using a discount rate that is 1-percentage point lower (5.50%) or 1-percentage point higher (7.50%) than the current rate:

2019
(in thousands)

	1% Decrease 5.50%	Current Discount Rate 6.50%	1% Increase 7.50%
Net pension liability	$2,556,206	$1,731,117	$1,036,341

The following presents the 2018 net pension liability of the Plan, calculated using the discount rate of 7.00%; as well as what the Plan's net pension would be if it were calculated using a discount rate that is 1-percentage point lower (6.00%) or 1-percentage point higher (8.00%) than the current rate:

2018
(in thousands)

	1% Decrease 6.00%	Current Discount Rate 7.00%	1% Increase 8.00%
Net pension liability	$2,146,497	$1,464,010	$888,282

Additional Important Actuarial Valuation Information

Valuation date	January 1, 2019
Valuation timing	Actuarially determined contributions calculated as of December 31, for the fiscal year and discounted to July 1 to reflect monthly payments throughout the year.
Actuarial cost method	Frozen Initial Liability cost method
Amortization method	For FIL bases, period specified in current valuation report for specific plan change bases. Fresh start base as of January 1, 2020 will be determined based on the Plan's unfunded Entry Age Normal liability less amortization balances of remaining plan change bases. Future gains/ losses are amortized through the calculation of the normal cost in accordance with FIL cost method amortized based on expected working lifetime, weighted by salary, of the projected population for each group.
Actuarial asset valuation method	Actuarial value equals market value less unrecognized gains/losses over a 5-year period. Gains/losses are based on market value of assets
Mortality	Based on experience of all MTA members reflecting mortality improvement ona generational basis using Scale AA
Actuarial assumptions:	
Investment rate of return	6.50%, net of investment expenses
Projected salary increases	Varies by years of employment, and employee group; 2.75% GWI increases for TWU Local 100 MTA Bus hourly employees
COLAs	60% of inflation assumption or 1.35%, if applicable
Inflation/Railroad Retirement wage base	2.25%; 3.25%

Valuation date	January 1, 2018
Valuation timing	Actuarially determined contributions calculated as of December 31, for the fiscal year and discounted to July 1 to reflect monthly payments throughout the year.
Actuarial cost method	Frozen Initial Liability cost method
Amortization method	For FIL bases, period specified in current valuation report. Future gains/ losses are amortized through the calculation of the normal cost in accordance with FIL cost method amortized based on expected working lifetime, weighted by salary, of the projected population for each group.
Actuarial asset valuation method	Actuarial value equals market value less unrecognized gains/losses over a 5-year period. Gains/losses are based on market value of assets
Mortality	Based on experience of all MTA members reflecting mortality improvement ona generational basis using Scale AA
Actuarial assumptions:	
Investment rate of return	7.0%, net of investment expenses
Projected salary increases	Varies by years of employment, and employee group; 3.0% GWI increases for TWU Local 100 MTA Bus hourly employees
COLAs	55% of inflation assumption or 1.375%, if applicable
Inflation/Railroad Retirement wage base	2.5%; 3.5%

Calculation on Money-Weighted Rate of Return

The money-weighted rate of return considers the changing amounts actually invested during a period and weights the amount of pension plan investments by the proportion of time they are available to earn a return during that period. External cash flows are determined on a monthly basis and are assumed to occur at the beginning of each month. External cash inflows are netted with external cash outflows, resulting in a net external cash flow in each month.

2019 Schedule of Calculations of Money-Weighted Rate of Return
(In thousands)

	Net External Cash Flows	Periods Invested	Period Weight	Net External Cash Flows With Interest
Beginning Value - January 1, 2019	$4,024,480	12.00	1.00	$4,666,242
Monthly net external cash flows:				
January	(9,210)	12.00	1.00	(10,679)
February	8,084	11.00	0.92	9,263
March	8,084	10.00	0.83	9,140
April	8,210	9.00	0.75	9,174
May	8,210	8.00	0.67	9,066
June	8,104	7.00	0.58	8,830
July	8,210	6.00	0.50	8,841
August	8,210	5.00	0.42	8,736
September	8,210	4.00	0.33	8,621
October	8,210	3.00	0.25	8,519
November	8,210	2.00	0.17	8,419
December	35,293	0.26	0.02	35,397
Ending Value - December 31, 2019				$4,779,569
Money-Weighted Rate of Return	15.95%			

	Net External Cash Flows	Periods Invested	Period Weight	Cash Flows With Interest
Beginning Value - January 1, 2018	$4,051,534	12.00	1.00	$3,902,670
Monthly net external cash flows:				
January	(8,342)	12.00	1.00	(8,035)
February	8,976	11.00	0.92	8,672
March	8,976	10.00	0.83	8,701
April	8,976	9.00	0.75	8,727
May	8,976	8.00	0.67	8,753
June	9,189	7.00	0.58	8,992
July	9,189	6.00	0.50	9,019
August	9,356	5.00	0.42	9,210
September	9,831	4.00	0.33	9,710
October	9,557	3.00	0.25	9,468
November	9,917	2.00	0.17	9,854
December	38,768	0.26	0.02	38,739
Ending Value - December 31, 2018				$4,024,480
Money-Weighted Rate of Return	-3.67%			

Calculation on Long-Term Expected Rate of Return

The best-estimate range for the long-term expected rate of return is determined by adding expected inflation to expected long-term real returns and reflecting expected volatility and correlation. The capital market assumptions are per Milliman's investment consulting practice as of December 31, 2019 and 2018.

SCHEDULE OF LONG TERM EXPECTED RATE OF RETURN FOR 2019

Asset Class	Index	Target Allocation*	Real Rate of Return
US Core Fixed Income	Barclays Aggregate	9.00%	1.51%
US Long Bonds	Barclays Long Term Government/Credit	1.00%	2.41%
US Bank/Leveraged Loans	Credit Suisse Leveraged Loan	7.00%	2.74%
US Inflation-Indexed Bonds	Barclays US TIPS	2.00%	0.71%
US High Yield Bonds	BAML High Yield	4.00%	3.13%
Emerging Market Bonds	JPM EMBI Plus	2.00%	3.36%
US Large Caps	S&P 500	12.00%	4.33%
US Small Caps	Russell 2000	6.00%	5.65%
Foreigh Developed Equity	MSCI EAFE NR	12.00%	5.95%
Emerging Market Equity	MSCI EM NR	5.00%	8.05%
Global REITS	FTSE EPRA/NAREIT Developed	1.00%	5.50%
Private Real Estate Property	NCREIF Property	4.00%	3.80%
Private Equity	Cambridge Private Equity	9.00%	9.50%
Commodities	Commodity	1.00%	2.79%
Hedge Funds - MultiStrategy	HFRI: Fund Wtd Composite	16.00%	3.26%
Hedge Funds - Event Driven	HFRI Event Driven	6.00%	3.41%
Hedge Funds - Equity Hedge	HFRI Equity Driven	3.00%	3.82%
Assumed Inflation - Mean			2.25%
Assumed Inflation - Standard Deviation			1.65%
Portfolio Nominal Mean Return			6.73%
Portfolio Standard Deviation			10.94%
Long-Term Expected Rate of Return selected by MTA			6.50%

SCHEDULE OF LONG TERM EXPECTED RATE OF RETURN FOR 2018

Asset Class	Index	Target Allocation*	Real Rate of Return
US Core Fixed Income	Barclays Aggregate	9.00%	2.03%
US Long Bonds	Barclays Long Term Government/Credit	1.00%	2.44%
US Bank/Leveraged Loans	Credit Suisse Leveraged Loan	7.00%	3.08%
US Inflation-Indexed Bonds	Barclays US TIPS	2.00%	1.16%
US High Yield Bonds	BAML High Yield	4.00%	3.93%
Emerging Market Bonds	JPM EMBI Plus	2.00%	3.76%
US Large Caps	S&P 500	12.00%	4.71%
US Small Caps	Russell 2000	6.00%	5.93%
Foreign Developed Equity	MSCI EAFE NR	12.00%	6.15%
Emerging Market Equity	MSCI EM NR	5.00%	8.22%
Global REITS	FTSE EPRA/NAREIT Developed	1.00%	5.80%
Private Real Estate Property	NCREIF Property	4.00%	3.69%
Private Equity	Cambridge Private Equity	9.00%	9.50%
Commodities	Commodity	1.00%	2.85%
Hedge Funds - MultiStrategy	HFRI: Fund Wtd Composite	16.00%	3.28%
Hedge Funds - Event Driven	HFRI Event Driven	6.00%	3.38%
Hedge Funds - Equity Hedge	HFRI Equity Driven	3.00%	3.85%
Assumed Inflation - Mean			2.50%
Assumed Inflation - Standard Deviation			1.65%
Portfolio Nominal Mean Return			7.19%
Portfolio Standard Deviation			10.87%
Long-Term Expected Rate of Return selected by MTA			7.00%

* Based on March 2014 Investment Policy

5. CONTRIBUTIONS

Employer contributions are actuarially determined on an annual basis. Amounts recognized as receivables for contributions include only those due pursuant to legal requirements. Employee contributions to the Plan are recognized in the period in which the contributions are due. There are no contributions required under the Metropolitan Suburban Bus Authority Employee’s Pension Plan.

The following summarizes the types of employee contributions made to the Plan.

Effective January 1, 1994, covered MTA Metro-North Railroad and MTA Long Island Rail Road non-represented employees are required to contribute to the Plan to the extent that their Railroad Retirement Tier II employee contribution is less than the pre-tax cost of the 3% employee contributions. Effective October 1, 2000, non-represented employee contributions, if any, were eliminated after 10 years of making contributions to the Plan. MTA Metro-North Railroad employees may purchase prior service from January 1, 1983 through December 31, 1993 and MTA Long Island Rail Road employees may purchase prior service from January 1, 1988 through December 31, 1993 by paying the contributions that would have been required of that employee for the years in question, calculated as described in the first sentence, had the Plan been in effect for those years.

Police Officers who became participants of the MTA Police Program prior to January 9, 2010 contribute to that program at various rates. Police Officers who became participants on or after January 9, 2010 but before April 1, 2012 contribute 3% up to the completion of 30 years of service, the maximum amount of service credit allowed. Police Officers who become participants on or after April 1, 2012 contribute 3%, with additional new rates starting April 2013, ranging from 3.5%, 4.5%, 5.75%, to 6%, depending on salary level, for their remaining years of service.

MTA Bus represented participants make contributions in accordance with their respective collective bargaining agreements and arbitration awards. MTA Bus non-represented employees are accessed contributions for their flat rate benefit of $10.33 for each week for the period from January 1, 2012 through December 31, 2016. Effective January 1, 2017, MTA Bus non-represented operating employee hired prior to April 1, 2012 contribute 2% of gross wages. MTA Bus non-represented non-operating employee hired prior to April 1, 2012 contribute 4.85% of gross wages for ten years of service after January 1, 2017, and then 1.85% gross salary thereafter until retirement. Contributions levels for MTA Bus non-represented employees hired on or after April 1, 2012, which are required until retirement, are determined every year at the beginning of the calendar year, and are based on annual wages during the prior year and the following schedule:

Annual Wages Earned During the Prior Year	Contribution Rate
Up to $45,000	3.00%
$45,001 to $55,000	3.50%
$55,001 to $75,000	4.50%
$75,001 to $100,000	5.75%
Greater than $100,000	6.00%

In 2017, a reserve was established for fifteen former MTA employees in accordance with Chapter 533 of the Laws of 2015. As of December 31, 2019, total transfer in the amount of $1.9 million, to the New York State and Local Police and Fire Retirement System allowed former MTA Police employees to transfer membership and contributions to the New York State and Local Police and Fire Retirement System from the MTA Defined Benefit Plan.

Covered MTA Metro-North Railroad represented employees and MTA Long Island Rail Road represented employees who first became eligible to be Plan participants prior to January 30, 2008 contribute 3% of salary. MTA Staten Island Railway employees contribute 3% of salary except for represented employees hired on or after June 1, 2010 who contribute 4%. MTA Long Island Rail Road represented employees who became participants after January 30, 2008 contribute 4% of salary. For the MTA Staten Island Railway employees, contributions are not required after the completion of 10 years of credited service. MTA Long Island Rail Road represented employees are required to make the employee contributions for 10 years, or 10 years if hired after certain dates in 2014 as per collective bargaining agreements. Certain Metro-North represented employees, depending on their collective bargaining agreements, are required to make the employee contributions until January 1, 2014, January 1, 2017, June 30, 2017, or the completion of required years of credited service as per the relevant collective bargaining agreements.

Covered MTA Bus represented employees and certain non-represented employees are required to contribute a fixed dollar amount, which varies, by Depot. MTA Bus is required to make significant annual contributions to the MTA Plan on a current basis. Pursuant to the January 1, 2019 and January 1, 2018 actuarial valuations for the MTA Plan, which included amounts for actuarial assets and liabilities relating to both active and retired members for most portions of the former private plans (excepting, for example, members of the Transport Workers Union — New York City Private Bus Lines Pension Trust who were working on school bus routes which did not become part of MTA Bus service), MTA Bus recorded pension expense equal to the valuation annual required contribution of $59.8 and $57.3 for the calendar years ended December 31, 2019 and 2018, respectively. Both of these employer contributions were paid to the MTA Plan in their respective years.

6. ACTUARIAL METHODS AND ASSUMPTIONS

A. Actuarial Valuation Method

The Frozen Initial Liability method was used for determining the actuarial determined contribution comprising the normal cost-plus amortization payments of the frozen unfunded actuarial accrued liability. The Normal Cost equals the present value of future employer normal contributions divided by the average future working lifetime factor. This factor equals the present value of future compensation or service divided by current compensation or the member count (less certain retirements), depending if benefits are pay-related, and weighted by the present value of benefits. Service is used for MTA Bus members with hourly benefits and benefits indexed to general wage increases.

The Entry Age Normal (EAN) method is used for determining changes in the frozen unfunded actuarial accrued liability due to plan provisions and assumption changes. For MTA Bus members with benefits indexed to general wage increases, the entry age normal cost uses assumed general wage increases rather than payroll, which conforms to a method compliant for GASB 67 purposes. For MTA Bus members with hourly benefits that are not indexed, the entry age normal cost is based on a level dollar method. If the benefit style changed from one type to another, the plan change base is based on the EAN method in effect prior to the change in benefit. For MTA Bus non-represented members where benefits are bifurcated into a past service level dollar component and a future service MaBSTOA benefit component, the EAN normal cost assumes that the MaBSTOA style benefits were in effect for the member's entire career.

For groups where service was reported as of the valuation date, Entry Age is based on an effective date of hire equal to the valuation date less provided service plus any purchased service, but not reflecting any military service purchased.

B. Asset Valuation Method

The Asset Valuation method smooths gains and losses over a 5-year period. The formula for the asset valuation method is as follows:

Actuarial Value of Assets = $MV_t - .8UR_1 - .6UR_2 - .4UR_3 - .2UR_4$

Where

MV_t = Market Value of assets as of the valuation date.

UR_n = Unexpected return during the n^{th} year preceding the valuation date. The unexpected return for a year equals the total investment return minus the total expected return. The total expected return equals the market value of assets at the beginning of the year plus the weighted net cash flow during the year multiplied by the expected rate of return.

The resulting value cannot be less than 80% or greater than 120% of the market value of assets.

The market value of assets is adjusted for any contributions made in the current year attributable to a prior year less any contributions made in a prior year and attributable to a future year, determined for each Agency independently.

C. Actuarial Assumptions Universal to all Groups

The assumptions described below were primarily determined based on an experience analysis covering the period from January 1, 2006 to December 31, 2011, with certain assumptions modified subsequently. The postretirement mortality assumption is based on an experience analysis covering the period from January 1, 2011 to December 31, 2015.

Interest — 6.50% per annum, compounded annually.

Railroad Retirement Wage Base — 3.25% per year.

Consumer Price Index — 2.25% per year.

Cost of Living Increases - 60% of inflation assumption or 1.35% per annum, compounded annually for Police and MTA Bus members eligible for a cost of living adjustment.

Provision for Expenses — Estimated administrative expenses are added to the normal cost. Administrative expenses are based on the average of the prior three year's reported administrative expenses and are assumed payable in the middle of the plan year.

Valuation Compensation: The valuation compensation is equal to the annualized base salary as of December 31, 2018 adjusted for wage increases granted after the valuation date but retroactive to earlier periods, multiplied by the overtime assumption and assumed salary increases for the year. Salary increases are assumed to occur on average at mid-year. Retroactive wage adjustments are as follows:

- MTA Metro-North represented employees: 5.0625% for IBT and ACRE
- MTA Staten Island Railway represented employees: 5.0625% for UTU

Mortality — Preretirement and postretirement healthy annuitant rates are projected on a generational basis using Scale AA. As a generational table, it reflects mortality improvements both before and after the measurement date.

Preretirement — RP-2000 Employee Mortality Table for Males and Females with Blue collar adjustments.

Postretirement Healthy Lives — 95% of RP-2000 Healthy Annuitant mortality table for males with Blue Collar adjustments and 116% of the rates from the RP-2000 Healthy Annuitant mortality table for females.

Postretirement Disabled Lives — RP-2014 Disabled Annuitant mortality table for males and females.

Post-termination Death Benefits - For current inactive participants eligible for post-retirement death benefits, an amount of $25,000 ($10,000 for certain M.S.B.A. inactive participants) is assumed to be payable at death. For current terminated vested members, $100,000 is assumed to be payable at death prior to retirement, except for Police officers. A load of 8.75% is applied to the liability for Police officers.

Participant Data — Service for MTA Police, MTA Metro-North Railroad and MTA Long Island Rail Road represented and management members is based on the sum of credited service, purchased service and military service provided by MTA. Retirement status and benefits based on information provided in JP Morgan file as of the valuation date, except if reported as disability retirement previously, the member continued to be treated as a disability retirement.

For inactive MTA Police, MTA Metro-North and MTA Long Island Rail Road represented and management participants, future offsets for Railroad Retirement benefits are estimated and assumed to occur at age 62 unless disabled or it appears the offset has occurred. For inactive MTA Long Island Rail Road Pension participants, offsets for Railroad Retirement benefits are estimated and assumed to occur at the member's age 65. Benefits, net of any Railroad Retirement benefits, are estimated for vested members who terminated during the past year if not provided by the Authority.

For inactive MTA Bus participants eligible for a COLA, including retroactive benefit increases that had not been reflected in the JP Morgan data, the increased benefits and basis for the COLA were estimated based on the terms of the Award.

D. Changes in Actuarial Assumptions Universal to all Groups

The provision for administrative expenses was changed from a 3-year average to a 2-year average of prior administrative expense charges.

E. Actuarial Assumptions — MTA Defined Benefit Pension Plan — Management

Salary Scale — Salaries are assumed to increase in accordance with the following schedule:

Years of Service	Rate of Increase
0	6.00 %
1	5.00
2	4.25
3	4.00
4+	3.50

Termination — Withdrawal rates vary by years of service and sex. Illustrative rates are shown below:

Years of Service	Male	Female
0 - 1	5.00 %	7.50 %
2 - 3	3.25	4.00
4	2.50	4.00
5 - 9	2.25	3.50
10 - 19	1.50	3.00
20+	1.00	1.50

Retirement — Rates vary by age and type of retirement. Illustrative rates are shown below:

A. For Management employees hired prior to January 31, 2008.

Age	Reduced Early Retirement	Unreduced Early Retirement
55	5.00 %	10.00 %
56	5.00	7.50
57	5.00	5.00
58	5.00	5.00
59	5.00	5.00

B. For Management employees hired on or after January 31, 2008.

Age	Reduced Early Retirement	Unreduced Early Retirement
55	3.00 %	10.00 %
56	3.00	7.50
57	3.00	5.00
58	3.00	5.00
59	3.00	5.00
60	3.00	30.00
61	3.00	30.00

C. For all management employees at Normal Retirement (age 60 or age 62 and later):

- 5% per year if members have fewer than 10 years of service
- 15% per year if members have 10 but fewer than 20 years of service
- 30% per year if member have 20 or more years of service

Certain retirement age is age 80

Disability — Rates vary by age, sex and type of disability beginning at benefit eligibility. Illustrative rates are shown below:

	Ordinary		Accidental			Ordinary		Accidental	
Age	**M**	**F**	**M**	**F**	**Age**	**M**	**F**	**M**	**F**
20	0.015 %	0.020 %	0.010 %	0.005 %	45	0.176 %	0.147 %	0.039 %	0.010 %
25	0.020	0.020	0.010	0.005	50	0.240	0.221	0.044	0.010
30	0.024	0.024	0.015	0.005	55	0.245	0.245	0.049	0.010
35	0.039	0.029	0.024	0.005	60	0.245	0.245	0.049	0.010
40	0.103	0.069	0.034	0.010	64	0.245	0.245	0.049	0.010

Employee Contributions — No employee contributions have been anticipated for future years.

Changes in Actuarial Assumptions — None.

F. Actuarial Assumptions — MTA Defined Benefit Pension Plan — MTA Metro-North Represented Employees

Salary Scale — Salaries are assumed to increase in accordance with the following schedule:

Years of Service	Rate of Increase
0	3.25 %
1	10.50
2	10.00
3	9.75
4	9.25
5	14.75
6+	3.25

Overtime - Members hired on or prior to New Participant Date are assumed to earn overtime equal to 25% of their rate of pay for years when they are retirement eligible and for members on after New Participant Date are assumed to earn overtime equal to 20% of their rate of pay for years when they are retirement eligible. Otherwise, members are assumed to earn overtime equal to 18% of their rate of pay.

Termination — Withdrawal rates vary by years of service. Illustrative rates are shown below:

Years of Service	Termination Rate
0	3.50 %
1	3.25
2 - 3	2.50
4 - 9	2.25
10 - 19	1.50
20+	1.00

Retirement — Rates vary by age and type of retirement. Illustrative rates are shown below:

A. For represented employees hired prior on or prior to New Participant Date:

Age	Reduced Early Retirement	Unreduced Early Retirement
55	4.50 %	10.00 %
56	4.00	7.50
57	3.00	5.00
58	3.00	5.00
59	3.50	5.00

B. For represented employees hired after New Participant Date:

Age	Reduced Early Retirement	Unreduced Early Retirement
55	3.00 %	10.00 %
56	3.00	7.50
57	3.00	5.00
58	3.00	5.00
59	3.00	5.00
60	3.00	30.00
61	3.00	30.00

Unreduced early retirement is not available to non-ACRE represented employees hired after New Participant Date.

C. For all represented employees at Normal Retirement (age 60 or age 62 and later):

- 5% per year if members have fewer than 10 years of service
- 15% per year if members have 10 but fewer than 20 years of service
- 30% per year if member have 20 or more years of service

Certain retirement age is age 80

Disability — Rates vary by age, sex and type of disability beginning at benefit eligibility. Illustrative rates are shown below:

	Ordinary		Accidental			Ordinary		Accidental	
Age	**M**	**F**	**M**	**F**	**Age**	**M**	**F**	**M**	**F**
20	0.17 %	0.25 %	0.01 %	0.01 %	45	0.27 %	0.41 %	0.06 %	0.01 %
25	0.17	0.25	0.01	0.01	50	0.50	0.75	0.06	0.01
30	0.17	0.25	0.02	0.01	55	0.95	1.43	0.07	0.01
35	0.18	0.27	0.03	0.01	60	1.93	2.90	0.07	0.01
40	0.20	0.31	0.05	0.01	64	1.93	2.90	0.07	0.01

Changes in Actuarial Assumptions — None.

G. Actuarial Assumptions — MTA Defined Benefit Pension Plan — MTA Long Island Rail Road Represented Employees

Salary Scale — Salaries are assumed to increase in accordance with the following schedule:

Years of Service	Rate of Increase
0	3.25 %
1	10.50
2	10.00
3	9.75
4	9.25
5	14.75
6+	3.25

Overtime - Members hired prior to January 31, 2008 are assumed to earn overtime equal to 30% of their pay for years when they are retirement eligible. Otherwise, members are assumed to earn overtime equal to 20% of their rate of pay.

Termination — Withdrawal rates vary by years of service. Illustrative rates are shown below:

Years of Service	Termination Rate
0	4.25 %
1 - 4	2.75
5 - 9	2.25
10+	1.25

Retirement — Rates vary by age and type of retirement. Illustrative rates are shown below:

A. For represented employees hired prior to January 31, 2018:

Age	Reduced Early Retirement	Unreduced Early Retirement
55	4.50 %	10.00 %
56	4.00	7.50
57	3.00	5.00
58	3.00	5.00
59	3.50	5.00

B. For represented employees hired on or after January 31, 2008:

Age	Reduced Early Retirement	Unreduced Early Retirement
55	3.00 %	10.00 %
56	3.00	7.50
57	3.00	5.00
58	3.00	5.00
59	3.00	5.00
60	3.00	30.00
61	3.00	30.00

C. For all represented employees at Normal Retirement (age 60 or age 62 and later):

- 5% per year if members have fewer than 10 years of service
- 15% per year if members have 10 but fewer than 20 years of service
- 30% per year if member have 20 or more years of service

Certain retirement age is age 80

Disability — Rates vary by age, sex and type of disability beginning at benefit eligibility. Illustrative rates are shown below:

	Ordinary		Accidental			Ordinary		Accidental	
Age	**M**	**F**	**M**	**F**	**Age**	**M**	**F**	**M**	**F**
20	0.17 %	0.25 %	0.01 %	0.01 %	45	0.27 %	0.41 %	0.06 %	0.01 %
25	0.17	0.25	0.01	0.01	50	0.50	0.75	0.06	0.01
30	0.17	0.25	0.02	0.01	55	0.95	1.43	0.07	0.01
35	0.18	0.27	0.03	0.01	60	1.93	2.90	0.07	0.01
40	0.20	0.31	0.05	0.01	64	1.93	2.90	0.07	0.01

Changes in Actuarial Assumptions - None.

H. Actuarial Assumptions — MTA 20-Year Police Retirement Program

Salary Scale — Salary increases vary by years of Police Service. Illustrative rates are shown below.

Years of Service	Rate of Increase
1	12.5 %
2	14.5
3 – 4	15.5
5	39.5
6 – 9	3.5
10	4.5
11 – 14	3.5
15	5.5
16 – 19	3.5
20	4.5
21 – 24	3.5
25	4.5
26+	3.5

Overtime - Members are assumed to earn overtime equal to 30% of their rate of pay. Overtime for those hired on and after January 9, 2010 is limited to 15% of their rate of pay.

Termination — Withdrawal rates vary by length of service. Illustrative rates are shown below:

Years of Service	Termination Rate
0	6.50 %
1	2.50
2 – 4	2.00
5	0.50
6 – 9	0.35
10+	0.30

Retirement — Rates vary by year of eligibility. Illustrative rates are shown below:

For represented employees hired prior to January 31, 2018:

Years of Eligibility	Retirement Rate
1	17.00 %
2	12.00
3 – 9	10.00
10+	50.00

Certain retirement age is 62.

Disability — Rates vary by age and type of disability beginning at benefit eligibility. Illustrative rates are shown below:

Age	Ordinary	Accidental	Age	Ordinary	Accidental
20	0.043 %	0.095 %	45	0.256 %	0.500 %
25	0.043	0.095	50	0.559	0.527
30	0.062	0.095	55	0.819	0.539
35	0.096	0.115	60	0.896	0.544
40	0.138	0.316			

Cost of Living Expenses — assumed to be 1.35% per annum, compounded annually.

Benefits Not Valued – Railroad benefit offset.

Changes in Actuarial Assumptions — None

I. Actuarial Assumptions — MSBA Employees Pension Plan

Benefit Estimates — Due to the insignificant number of active employees, benefits are estimated based on plan provisions and actuarial assumptions used for management benefits, except for the overtime assumption. No railroad offset is assumed.

Overtime – Members are assumed to earn overtime equal to the following percentage of their rates of pay:

Years of Service	Rate
Under 25 years of service	17.00 %
25 to 29 years of service	20.00
30 or more years of service	23.00

Changes in Actuarial Assumptions - None.

J. Actuarial Assumptions — MTA Defined Benefit Plan — MTA Staten Island Railway

Salary Scale — Salary increases vary by years of service. Illustrative rates are shown below.

Years of Service	Rate
0	10.00 %
1	9.50
2	9.25
3	9.00
4	8.75
5	6.00
6+	3.25

Overtime — Hourly employees are assumed to earn overtime equal to 7.50% of their rate of pay.

Termination — Withdrawal rates vary by years of service. Illustrative rates are shown below:

Year of Service	Termination Rate
0	9.00 %
1 - 3	5.50
4 - 9	3.50
10 - 19	1.40
20+	0.50

Retirement — Rates vary by age and type of retirement. Illustrative rates are shown below:

		Normal Retirement	
Age	Reduced Early Retirement	First Year Eligible	After First Eligibility
55	3.00 %	30.00 %	20.00 %
56	3.00	30.00	20.00
57	3.00	30.00	20.00
58	3.00	30.00	20.00
59	3.00	30.00	20.00
60	3.00	30.00	20.00
61	3.00	30.00	20.00

For all employees at Normal Retirement (age 60 or age 62 and later):

- 5% per year if members have fewer than 10 years of service
- 15% per year if members have 10 but fewer than 20 years of service
- 30% per year if member have 20 or more years of service

Certain retirement age is age 80

Disability — Rates vary by age and type of disability beginning at benefit eligibility. Illustrative rates are shown below:

Age	Ordinary	Accidental	Age	Ordinary	Accidental
20	0.15 %	0.03 %	45	0.44 %	0.05 %
25	0.17	0.03	50	0.54	0.06
30	0.19	0.03	55	0.61	0.07
35	0.24	0.03	60	0.81	0.08
40	0.33	0.04			

Benefits Not Valued — Accidental death benefits.

Changes in Actuarial Assumptions — None.

K. Actuarial Assumptions — MTA Long Island Rail Road Pension Plan

Termination — Withdrawal rates vary by age. Illustrative rates are shown below:

Age	Rate	Age	Rate
20	2.12 %	45	0.96 %
25	1.64	50	0.80
30	1.44	55	0.60
35	1.36	60	0.00
40	1.16	65	0.00

Retirement — Assumed retirement rate varies by year of eligibility.

Eligibility Period	Rate of Retirement
First Year	40 %
Years 2–4	33
Years 5	37
Years 6–7	35
Years 8–9	33
Years 10–15	55
Years 16 and above	100

Terminated vested participants are assumed to retire upon first eligibility, or attained age if later.

Interest on Employee Contributions — Assumed to be 3.5% per year for future years.

Participant Data — Benefits under the Plan are frozen and based on information provided by MTA Headquarters, Consolidated Pensions.

Benefits Not Valued — Disability benefits since the majority of active plan participants are at or near retirement eligibility.

Changes in Actuarial Assumptions — None.

L. Actuarial Assumptions — MTA Bus

Salary Scale for Non-represented Employees - Salaries are assumed to increase in accordance with the following schedule for:

Years of Service	Rate
0	6.00 %
1	5.00
2	4.25
3	4.00
4+	3.50

General Wage Increase (GWI) - The benefit level and contribution rate is assumed to increase 3% each year based on the anniversary of the last scheduled increase for TWU Local 100, ATU 1179, and ATU 1181 represented employees.

Termination — Withdrawal rates vary by years of service. Illustrative rates are shown below:

Year of Service	Termination Rate
0	17.50 %
1	4.75
2 - 9	2.75
10+	2.75

Retirement — Rates vary by age, service, employee type, Tier, Operating/Non-operating distinction, and retirement eligibility. All members are assumed to retire by age 80. Terminated vested members are assumed to retire at first eligibility for an unreduced benefit. Illustrative rates are shown below:

For represented members:

	Years of Service at Retirement		
Age	<5	5-10	10+
57-64	N/A	N/A	30 %
65-79	0 %	5 %	30
80 +	100	100	100

For certain former non-represented employees of Alliance Companies (Article 18):

Age	Retirement Rate
55–56	6 %
57–58	8
59	9
60–61	13
62	25
63–64	15
65	100

For all other non-represented employees:

Tier	Operating/Non-operating	Age	<10	10-20	20-24	25+
4	Operating	55–61	N/A	N/A	N/A	30 %
4	Operating	62–64	5 %	20 %	40 %	40
4	Operating	65–79	5	20	25	25
4	Non-operating	57–79	5	15	30	30
6	Operating	55–62	N/A	N/A	N/A	30
6	Operating	63–64	N/A	20	20	40
6	Operating	65–79	N/A	20	20	25
6	Non-operating	55–59	N/A	0.5	1	1
6	Non-operating	60–61	N/A	1	2	2
6	Non-operating	62	N/A	3	6	6
6	Non-operating	63	N/A	25	50	50
6	Non-operating	64–79	N/A	15	30	30

100% retirement is assumed for employees age 80 and above

For employees hired prior to January 1, 2017, retirement conditions are modified to reflect a single commencement date at the earliest eligible retirement date among former MTA Bus Article 14, 15, 16, 17, and 19 provisions and MaBSTOA-style provisions. The retirement rates above are modified as follows:

- Former Article 14 Tier 4 operating members with between 10 and 20 years of service and between ages 62 and 64 were assumed to retire at 15% per year phasing into 20% per year over the next 10 calendar years

- Former Article 14 Tier 4 non-operating members with between 10 and 20 years of service and between ages 57 and 64 were assumed to retire at rates ranging from 2% to 10% per year phasing into 15% per year over the next 10 calendar years

- Former Article 14 Tier 4 operating members with between 20 and 25 years of service and between ages 57 and 61 were assumed to retire at rates ranging from 4% to 10% per year

- Former Article 14 Tier 4 operating members with 25 or more years of service and between ages 55 and 61 were assumed to retire at rates ranging from 1% to 10% per year phasing into 30% per year over the next 15 calendar years

- Former Article 14 Tier 4 non-operating members with 20 or more years of service and between ages 57 and 61 were assumed to retire at rates ranging from 4% to 10% per year phasing into 30% per year over the next 15 calendar years

- Former Article 14 Tier 4 and Tier 6 non-operating members with 20 or more years at age 62 were assumed to retire at 40% and 10% per year, respectively

- Former Article 14 Tier 6 operating with between 20 and 24 years of service and between ages 57 and 61 were assumed to retire at rates ranging from 1% to 2% per year and at age 62 at 10% per year

- Former Article 15 Tier 4 operating members with between 10 and 20 years of service and between ages 62 and 64 were assumed to retire at 15% per year phasing into 20% per year over the next 10 calendar years

- Former Article 15 Tier 4 operating members with 20 or more years of service and between ages 57 and 61 were assumed to retire at 10% per year; slightly lower rates used at ages 55 and 56

- Former Article 15 Tier 4 operating members with 25 or more years of service and between ages 55 and 56 were assumed to retire at rates of 10% per year phasing into 30% per year over the next 15 calendar years

- Former Article 16 Tier 4 operating members with 25 or more years of service and between ages 57 and 61 were assumed to retire at rates of 10% per year; rates of 1% and 2% were used at ages 55 and 56, respectively

- Former Article 16 Tier 4 non-operating members with between 10 and 20 years of service and between ages 57 and 62 were assumed to retire at rates ranging from 2% to 5% per year phasing into 15% per year over the next 10 calendar years

- Former Article 16 Tier 4 non-operating members with 20 or more years of service and between ages 57 and 61 were assumed to retire at rates ranging from 4% to 10% per year phasing into 30% per year over the next 15 calendar years

- For members eligible to retire with less than 10 years of service, rates were reduced slightly

- Assumptions for former Article 17 members are consistent with former Article 15 members

- Assumptions for former Article 19 members are consistent with former Article 16 members

Disability — Rates vary by age. Illustrative rates are shown below:

Age	Rate	Age	Rate
20	0.03 %	45	0.27 %
25	0.04	50	0.48
30	0.08	55	0.87
35	0.11	60	1.30
40	0.16		

Disability rates cease upon attainment of unreduced retirement eligibility.

Marriage — 80% of members are assumed to be married with wives 3 years younger than their husbands.

Interest on Employee Contributions — Future years assumed to be 3.5% per year for represented employees and for the accumulated balances as of December 31, 2016 for non-represented employees.

Benefits Not Valued — The $2,500 post-retirement death benefit for represented members is not valued since premiums are paid outside of the plan trust.

The $10,000 post-retirement death benefit for former Queens Surface, Jamaica and Triboro Bus Service non-represented Employees (former Article 15) is not valued since premiums are paid outside of the plan trust.

The accidental death and dismemberment benefit for former Queens Surface, Jamaica and Triboro Bus Service non-represented Employees (former Article 15) is not valued as the costs are paid outside of the plan trust.

Form of payment - Normal Form, except that all former Liberty Lines Bus non-represented employees (former Article 13) members are assumed to elect the lump sum payment option. Lump sums valued using the current (2019) lump sum mortality table published by the IRS and a 4.5% assumed interest rate.

Changes in Actuarial Assumptions — None.

7. CUSTODIAL AND OTHER PROFESSIONAL SERVICES

JP Morgan Chase Bank is the custodian and trustee of plan assets with the exception of Mellon asset management investments in which Mellon Bank N.A. is the custodian. JP Morgan Chase also provides cash receipt and cash disbursement services to the Plan. NEPC reviews the Plan's portfolio, the investment policies as stipulated by the Investment Committee and the performance of the Investment Managers. NEPC also provides audit services for the Plan's equity portfolios. Actuarial services were provided to the Plan by Milliman Inc.

8. SUBSEQUENT EVENTS

On March 25, 2020, Allianz Global Investors U.S. LLC ("AllianzGI), managing member of AllianzGI Structured Alpha 1000 LLC (the "Fund"), informed the Plan that it was in the best interest of its investors to terminate the Fund and pursue an orderly liquidation program. AllianzGI stated that the Fund suffered significant losses due to the severe and tumultuous market volatility as a result, in part, of the coronavirus pandemic. No redemptions were permitted after the announcement of the Fund closure. The Plan lost nearly all of its investment. Fund investors will receive a pro-rata distribution of the remaining assets after accounting for Fund expenses and liabilities. So far, the Fund has returned $5.2 million. The Plan is exploring all options to recover its losses.

MTA Capital Construction Company has been renamed MTA Construction and Development Company, was pursuant to an amendment to Public Authorities Law Section 1266(5).and will be reported as such in the future.

The COVID-19 pandemic during 2020 has significantly disrupted financial markets, economies and other events subsequent to December 31, 2019. As noted in the risk and uncertainties note, investment securities are exposed to various risks, such as interest rate, market and credit risks. Due to the level of risk associated with certain investment securities and the level of uncertainty related to changes in the value of investment securities, it is at least reasonably possible that changes in risks in the near term would materially affect the amounts reported in the statements of net assets available for benefits and the statement of changes in net assets available for benefits.

The actuarial present value of plan benefits is reported based on certain assumptions pertaining to interest rates and employee demographics. Due to the changing nature of these assumptions, it is at least reasonably possible that changes in these assumptions will occur in the near term and, due to the uncertainties inherent in setting assumptions, that the effect of such changes could be material to the value of plan benefits.

Subsequent to December 31, 2019, the impact to the Plan of the COVID-19 pandemic during 2020 has resulted in significant reductions in values to many investments of the Plan. It has also significantly decreased interest rates and could impact employee demographics which could change assumption utilized in the future for the actuarial present value of plan benefits.

While management of the Plan currently expects to be able to continue to meet immediate contribution requirements, the long-term impact of the effects of the COVID-19 pandemic to the Plan and Plan sponsor as well as any relief from regulatory authorities are currently not known. The extent of the adverse impact of the COVID-19 pandemic on the Plan's net assets available for benefits and actuarial present value of plan benefits cannot be reasonably estimated at this time.

The Covid-19 outbreak has resulted in a significant decline in ridership and vehicle crossings. The decline in ridership and vehicle crossings have caused a material impact on the MTA's results of operations, financial position, and cash flows in fiscal 2020. In response to the adverse conditions, the MTA has secured funding under the "Coronavirus Aid, Relief and Economic Security Act" or "CARES Act"; received State of New York authorization to increase debt issuing capacity, including $10 billion in deficit bonds; received State of New York authorization to use the Central Business District Tolling lockbox monies to fund COVID-19 operating costs; and has been granted flexibility to apply existing FTA grant program proceeds to operating costs or other purposes to address COVID-19 impacts. In addition, the volatility and uncertainty of the financial market have negatively affected the investment earnings of retirement plans. Although the long-term impact of the Covid-19 outbreak on the financial market is still unpredictable, it could have a negative impact on the market value of the Plan in future years.

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METROPOLITAN TRANSPORTATION AUTHORITY
DEFINED BENEFIT PENSION PLAN

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)
SCHEDULE OF CHANGES IN THE EMPLOYERS' NET PENSION LIABILITY AND RELATED RATIOS
(in thousands)

		2019	2018	2017	2016	2015	2014
Total pension liability:							
Service cost	$	173,095	162,273	148,051	138,215	124,354	121,079
Interest		387,193	358,118	335,679	308,009	288,820	274,411
Changes of benefit terms		-	61,890	76,511	73,521	6,230	-
Differences between expected and actual experience		35,935	75,744	(27,059)	86,809	121,556	2,322
Changes of assumptions		690,958	-	10,731	-	(76,180)	-
Benefit payments and withdrawals		(264,985)	(242,349)	(232,976)	(209,623)	(199,572)	(191,057)
Net change in total pension liability		1,022,196	415,676	310,937	396,931	265,208	206,755
Total pension liability – beginning		5,488,490	5,072,814	4,761,877	4,364,946	4,099,738	3,892,983
Total pension liability – ending (a)		6,510,686	5,488,490	5,072,814	4,761,877	4,364,946	4,099,738
Plan fiduciary net position:							
Employer contributions		344,714	338,967	321,861	280,768	221,694	331,259
Member contributions		31,504	29,902	31,027	29,392	34,519	26,006
Net investment income		647,264	(150,422)	516,153	247,708	(45,122)	102,245
Benefit payments and withdrawals		(264,985)	(242,349)	(232,976)	(209,623)	(199,572)	(191,057)
Administrative expenses & Transfer to investments		(3,408)	(3,152)	(4,502)	(3,051)	(1,962)	(9,600)
Net change in plan fiduciary net position		755,089	(27,054)	631,563	345,194	9,557	258,853
Plan fiduciary net position – beginning		4,024,480	4,051,534	3,419,971	3,074,777	3,065,220	2,806,367
Plan fiduciary net position – ending (b)		4,779,569	4,024,480	4,051,534	3,419,971	3,074,777	3,065,220
Employer's net pension liability – ending (a)-(b)	$	1,731,117	1,464,010	1,021,280	1,341,906	1,290,169	1,034,518
Plan fiduciary net position as a percentage of the total pension liability		73.41%	73.33%	79.87%	71.82%	70.44%	74.77%
Covered payroll	$	1,996,090	1,984,629	1,805,156	1,724,219	1,603,924	1,544,050
Employer's net pension liability as a percentage of covered payroll		86.73%	73.77%	56.58%	77.83%	80.44%	67.00%

In accordance with GASB No. 67, paragraph 50, such information was not readily available for periods prior to 2014.

METROPOLITAN TRANSPORTATION AUTHORITY DEFINED BENEFIT PENSION PLAN

SCHEDULE II

Required Supplementary Information (Unaudited)
Schedule of Employer Contributions
(in thousands)

Fiscal Year Ending December 31	Actuarially Determined Contribution	Actual Employer Contribution	Contribution Deficiency (Excess)	Covered Payroll	Contribution as a % of covered Payroll
2010	$ 155,318	$ 155,318	$ -	$ -	N/A
2011	166,188	166,188	-	-	N/A
2012	212,397	212,397	-	-	N/A
2013	242,980	242,980	-	-	N/A
2014	271,523	331,259	(59,736) *	1,544,050	21.45%
2015	273,730	221,694	52,036	1,603,924	13.82%
2016	290,415	280,768	9,647	1,724,219	16.28%
2017	316,916	321,861	(4,945)	1,805,156	17.83%
2018	331,566	338,967	(7,401)	1,984,629	17.08%
2019	349,928	344,714	5,214	1,996,090	17.27%

* Excess for 2014 reflects a prepaid contribution toward the 2015 Actuarially Determined Contribution.

In accordance with GASB No. 67, paragraph 50, such information was not readily available for periods prior to 2014.

METROPOLITAN TRANSPORTATION AUTHORITY
DEFINED BENEFIT PENSION PLAN

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)
SCHEDULE OF EMPLOYER CONTRIBUTIONS

Note to Schedule II:
The more significant actuarial assumptions and methods used in the calculation of employer contributions to the Plan for are as follows:

Valuation Dates	January 1, 2019	January 1, 2018	January 1, 2017
Actuarial cost method	Frozen initial liability (FIL) (1)	Frozen initial liability (FIL) (1)	Frozen initial liability (FIL) (1)
Amortization method	For FIL bases, period specified in current valuation report for specific plan change bases. Fresh start base as of January 1, 2020 will be determined based on the Plan's unfunded Entry Age Normal liability less amortization balances remaining plan change bases. Future gains/losses are amortized through the calculation of the normal cost in accordance with the FIL cost method amortized based on expected working lifetime, weighted by salary, of the projected population for each group	For FIL bases, period specified in current valuation report. Future gains/losses are amortized through the calculation of the normal cost in accordance with the FIL cost method amortized based on expected working lifetime, weighted by salary, of the projected population for each group	For FIL bases, period specified in current valuation report. Future gains/losses are amortized through the calculation of the normal cost in accordance with the FIL cost method amortized based on expected working lifetime, weighted by salary, of the projected population for each group
Actuarial asset valuation method	Actuarial value equals market value less unrecognized gains/losses over a 5-year period. Gains/losses are based on market value of assets.	Actuarial value equals market value less unrecognized gains/losses over a 5-year period. Gains/losses are based on market value of assets.	Actuarial value equals market value less unrecognized gains/losses over a 5-year period. Gains/losses are based on market value of assets.
Interest rate	Net rate of 6.50% for 2019, per annum, net of investment expenses	Net rate of 7.0% for 2018, per annum, net of investment expenses	Net rate of 7.0% for 2017, per annum, net of investment expenses
Inflation	2.25% per annum	2.5% per annum	2.5% per annum
Railroad retirenment wage base	3.25% per year	3.5% per year	3.5% per year
Mortality	Based on experience of all MTA members reflecting mortality improvement ona generational basis using Scale AA	Based on experience of all MTA members reflecting mortality improvement ona generational basis using Scale AA	Based on experience of all MTA members reflecting mortality improvement ona generational basis using Scale AA
Separations other than for normal retirement	Tables based on recent experience	Tables based on recent experience	Tables based on recent experience
Rates of normal retirement	Tables based on recent experience. Rates vary by age, years of service at retirement and Tier/Plan.	Tables based on recent experience. Rates vary by age, years of service at retirement and Tier/Plan.	Tables based on recent experience. Rates vary by age, years of service at retirement and Tier/Plan.
Salary increases	Varies by years of employment, and employee group; 2.75% General Wage Increases ("GWI") for TWU MTA Bus hourly employees	Varies by years of employment, and employee group; 3.0% General Wage Increases ("GWI") for TWU MTA Bus hourly employees	Varies by years of employment, and employee group; 3.0% General Wage Increases ("GWI") for TWU MTA Bus hourly employees
Overtime	Tables based on recent experience	Tables based on recent experience	Tables based on recent experience
Cost-of-living adjustments	1.35% per annum (2)	1.375% per annum (2)	1.375% per annum (2)
Provision for expenses	An average of the prior three years' administrative charges added to the normal cost	An average of the prior three years' administrative charges added to the normal cost	An average of the prior three years' administrative charges added to the normal cost

Valuation Dates	January 1, 2016	January 1, 2015	January 1, 2014
Actuarial cost method	Frozen initial liability (FIL) (1)	Frozen initial liability (FIL) (1)	Frozen initial liability (FIL) (1)
Amortization method	For FIL bases, period specified in current valuation report. Future gains/losses are amortized through the calculation of the normal cost in accordance with the FIL cost method amortized based on expected working lifetime, weighted by salary, of the projected population for each group	For FIL bases, period specified in current valuation report. Future gains/losses are amortized through the calculation of the normal cost in accordance with the FIL cost method amortized based on expected working lifetime, weighted by salary, of the projected population for each group	For FIL bases, period specified in current valuation report. Future gains/losses are amortized through the calculation of the normal cost in accordance with the FIL cost method amortized based on expected working lifetime, weighted by salary, of the projected population for each group
Actuarial asset valuation method	Actuarial value equals market value less unrecognized gains/losses over a 5-year period. Gains/losses are based on market value of assets.	Actuarial value equals market value less unrecognized gains/losses over a 5-year period. Gains/losses are based on market value of assets.	Actuarial value equals market value less unrecognized gains/losses over a 5-year period. Gains/losses are based on market value of assets.
Interest rate	Net rate of 7.0% for 2016, per annum, net of investment expenses	Net rate of 7.0% for 2015, per annum, net of investment expenses	Net rate of 7.0% for 2015, per annum, net of investment expenses
Inflation	2.5% per annum	2.5% per annum	2.5% per annum
Railroad retirenment wage base	3.5% per year	3.0% per year	3.0% per year
Mortality	Based on experience of all MTA members reflecting mortality improvement ona generational basis using Scale AA	Based on experience of all MTA members reflecting mortality improvement ona generational basis using Scale AA	Based on experience of all MTA members reflecting mortality improvement ona generational basis using Scale AA
Separations other than for normal retirement	Tables based on recent experience	Tables based on recent experience	Tables based on recent experience
Rates of normal retirement	Tables based on recent experience. Rates vary by age, years of service at retirement and Tier/Plan.	Tables based on recent experience. Rates vary by age, years of service at retirement and Tier/Plan.	Tables based on recent experience. Rates vary by age, years of service at retirement and Tier/Plan.
Salary increases	Varies by years of employment, and employee group; 3.0% General Wage Increases ("GWI") for TWU MTA Bus hourly employees	Varies by years of employment, and employee group; 3.5% for MTA Bus hourly employees	Varies by years of employment, and employee group; 3.5% for MTA Bus hourly employees
Overtime	Tables based on recent experience	Tables based on recent experience	Tables based on recent experience
Cost-of-living adjustments	1.375% per annum (2)	1.375% per annum (2)	1.375% per annum (2)
Provision for expenses	An average of the prior three years' administrative charges added to the normal cost	An average of the prior three years' administrative charges added to the normal cost	An average of the prior three years' administrative charges added to the normal cost

(1) Under this actuarial method, the initial liability has been established by the Entry Age Actuarial Cost Method for determining changes in the Unfunded Actuarial Accrued Liability (UAAL) due to plan provision and assumption changes.
(2) Assumes a long-term consumer price inflation assumption of 2.5% per annum, compounded annually.

SCHEDULE III

Required Supplementary Information (Unaudited)
Schedule of Investment Returns

The following table displays annual money-weighted rate of return, net of investment expense.

Fiscal Year Ending December 31	Net Money-Weighted Rate of Return
2010	N/A
2011	N/A
2012	N/A
2013	N/A
2014	3.58%
2015	(1.47%)
2016	7.97%
2017	14.94%
2018	(3.67%)
2019	15.95%

In accordance with GASB No. 67, paragraph 50, such information was not readily available for periods prior to 2014.

Calculation on Long-Term Expected Rate of Return

The best-estimate range for the long-term expected rate of return is determined by adding expected inflation to expected long-term real returns and reflecting expected volatility and correlation. The capital market assumptions are per Milliman's investment consulting practice as of December 31, 2019.