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BEFORE THE
SURFACE TRANSPORTATION BOARD

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RAILROAD COST OF CAPITAL — 2017	)	EX PARTE NO. 558 (Sub- No. 21)

COMMENTS OF THE ASSOCIATION OF AMERICAN RAILROADS AND ITS MEMBER RAILROADS

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April 20, 2018

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Verified Statements

Witness*	Subject
John T. Gray	The railroads' market value capital structure, overall cost of capital, cost of common and preferred equity, and cost of all types of debt.

*Verified statements are referenced in these comments by witness name – viz., V.S. Gray at _____

BEFORE THE
SURFACE TRANSPORTATION BOARD

RAILROAD COST OF CAPITAL — 2017	)	STB Docket No. EP 558 (Sub-No. 21)

COMMENTS OF THE ASSOCIATION OF AMERICAN RAILROADS AND ITS MEMBER RAILROADS

By order served on February 8, 2018, the Surface Transportation Board ("Board") instituted this proceeding to determine the railroad industry's cost of capital for the year 2017. The Board noted that this determination will enable it to make the statutorily required annual individual railroad revenue adequacy determination for 2017. 49 U.S.C. § 10701(d)(2), § 10704(a)(2). The Board noted further that the cost of capital determination may also be used in various other STB railroad proceedings. *See Railroad Cost of Capital – 2017*, EP 558 (Sub-No. 21) (STB served Feb. 8, 2018).

The railroads, through the Association of American Railroads ("AAR"), are submitting their calculation of: (1) the railroads' 2017 cost of common equity capital; (2) the railroads' 2017 current cost of preferred equity capital; (3) the railroads' current 2017 cost of debt capital; and (4) the 2017 capital structure mix of the railroad industry on a market value basis.

The AAR's calculations are discussed in the attached verified statement of John T. Gray, Senior Vice President, Policy and Economics of the AAR. Mr. Gray's statement establishes the following:

1. The 2017 cost of common equity capital is 12.04 percent.

3. The 2017 cost of preferred equity capital is 3.58 percent.

3. The 2017 cost of debt capital is 3.57 percent.

4. The capital structure of the railroad industry is 17.99 percent debt, 0.00 percent preferred equity,[1] and 82.01 percent common equity.

From these data, Mr. Gray concludes that the overall railroad industry cost of capital for 2017 is 10.52 percent.[2]

I. Introduction

The sole purpose of this proceeding is to determine the railroad industry's cost of capital for 2017. The cost of capital will be computed using the current cost of debt and equity and market value weights. *See Standards for Railroad Revenue Adequacy*, 3 I.C.C.2d 261 (1986), *aff'd sub nom., Consolidated Rail Corporation v. United States*, 855 F.2d 78 (3rd Cir. 1988). The Board has adopted a composite railroad approach to computing an industry-wide cost of capital. This approach relies upon data from a sample of railroads meeting criteria established by the Board and it's predecessor, the Interstate Commerce Commission, in Ex Parte No. 458, *Railroad Cost of Capital — 1984,* 1 I.C.C. 2d 989, 1003–04 (1985), and *Revisions to the Cost-of-Capital Composite Railroad Criteria*, EP 664 (Sub-No. 3) (STB served Oct. 25, 2017). Those criteria are: (1) the company is a Class I line-haul railroad; (2) if the Class I railroad is controlled by another company, the controlling company is primarily a railroad company (at least 50 percent of its total assets are devoted to railroad operations), and it is not already included in the study frame; (3) the company's bonds are rated at least BBB by Standard & Poor's and Baa

[1] The weight for preferred equity is small enough that it rounds to 0.00.

[2] Gray V.S. at 2, 55.

by Moody's; (4) the company's stock is listed on either the New York Stock Exchange or the NASDAQ[3]; and (5) the company has paid dividends throughout the year (2017).

This year there are four railroad corporations or holding companies in the sample meeting the Board's criteria: CSX Corporation, Kansas City Southern, Norfolk Southern Corporation, and Union Pacific Corporation. These railroad companies are the same four companies included in the 2016 sample.

II. The Cost of Common Equity Capital

In its February 8, 2018, order instituting this proceeding, the Board directed that the cost of capital components be calculated "using the methodology followed in Railroad Cost of Capital –2016." *See Railroad Cost of Capital – 2017,* EP 558 (Sub-No. 21), slip op. at 2 (STB served Feb. 8, 2018). In *Railroad Cost of Capital –2016*, the Board calculated the cost of equity component in its annual cost of capital proceeding using a simple average of the estimates produced by the Capital Asset Pricing Model (CAPM) adopted in *Methodology to be Employed in Determining the Railroad Industry's Cost of Capital,* EP 664 (STB served Jan. 17, 2008) and the Morningstar/Ibbotson Multi-Stage Discounted Cash Flow Model (MSDCF) adopted in *Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital,* EP 664 (Sub-No. 1) (STB served Jan. 28, 2009).[4] *See Railroad Cost of Capital – 2016,* EP 558 (Sub-No. 20), slip op. at 6-13 (STB served August 7, 2017).[5] Mr. Gray used a simple

[3] Effective November 24, 2017, the Board modified the fourth screening criterion, requiring a company's stock to be listed on either the NYSE or NASDAQ.

[4] The Morningstar/Ibbotson MSDCF model adopted by the Board is a modified version that includes only the railroads that pass the screening criteria set forth in *Railroad Cost of Capital—1984*, 1 I.C.C. 2d 989 (1985), for inclusion in the sample of railroads used for the annual cost of capital determination. *See Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital,* EP 664 (Sub-No. 1), slip op. at 4 (STB served Jan. 28, 2009).

[5] The Board determined that using a simple average of CAPM and the commercially accepted Morningstar/Ibbotson multi-stage DCF model to calculate the cost of equity yields a more precise

average of the CAPM and Morningstar/Ibbotson MSDCF models adopted by the Board in his calculation of the cost of common equity in this proceeding.

A. The CAPM Methodology

Under the CAPM methodology as applicable to the annual cost of capital proceeding, the cost of common equity is calculated by determining the return an investor would receive on a risk-free investment and by adding to the risk-free return a premium associated with the risk of railroad stocks. The premium is calculated by multiplying the market risk premium of the stock market as a whole by a factor, known as beta, that represents the non-diversifiable risk of holding railroad stocks. In formulaic terms, the CAPM can be expressed as:

K = RF + (MRP x beta)

Where K = the firm's cost of equity,
RF = the risk-free rate,
MRP = the market's risk premium, and
beta = coefficient of systematic, non-diversifiable risk of the stock.

Mr. Gray's attached Verified Statement explains how the AAR calculated the cost of equity using the CAPM methodology. The risk-free rate was retrieved directly from the Federal Reserve Board website as approved by the Board in earlier proceedings, including the 2016 cost of capital proceeding. *Railroad Cost of Capital – 2016,* EP 558 (Sub-No. 20), slip op. at 7. Since the 2006 cost of capital determination, the well-regarded and widely-accepted Ibbotson Equity Risk Premium has been used for the market risk premium, as found in the *Ibbotson SBBI Valuation Yearbook* published by Morningstar.[6] Though that publication was discontinued after

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determination than relying on CAPM alone. As noted by the Board, "By using an average of the results produced by both models, we harness the strengths of both models while minimizing their respective weaknesses. The result should be a stable yet precise estimate of the cost of equity that we can use in future regulatory proceedings and to gauge the financial health of the railroad industry." *Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital*, EP 664 (Sub-No. 1), slip op. at 15 (STB served Jan. 28, 2009).

[6] Ibbotson Associates is a wholly-owned subsidiary of Morningstar, Inc. "SBBI" stands for "Stocks,

the 2013 edition, much of the same data could be found in the *Ibbotson SBBI Classic Yearbook*. Beginning in 2016, Morningstar stopped publishing its *Ibbotson SBBI Classic Yearbook*. For the 2015 cost of capital calculation, the AAR utilized the Duff & Phelps *2016 Valuation Handbook – Guide to Cost of Capital* as a source for the Ibbotson Equity Risk Premium (a.k.a. market risk premium), as this figure is calculated using the same sources and methodology as Ibbotson.[7] Gray V.S. at 30. For the 2016 calculation, the same source was used: the Duff & Phelps *2017 Valuation Handbook – Guide to Cost of Capital*. Though that publication was discontinued in hardcover form, the publication is available through the Duff & Phelps online Cost of Capital Navigator. For the 2017 calculation, the same source was used (the Duff & Phelps *2018 Valuation Handbook – Guide to Cost of Capital*), but it was obtained through the online Cost of Capital Navigator. The calculation for beta was made using the S&P 500 Price Index and the same methodology approved by the Board in previous cost of capital proceedings, including the 2016 cost of capital proceeding. Gray V.S. at 31-36.

The values determined by Mr. Gray for the elements of the CAPM methodology were 2.65 percent for the risk-free rate, 7.07 percent for the market risk premium, and 1.1438 for beta.

Based on the four-railroad composite described above and the procedures used by the STB in the last cost of capital proceeding, Mr. Gray estimates that under the CAPM methodology the cost of common equity capital for 2017 is 10.74 percent. Gray V.S. at 37.

Bonds, Bills, and Inflation.

[7] Duff and Phelps notes that this premium is "Calculated as the average annual return of the S&P 500 total return index minus the average annual return of the SBBI long-term (20-year) government bond income return series over the 1926-2016 time period. The long-horizon historical equity risk premium was previously published on the "back page" of the Morningstar/Ibbotson *SBBI Valuation Yearbook* (discontinued)."

B. The Morningstar/Ibbotson MSDCF Methodology

The Morningstar/ Ibbotson MSDCF methodology, as adopted by the Board, calculates the cost of common equity capital as follows:

> The cost of equity in a DCF model is the discount rate that equates a firm's market value to the present value of the stream of cash flows that could affect investors. These cash flows are not presumed to be paid out to investors; instead, it is assumed investors will ultimately benefit from these cash flows through higher regular dividends, special dividends, stock buybacks, or stock price appreciation. The incorporation of these cash flows and the expected growth of earnings are the essential aspects of the multi-stage DCF we are adopting here.
>
> The Morningstar/Ibbotson model defines cash flows (CF), for the first two stages, as income before extraordinary items (IBEI) minus capital expenditures (CAPEX) plus depreciation (DEP) and deferred taxes (DT), or
>
> $$CF = IBEI - CAPEX + DEP + DT.$$
>
> An average cash flow figure is used as the starting point of the analysis under the Morningstar/Ibbotson model. To find the average cash flow, the model uses the 5-year period leading up to the year being analyzed, and the total cash flows for that time period are divided by total sales, which determine the 5-year cash-flow-to-sales ratio. The ratio is then multiplied by the total sales for the year being analyzed to obtain the average cash flow estimate for that year. For the third (and final) stage of the Morningstar/Ibbotson multistage DCF model stage, Morningstar/Ibbotson uses two additional assumptions: that there is no depreciation or deferred taxes. Therefore, in the third stage, cash flows are based solely on income before extraordinary items.
>
> Growth of earnings is also calculated in three stages. In the first stage (years 1-5), the firm's annual earnings growth rate is assumed to be the median value of the qualifying railroad's 3- to 5-year growth estimates as determined by railroad industry analysts and published by Institutional Brokers Estimate System (IBES). In the second stage (years 6-10), the growth rate is the simple average of all growth rates in stage 1. In stage three (years 11 and onwards), the growth rate is the average long-run nominal growth rate of the U.S. economy. This long-run nominal growth rate is estimated by using the historical growth in real GDP and the long-run expected inflation rate.

Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital, EP 664 (Sub-No. 1), slip. op. at 5-6 (STB served Jan. 28, 2009).

The cost of common equity capital using the Morningstar/Ibbotson MSDCF model adopted by the Board is also calculated and explained in the attached Verified Statement of Mr. Gray. Consistent with the methodology approved by the Board in *Railroad Cost of Capital – 2008*, EP 558 (Sub-No. 12), slip op. at 9-10 (STB served Sept. 25, 2009), Mr. Gray's calculations used only IBES growth estimates available as of December 31, 2017, and stock market values were based on shares outstanding and stock prices as of the last trading day of the last full week for 2017 – December 29, 2017 (Friday). Gray V.S. at 42.[8]

Mr. Gray calculates the cost of common equity capital for 2017, using the STB's version of the Morningstar/Ibbotson MSDCF model, as 13.33 percent. Gray V.S. at 49.

C. Conclusion as to the Cost of Common Equity Capital

Under the Board's methodology, the cost of common equity capital is the simple average of the results using the CAPM and Morningstar/Ibbotson MSDCF models. The simple average produces a cost of common equity capital of 12.04 percent. Gray V.S. at 50.

III. The Cost of Preferred Equity Capital

Preferred stock is a hybrid security which has some characteristics of debt and some characteristics of equity. Its cost depends on its specific features. The methodology used by the Board applies the following criteria:

(a) Where the preferred is not convertible into common stock, and where the corporation is not required to redeem the preferred at specific times, the cost of preferred equity is equal to its current dividend yield.

[8] Consistent with the methodology approved by the Board in *Railroad Cost of Capital – 2016,* EP 558 (Sub-No. 20), slip op. at 11-12, Mr. Gray's calculations used data inputs in the cash flow formula as retrieved from the railroads' 2013 - 2017 10-K filings with the SEC (and used restated data where set forth in any subsequently filed 10-K filings with the SEC). *See* Gray V.S. at 39.

(b) Where the preferred is not convertible but is subject to mandatory redemption providing holders of the instrument with a premium, the cost is equal to the current dividend yield, plus the present value of the premium.

(c) Where the preferred is convertible at the option of the holder, and the market values of the preferred and common indicate that conversion is likely to occur or that the conversion right controls the price of the preferred, the preferred has the same cost as common equity.

For the first time since 2002, one railroad in the composite had preferred stock outstanding at the end of 2013. This continues through 2017, and the estimated cost of preferred equity is 3.58 percent for 2017. Gray V.S. at 53.

IV. The Cost of Debt

The cost of debt can include costs for three categories (bonds, equipment trust certificates, conditional sales agreements) of debt instruments, plus flotation costs.[9] To determine the cost of debt for bonds, Mr. Gray has computed the average current bond yield for 113 bonds from the sample railroads for which data were available during 2017. This methodology is identical to that used in the last 27 cost of capital proceedings. *Railroad Cost of Capital – 2016*, EP 558 (Sub-No. 20), slip op. at 4. Under this approach, the bond yield is based on a sample representing 98.6 percent of the book value of the bonds issued by the railroads in the sample.[10] As the Board has recognized, equipment trust certificates (ETCs) and conditional sales agreements (CSAs) are not actively traded in secondary markets. Their costs were therefore estimated by comparing them to the yields on Treasury securities that are actively

[9] The term "bonds" is used to describe bonds, notes, debentures, and other similar types of debt.

[10] Bond data were retrieved from a Bloomberg database. Gray V.S. at 8.

traded.[11] This is the same methodology used by the Board in the last 28 proceedings. The composite current cost of debt is the market-weighted average cost of bonds, ETCs, and CSAs (if there were any), plus a small flotation cost.[12] Using the Board's established methodology, the railroads' 2017 cost of new debt is 3.57 percent. Gray V.S. at 24.

V. The 2017 Capital Structure of the Railroad Industry and the Overall Cost of Capital

Pursuant to the Board's February 8, 2018 decision, the market values of debt, preferred equity, and common equity were compiled to compute the 2017 capital structure of the railroad industry. The railroads' market value capital structure on a market value basis is 17.99 percent debt, 82.01 percent common equity capital, and 0.00 percent preferred equity capital. Gray V.S. at 54. Based upon this capital structure, the overall 2017 cost of capital is 10.52 percent. Gray V.S. at 55.

Conclusion

The Board should determine that the railroads' cost of capital for 2017 is 10.52 percent.

Respectfully submitted,

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April 20, 2018

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[11] Gray V.S. at 12, 16. No CSAs were modeled because none are outstanding.

[12] In this proceeding, the AAR calculated bond flotation costs by using data reported by the sample railroads to the Securities and Exchange Commission (SEC) regarding new debt offerings in 2017. This is the same methodology approved by the Board in *Railroad Cost of Capital –2016,* EP 558 (Sub-No. 20), slip op. at 6. Gray V.S. at 19-23.

CERTIFICATE OF SERVICE

I hereby certify that on this 20th day of April, 2018, I caused to be served by first class mail, postage prepaid, a copy of the forgoing on the following:

Robert D. Rosenberg
Slover & Loftus
1224 Seventeenth St, NW
Washington, DC 20036-3003

Kathleen M. Birch

BEFORE THE

SURFACE TRANSPORTATION BOARD

EX PARTE NO. 558 (Sub-No. 21)

RAILROAD COST OF CAPITAL — 2017

VERIFIED STATEMENT

OF

JOHN T. GRAY

SENIOR VICE PRESIDENT — POLICY AND ECONOMICS

ASSOCIATION OF AMERICAN RAILROADS

April 20, 2018

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Verified Statement
of
John T. Gray

I. Introduction

My name is John T. Gray. I am Senior Vice President – Policy and Economics of the Association of American Railroads (AAR), with offices at 425 Third Street, SW, Suite 1000, Washington, DC 20024. The AAR is the trade association of the Nation's major railroads, as well as the railroads of Canada and Mexico. The AAR's United States railroad members, which include all of the Class I railroads plus about 150 additional Class II and III freight railroads, account for approximately 97 percent of our Nation's total railroad freight operating revenue.

When appropriate, the AAR represents the railroad industry before government bodies, including economic regulatory proceedings before the Surface Transportation Board ("STB" or "Board"). In particular, the AAR has participated in all of the STB proceedings addressing revenue adequacy standards and the annual cost of capital determinations.

Aside from other responsibilities, I have conducted or directed a wide range of analyses and projects addressing regulatory, legislative and internal issues relevant to railroads. Furthermore, I have testified before federal regulatory agencies, and have been an expert witness for a railroad. A summary of my qualifications and experience appears at the end of this statement.

In this submission, I am responding to the Board's decision of February 7, 2018 (served February 8), instituting a proceeding to determine the railroad industry's 2017 cost

of capital — Ex Parte No. 558 (Sub-No. 21), *Railroad Cost of Capital — 2017* ("Ex Parte 558 Decision"). In my statement, I calculate the cost of debt for the railroad industry using the procedures accepted in previous STB proceedings. I also calculate the cost of common equity using a simple average of the estimates produced using the following methods: (1) the Capital Asset Pricing Model used by the Board in Ex Parte No. 558 (Sub-No. 20); and (2) the STB's version of the Morningstar/Ibbotson Multi-Stage Discounted Cash Flow Model as used by the Board in Ex Parte No. 558 (Sub-No. 20). In addition, I calculate a cost of preferred equity using the dividend yield method, as used in Ex Parte No. 558 (Sub-No. 20). Finally, I calculate the market value capital structure and the overall cost of capital using the procedures accepted in previous Cost of Capital proceedings. This statement presents the details for calculating the necessary components for the overall cost of capital calculation: the market value capital structure, the cost of debt, the cost of common equity capital using the Capital Asset Pricing Model and the Multi-Stage Discounted Cash Flow Model, and the cost of preferred equity capital.

I conclude that the 2017 cost of capital for the railroad industry is 10.52 percent. This estimate is based on a current cost of debt of 3.57 percent, a cost of common equity capital of 12.04 percent; a cost of preferred equity of 3.58 percent; and market value weights for debt, common equity, and preferred equity of 17.99 percent, 82.01 percent, and 0.00 percent, respectively.

II. Determining the Cost of Capital

A. Defining the Cost of Capital

The cost of capital for a firm is the minimum rate of return on investment that the providers of capital require as a condition for making an investment in the firm. In essence, it is the threshold rate of return on investment that makes investment in the firm attractive. The cost of capital necessarily incorporates long-term investor expectations for a company's performance. Investment funds flow to companies where the expected returns, over the investors' investment horizons, are thought to at least equal the expected returns available from other investment opportunities, giving consideration to the relative (or commensurate) risk of investment. Similarly within a company, limited capital resources flow to projects where the expected returns are anticipated to be highest, giving consideration to the relative (or commensurate) risk, uncertainty and timing of investment. Methods used to estimate the cost of capital therefore attempt to measure investor expectations. Such models of future behavior are inherently uncertain, and cost of capital computations provide only an estimate of an expected value of the cost of invested capital at a particular point in time. For some types of capital, such as traded bonds, investor expectations can be readily observed. For other types of capital, such as common equity, modeling is necessary.

B. The Composite Railroad Approach

The STB has adopted a composite railroad approach to computing an industry-wide cost of capital. This approach relies upon data from a sample of railroads meeting criteria established by the Board's predecessor, the Interstate Commerce Commission, in Ex Parte

No. 458, *Railroad Cost of Capital — 1984,* 1 I.C.C. 2d 989, 1003–1004 (1985), and modified by the STB in Ex Parte No. 664 (Sub-No. 3) served October 25, 2017.

C. Selection of Railroads for Analysis

Under the criteria established by the Board for individual firm inclusion in the composite railroad sample, a company must meet certain criteria. (Ex Parte 558 Sub-No. 21 Decision) Those criteria are:

- The company is a Class I line-haul railroad.
- If the Class I railroad is controlled by another company, the controlling company is primarily a railroad company (at least 50 percent of its total assets are devoted to railroad operations), and it is not already included in the study frame.
- The company's bonds are rated at least BBB by Standard & Poor's and Baa by Moody's.
- The company's stock is listed on either the NYSE or the NASDAQ.
- The company has paid dividends throughout the year (2017).

Table 1 (next page) lists the AAR's evaluation of railroad companies that may meet the STB's criteria.

Table No. 1
Evaluation of Class I Railroads
Under Surface Transportation Board Selection Criteria
2017

Class I Railroad	Parent	Stock Symbol	Dividends Throughout 2017	Rail Assets Account For At Least 50% of Parent	Adequate Debt Rating	NYSE or NASDAQ[1]
BNSF	Berkshire Hathaway	BRK-A	No	No	Yes	Yes
CSX	CSX Corporation	CSX	Yes	Yes	Yes	Yes
CNGT*	Canadian National Railway Co.	CNI	---	Non-U.S. company	---	
KCS	Kansas City Southern	KSU	Yes	Yes	Yes	Yes
NS	Norfolk Southern Corporation	NSC	Yes	Yes	Yes	Yes
CPSL*	Canadian Pacific Railway Ltd.	CP	---	Non-U.S. company	---	
UP	Union Pacific Corporation	UNP	Yes	Yes	Yes	Yes

* CNGT is Grand Trunk Corporation, and consists of almost all of the U.S. railroad operations of Canadian National Railway (a.k.a. CN). CPSL is Soo Line Corporation, and consists of the U.S. operations of Canadian Pacific (CP). Following STB precedent, CN and Canadian Pacific were not included in the sample because both CN and Canadian Pacific are Canadian corporations – and the cost of capital proceeding is concerned with determining costs for U.S. railroads under STB jurisdiction.

[1] Effective November 24, 2017, the Board modified the fourth screening criterion used to create the "composite railroad". This action requires a company's stock to be listed on either the NYSE or NASDAQ.

This year there are four railroad corporations or holding companies in the sample meeting the Board's criteria: CSX Corporation, Kansas City Southern, Norfolk Southern Corporation, and Union Pacific Corporation. These are the same railroad companies included in the 2016 sample. Consistent with past proceedings, the two Canadian-owned railroads have been excluded from the sample.[1] Berkshire Hathaway, owner of BNSF Railway Company, did not pay dividends throughout 2017, and the railroad is less than 50% of the company's assets.[2] Based on data from

[1] *See* STB Ex Parte No. 558, decided July 2, 1997, page 2, and verified statement of Craig F. Rockey on behalf of the Association of American Railroads in Ex Parte No. 558, submitted March 19, 1997, Table 1 on page 6. Accounting methods, differences in the treatment of taxes, and currency conversion could also be issues if foreign companies were added to the composite railroad. The railroad parents (CN and Canadian Pacific) are still more Canadian than USA. Comparing operating revenues for 2016 as reported in the AAR's *Railroad Facts* book, 2017 edition: CNGT was 33 percent of CN, and SOO was 28 percent of Canadian Pacific.

[2] The rail operations of BNSF Railway Company are the principal operating subsidiary of Burlington Northern Santa Fe, LLC – which is a subsidiary of Berkshire Hathaway, Inc. At the end of 2017, BNSF accounted for 11.8 percent of Berkshire Hathaway's total assets. Among the many other subsidiaries of Berkshire

Annual Report Form R-1 for 2017, the four-firm composite accounts for 63 percent of the operating revenues and 60 percent of the assets of all Class I railroads.

D. Types of Railroad Capital

The total capital of a firm may include various forms of debt and two types of equity; common stock and preferred stock. Each of these three sources of capital has different expected rates of return (reflecting different levels of perceived risk of the particular debt or equity instrument), and the overall cost of capital is calculated as the market value weighted average of the costs of common equity, preferred equity, and debt. Different approaches are used to estimate the costs of each of the types of capital. In this statement, 97 percent of the cost of debt is calculated using bonds and similar instruments (including notes and debentures). The remaining 3 percent – in the form of Equipment Trust Certificates – is calculated with a long-used model that permits comparison of market-determined yields for government debt, and the historical relationship between government debt and the type of railroad debt modeled.[3] No Conditional Sales Agreements were used to calculate the 2017 cost of debt because they have all been retired. The estimate of the cost of common equity is a simple average of the results from two estimation methods. One method is calculated using the backward looking Capital Asset Pricing Model (CAPM) following the methodology prescribed by the Board in the 2016 Cost of Capital decision. The other method is calculated using the somewhat more forward looking Multi-Stage Discounted Cash Flow model methodology prescribed by the Board in the 2016 Cost

Hathaway are GEICO, Fruit of the Loom, Helzberg Diamonds and Dairy Queen. The company also owns numerous automobile dealerships, real estate companies, and newspapers.

[3] There are currently five Equipment Trust Certificates modeled.

of Capital Decision. The cost of preferred equity capital has been calculated using a simple dividend yield method, as used in the 2016 Cost of Capital Decision. Calculations for all three types of capital are based on data through 2017. The industry's overall cost of capital is computed as a weighted average of the three costs — debt, common equity, and preferred equity — based upon the market value for each type of capital.

III. Debt Capital in 2017

The current cost of debt is determined from the current market-determined yields on all debt outstanding. This approach is necessary, and in past Board Cost of Capital decisions has been accepted as appropriate, because of the reasons listed below.[4]

(1) There is a lack of sufficient new issues from which to develop a representative, and statistically reliable, current cost.

(2) The stated rate of interest/dividend payment to the investor is not always the same as the cost to the railroad. For example, when securities are issued, the total amount paid by investors is seldom received by the railroad. Administrative fees, such as compensation paid to investment bankers, reduce the proceeds to the railroad. The effect of this is to increase the cost of the securities to the railroad.

(3) The maturity mix and the type of instrument (equipment trust certificates, conditional sales agreements, long-term debt) of new security issues may be different from the average of existing securities. Because of the effect that length

[4] *See* Ex Parte Nos. 415, 436, 452, 458, 464, 466, 473, 478, 486, 491, 506, 513, 518, 523, 523 (Sub-No. 1), 588, and 588 (Sub-No. 1) through (Sub-No. 20).

of maturity and type of security has on its current cost, the use of only new issues would not accurately measure the current cost.

(4) The quantity and quality of existing debt has an impact on the yield of new issues.

A. Bonds, Notes and Debentures

As in previous Cost of Capital determinations, calculations relating to the bond market value use market data for the composite railroad whenever possible, and calculations for the cost of bond debt rely entirely on market data.[5] Multiple sources for market data are available, and each source has its own criteria for including a financial instrument in its database. However, no market data will be available in any database for bonds that do not trade.[6] For 2017, yields and prices of the sample railroads' bonds, notes and debentures were obtained from Bloomberg.[7] This source is the same data source used since the 2011 cost of capital determination. We were able to find data for 113 unique CUSIPs (bond identifiers).[8] The 113 bonds represent 98.6 percent of the book value of all railroad bonds belonging to the composite railroad.[9] The bonds not included are those that are either not in Bloomberg's database, or were in the database but did not trade.

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[5] The terms "bonds" and "bonds, notes, and debentures" are used interchangeably herein.

[6] In some cases, a comparable bond method could be used, where yields for traded bonds could be used for non-traded bonds with similar qualities (maturity date and type of instrument), enabling the calculation of a probable market price. Another approach would be to construct a yield curve for a railroad. We have not recommended these approaches because the supply of bonds with market data is adequate.

[7] Bloomberg's product is called Bloomberg Professional, and it is available as a subscription service. https://www.bloomberg.com/professional/

[8] A CUSIP number is a 9-character identification code used to identify a security. CUSIP is an abbreviation for Committee on Uniform Securities Identification Procedures.

[9] In some cases, similar series of bonds have been assigned two CUSIPs because a privately-placed portion trades *among* qualified institutional buyers instead of *through an exchange*. This can happen in a bond exchange offer where not all of the "old" bonds have been redeemed for the new version.

1. Market Value of Bonds, Notes, and Debentures

The average market value for traded bonds, notes, and debentures is calculated using the methodology employed in previous Cost of Capital proceedings. For each of 113 traded CUSIPs in 2017, an average price is calculated based on the simple average of monthly prices. The prices represent what the investor is willing to pay for the bond given its coupon rate and maturity date. The market value is the average market price (stated as a price per hundred dollars of principal) times the amount of debt outstanding as of December 31, 2017.[10] Where market prices are not available (i.e., for instruments that did not trade or were not found in the Bloomberg database), the "face value" of the bond is assumed to be the price investors would pay. This assumption may slightly overstate the market value of some issues and understate the value of others, depending upon the relationship of the instruments' coupon rate and the current market rate. However, this possible variation is not likely to significantly affect the overall estimate of the cost of debt capital, since the differences are likely to be both small and offsetting – and, most importantly, since 98.6 percent of the book value of bonds is priced at market. Table 2 summarizes the results of the market value calculations for 2017. The market value for bonds, notes, and debentures that traded is $37.98 billion, which is 98.7 percent of the total market value of $38.49 billion.[11]

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[10] Securities that were newly issued during the year were prorated by the ratio of the number of months outstanding (rounded to the nearest half month) to the twelve-month year, as done in past proceedings.

[11] The market value and book value percentages for traded bonds were very close, but not exactly the same.

Table No. 2
Bonds, Notes and Debentures
Average Market Value

Railroad Co.	Traded Value ($000)	Non-Traded Value ($000)	Total Value ($000)	Weight Based on Traded
CSX	$12,372,815	$254,338	$12,627,153	32.57 %
KSU	$2,152,650	$162,012	2,314,662	5.67
NSC	$9,714,193	$84,902	9,799,095	25.58
UNP	$13,740,797	$4,921	13,745,718	36.18
Total	$37,980,454	$506,173	$38,486,628	100.00 %
* The traded weight for CSX, 32.576795%, was rounded down instead of up to force the total to be exactly 100.00%.				
Prior Year	$34,494,031	$530,069	$35,024,100	
Change	10.1%	-4.5%	9.9%	

Total market value for bonds is up 9.9 percent from the previous year. Among the causes of this increase are new debt offerings outpacing retirements, as year-end book values of bonds are higher for three of the four railroads.

Appendix A lists details for each of 113 unique CUSIPs for bonds, notes, and debentures belonging to the composite railroad – and having trading data available for 2017 in the Bloomberg database. As footnoted earlier, there are a few cases where a similar series of bonds has been assigned two CUSIPs because a privately-placed portion trades among qualified institutional buyers instead of through an exchange, as allowed under the Securities and Exchange Commission's Rule 144A. All instruments are summarized for each sample railroad in the front of the Appendix. Book values for non-traded debt are also listed.

2. Current Cost of Bonds, Notes, and Debentures

Table 3 summarizes the yield or cost of each railroad's debt (bonds, notes, and debentures), which, when weighted by the market value of the traded debt (as shown in Table 3), determines the sample composite cost of bonds, notes and debentures. The

weighted average is 3.510 percent, which is a little higher than 2016's figure of 3.393 percent.

Table No. 3
Bonds, Notes and Debentures
Weighted Current Cost

Railroad Co.	Weight	Current Cost
CSX	32.57 %	3.729 %
KSU	5.67	3.701
NSC	25.58	3.493
UNP	36.18	3.295
Total	100.00 %	3.510 %

As noted earlier, the current cost for bonds, notes, and debentures is based on traded instruments issued by the sample railroads. Appendix A contains the average yield for each of the 113 unique CUSIP securities that traded according to Bloomberg's database. The average yield for each security is a simple average of the twelve month-end yields. The traded portion of Appendix A summarizes the yield, or cost of each railroad's debt, which, when weighted by the market value of the traded debt, determines the sample composite cost of bonds, notes and debentures of 3.510 percent. The weights used in Table 3, as derived from the calculations in Table 2, are also based on the traded portion of bonds, notes and debentures listed in Appendix A.

B. Equipment Trust Certificates

Equipment Trust Certificates (ETCs) are debt obligations that are secured by the particular equipment which is acquired with the instrument's proceeds. In the event of default, creditors may repossess and resell or lease the equipment to pay off the debt obligations. This type of security has declined in popularity. In the 1990 cost of capital determination, ETCs accounted for 17.7 percent of the market value for the sum of bonds,

ETCs, and conditional sales agreements.[12] For 2017, this percentage is 2.63 percent. Because entire ETCs are not actively traded in secondary markets, it is necessary to determine their cost by examining the return on other debt securities that are actively traded.

An ETC is generally serially issued. As such, each year during its life an equal amount (typically 1/15th) of the original amount must be retired. Consequently, an ETC may be thought of as a series of individual, annually-retiring bonds. In fact, when ETCs are issued, each of the maturities is sold independently from the others. A serially issued debt instrument provides an investor with the ability to purchase only those maturities of particular interest. To correctly compute the composite yield on a serially issued bond, the internal rate of return on the bond's principal and interest payments must be calculated.

To compare ETCs to other debt instruments, the yields to maturity (as detailed in Appendix B) for government bills, notes, and bonds having the same range of maturities as current ETCs were obtained from Federal Reserve data. The yield curve for these government securities (also in Appendix B) shows the relationship between the current costs, or yields to maturity, and maturity dates for government bonds (which, unlike ETCs, are actively traded in secondary markets).

These yield data have been adjusted by the Federal Reserve Board to reflect constant maturities, such that the data accurately reflect the 2017 relationships between yields and maturities. After determining the yields to maturity for government bonds of maturities similar to those of an ETC, those yields are adjusted to reflect the risk associated

[12] *See* verified statement of David F. Miller on behalf of the Association of American Railroads in Ex Parte No. 491, submitted February 15, 1991, Appendix I.

with the ETCs as compared to government bonds. This adjustment is the risk premium for railroad ETCs, which is the spread between ETCs and government securities.

In 2007, 2009, 2014, and 2015, a railroad issued new ETCs with interest rate spreads above government bonds of 125, 80, 76 and 44 basis points, respectively. In 2016, another new ETC was issued by a railroad, and its interest rate spread was calculated to be 70 basis points. Since there were no new ETCs issued in 2017, the 70 basis point spread remains the same. For comparisons, Table 4 lists historical spreads used since 2000 and the spread proposed for 2017.[13]

[13] The 70 basis point spread was calculated using the same method as that used for 2008, 2010, 2014, 2015, and 2016, and calculations are included in my work papers submitted with each of my verified statements.

Table No. 4
History of Premiums for
Equipment Trust Certificates (ETC)

Data Year	Proceeding	Basis Points
2000	Ex Parte No. 558 (Sub-No. 4)	171
2001	Ex Parte No. 558 (Sub-No. 5)	114
2002	Ex Parte No. 558 (Sub-No. 6)	114
2003	Ex Parte No. 558 (Sub-No. 7)	114
2004	Ex Parte No. 558 (Sub-No. 8)	114
2005	Ex Parte No. 558 (Sub-No. 9)	114
2006	Ex Parte No. 558 (Sub-No. 10)	114
2007	Ex Parte No. 558 (Sub-No. 11)	125
2008	Ex Parte No. 558 (Sub-No. 12)	125
2009	Ex Parte No. 558 (Sub-No. 13)	80
2010	Ex Parte No. 558 (Sub-No. 14)	80
2011	Ex Parte No. 558 (Sub-No. 15)	80
2012	Ex Parte No. 558 (Sub-No. 16)	80
2013	Ex Parte No. 558 (Sub-No. 17)	80
2014	Ex Parte No. 558 (Sub-No. 18)	76
2015	Ex Parte No. 558 (Sub-No. 19)	44
2016	Ex Parte No. 558 (Sub-No. 20)	70
2017	Proposed for EP 558 (Sub-No. 21)	70

The methodology used to determine the cost of ETC debt is the same as the method employed and approved in previous proceedings. Risk-adjusted yields provide the basis to value each ETC. Using formulae suggested by *Standard Security Calculation Methods,* the market value of each maturity comprising an ETC is determined. In effect, these formulae make it possible to determine the price investors would pay in 2017 for the contractual interest payments and price appreciation for holding the instrument. It is the most accurate way to compute the current cost of ETCs to the firm for the defined period. Computing the internal rate of return of the ETC prices and their associated cash flow streams establish the current cost for ETCs. The weighted-average cost for all modeled Equipment Trust

Certificates (now 5) is shown in Table 5.[14]

Table No. 5
Summary of Equipment Trust Certificates Modeled for 2017
($000)

Railroad	Amount Outstanding Beg.	Ending	Average	Yield	Current Market Value	Current Interest Amount	No. ETC
CSX	$0	$0	$0	--	$0	$0	0
KCS	0	0	0	--	0	0	0
NS	0	0	0	--	0	0	0
UP	1,061,098	1,010,889	1,035,994	2.963%	1,044,632	30,949	5
Total	$1,061,098	$1,010,889	$1,035,994	2.963%	$1,044,632	$30,949	5

Weighing each railroad's yield (there was only one railroad) by its current market value for modeled ETCs results in a current cost of 2.963 percent. The average rate is

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[14]The formulae used to value these bonds are standards of the security industry. They are:

For bonds with less than six months to maturity:

$$DP = \left[\frac{100 + C/2}{1 + DY/360}\right] - \left[C/2\ \frac{(180 - D)}{180}\right]$$

For bonds with six months or longer to maturity:

$$DP = \left[\frac{100}{(1 + Y/2)_{\text{EXP}}(N - 1 + D/180)}\right] + \left[\sum_{k=1}^{N} \frac{C/2}{(1 + Y/2)_{\text{EXP}}(K - 1 + D/180)}\right] - \left[C/2\frac{(180 - D)}{180}\right]$$

Where: DP = Dollar price of the bond
C = Coupon rate as a percent per year
D = Number of days from settlement date to coupon date
Y = Yield to maturity as a decimal per year
EXP = Raise the term on the left to the power indicated by the term on the right
N = Whole number of coupons payable plus 13
K = Compute for K, values 1 to N and sum the results

slightly higher than the 2.494 percent found for 2016. In this year's case, the higher yield curve for 2017 reflects the higher interest rates on government securities. (See Appendix B).

A summary of each railroad's modeled ETCs can be found in Appendix C, which includes a market value and a current yield. (Union Pacific is the only railroad using ETCs currently.) The large difference in yields for the first ETC compared to the other four (Appendix C, page 7) is caused by the big difference in their series of maturity dates – they have a different set of places on an upward sloping yield curve. Appendix C also lists ETCs that were not modeled (and those current, which are not used). ETCs can fail to be modeled for two reasons: (1) the ETC instrument does not have all of the characteristics typical of an ETC; or (2) the ETC has a floating rate (instead of fixed) making its rate for a particular future year uncertain. There were no non-modeled ETCs this year. The market value of all modeled ETCs is $1.04 billion.

C. Conditional Sales Agreements

Conditional Sales Agreements (CSAs) are another form of railroad financing that is treated by investors as debt securities, because their interest obligations are essentially the same as interest obligations on ETCs. Like ETCs, CSAs are not generally traded in secondary markets. Accordingly, as in prior proceedings, their current cost can be determined from current yields on government bonds in a similar manner to ETCs, using a 1997 relationship between CSAs and ETCs to determine the yield spread over government bonds. However, no CSAs were outstanding in 2017 – so none were modeled and none were added to Miscellaneous Debt. There is no appendix for CSAs.

D. All Other Debt

Capital leases and miscellaneous debt such as commercial paper, demand deposits, and other instruments with relatively small amounts outstanding are listed as All Other Debt. To comply with past decisions of the Board, non-modeled Equipment Trust Certificates and Conditional Sales Agreements would have been listed in this category had there been any this year. Capital leases account for most of the All Other Debt category.

Capital leases are contracts between two parties and as such take many forms.[15] Since capital leases are not traded in the marketplace, their current cost is not directly observable. The lack of complete information with respect to leases necessitates that many assumptions be made to estimate their current cost and their values. For market value purposes, capital leases are included at book value. Given the large number of these leases and the significant differences among their terms, this is the only practical option available. Because the cost of capital calculation assigns this debt a cost based on traded or modeled securities (bonds, notes, debentures, ETCs and CSAs) that typically have a lower cost, the cost used for capital leases will be somewhat understated.

Miscellaneous debt, such as commercial paper, demand deposits, and various instruments with extremely small amounts outstanding are also excluded from the current cost computations. The book value (assumed market value) of capital leases and miscellaneous debt is $246.7 million; as a percent of the total market value of debt of the composite railroad, it is 0.6 percent. Miscellaneous debt is lower than it was for 2016. (More detail on Miscellaneous Debt can be found in the Debt Reconciliation portion of my

[15] *See* generally 49 C.F.R. 1201, 2–20 for definitions.

work papers.) This treatment of All Other Debt is the same approach used in the previous cost of capital proceeding.[16]

E. Market Value of Debt

Table 6 summarizes the total market value for each debt category. The total market value for traded and non-traded debt is $39,778 million. Bonds, Notes, and Debentures (Bonds) account for 97 percent of the total market value. As can be computed from Appendix D, 98.7 percent of the Bonds' market value is determined by the results of trading throughout the year, while the remaining portion is based upon the book value of non-traded bonds.

Table No. 6
Market Value of Debt ($000)

Type of Debt	Market Value	Percent of Total	Percent of Subtotal
Bonds, Notes & Debentures	$38,486,628	96.75 %	97.36 %
Equipment Trust Certificates	1,044,632	2.63	2.64
Conditional Sales Agreements	0	0.00	0.00
Subtotal	39,531,260	99.38	100.00 %
All Other Debt*	246,734	0.62	
Total	$39,777,994	100.00 %	

* If any ETCs or CSAs are not modeled, they are included in All Other Debt.

Current costs can be determined for three of the four debt categories — Bonds, Equipment Trust Certificates, and Conditional Sales Agreements, had there been any. Therefore, in 2017, the weighted average cost of debt is based upon these three (of the four) debt categories (see subtotal column). The total market value of debt, used to determine

[16] Non-modeled ETCs and/or CSAs would also have been included in the All Other category if there had been any.

the weight for debt in the overall cost of capital calculation, includes all four categories. The market value of debt, including traded and non-traded debt, is described in more detail in Appendix D.

F. Flotation Costs for Debt Capital

The cost of issuing new debt generally has two portions. First, when new debt is issued by a negotiated offering or a competitive bid, the issuing firm pays a fee to the investment banking firm or firms handling the offer. These fees cover the banker's administrative costs in handling the sale and profits. Second, the issuer incurs expenses such as legal, accounting, and printing. Those types of expenses are quantified in the Securities and Exchange Commission's Form 424(b)(5) or 424(b)(2), as are the investment banker's fee and other details of new debt offerings. Flotation costs generally vary by type of security. For ETCs and CSAs, the fees are extremely small, but costs increase as the administrative burden and underwriting risk increase (i.e., in order of increasing cost — ETCs and CSAs, bonds and notes, convertible bonds, and preferred stock and common stock). As discussed below, flotation costs directly reduce the gross proceeds available to the issuing firm.

An example helps to illustrate how flotation costs permanently increase the cost of debt capital to the railroad. If a railroad sells a 10-year bond with an annual coupon of 15 percent and investors are willing to pay $98 for each $100 in face value, the effective yield on the bond is 15.40 percent. Because the investment banker requires compensation (flotation costs) for his work, the railroad does not receive the full $98 from the investors. In addition, the railroad will have its own internal costs such as legal and accounting. If flotation costs reduce the net proceeds to say $96, the effective cost to the railroad over the

life of the bond is 15.82 percent. Therefore, flotation costs have increased the cost of debt from 15.40 to 15.82, or by 42 basis points. Proper accounting treatment requires the $4 per $100 ($100 - $96) to be amortized on a straight line basis over the life of the bond. In addition, the Uniform System of Accounts requires the annual amortization to be charged directly to Account No. 548, Amortization of Discount on Funded Debt, a fixed charge item. This results in fixed charges for the year totaling $15.40 ($15.00 coupon payment + amortization of $0.20 discount + $0.20 flotation costs). It is important to note that these flotation costs are not recovered through operating costs but are fixed charges each year during the life of the bond. Also, it is evident that in order to reflect the total current cost of debt, flotation costs must be included.

Any firm requires the opportunity to cover flotation costs before it will have an incentive to make future capital expenditures. Before creditors will lend their funds, they must be assured that the railroad will have the opportunity to earn returns sufficient to cover all costs.

Using the same methodology used since 2008, I calculated 2017 flotation costs for bonds using publicly available data from electronic filings with the Securities and Exchange Commission (SEC).[17] The filing types are "Prospectus Rule 424(b)(2)" and "Prospectus Rule 424(b)(5)". In addition to standard bond information such as coupon and maturity date, these filings also provide the price to investors, underwriter's fee, and railroad expenses excluding the underwriter's fee. I have calculated a yield based on the price to investors and a yield that also included flotation costs. The difference between the

[17] The SEC's EDGAR (Electronic Data Gathering, Analysis, and Retrieval) system is available on the internet at the following address: https://www.sec.gov/edgar.shtml .

two yields is the flotation cost expressed in percentage points. For 2017, 6 new issues were reported in four filings, with some filings reporting multiple new issues. A simple average of the 6 flotation costs is 0.069 points, which is slightly higher than the figure used by the Board for 2016 – although not substantially different. As before, debt exchanges have not been included. Page 1 of Appendix E contains a table with input data and calculations. Pages 2 and 3 of the same appendix contain, as an example, the pages from the SEC filing that were used as a source for one of the filings. The source filings for all of the new bond issues have been included in my work papers. I believe the 6 new railroad debt issues, which were issued by three different railroads, provide the best information to determine flotation costs for 2017, and I have therefore used 0.069 percentage points for the flotation costs for bonds.

The Securities and Exchange Commission (SEC) conducted a study of flotation costs using railroad ETC data for the years 1951, 1952 and 1955.[18] In that study, the SEC determined that ETC flotation costs averaged 0.89 percent of gross proceeds.

I have calculated flotation costs for ETCs using the same methodology used in the previous Cost of Capital decision, although it has some flaws. See my testimony for 2012 for a discussion of the incorrect assumption used with the current method. Because ETCs are such a small portion of total debt, this flawed method for estimating flotation costs for ETCs does not affect the cost of debt, so I have not expended resources with an alternative method. Table 7 below calculates flotation costs for ETCs using the flotation percent of

[18] *Cost of Flotation of Corporate Securities 1951-1955,* Securities and Exchange Commission, June 1957.

gross proceeds discussed above. No flotation costs have been calculated for CSAs, as none have been modeled.

Table No. 7
Flotation Costs for
Equipment Trust Certificates

Given	**ETC**
Flotation Costs as Pct of Gross Proceeds	0.890%
Avg. Railroad Yields (Table 5)	2.963%
Assumed Duration of New Instrument (Yrs)	15
Calculated	
Price After Flotation Costs	$99.11
Effective Yield Including Flotation Costs	3.037%
Difference Between Yields With and Without Floatation Costs =	
Flotation Cost as Percentage Points	**0.074%**

In this calculation, current average yields on railroad ETCs are assumed to be equal to the yield resulting from the price to investors for a new issue (a flawed assumption because the current yields and new issues are on different places in the yield curve). Coupons are assumed to be paid twice per year. The duration for new ETCs is assumed to be 15 years. Given the input data, effective yields can be calculated, and the difference between the yields excluding flotation costs and the yields including flotation costs are the flotation costs measured in percentage points. The results are flotation costs for ETCs of 0.074 percentage points – which is slightly higher than, but very close to, the value for 2016.

To compute the overall effect of flotation cost on debt, the market value weight of the debt outstanding is multiplied by the respective flotation cost. The weights for each type of debt are based on market values for debt (excluding All Other Debt), as found in the

Percent of Subtotal column in Table 6. All Other Debt is excluded from the weight calculation, since a current cost of debt for that category has not been determined. As shown in Table 8, flotation costs increase the cost of debt by 0.069 percentage points.

Table No. 8
Flotation Costs For Debt

Type of Debt	Market Weight	Flotation Cost
Bonds, Notes & Debentures	97.36%	0.069%
Equipment Trust Certificates	2.64%	0.074%
Conditional Sales Agreements	0.00%	not calculated
Total	100.00%	0.069%

This flotation cost for 2017 is slightly higher than the Board's 0.067 percentage points calculated in its 2016 Cost of Capital decision. Since bonds have a market weight of over 97 percent, flotation costs for total debt rounds to the same number as the flotation costs for bonds.

G. Conclusion as to the Cost of Debt Capital

To determine the overall composite current cost of debt, the current cost of each of three categories of debt (Bonds, ETCs and CSAs) is multiplied by its market value proportion. Market values are properly used in this connection, because they represent the amounts on which the current cost must be paid. Table 9 shows the results of this calculation.

Table No. 9
Composite Current Cost Of Debt

Type of Debt	Market Weight	Current Cost
Bonds, Notes & Debentures	97.36%	3.510%
Equipment Trust Certificates	2.64%	2.963%
Conditional Sales Agreements	0.00%	--
Subtotal	100.00%	3.496%
Flotation Costs		0.069%
Weighted Cost of Debt		3.565%
Weighted Cost of Debt (Rounded)		**3.57%**

The current weighted cost of debt before flotation costs is 3.496 percent. The addition of flotation costs results in a rounded cost of debt of 3.57 percent. This cost of debt is higher than the 2012 record low of 3.29 percent, as well as the second-lowest of 3.43 for 2016, but it is very close to the 3.55 percent calculated for 2015.[19] A summary for the 2017 calculation of the overall cost of debt is provided in Appendix F.

IV. Common Equity Capital In 2017

A. The Market Value of Common Equity Capital

The market value of common equity is based on stock prices and shares outstanding for 2017. Table 10 below summarizes the market value calculation. The Weight column, which is not used directly in our calculation, is provided as additional information.

[19] The AAR's *Railroad Facts* book lists the cost of debt decided by the Board, and its predecessor. The 2013 edition contains, on page 19, data from 1978 through 2012. The 2017 edition lists, on page 20, data from 1990 through 2016.

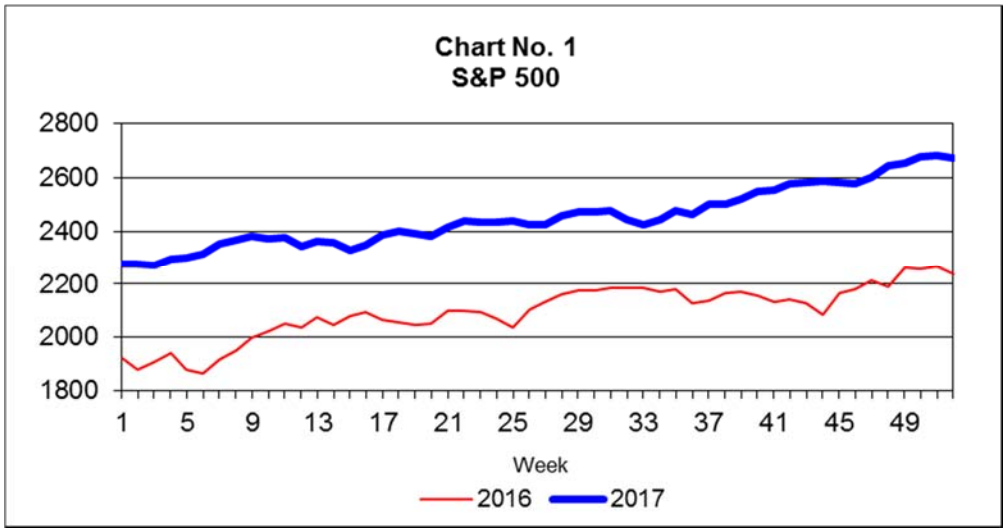
Table No. 10
Average Market Value
For Common Equity in 2017

Railroad Co.	Value ($000)	Weight %
CSX	46,185,093.8	25.46
KSU	10,327,996.3	5.69
NSC	35,467,049.2	19.56
UNP	89,387,438.2	49.29
Total	$181,367,577.5	100.00 %
Prior Year	$139,592,316.0	
Change	29.9%	

Details of the calculation are presented in Appendix G. Weekly market values were calculated for each railroad using shares outstanding data from railroad 10-Q and 10-K reports multiplied by stock prices at the close of each week in 2017.[20] Calculations for 2017 included 52 weeks. Week 1 began on Tuesday January 3, 2017, and is the first week after 2016's week 52 used in last year's calculation. The week beginning Tuesday December 26, 2017, qualifies as the final week for 2017. Thus, 2017 is a 52-week year for the purpose of calculating the market value of common equity (and for the regression data set used by this year's Capital Asset Pricing Model).

The 52-week average market capitalization of the composite railroad (the four railroads that comprise the composite sample), listed on page 5 of Appendix G, is $181.4 billion. This is a 29.9 percent increase from last year's average. Railroad market capitalization started the year slightly higher than it was at the end of 2016, and it continued to increase throughout 2017.

[20] The 10-Q and 10-K reports are filed with the US. Securities and Exchange Commission (SEC), and are available from railroad web sites or the SEC web site.



As shown in Chart 1, the stock market in general, as represented by the Standard & Poor's 500, was an average of 17% higher throughout 2017 than it was in 2016.

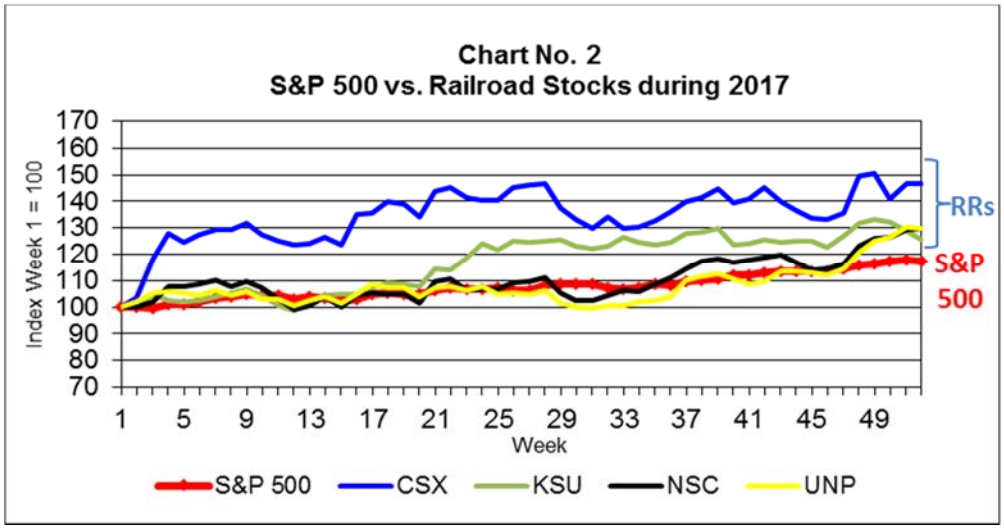


Chart 2 compares the stock performance of the railroads against the Standard & Poor's 500 Index in 2017. Some railroads trended very closely to the S&P 500, and some had a better 2017 than the Standard & Poor's 500 index.

B. The Capital Asset Pricing Model (CAPM)

The cost of equity is a measure of investor expectations, including the opportunity cost of investing in a share of a firm's stock; i.e., the expected rate of return that investors require on the market value (purchase price) of the stock in light of alternative investment opportunities of comparable risk. Because investor expectations are not directly observable, analysts have developed methods of inferring the cost of equity from available financial data. There are several methods available to estimate the cost of equity. Two of these methods, the Capital Asset Pricing Model (CAPM) and a Multi-Stage Discounted Cash Flow Model (MSDCF) are used in this statement to compute an estimate for the cost of equity — in accordance with STB Ex Parte No. 558 (Sub No. 20). The CAPM is discussed herein, and the MSDCF is discussed in the next section.

The theory underlying the CAPM is that an investor seeks a risk-free return plus a premium that is dependent upon risk. Since all of the principal elements of the CAPM (the risk-free rate, the market risk premium, and the beta) are estimated using historical data and relationships computed from that data, the CAPM is essentially a backward look at how equity markets have regarded a particular firm or group of firms. In formulaic terms, the cost of equity as estimated by the CAPM may be expressed as:

$$K = RF + \text{beta}\ (MRP)$$

Where K = the firm's cost of equity,
RF = the risk-free rate,
MRP = the market's risk premium, and
beta = the coefficient of systematic, non-diversifiable risk of the stock.

Therefore, each firm's cost of equity above the risk-free rate depends on the market risk premium adjusted for the non-diversifiable risk of its common stock, with the adjustment factor represented in the model as beta. The risk-free rate (RF) is typically represented by the rate of a U.S. Government (Treasury) instrument. The market risk premium (MRP) is the expected future difference between returns for the overall stock market and risk-free returns. That expected difference is typically estimated using historical differences. Beta is the coefficient of systematic, non-diversifiable risk of the stock, which depends on its volatility and its correlation with the overall stock market. The beta for the overall stock market is 1.0. Firms with higher risk will have a beta above 1.0, while firms with lower risk will have a beta below 1.0. As with the market risk premium, betas are also typically estimated using historical relationships. The methodology used for the CAPM calculation — including details for using certain inputs — follows the methodology prescribed and used by the STB in the 2016 Cost of Capital decision.[21]

1. Risk-Free Rate (RF)

In all decisions regarding the CAPM, the Board has specified a risk-free rate based on an average yield to maturity for a 20-year U.S. Treasury Bond. The average yield-to-maturities for U.S. Treasury Bonds are available from the Federal Reserve web site, and I have again utilized this resource to retrieve data for 2017.[22] A copy of the "download" from the Federal Reserve web site is included in my work papers. Table 11 lists a 10-year history of this bond. As the table shows, the average rate for 20-Year U.S. Treasury Bonds

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[21] *Railroad Cost of Capital – 2016,* EP 558 (Sub-No. 20) (STB served Aug. 7, 2017).

[22] Federal Reserve's new web site is https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H15. For Data set, choose Selected Interest Rates. For Instrument, select U.S. government securities/Treasury constant maturities/Nominal. For Maturity, select Y 20 20-year. For Frequency, select Annual.

in 2017 is an increase from the previous year. Appendix H lists all of the annual 20-Year U.S. Treasury Bond rates available since 1980. The 20-year rate for 2016 was the lowest rate during that period.[23]

Table No. 11
20-Year U.S. Treasury Bonds 2008 - 2017

Year	Average Annual Rate
2008	4.36 %
2009	4.11
2010	4.03
2011	3.62
2012	2.54
2013	3.12
2014	3.07
2015	2.55
2016	2.22
2017	2.65

Source: Federal Reserve

Using the average yield to maturity in 2017 for a 20-year U.S. Treasury Bond, as directed in STB Ex Parte No. 558 (Sub No. 20), the CAPM's risk-free rate is 2.65 percent.

2. Market Risk Premium (MRP)

In previous decisions, the STB has required that the market risk premium (a.k.a. equity risk premium) calculation begin with year 1926, which is a standard approach. The Standard & Poor's 500 Index is to be used as the representative of the market — also a

[23] The Federal Reserve Board has two series for 20-Year Treasury Bonds. The first data set is from 1962 through 1986. The second set has data from 1993 to current. Rates from the two data sets are listed in my work papers. There are no data for 1987 through 1992.

standard approach. The STB's decision also stated that the "data are also available from a variety of commercial vendors, including Ibbotson."

In the 2006 through 2012 Cost of Capital determinations, the well-regarded and widely-accepted Ibbotson Equity Risk Premium was used. The premium was listed in the *Ibbotson SBBI Valuation Yearbook* published by Morningstar.[24] This premium is the long-horizon equity risk premium, using the S&P 500 and data beginning with 1926. Although Morningstar discontinued its *Ibbotson SBBI Valuation Yearbook,* it published the same long-horizon equity risk premium in the *Ibbotson SBBI Classic Yearbook.* This source was used for 2013 and 2014 equity risk premiums.

In 2015 and 2016, yet another source of data was needed, as Morningstar decided to discontinue its *Ibbotson SBBI Classic Yearbook.* The valuation and financial advisory firm Duff & Phelps maintains many of the same series formerly published by Ibbotson, and their *Valuation Handbook-U.S. Guide to Cost of Capital* included a page that listed the long-horizon expected equity risk premium.[25] The Duff & Phelps *Valuation Handbook-U.S. Guide to Cost of Capital* was the source used to obtain the 2015 and 2016 equity risk premiums. In 2018, however, Duff & Phelps decided to discontinue the publication of that book in hardcover form, which would have been used as the source for the 2017 equity risk premium. Although the physical book will no longer be published, Duff & Phelps has

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[24] Ibbotson Associates is a wholly-owned subsidiary of Morningstar, Inc. "SBBI" stands for "Stocks, Bonds, Bills, and Inflation.

[25] The Duff & Phelps *2017 Valuation Handbook – Guide to Cost of Capital* was published by John Wiley & Sons. The handbook listed the premium on page 36 of chapter 3 (and page 14 of chapter 5). The last sentence of Footnote 5-16 (on page 14 of Chapter 5) in the Handbook says "The long-horizon historical equity risk premium was previously published on the "back page" of the Morningstar/Ibbotson SBBI Valuation Yearbook (discontinued)."

developed an online tool called the Cost of Capital Navigator, and the data that would have been published in the *Valuation Handbook-U.S. Guide to Cost of Capital* will now only be available in the online Cost of Capital Navigator.[26] The Cost of Capital Navigator contains the "Long-horizon expected equity risk premium (historical)", which is calculated using "large company stock total returns minus long-term government bond income returns", beginning 1926. This premium is calculated using the same method as that used by Ibbotson to calculate the market risk premiums used in previous cost of capital determinations. For 2017, this premium is 7.07 percent – as found in the online Duff & Phelps Cost of Capital Navigator. This is a small increase from the 6.94 percent figure used by the Board for 2016. (Page 1 of Appendix H shows Equity Risk Premiums since 1980, and page 2 shows the source document for the 2017 equity risk premium.) Thus, I used 7.07 percent as the rate for the CAPM's market risk premium.

3. Beta

The STB Ex Parte No. 664 decision requires parties to calculate the CAPM's beta using a portfolio of weekly, merger-adjusted stock returns for the prior five years in the following equation:

[26] The References section of the online Cost of Capital Navigator contains the same data, in the same chapter format, that would have been published in the Valuation Handbook – U.S. Guide to Cost of Capital. It is essentially an online book, instead of a hardcover book.

R – SRRF = Alpha + beta (RM – SRRF) + E

Where:

R	=	merger-adjusted stock returns for the portfolio of railroads;[27]
SRRF	=	short-run risk-free rate represented by 3-mo. U.S. Treasury Bills;
alpha	=	constant term;
beta	=	coefficient of systematic, non-diversifiable risk;
RM	=	return for the market, represented by the S&P 500; and
E	=	random error term.

In its Railroad Cost of Capital – 2006 decision, the STB clarified its beta calculation methodology. The STB noted that "[t]he proper way to arrive at the weekly portfolio change is to calculate the weekly stock percentage change for each firm, weighted by that firm's share of the industry as a whole." The STB also determined that the Standard & Poor's 500 Price Index, which is publicly available, should be used as a proxy for the Standard & Poor's 500 Total Return Index, unless the Total Return Index is made available to the public.

Using the STB instructions, the value for beta can be solved for using a linear regression. The railroad portfolio return less the short-term risk free rate is the dependent variable, while the market return less the risk free rate is the independent variable. The regression's random error term is unknown, the intercept is the Alpha, and the coefficient for the explanatory variable is the beta.

The raw regression data set used in the AAR calculation is derived from publicly available data from web sites on the internet (for further information, see the work papers). As instructed, I have used weekly stock price data for the prior five years. The raw data

[27] Railroads must meet the screening criteria set forth in *Railroad Cost of Capital – 1984* and modified recently by the Board in Revisions to the *Cost-of-Capital Composite Railroad Criteria*.

consists of weekly observations from the last week of 2012 (Week 0) through the last week of 2017 (Week 261). Each week in the data set is identified by the first trading day of the week (typically Monday), but the prices are actually for the last day of trading in the week (typically Friday).[28] Week 1 in the regression data set is the week beginning Monday, December 31, 2012.[29] This week meets the Board's criterion to qualify as week 1 because it contains 3 or more trading days in 2013. The last week of 2017, Week 261, began on Tuesday, December 26. This week had no days of trading in 2018 (Friday, December 29, is the last trading day of the week, and the final two days in December were Saturday and Sunday) – meaning that it could not meet the Board's "3 or more trading days" criterion to qualify as week 1 for 2018. Week 0 began in 2012 on Monday December 24, and it is *not* directly used in our regression for beta. The purpose of having a Week 0 is to be able to calculate the return for Week 1 and to have a weight for the beginning (instead of the end) of Week 1. This enables a Week 1 return to be included in the regression data set as clarified by the Board on page 7 of its 2008 cost of capital decision.[30]

Three categories of data are necessary for the raw regression data set. First, weekly stock prices for CSX, KSU, NSC, and UNP are downloaded from a web site.[31] The price data were downloaded on January 10, 2018, and then again on January 16, 2018, because one railroad paid a dividend late in the year and it did not show up initially in the first

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[28] In some cases, stock did not trade on Monday. For example, trading during Week 245 began Tuesday, September 5, 2017, because Monday, September 4, 2017 was the Labor Day holiday. There are also cases where the last trading day of the week was not Friday because of a holiday.

[29] Following the Board's clarification in Ex Parte No. 558 (Sub-No. 12), the week beginning December 31, 2012, is the first week in the relevant year that contains 3 or more trading days.

[30] EP 558 (Sub-No. 12), (STB served Sept. 25, 2009).

[31] CSX Corporation has a stock symbol of CSX, Kansas City Southern is KSU, Norfolk Southern Corporation is NSC, and Union Pacific Corporation is UNP.

download. These downloads are included in my work papers.[32] Stock prices adjusted for dividends and splits are used as the regression's dependent variable, while prices that are only adjusted for splits are used for weighting.[33] (I have adjusted shares outstanding for splits.) The price index values for Standard & Poor's 500 Price Index were also downloaded from the same web site.

The second category of data is shares outstanding. Stock shares outstanding, and an effective date, were gathered from each railroad's 10-Q and 10-K reports. The shares outstanding data were adjusted for stock splits, if necessary. For each railroad, a shares outstanding value is assigned to each week based upon the latest available 10-Q or 10-K submissions by that railroad to the Securities and Exchange Commission.[34]

The final category of raw data is the rate for 3-Month U.S. Treasury Bills. These securities are also known as 13-Week Treasury Bills or 90-Day Treasury Bills. The Treasury Bill rates are acquired from the Federal Reserve web site, and the "download" is included in my work papers.

SAS statistical software was used to prepare the regression data set from the raw data.[35] The weekly stock percentage change for each railroad was calculated and weighted

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[32] The Yahoo! Finance web site was used. Go to http://finance.yahoo.com/q/hp?s=CSX to start with the first railroad (CSX). Select weekly data and a date range.

[33] The dividend-adjusted values may differ for a given week if the data are downloaded at different times during the year, especially if dividends have been paid during the interim time. The difference typically affects the fourth digit after the decimal of the beta calculations.

[34] Shares outstanding are updated using the first Friday on (provided the stock traded that day), or after, the effective date listed in the 10-Q and 10-K reports – since Friday's (or the end of the week) stock price is used.

[35] SAS Institute Inc., Cary, NC.

by that railroad's share of the industry as a whole to create a composite railroad return.[36] Weekly returns are also calculated for the Standard & Poor's 500 Price Index (the proxy for the market as a whole). Each week's three-month Treasury Bill rate, which is the measure employed for the short-run risk-free rate, is restated from an annual to a weekly rate to make it comparable to the weekly returns. The method used to convert to a weekly rate accounts for compounding. The weekly Treasury Bill rates are then deducted from the composite railroad portfolio returns and market returns as was done in the previous cost of capital submissions. The resulting regression data set has 261 observations (weeks 1 through 261), since week 0 of the raw data set was used only to calculate a weighted return for week 1.

The SAS General Linear Model procedure was used to calculate the regression, with composite railroad returns less the short-run risk-free rate as the dependent variable and the market returns less the short-run risk-free rate as the independent variable. As a check against our beta calculations, a spreadsheet has also been utilized to calculate the beta using a linear regression, and the results matched the SAS calculation. As specified by the STB decisions, the regression includes an intercept. Appendix I contains a summary of the regression using SAS. The beta is the estimate of the parameter shown on the bottom of the Appendix page. The entire SAS printout and a spreadsheet version are included in my work papers. The regression resulted in a beta estimate of 1.143839687, which rounds to 1.1438.

[36] Since the weight needs to be the weight at the beginning of the week instead of the end of the week, data from the end of the previous period are used to represent the beginning of the current period.

The 2017 beta is lower than, but very close to, the beta for 2016 (1.1467). This is the ninth consecutive year that the railroad beta has been above 1.0.

Additional checks were performed on our beta calculation. A new spreadsheet data set was created using data downloaded in early April. Changes in download date and data captured can cause different adjusted values in the regression data set, often affecting the beta calculation at the third to eighth digit after the decimal. The beta calculated in this second spreadsheet was 1.14565925, which rounds to 1.1457. This is extremely close to our calculation using data retrieved in January.

We have evaluated our beta calculation by (1) comparing it to previous years and expectations, and (2) comparing the results of two data sets created at different times. The value of 1.1438 for beta, as calculated in our initial regression, is used as an input to the Capital Asset Pricing Model.

4. Cost of Common Equity Using the CAPM

A review of the Capital Asset Pricing Model (CAPM) is as follows:

K = RF + beta (MRP)

Where K = the cost of equity for the portfolio of railroads,
RF = the risk-free rate,
MRP = the market's risk premium, and
beta = coefficient of systematic, non-diversifiable risk.

Our CAPM used the methodology used by the STB in the previous cost of capital determination, Ex Parte No. 558 (Sub-No. 20). Table 12 is a summary of our CAPM cost of common equity calculation, which resulted in an average 2017 cost of equity estimate for the composite railroad of 10.74 percent. This is an increase from 2016's 10.18 percent.

Table No. 12
Cost of of Common Equity
Using STB's Capital Asset Pricing Model

Inputs to Model		
Risk-Free Rate	2.65 %	From Table No. 11
Market Risk Premium	7.07 %	From D&P, Ch 5, p.14
Beta	1.1438	From Appendix I
Calculation		
Risk-Free Rate	2.65 %	Given
Plus: Beta Adjusted Risk Premium	8.09 %	Beta x Mkt. Risk Prem.
CAPM Cost of Equity	10.74 %	Risk-Free Rate + Prem.

C. The Multi-Stage Discounted Cash Flow Model

As stated earlier, there are several methods available to estimate the cost of equity. The Multi-Stage Discounted Cash Flow Model (MSDCF) is another model available. Using this model, the cost of equity is the discount rate that equates a firm's market value to the present value of the expected stream of free cash flow that is potentially available for distribution to equity investors. The multiple stage portion of the model accounts for the assumption that the firm will not experience a constant growth rate throughout its life. These features make the MSDCF somewhat more forward looking in that it relies on the expectations of the equities markets as to the firm's future performance although its accounting treatment of cash flows remains grounded in historic relationships. Thus, its theoretical basis contrasts dramatically with the historic view of the CAPM, and brings investor perceptions of the firm's future into the process of estimating its cost of equity.

The STB, in Ex Parte No. 664 (Sub No. 1), adopted the Morningstar/Ibbotson MSDCF model to use for estimating the cost of common equity capital.[37] This model assumes that investor cash flows do not all have to be in the form of dividends. Instead, investors benefit from regular dividends, special dividends, stock buybacks, or stock price appreciation. Major inputs to the model include cash flows, expected growth rates, and market values. An equation for this model can be found in Appendix J. A firm's present value as determined by the market is therefore equal to the sum of the present value of three sets of cash flows. This is the same formula that appeared in the Appendix to the Board's decision in Ex Parte No. 664 (Sub-No.1) served August 11, 2008, and it is the same formula found in the AAR's submissions for the 2008 through 2016 cost of capital.

1. Cash Flows

The Morningstar/Ibbotson MSDCF model uses an initial cash flow and a terminal cash flow as inputs. The initial cash flow is defined as income before extraordinary items minus capital expenditures plus depreciation plus deferred taxes. Income before extraordinary items (IBEI) is derived by deducting extraordinary items from net income. Thus, the model's formula for cash flows is as follows:

[37] The Morningstar/Ibbotson MSDCF model adopted by the Board in Ex Parte No. 664 (Sub-No.1) is a modified version that includes only the railroads that pass the screening criteria set forth in Railroad Cost of Capital – 1984, 1 I.C.C. 2d 989 (1985), for inclusion in the sample of railroads used for the annual cost of capital determination. See Ex Parte No. 664 (Sub-No.1), *Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital,* served January 28, 2009.

$$CF = (NI - EI) - CAPEX + DEP + DT$$

Where CF = cash flow,
NI = net income,
EI = extraordinary items,
CAPEX = capital expenditures,
DEP = depreciation, and
DT = deferred taxes.

The Morningstar/Ibbotson MSDCF model utilizes five-year moving averages for each railroad. The years used in this case are 2013 through 2017. Data are copied from the Consolidated Cash Flow and Income Statement of each railroad's annual 10-K report, and any changes to prior years have been incorporated. The 10-K reports, which are filed with the Securities and Exchange Commission, are usually available each year around February. In addition to the data points listed above, sales (a.k.a. revenue) is used as part of a smoothing (or averaging) process. Table 13 illustrates the Morningstar/Ibbotson process to calculate an average cash flow. Revenue, Net Income, and Extraordinary Items are sourced from the Income Statement. Depreciation, Deferred Taxes, and Capital Expenditures are sourced from the Statement of Cash Flows.

Table No. 13
Example Cash Flow Calculations for UNP in 2017
($ in millions)

	2013	2014	2015	2016	2017	Total
Net Income	$4,388	$5,180	$4,772	$4,233	$10,712	$29,285
Less Extraord. Items	0	0	0	0	0	0
Inc. Bef. Extraord. Items (+)	$4,388	$5,180	$4,772	$4,233	$10,712	$29,285
Capital Expenditures (-)	$3,496	$4,346	$4,650	$3,505	$3,238	$19,235
Depreciation (+)	1,777	1,904	2,012	2,038	2,105	9,836
Deferred Taxes (+)	723	895	765	831	-5,067	-1,853
Cash Flow	$3,392	$3,633	$2,899	$3,597	$4,512	$18,033
Revenue (a.k.a. "Sales")	$21,963	$23,988	$21,813	$19,941	$21,240	$108,945
Ratio of Cash Flow to Sales (Smoothed Ibbotson-style) = ($18,033 / $108,945) =						0.16552
Initial Cash Flow in 2017 (Smoothed Ibbotson-style) = (0.16552 x $21,240) =						**$3,515.73**
Ratio of IBEI to Sales (Smoothed Ibbotson-style) = ($29,285 / $108,945) =						0.26881
Terminal Cash Flow input (Smoothed Ibbotson-style) = (0.26881 x $21,240) =						**$5,709.43**

After the financial data are collected, they are combined (Total column in the example) into a five-year cash flow for the purpose of averaging or smoothing. The average cash flow for 2017, which is the initial cash flow in the model, is calculated by multiplying revenue for 2017 times the five-year average ratio of cash flow to revenue. In our example here, the model's input for the initial cash flow is $3,515.73 million. The ratio of cash flow to sales is calculated by dividing the five year total cash flow by the five year total revenue.

The model's terminal cash flow value is based on the assumptions that in the third stage of the model, depreciation equals capital expenditures, and deferred taxes are zero. Therefore, the depreciation and capital expenditures from the initial cash flow formula cancel each other, and deferred taxes are eliminated because they are zero. The remaining part of the equation for the model's terminal cash flow is income before extraordinary items (IBEI), which we calculate by subtracting extraordinary items from net income. In

our Table 13 example, the model's input for the terminal cash flow is $5,709.43 million. The model's terminal cash flow input is calculated by multiplying revenue for 2017 times the five-year average ratio of income before extraordinary items to revenue. The ratio of income before extraordinary items to sales is calculated by dividing the five year income before extraordinary items by the five year total revenue.

All cash flow calculations herein have been calculated using the same procedure used by the AAR for the previous cost of capital determination. Appendix K contains the cash flow calculations for all four railroads. The pages from the 2017 10-K reports that were used as data sources for cash flows are included in my work papers. Data for prior years (2013-2016) used in this year's calculation are unchanged from last year's submission – unless restated/revised data were found in the 2017 10-K statements.

2. Growth Rates

The first stage of the Morningstar/Ibbotson MSDCF model applies to a period that is one to five years in the future. The current year (2017) is considered to be year 0. In each year of the first stage, a firm's annual earnings growth rate is assumed to be the median value of the firm's three- to five-year growth estimates that are made by railroad industry analysts after the release of the year-end financial statements. However, in Ex Parte No. 558 (Sub No. 12), the STB clarified their interpretation of the Morningstar/Ibbotson MSDCF model by specifying use of data in effect at the end of the current year as the date for growth rates, stock prices, and stock shares outstanding.[38] (Clearly, the Board's interpretation does not anticipate the use of growth estimates based on the release of audited year-end financial statements.) In Ex Parte No. 558 (Sub No. 16), the

[38] *Railroad Cost of Capital – 2008*, EP 558 (Sub-No. 12) (STB served Sept. 25, 2009).

STB made another clarification in their interpretation of the Morningstar/Ibbotson MSDCF model by specifying the *last full week of the year* as the point from which stock prices should be used. Therefore, we have utilized growth rate projections that were in effect at the end of 2017, and stock prices as of December 29, 2017 – the prices at the end of the last full week for 2017.[39] Each growth rate projection was reviewed by the brokerage firm's analyst during 2017, and the stock prices (like the data used in the CAPM) were retrieved from Yahoo! Finance.

For many years, analyst growth rate estimates were collected, and distributed, by the Institutional Brokers Estimate System (a.k.a. IBES or I/B/E/S). In recent years, the IBES growth rates have been distributed by Thomson Financial through its Thomson ONE Investment Management service. Although the term "IBES" is rarely used by Thomson, many users of the data still refer to these growth rates as "IBES" growth rates. Thomson Financial also distributes medians of the IBES growth rate estimates on a historical basis through its Thomson ONE Banker service. The median estimates provided through the Thomson ONE Banker service do not always reflect the full set of growth rate estimates. Therefore, I have utilized all estimates available from the Thomson ONE Investment Management service, and determined medians based on that data. These growth rates are described in the Thomson Financial Glossary as the expected annual increase in operating earnings over a company's next full business cycle. A worktable and the source data are included in Appendix L. Table 14 below lists the median growth rate estimates.

[39] Friday, December 29, 2017 was the last trading day for the week.

Table No. 14
2017 Thomson Median Growth Rate Estimates

Company	Stock Symbol	Growth Rate
CSX Corporation	CSX	15.66 %
Kansas City Southern	KSU	13.16
Norfolk Southern Corporation	NSC	12.00
Union Pacific Corporation	UNP	13.36
Simple Average		13.55

Thus, the median growth rate estimates have been retrieved using the same procedure and source used by the AAR last year. Each individual railroad's median growth rate is used in the first stage of the Morningstar/Ibbotson MSDCF model.

The second stage of the Morningstar/Ibbotson MSDCF model applies to a period six to ten years in the future. This is *not a transition stage* where the growth rate should be smoothed between the first and third stages. Morningstar's model assumes "that over a middle horizon, growth of any particular company will lie more in line with the industry as a whole".[40] In other words, other companies "catch" their industry growth leaders, or the leaders fall back to the rate of the slower growth railroads. Therefore, in this stage, the cash flows at the end of year five are assumed to grow at the simple (not weighted) average of the individual firm medians used in the first stage. Any attempt to change the second stage to a transition stage is corrupting the intent of the model.

In Table 14, the average of the median growth rates is 13.55 percent, which is an increase from 2016 (7.47 percent). Although it is higher than the median growth rates used in 2015 and 2016, it is in line with the rates used for 2008 through 2014. For all railroads

[40] *Ibbotson SBBI 2013 Valuation Yearbook*, page 51.

in the Morningstar/Ibbotson MSDCF model, a second stage growth rate of 13.55 percent is used.[41]

The third stage of the MSDCF model begins 11 years in the future and continues in perpetuity. Starting in year 11, the firm's growth rate is assumed to be the long-run nominal growth rate of the aggregate U.S. economy, which can be thought of as a combination of expected inflation plus the real growth rate in Gross Domestic Product (GDP). Until the 2013 Cost of Capital determination, the long-run nominal growth rate was supplied by Morningstar/Ibbotson in its *Ibbotson SBBI Valuation Yearbook*. In September 2013, customers subscribing to the *Ibbotson SBBI Valuation Yearbook* were notified that the publication was being discontinued. The *Ibbotson® SBBI® Classic Yearbook* (Classic Yearbook) was expanded and contained some of the data needed for the Stage 3 calculation, but it was discontinued after two years. Therefore, beginning with the 2013 determination, and then more so beginning with the 2015 determination, I have continued the original Ibbotson methodology by using data available from the Federal Reserve and Bureau of Economic Analysis.

The real GDP growth rate is simply a compound growth rate calculated from Bureau of Economic Analysis data beginning in 1929, and it is illustrated on pages 2 through 4 of Appendix M, including replication of Morningstar/Ibbotson calculations. This procedure has been used, and accepted, since the 2013 Cost of Capital determination.

The second piece of our Stage 3 calculation, expected inflation, is calculated by subtracting Inflation Indexed 20-Year Treasury Bond rates from Long-Term Government

[41] The model used an average rounded to 2 digits after the decimal.

Yields (which are not inflation indexed). Using data from the Ibbotson and the Federal Reserve, I have replicated the 2008 through 2012 Ibbotson calculations for expected long-term inflation (page 5 of Appendix M). Beginning with the 2013 Cost of Capital determination, Ibbotson did not release a rate for Inflation-Indexed 20-Year Bonds. However, I have been able to replicate their source (Federal Reserve data as shown on page 5 of Appendix M), and Long-Term Government yields were available from Morningstar's Ibbotson SBBI Classic yearbook. This methodology to determine expected inflation was accepted in the 2013 and 2014 Cost of Capital determinations.

Beginning with the 2015 Cost of Capital determination, the SBBI long-term government yields are no longer available since Morningstar no longer publishes its *Ibbotson SBBI Classic Yearbook*. In lieu of the SBBI number used for part of the calculation (that is no longer available), I have used 20-Year U.S. Treasury Bond yields at the end of the year (see page 5 of Appendix M), which are very close to the numbers used by Ibbotson.[42] This methodology was accepted in the 2015 and 2016 cost of capital determinations, and has been used again for 2017.

Appendix M contains my calculations for the Stage 3 growth rate for 2013 through 2017. Because expected real growth in output is very stable, changes in the Stage 3 growth rate are usually determined by changes in inflation expectations. For comparison purposes, page 6 of Appendix M shows Stage 3 rates since 2008, including the two components: the expected real growth in output (as measured by Gross Domestic Product) and expected inflation. The Stage 3 rate for 2017 is 5.18 percent (as shown on page 1 of Appendix M),

[42] *See* Appendix M, page 5, columns (b) and (c) for a comparison of Long-Term Government Yields from the SBBI compared to 20-Year Treasury Bonds at the end of the year.

which is nearly identical to the number used for 2016. The numbers used for 2016 and 2017 were higher than 2014 and 2015 because of higher expected inflation. The rate for 2017 is lower than the rates for 2009 through 2013 because those years had higher inflation expectations. The long-term expected inflation rate of 1.97 for 2017 is the same as it was for 2016. I will continue to follow the procedure used in the past, which I believe is logical. Thus, I have calculated a Stage 3 growth rate of 5.18 percent based on expected real growth of the economy of 3.21 percent plus expected inflation of 1.97 percent. This is the same method I used for the previous year.

3. Market Values

The final inputs to the Morningstar/Ibbotson MSDCF model are the stock market values for the common equity of each railroad. The market values serve two purposes. First, a firm's market value is a necessary part of the MSDCF model. As stated earlier, each railroad's cost of equity in the MSDCF model is determined by solving for the discount rate that equates a firm's *market value* to the present value of the expected stream of free cash flow that is potentially available for distribution to equity investors.

Market values are also used to determine weights for combining the model's cost of equity for each individual railroad into the composite railroad mandated by the Board. Thus, Table 15 below calculates the market value for each railroad, and it uses the market values to calculate weights. Prices and shares outstanding are for common stock. Although weights are shown at three digits after the decimal, they have been left at full float for calculation purposes – and so they will total to exactly 100 percent.

Table No. 15
Equity Market Value on December 29, 2017

Company	Stock Price	Shares Outstanding	Market Value ($mil)	Weight
CSX	$55.01	893,723,083	49,163.7	23.741 %
KSU	$105.22	103,543,121	10,894.8	5.261
NSC	$144.90	286,148,766	41,463.0	20.023
UNP	$134.10	787,168,815	105,559.3	50.975
Total		2,070,583,785	$207,080.8	100.000 %

As directed by the Board, I have used stock prices (from Yahoo Finance) for December 29, 2017, the last trading day of the week that qualifies as the last week of 2017 for cost of capital purposes. For 2017, the last trading day of the week is Friday, December 29. I have also used the shares outstanding for that day from the 2017 Q3 10-Q reports (the latest information available prior to December 29, 2017) filed with the Securities and Exchange Commission. Market value is simply each firm's stock price multiplied by its shares outstanding, and weights are based on the market values. Appendix N contains the stock price pages as retrieved from Yahoo Finance, and it also contains the 10-Q pages used for shares outstanding.

4. Cost of Common Equity Using the MSDCF Model

The equation found in Appendix J provides the mathematical formula that is used to generate the three-stage DCF cost of equity estimates for each railroad. The left side of this equation is the market value of the firm in year 0. The right side of the equation is the discounted value of the cash flows from the three stages of the firm's expected future growth. Essentially, this equation is solved for each firm by simply testing discount rates (cost of equity) in an effort to find one that causes the sum of the present values of the cash flows for the three stages to be equal to the market value at year 0. An iterative process can

be used to narrow down the possible solutions to the ultimate answer, or Microsoft Excel's Solver function can be used to automate the process.[43]

Applying the methods described above, I have calculated a cost of common equity for each of the four railroads specified using a spreadsheet like the one utilized in the 2016 filing. Using an initial cash flow, an input for calculating the terminal cash flow, growth rates for each of the three stages, and a market value effective December 29, 2017, I have solved for the discount rate (cost of equity) that causes the sum of the present values of cash flows for each stage to equal the firm's market value. The spreadsheet used for the calculations is displayed in Appendix O.

The resulting costs of common equity for each railroad, using the Board's MSDCF, are shown in Table 16. In the same table, I have also calculated an MSDCF cost of common equity (using weights from Table 15 and the individual railroad cost of equities) for the composite railroad, which is the current cost of equity for this model.

Table No. 16
Cost of Equity Using STB's Ibbotson MSDCF

Company	Weight	Cost of Equity	Weighted Calculation
CSX	23.741%	13.15 %	3.12
KSU	5.261%	12.06	0.63
NSC	20.023%	13.25	2.65
UNP	50.975%	13.58	6.92
Total	100.000%		
Weighted Current Cost of Equity			**13.33 %**

[43] A commonly used Excel user's manual describes the Solver function as follows: "Solver is an Excel add-in that goes several steps further than goal seeking. It uses the same basic trial-and-error approach (known to scientific types as an iterative approach), but it's dramatically more intelligent than goal seeking." See Matthew McDonald, Excel: *The Missing Manual*, O'Reilly Media, 2005, p. 519.

Thus, the MSDCF produces a cost of common equity of 13.33 percent for 2017 – an increase from the 10.44 percent used by the Board for 2016, which was the lowest cost of common equity calculated using the MSDCF since it began being used by the Board for 2008. Despite the increase, the cost of equity produced by this model is lower than all but two cost of equities estimated since 2008.

D. Conclusion as to the Cost of Common Equity Capital

In the STB's Ex Parte No. 558 (Sub-No. 21) decision served February 8, 2018, the Board specified that comments "should focus … using the methodology followed in *Railroad Cost of Capital – 2016",* which means that a simple average of the estimates produced by the CAPM adopted in STB Ex Parte No. 664 and the Morningstar/Ibbotson Multi-Stage DCF Model specified in STB Ex Parte 664 (Sub No. 1) should be used. Table 17 contains the cost of common equity estimated by each model, and a simple average of the estimates. Observing the estimates for the two cost of equity models, one can notice a difference between them that is larger than that for 2015, when the two models were almost identical. In this case, we believe that the CAPM would have difficulty capturing the impact of the recently-signed Tax Cuts and Jobs Act. It would therefore be wrong to claim the estimate using the MSDCF was too high by wrongly assuming the CAPM was the better model. In all probability, the CAPM is too low because it has no way to account for the lower corporate tax rate. As each model has its strengths and weaknesses, this illustrates the Board's wisdom in using more than one model to estimate the cost of common equity.

Table No. 17
Cost of of Common Equity Capital

Model		
Capital Asset Pricing Model	10.74 %	From Table No. 12
Multi-Stage Discounted Cash Flow	13.33	From Table No. 16
Cost of Common Equity	12.04 %	Average

The cost of common equity for 2017 is 12.04 percent, which is above the 10.31 percent decided for 2016, but lower than all cost of equities from 1980 through 2014.

V. Preferred Equity Capital in 2017

There were no preferred stock shares outstanding for the composite railroad sample from 2002 through 2012. Beginning 2013, one of the railroad companies comprising the railroad composite sample had preferred stock outstanding. This continues in 2017, although the market value of the preferred stock remains very small.

A. Overview of Preferred Stock

Preferred stock is a hybrid security which has some characteristics of debt and some characteristics of equity. The general characteristics of preferred stock are as follows:

1. It is an equity security similar to common stock in that it represents ownership in the corporation.
2. It has dividend preference over common stock in that it has prior claim on the corporation's earnings before dividends are paid to holders of common stock.
3. It is a security which typically has a stated rate of return or fixed dividend. (If the stock has a par value, it will state the annual dividend payments in terms of percentage of par value – for example, a 6 percent preferred. No-par value preferred stock has a dividend stated in a dollar amount, for example, a $6 preferred.)
4. It is a security that pays dividends only if they are declared by the board of directors. (If there are no earnings, the dividends may be paid out of earned surplus. In any event, dividends must be declared by the board.)
5. It has prior claim over assets at dissolution. If the corporation is liquidated, the holders of preferred stock, like bondholders, have a prior claim on assets

over common stock shareholders. Therefore, preferred stock is also referred to as a senior security.

6. Ownership privileges are limited. (Preferred stock usually carries no voting right. In most instances, it does not participate in earnings above a set amount. The preemptive right to buy new securities is limited.)
7. It generally has no maturity date or maturity value. (The exception is sinking fund preferred issues which effectively must be retired at some future date.)

There are numerous types of preferred stock. The chief distinction among different types of preferred stock is the method and amount of dividend payment to the investor. In addition, there are specific privileges related to each type. Major types of preferred stock are listed below.

1. *Cumulative* - Occasionally, a board will decide not to pay dividends. If the stock is cumulative, unpaid dividends accumulate and the total accumulated (in arrears) must be paid to the holder of cumulative preferred stock before any dividends can be paid to the common stockholders. Most preferred stocks are cumulative.
2. *Noncumulative* - When business is such that the corporation's board of directors decides not to pay dividends, holders of noncumulative preferred stock lose their dividends. These dividends cannot be claimed in the future.
3. *Participating* - Owners of participating preferred stock receive – in addition to their fixed dividend – a share in the earnings remaining after all senior securities have been paid. If any additional dividend is declared, it is generally declared along with the common stock dividend. Participating preferred stock may also be cumulative, noncumulative or convertible.
4. *Redeemable* - Preferred stock is usually callable immediately. This means that the issuer can retire the stock at any time, if the company has the necessary cash. In some instances, as with so-called sinking fund preferred, the issuer is required to redeem the stock over a specified period of time. Generally, when redemption occurs, the firm must pay a premium price to the holder of the instrument.
5. *Auction Market* - This stock represents a new variety of variable-rate preferred stock. This security is generally appropriate for corporations with "temporary" idle corporate funds. The dividends, payable every seven weeks in the case of most issues, are determined by bids from current holders and potential buyers. The Auction Market Preferred shares are redeemable at the issuer's option, in whole or in part, on or near the interest payment date.
6. *Convertible* - A preferred stock is convertible if the holder has the privilege of converting the preferred stock into common stock at specified prices. This is an advantage to the holder if the market price of common stock increases. Often the convertible preferred will sell at a premium (above conversion parity) because of the conversion feature, especially as the selling price of common issues increase. Dividends of convertible preferred stock can also be cumulative or noncumulative.

B. The Market Value of Preferred Equity Capital

The market value of preferred equity is based on stock prices and shares outstanding for 2017. Kansas City Southern is the only railroad included in the composite railroad sample that has preferred stock. Table 18 below summarizes the market value calculation. The Weight column, which is not used directly in our calculation, is provided as additional information (which would be more useful if more than one railroad had preferred stock). Calculations are shown in Appendix P.

Table No. 18
Average Market Value
For Preferred Equity in 2017

Railroad Co.	Value ($000)	Weight %
CSX	$0.0	0.00
KSU	6,762.9	100.00
NSC	0.0	0.00
UNP	0.0	0.00
Total	$6,762.9	100.00 %
Prior Year	$6,655.7	

C. The Cost of Preferred Equity Capital

The cost of preferred equity depends, in large part, on its specific features. Three methods for determining the cost of preferred equity capital are listed below.

1. *The Dividend Yield Method* is used when the preferred stock is not convertible and there is no specific requirement to redeem the preferred. It is also used to cost preferred issues retired or redeemed during the year. The current cost in this instance is computed by dividing the stated dividend by the current market price. This method was used for all preferred stock in the 2002 cost of capital proceeding. This was also the method used for Kansas City Southern preferred stock in 1999, which was the

last time Kansas City Southern was part of the composite railroad until 2013.

2. The *Internal Rate of Return Method* is used for preferred stocks which are not convertible but are subject to a mandatory redemption schedule providing a premium over the stated/par value. The current cost is equal to rate of return which equates the current price with the present value of dividends plus the redemption price.
3. The *Common Equity Method* is used when the preferred stock is convertible at the option of the holder, and the market values of the preferred and common stock indicate that conversion is likely to occur or the conversion right is influencing the price of the preferred stock. In this case, the preferred equity has the same cost as common equity.

The preferred stock that is part of the composite railroad belongs to Kansas City Southern. This stock is not convertible, and is non-cumulative. Therefore, I have used the Dividend Yield Method to estimate the cost of preferred equity. This is the same method used for 2013 through 2016. The formula for the Dividend Yield Method is simply the annual dividends divided by the average price for the year. In this year's case, the cost of preferred equity is 3.58 percent, which is very close to the 3.64 percent calculated for 2016. Appendix P provides more detail for this calculation, and the table below summarizes my findings.

Table No. 19
Cost of Preferred Equity Capital

Company	Weight	Cost of Equity	Weighted Calculation
CSX	0.00%	-- %	0.00
KSU	100.00%	3.58	3.58
NSC	0.00%	--	0.00
UNP	0.00%	--	0.00
Total	100.00%		
Weighted Current Cost of Equity			**3.58 %**

VI. The Overall Cost of Capital In 2017

A. Determination of Market Value Weights

With more detail shown in Tables 6, 10, and 18, the average market value of debt, common equity, and preferred equity are $39.8 billion, $181.4 billion, and $6.8 million, respectively. More market value detail are provided in Appendixes D, G, and P. The figure for the market value of debt includes market values of bonds, notes, debentures, equipment trust certificates, and conditional sales agreements (if there had been any). Other debt and capitalized leases are included at their book value, because market values are difficult to determine (in some instances book values correspond to market values) and because these other instruments are a minimal portion of all railroad debt.

Based on the market value calculations, the capital structure for 2017 has weights for debt, common equity, and preferred equity of 17.99 percent, 82.01 percent, and 0.00 percent, respectively. Table 20 contains the weights computation and a comparison to the previous year. Note that the weight for preferred equity again rounds to zero.

Table No. 20
Capital Structure and Weights

		2017		2016	
	Source Table	Market Value (mil)	Capital Structure Weight	Market Value (mil)	Capital Structure Weight
Debt	6	$39,778.0	17.99 %	$36,543.7	20.75 %
Common Equity	10	181,367.6	82.01	139,592.3	79.25
Preferred Equity	18	6.8	0.00	6.7	0.00
Total		$221,152.3	100.00 %	$176,142.6	100.00 %

The market value for debt, common equity, and preferred stock all increased from the prior year. Weights shifted closer to their values for 2015. Debt decreased 2.76

percentage points from 2016, while common equity increased by that amount, and preferred remains at zero.

B. The Overall Cost of Capital

Multiplying the cost of debt, the cost of common equity capital, and the cost of preferred equity capital, by their respective market value proportions, results in a 2017 overall cost of capital of 10.52 percent, as shown in Table 21. Other than 2015 and 2016, which were years of declining manufacturing output and low interest rates, this is the lowest cost of capital since the Great Recession (2009).

Table No. 21
Weighted Current Cost of Capital for 2017

	Source Table	Capital Structure Weight	Current Cost
Debt	11	17.99 %	3.57 %
Common Equity	18	82.01	12.04
Preferred Equity	20	0.00	3.58
Total		100.000 %	
Weighted Current Cost of Capital			**10.52 %**

VII. Qualifications of John T. Gray

My name is John T. Gray. I am Senior Vice President — Policy and Economics for the Association of American Railroads (AAR), with offices located at 425 Third Street SW, Suite 1000, Washington, D.C. 20024. Among other responsibilities, my duties include the collection, analysis, and presentation of economic data related to railroads and their economic environment. One of my principal duties is conducting and supervising

economic, financial, statistical and cost studies dealing with various aspects of the rail industry.

Prior to joining the AAR, I worked for Union Pacific Railroad where my most recent position was as Executive Director, responsible for the commercial relationship with other transportation carriers and ports, and for strategic policy analysis on issues involving regulatory proposals, legislation and potential litigation. I have also held marketing, planning, and operating positions with other railroads including the Southern Pacific, the Burlington Northern and the Alaska Railroad. I began my railroad career at Atchison, Topeka, and Santa Fe in their cost analysis organization. Additionally, I have also worked for ARCO Alaska.

At Southern Pacific, I was responsible for network planning, analysis, and management, as well as the company's cost analysis organization. I provided testimony on behalf of Southern Pacific regarding the economic impact to the company of the proposed combination of the Chicago and North Western Transportation Company with Union Pacific Railroad. Later, I provided extensive testimony on the economic position of Southern Pacific during the STB's review of the merger application for Union Pacific and Southern Pacific.

I hold both a Bachelors and Masters degree in Civil Engineering from Tulane University and did post-graduate work in mathematical modeling of transportation networks and rail cost systems at Northwestern University. I have also served on the faculty at the University of Alaska, where my work included network modeling and research concerning the interrelationship of transportation and economic development.

VERIFICATION

WASHINGTON, D.C.)
) SS.

I, John T. Gray, being duly sworn, state that I have read the foregoing statement, that I know its contents, and that those contents are true as stated.

JOHN T. GRAY

Subscribed and sworn to before me this 20 day of April 2018.

Notary Public

My Commission expires:

ELIZABETH J. EAGNEY
NOTARY PUBLIC DISTRICT OF COLUMBIA
My Commission Expires October 14, 2022

ELIZABETH J. EAGNEY NOTARY PUBLIC EXP. 10-14-22 DISTRICT OF COLUMBIA

Appendix A
Bonds, Notes and Debentures

Summaries

CSX Corporation	**A-1**
Kansas City Southern	**A-4**
Norfolk Southern Corporation	**A-7**
Union Pacific Corporation	**A-10**

Individual Bonds, Notes, and Debentures

CSX Corporation	**A-13**
Kansas City Southern	**A-41**
Norfolk Southern Corporation	**A-53**
Union Pacific Corporation	**A-79**

CSX Corporation
12/31/2017

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
						Traded						
1	Notes	CSX Corp.	1	126408GT4	3.700%	10/30/2020	$500,000	$500,000	104.331	$521,653	2.320%	$12,102
2	Notes	CSX Corp.	2	12641LBD4	9.870%	2/12/2021	$10,000	$10,000	121.417	$12,142	3.430%	$416
3	Notes	CSX Corp.	3	126408GV9	4.250%	6/1/2021	$350,000	$350,000	106.432	$372,513	2.490%	$9,276
4	Notes	CSX Corp.	4	126408AQ6	8.100%	9/15/2022	$69,081	$69,081	122.913	$84,910	3.230%	$2,743
5	Notes	CSX Corp.	5	126408AM5	8.625%	5/15/2022	$81,517	$81,517	124.359	$101,374	3.130%	$3,173
6	Notes	CSX Corp.	6	126408GZ0	3.700%	11/1/2023	$500,000	$500,000	104.932	$524,662	2.840%	$14,900
7	Notes	CSX Corp.	7	126408HB2	3.400%	8/1/2024	$550,000	$550,000	102.772	$565,247	2.960%	$16,731
8	Notes	CSX Corp.	8	126408HD8	3.350%	11/1/2025	$600,000	$600,000	101.747	$610,482	3.110%	$18,986
9	Notes	CSX Corp.	9	126408HE6	2.600%	11/1/2026	$700,000	$700,000	95.399	$667,794	3.180%	$21,236
10	Notes	CSX Corp.	10	126408BP7	7.250%	5/1/2027	$83,312	$83,312	126.918	$105,738	3.870%	$4,092
11	Notes	CSX Corp.	11	126408BM4	7.950%	5/1/2027	$64,266	$64,266	129.037	$82,927	4.280%	$3,549
12	Notes	CSX Corp. (New)	12	126408HH9	3.250%	6/1/2027	$850,000	**$566,667**	100.431	$569,107	3.200%	$18,211
13	Notes	CSX Corp.	13	12641LBU6	6.800%	12/1/2028	$200,000	$200,000	126.476	$252,953	3.890%	$9,840
14	Notes	CSX Corp.	14	126408GH0	6.000%	10/1/2036	$400,000	$400,000	124.737	$498,947	4.120%	$20,557
15	Notes	CSX Corp.	15	126408GK3	6.150%	5/1/2037	$700,000	$700,000	127.137	$889,960	4.130%	$36,755
16	Notes	CSX Corp.	16	126408GP2	7.450%	4/1/2038	$79,226	$79,226	135.468	$107,325	4.740%	$5,087
17	Notes	CSX Corp.	17	126408GS6	6.220%	4/30/2040	$660,000	$660,000	128.638	$849,012	4.250%	$36,083
18	Notes	CSX Corp.	18	126408GU1	5.500%	4/15/2041	$550,000	$550,000	119.039	$654,716	4.220%	$27,629
19	Notes	CSX Corp.	19	126408GW7	4.750%	5/30/2042	$600,000	$600,000	109.095	$654,568	4.160%	$27,230
20	Notes	CSX Corp.	20	126408GX5	4.400%	3/1/2043	$300,000	$300,000	104.221	$312,664	4.130%	$12,913
21	Notes	CSX Corp.	21	126408GY3	4.100%	3/15/2044	$800,000	$800,000	100.335	$802,680	4.080%	$32,749
22	Notes	CSX Corp.	22	126408HF3	3.800%	11/1/2046	$800,000	$800,000	95.606	$764,850	4.060%	$31,053
23	Notes	CSX Corp.	23	126408HC0	3.950%	5/1/2050	$600,000	$600,000	95.233	$571,396	4.220%	$24,113
24	Notes	CSX Corp.	24	126408HA4	4.500%	8/1/2054	$450,000	$450,000	102.394	$460,771	4.370%	$20,136
25	Notes	CSX Corp.	25	126408HG1	4.250%	11/1/2066	$700,000	$700,000	96.176	$673,230	4.450%	$29,959
26	Notes	CSXT - Conrail	26	126410LK3	9.750%	6/15/2020	$227,171	$227,171	120.401	$273,517	2.430%	$6,646
27	Notes	CSXT - Conrail	27	126410LL1	7.875%	5/15/2043	$99,989	$99,989	146.254	$146,238	4.750%	$6,946
28	Sec'd Eq Notes	CSXT	28	126410LM9	6.251%	1/15/2023	$213,608	$213,608	113.030	$241,440	3.430%	$8,281
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Total							**$11,738,170**	**$11,454,837**		**$12,372,815**	**3.729%**	**$461,394**

CSX Corporation
12/31/2017

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
					Trading Data Not Available or Did Not Trade							
1	Notes	CSX Corp.			2.890%	10/22/2044	73,304	73,304	100.000	$73,304		
2	Conrail Tax Note	CSXT			2.890%	10/22/2044	151,334	151,334	100.000	$151,334		
3	Other Notes	TORCO Toledo Ore Railroad Co.			6.450%	12/15/2021	29,700	29,700	100.000	$29,700		
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Total							**$254,338**	**$254,338**		**$254,338**		

CSX Corporation
12/31/2017

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
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Total							**$0**					

	Grand Totals		
Total Traded and Trading Data Not Available	**$11,992,508**	**$11,709,175**	**$12,627,153**
Grand Total (for reconciliation to carrier data only)	**$11,992,508**		

From CSX:

Corporate Notes	$11,270,706
Convertible Debt	0
CSXT Notes	478,494
Secured Equipment Notes	213,608
Other Notes	29,700
Total	**$11,992,508**

Kansas City Southern Corporation

12/31/2017

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
						Traded						
1	Sr Note	KCSR	29	485188AN6	4.300%	5/15/2043	$1,329	$1,329	89.233	$1,186	5.050%	$60
2	Sr Note	KCSR	30	485188AM8	3.850%	11/15/2023	$776	$776	100.496	$780	3.770%	$29
3	Sr Note	KCSR	31	485188AP1	4.950%	8/15/2045	$792	$792	102.378	$811	4.800%	$39
4	Sr Note	KCS	32	485170AF1	7.000%	12/15/2025	$221	$221	114.964	$254	4.810%	$12
5	Sr Note	KCS	33	485170AQ7	4.300%	5/15/2043	$448,651	$448,651	98.819	$443,351	4.380%	$19,419
6	Sr Note	KCS	34	485170AR5	3.850%	11/15/2023	$199,224	$199,224	102.814	$204,830	3.350%	$6,862
7	Sr Note	KCS	35	485170AS3	4.950%	8/15/2045	$499,165	$499,165	107.987	$539,033	4.460%	$24,041
8	Sr Note	KCS	36	485170AU8	2.350%	5/15/2020	$257,346	$257,346	99.851	$256,963	2.400%	$6,167
9	Sr Note	KCS	37	485170AV6	3.000%	5/15/2023	$439,123	$439,123	99.553	$437,160	3.080%	$13,465
10	Sr Note	KCS	38	485170BA1	3.125%	6/1/2026	$250,000	$250,000	96.108	$240,270	3.640%	$8,746
11	Sr Note	KCSM	39	485161AQ6	2.350%	5/15/2020	$17,594	$17,594	99.322	$17,475	2.640%	$461
12	Sr Note	KCSM	40	485161AS2	3.000%	5/15/2023	$10,877	$10,877	96.876	$10,537	3.600%	$379
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Total							**$2,125,098**	**$2,125,098**		**$2,152,650**	**3.701%**	**$79,680**

Kansas City Southern Corporation

12/31/2017

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
					Trading Data Not Available or Did Not Trade							
1	RRIF Loan	KCSR			2.960%	2/24/2037	45,387	45,387	100.000	$45,387		
2	FRA RRIF	TexMex			4.290%	7/13/2030	32,394	32,394	100.000	$32,394		
3	EDC Loan	KCSM			5.740%	2/28/2023	25,341	25,341	100.000	$25,341		
4	DVB Loan	KCSM			6.200%	9/29/2023	20,010	20,010	100.000	$20,010		
5	WF Loan	KCSM			9.310%	12/15/2020	38,880	38,880	100.000	$38,880		
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Total							**$162,012**	**$162,012**		**$162,012**		

Kansas City Southern Corporation

12/31/2017

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
					Matures in 2018							
1	IDOT-GWE	KCSR			3.000%	2/19/2018	62					
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Total							**$62**					

Grand Totals			
Total Traded and Trading Data Not Available	**$2,287,110**	**$2,287,110**	**$2,314,662**
Grand Total (for reconciliation to carrier data only)	**$2,287,172**		

From KSU:

KCSR	$48,346
TexMex	32,394
KCS	2,093,730
KCSM	112,703
Total	**$2,287,172**

Norfolk Southern Corporation

12/31/2017

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
						Traded						
1	Debenture	Southern Railway	41	655855FA7	9.750%	6/15/2020	$313,741	$313,741	120.144	$376,942	2.320%	$8,745
2	Debenture	Southern Railway	42	655855FB5	7.875%	5/15/2043	$138,085	$138,085	153.297	$211,680	4.400%	$9,314
3	Notes	Series A NSC	43	655844AA6	9.000%	3/1/2021	$83,372	$83,372	119.797	$99,877	3.150%	$3,146
4	Notes	Senior	44	655844AQ1	7.250%	2/15/2031	$284,028	$284,028	136.706	$388,283	3.770%	$14,638
5	Notes	Senior	45	655844BC1	5.900%	6/15/2019	$500,000	$500,000	107.266	$536,330	2.000%	$10,727
6	Notes	Senior	46	655844BG2	3.250%	12/1/2021	$500,000	$500,000	103.110	$515,550	2.490%	$12,837
7	Notes	Senior	47	655844BJ6	3.000%	4/1/2022	$600,000	$600,000	102.001	$612,004	2.540%	$15,545
8	Notes	Senior	48	655844BL1	2.903%	2/15/2023	$596,450	$596,450	100.835	$601,430	2.740%	$16,479
9	Notes	Senior 144A	49	655844BK3	2.903%	2/15/2023	$3,550	$3,550	100.803	$3,579	2.740%	$98
10	Notes	Senior	50	655844BD9	6.000%	5/23/2111	$121,731	$121,731	123.335	$150,137	4.870%	$7,312
11	Notes	Senior 2105	51	655844AV0	6.000%	3/15/2105	$184,118	$184,118	121.773	$224,206	4.930%	$11,053
12	Notes	Senior	52	655844AX6	5.640%	5/17/2029	$210,316	$210,316	117.046	$246,166	3.830%	$9,428
13	Notes	Senior	53	655844AW8	5.590%	5/17/2025	$251,172	$251,172	114.806	$288,359	3.420%	$9,862
14	Notes	Senior	54	655844BH0	4.837%	10/1/2041	$595,504	$595,504	112.232	$668,347	4.040%	$27,001
15	Notes	Senior	55	655844BM9	3.950%	10/1/2042	$600,000	$600,000	99.603	$597,616	3.980%	$23,785
16	Notes	Senior	56	655844BN7	4.800%	8/15/2043	$291,829	$291,829	111.944	$326,684	4.060%	$13,263
17	Notes	Senior	57	655844BP2	3.850%	1/15/2024	$400,000	$400,000	105.595	$422,382	2.890%	$12,207
18	Notes	Senior	58	655844BQ0	4.450%	6/15/2045	$500,000	$500,000	107.480	$537,398	4.000%	$21,496
19	Notes	Senior	59	655844BR8	4.650%	1/15/2046	$600,000	$600,000	110.710	$664,263	4.020%	$26,703
20	Notes	Senior	60	655844BS6	2.900%	6/15/2026	$600,000	$600,000	98.221	$589,323	3.130%	$18,446
21	Notes	Senior (New)	61	655844BT4	3.150%	6/1/2027	$300,000	**$187,500**	100.354	$188,164	3.110%	$5,852
22	Notes	Senior 144A (New)	62	655844BW7	3.942%	11/1/2047	$749,997	**$125,000**	102.193	$127,741	3.820%	$4,880
23	Notes	Senior 144A (New)	63	655844BU1	4.050%	8/15/2052	$749,994	**$312,498**	100.872	$315,222	4.010%	$12,640
24	Conrail Notes	CR NSC 2027	64	655844AJ7	7.800%	5/15/2027	$319,135	$319,135	134.186	$428,235	3.630%	$15,545
25	Conrail Notes	CR NSC 2037	65	655844AF5	7.050%	5/1/2037	$178,995	$178,995	135.579	$242,679	4.350%	$10,557
26	Conrail Notes	CR NSC 2097	66	655844AK4	7.900%	5/15/2097	$225,222	$225,222	156.111	$351,597	5.050%	$17,756
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Total							**$9,897,239**	**$8,722,245**		**$9,714,193**	**3.493%**	**$339,315**

Norfolk Southern Corporation

12/31/2017

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
					Trading Data Not Available or Did Not Trade							
1	Other Bond	NSC Poca Dev Timber Bond			8.250%	10/1/2019	75,734	75,734	100.000	$75,734		
2	Other Bond	NSC Poca Dev Timber Zero Coupon			0.000%	10/1/2019	9,168	9,168	100.000	$9,168		
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Total							**$84,902**	**$84,902**		**$84,902**		

Norfolk Southern Corporation

12/31/2017

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
						Matures in 2018						
1	Notes	Senior	44	655844AZ1	5.750%	04/01/18	595,925					
2	Notes	Senior 144A	45	655844AY4	5.750%	04/01/18	4,075					
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Total							**$600,000**					

	Grand Totals		
Total Traded and Trading Data Not Available	**$9,982,141**	**$8,807,147**	**$9,799,095**
Grand Total (for reconciliation to carrier data only)	**$10,582,141**		

From NSC:

Income Debentures	$451,826
Medium Term Notes & Conrail Notes	10,045,413
Other Debt (Poca Dev)	84,902
Total	**$10,582,141**

Union Pacific Corporation
12/31/2017

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
						Traded						
1	Debentures	UP Corp.	67	907818CS5	5.375%	6/1/2033	$182,467	$182,467	116.461	$212,503	3.970%	$8,436
2	Debentures	UP Corp.	68	907818CX4	6.150%	5/1/2037	$108,739	$108,739	126.391	$137,437	4.180%	$5,745
3	Debentures	UP Corp.	69	907818CU0	6.250%	5/1/2034	$175,749	$175,749	128.544	$225,915	3.920%	$8,856
4	Debentures	UP Corp.	70	907818CF3	6.625%	2/1/2029	$393,457	$393,457	131.129	$515,936	3.350%	$17,284
5	Debentures	UP Corp.	71	907818BY3	7.125%	2/1/2028	$173,467	$173,467	131.275	$227,719	3.540%	$8,061
6	Notes	UP Corp.	72	907818EA2	1.800%	2/1/2020	$249,000	$249,000	99.764	$248,413	1.900%	$4,720
7	Notes	UP Corp.	73	907818DW5	2.250%	2/15/2019	$299,399	$299,399	100.874	$302,014	1.700%	$5,134
8	Notes	UP Corp.	74	907818EE4	2.250%	6/19/2020	$398,402	$398,402	100.708	$401,222	2.000%	$8,024
9	Notes	UP Corp.	75	907818DN5	2.750%	4/15/2023	$322,522	$322,522	101.026	$325,829	2.550%	$8,309
10	Notes	UP Corp.	76	907818EH7	2.750%	3/1/2026	$647,005	$647,005	98.776	$639,083	2.910%	$18,597
11	Notes	UP Corp.	77	907818DM7	2.950%	1/15/2023	$298,752	$298,752	102.138	$305,140	2.530%	$7,720
12	Notes	UP Corp. (New)	78	907818EP9	3.000%	4/15/2027	$489,860	**$367,395**	100.460	$369,086	2.940%	$10,851
13	Notes	UP Corp.	79	907818DY1	3.250%	1/15/2025	$347,336	$347,336	102.771	$356,959	2.840%	$10,138
14	Notes	UP Corp.	80	907818ED6	3.250%	8/15/2025	$498,782	$498,782	102.738	$512,438	2.870%	$14,707
15	Notes	UP Corp.	81	907818EK0	3.350%	8/15/2046	$295,937	$295,937	92.838	$274,742	3.760%	$10,330
16	Notes	UP Corp.	82	907818EB0	3.375%	2/1/2035	$444,800	$444,800	98.522	$438,225	3.490%	$15,294
17	Notes	UP Corp. (New)	83	907818EQ7	3.600%	9/15/2037	$494,568	**$144,249**	101.820	$146,874	3.470%	$5,097
18	Notes	UP Corp.	84	907818DR6	3.646%	2/15/2024	$376,494	$376,494	105.358	$396,667	2.750%	$10,908
19	Notes	UP Corp.	85	907818DV7	3.750%	3/15/2024	$396,016	$396,016	105.912	$419,426	2.770%	$11,618
20	Notes	UP Corp.	86	907818EM6	3.799%	10/1/2051	$693,192	$693,192	97.508	$675,919	3.940%	$26,631
21	Notes	UP Corp.	87	907818EC8	3.875%	2/1/2055	$443,838	$443,838	96.618	$428,825	4.060%	$17,410
22	Notes	UP Corp.	88	907818DG0	4.000%	2/1/2021	$497,952	$497,952	105.945	$527,553	2.240%	$11,817
23	Notes	UP Corp. (New)	89	907818EN4	4.000%	4/15/2047	$488,440	**$366,330**	103.507	$379,176	3.800%	$14,409
24	Notes	UP Corp.	90	907818EF1	4.050%	11/15/2045	$489,636	$489,636	103.359	$506,082	3.860%	$19,535
25	Notes	UP Corp.	91	907818EJ3	4.050%	3/1/2046	$586,590	$586,590	103.480	$607,002	3.850%	$23,370
26	Notes	UP Corp. (New)	92	907818ER5	4.100%	9/15/2067	$494,280	**$144,165**	102.194	$147,328	4.000%	$5,893
27	Notes	UP Corp.	93	907818DZ8	4.150%	1/15/2045	$341,798	$341,798	104.690	$357,827	3.880%	$13,884
28	Notes	UP Corp.	94	907818DK1	4.163%	7/15/2022	$666,392	$666,392	108.045	$720,006	2.440%	$17,568
29	Notes	UP Corp.	95	907818DP0	4.250%	4/15/2043	$317,954	$317,954	105.687	$336,037	3.900%	$13,105
30	Notes	UP Corp.	96	907818DL9	4.300%	6/15/2042	$297,060	$297,060	106.342	$315,900	3.900%	$12,320
31	Notes	UP Corp.	97	907818EG9	4.375%	11/15/2065	$568,915	$568,915	105.327	$599,221	4.130%	$24,748
32	Notes	UP Corp.	98	907818DJ4	4.750%	9/15/2041	$316,134	$316,134	112.453	$355,502	3.950%	$14,042
33	Notes	UP Corp.	99	907818DU9	4.750%	12/15/2043	$292,929	$292,929	111.703	$327,211	4.030%	$13,187
34	Notes	UP Corp.	100	907818DT2	4.821%	2/1/2044	$221,084	$221,084	114.064	$252,176	3.960%	$9,986
35	Notes	UP Corp.	101	907818DX3	4.850%	6/15/2044	$143,843	$143,843	113.773	$163,655	4.010%	$6,563
36	Notes	UP Corp.	102	907818DF2	5.780%	7/15/2040	$62,860	$62,860	122.445	$76,969	4.240%	$3,263
37	Notes	UP Corp. 144A	103	907818DE5	5.780%	7/15/2040	$10	$10	122.178	$12	4.260%	$1
38	Notes	UP Corp.	104	907818DD7	6.125%	2/15/2020	$162,061	$162,061	109.804	$177,949	2.180%	$3,879
39	Notes	UP Corp.	105	907818DB1	7.875%	1/15/2019	$158,326	$158,326	108.591	$171,928	1.990%	$3,421
40	Notes	UP Corp. Series B	106	90782ECK8	9.300%	1/17/2020	$310	$310	114.066	$354	3.370%	$12
41	Notes	UP Corp. Series C	107	90782EDE1	9.940%	4/1/2020	$4,100	$4,100	117.228	$4,806	3.230%	$155
42	Notes	UP Corp. Series C	108	90782ECU6	10.000%	4/10/2020	$2,500	$2,500	117.285	$2,932	3.320%	$97
43	Notes	UP Corp. Series C	109	90782EDG6	9.900%	4/15/2020	$250	$250	116.701	$292	3.460%	$10
44	Notes	UP Corp. Series C	110	90782EDJ0	9.900%	4/15/2020	$525	$525	116.699	$613	3.460%	$21
45	Mort. Bond	UPRR-MP	111	606198LF4	4.750%	1/1/2020	$29,905	$29,905	100.155	$29,951	4.680%	$1,402
46	Mort. Bond	UPRR-MP	112	606198LG2	4.750%	1/1/2030	$27,381	$27,381	97.330	$26,650	5.040%	$1,343
47	Debentures	UPRR-MP	113	606198LH0	5.000%	1/1/2045	$96,025	$96,025	97.155	$93,293	5.200%	$4,851
Total							**$13,997,042**	**$13,052,033**		**$13,740,797**	**3.295%**	**$452,754**

Union Pacific Corporation

12/31/2017

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
					Trading Data Not Available or Did Not Trade							
1	Debentures	MP C&EI UPRR		167123AP3	5.000%	1/1/2054	1,641	1,641	100.000	$1,641		
2	Debt Security	Illinois DOT SPCSL			3.000%	12/31/2019	3,280	3,280	100.000	$3,280		
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Total							**$4,921**	**$4,921**		**$4,921**		

Union Pacific Corporation

12/31/2017

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
					Matures in 2018							
1	Notes	UP Corp.	96	907818DA3	5.700%	08/15/18	368,967					
2	Debt Security	Illinois DOT UPRR			3.000%	03/14/18	163					
3	Notes	UP Corp. Series C		90782EDX9	9.900%	05/15/18	9,958					
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Total							**$379,088**					

Grand Totals			
Total Traded and Trading Data Not Available	**$14,001,963**	**$13,056,954**	**$13,745,718**
Grand Total (for reconciliation to carrier data only)	**$14,381,051**		

From UNP:

Corporate Debentures, Notes, and Floating Rate Loans	$14,472,657
Removal of Floating Rate Loans & Commercial Paper	-250,000
RR Misc Debt Securities (Albany County, MP, IL DOT….)	572,094
Removal of MP Debt Discount, and SP Purch. Acct. Debt Premium	86,300
Removal of Sale of Receivables	-500,000
Total	**$14,381,051**

CSX Corporation

1

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GT4
Coupon Rate:	3.700%
Maturity Date:	10/30/2020
Amount Outstanding ($ 000)	$500,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	104.770	2.36 %
February	104.333	2.45
March	104.229	2.46
April	104.766	2.27
May	104.883	2.20
June	104.335	2.33
July	104.668	2.20
August	104.769	2.13
September	104.241	2.26
October	104.070	2.29
November	103.597	2.41
December	103.305	2.48
Average	104.331	2.32 %

Source: Bloomberg

CSX Corporation

2

Type:	Notes
Description:	CSX Corp.
CUSIP:	12641LBD4
Coupon Rate:	9.870%
Maturity Date:	2/12/2021
Amount Outstanding ($ 000)	$10,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	123.591	3.53 %
February	123.245	3.50
March	122.544	3.56
April	122.801	3.38
May	122.551	3.32
June	121.805	3.38
July	121.632	3.32
August	121.446	3.22
September	120.445	3.38
October	119.807	3.43
November	118.895	3.55
December	118.246	3.61
Average	121.417	3.43 %

Source: Bloomberg

CSX Corporation

3

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GV9
Coupon Rate:	4.250%
Maturity Date:	6/1/2021
Amount Outstanding ($ 000)	$350,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	106.264	2.71 %
February	106.278	2.67
March	106.481	2.59
April	107.022	2.43
May	107.312	2.32
June	106.685	2.44
July	107.023	2.32
August	106.959	2.30
September	106.309	2.44
October	105.948	2.50
November	105.664	2.54
December	105.243	2.63
Average	106.432	2.49 %

Source: Bloomberg

CSX Corporation

4

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408AQ6
Coupon Rate:	8.100%
Maturity Date:	9/15/2022
Amount Outstanding ($ 000)	$69,081
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	123.115	3.53 %
February	122.679	3.55
March	122.532	3.52
April	123.127	3.35
May	123.583	3.21
June	122.956	3.26
July	124.433	2.92
August	124.292	2.87
September	122.786	3.10
October	122.292	3.13
November	121.797	3.15
December	121.368	3.17
Average	122.913	3.23 %

Source: Bloomberg

CSX Corporation

5

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408AM5
Coupon Rate:	8.625%
Maturity Date:	5/15/2022
Amount Outstanding ($ 000)	$81,517
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	125.047	3.40 %
February	124.506	3.44
March	124.362	3.39
April	124.868	3.23
May	125.239	3.08
June	124.585	3.13
July	125.866	2.81
August	125.624	2.76
September	124.204	2.97
October	123.020	3.14
November	122.853	3.09
December	122.132	3.16
Average	124.359	3.13 %

Source: Bloomberg

CSX Corporation

6

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GZ0
Coupon Rate:	3.700%
Maturity Date:	11/1/2023
Amount Outstanding ($ 000)	$500,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	103.818	3.07 %
February	103.789	3.07
March	104.433	2.95
April	105.137	2.83
May	105.972	2.68
June	105.237	2.79
July	105.962	2.66
August	106.311	2.58
September	105.204	2.76
October	105.023	2.79
November	104.150	2.93
December	104.153	2.92
Average	104.932	2.84 %

Source: Bloomberg

CSX Corporation

7

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HB2
Coupon Rate:	3.400%
Maturity Date:	8/1/2024
Amount Outstanding ($ 000)	$550,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	101.347	3.20 %
February	101.387	3.19
March	101.666	3.14
April	102.769	2.97
May	103.705	2.82
June	103.317	2.88
July	103.716	2.81
August	103.771	2.80
September	102.770	2.95
October	103.220	2.87
November	102.771	2.94
December	102.827	2.92
Average	102.772	2.96 %

Source: Bloomberg

CSX Corporation

8

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HD8
Coupon Rate:	3.350%
Maturity Date:	11/1/2025
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	99.772	3.38 %
February	100.035	3.35
March	100.304	3.31
April	101.514	3.15
May	102.857	2.96
June	102.561	3.00
July	103.011	2.94
August	103.242	2.90
September	101.822	3.09
October	102.400	3.01
November	101.790	3.09
December	101.656	3.11
Average	101.747	3.11 %

Source: Bloomberg

CSX Corporation

9

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HE6
Coupon Rate:	2.600%
Maturity Date:	11/1/2026
Amount Outstanding ($ 000)	$700,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	93.040	3.45 %
February	93.845	3.35
March	93.800	3.36
April	95.260	3.18
May	96.598	3.02
June	96.478	3.04
July	96.793	3.00
August	96.608	3.03
September	95.603	3.16
October	95.753	3.15
November	95.349	3.20
December	95.663	3.17
Average	95.399	3.18 %

Source: Bloomberg

CSX Corporation

10

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408BP7
Coupon Rate:	7.250%
Maturity Date:	5/1/2027
Amount Outstanding ($ 000)	$83,312
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	127.812	3.85
June	127.240	3.89
July	127.940	3.79
August	128.390	3.72
September	126.453	3.91
October	125.994	3.94
November	125.669	3.96
December	125.848	3.91
Average	126.918	3.87 %

Source: Bloomberg

CSX Corporation

11

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408BM4
Coupon Rate:	7.950%
Maturity Date:	5/1/2027
Amount Outstanding ($ 000)	$64,266
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	127.847	4.52 %
February	127.799	4.51
March	127.887	4.48
April	129.158	4.33
May	130.341	4.18
June	129.748	4.22
July	130.534	4.11
August	131.006	4.04
September	128.959	4.24
October	128.558	4.26
November	128.302	4.27
December	128.304	4.24
Average	129.037	4.28 %

Source: Bloomberg

CSX Corporation

12

Type:	Notes
Description:	CSX Corp. (New)
CUSIP:	126408HH9
Coupon Rate:	3.250%
Maturity Date:	6/1/2027
Amount Outstanding ($ 000)	$850,000
Months Outstanding	8.0

End of Month in 2017	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	100.257	3.22
May	101.255	3.10
June	100.851	3.15
July	100.882	3.14
August	100.750	3.16
September	100.137	3.23
October	100.147	3.23
November	99.679	3.29
December	99.918	3.26
Average	100.431	3.20 %

Source: Bloomberg

Announcement date: 4/26/2017

CSX Corporation

13

Type:	Notes
Description:	CSX Corp.
CUSIP:	12641LBU6
Coupon Rate:	6.800%
Maturity Date:	12/1/2028
Amount Outstanding ($ 000)	$200,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	123.541	4.25 %
February	123.631	4.23
March	123.779	4.20
April	126.803	3.90
May	128.209	3.75
June	127.620	3.79
July	128.249	3.72
August	128.784	3.65
September	127.476	3.76
October	126.829	3.81
November	126.591	3.82
December	126.205	3.84
Average	126.476	3.89 %

Source: Bloomberg

CSX Corporation

14

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GH0
Coupon Rate:	6.000%
Maturity Date:	10/1/2036
Amount Outstanding ($ 000)	$400,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	119.516	4.49 %
February	121.266	4.37
March	121.337	4.36
April	122.694	4.27
May	125.018	4.11
June	125.863	4.05
July	126.890	3.98
August	128.037	3.90
September	125.936	4.03
October	126.228	4.01
November	126.619	3.98
December	127.436	3.92
Average	124.737	4.12 %

Source: Bloomberg

CSX Corporation

15

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GK3
Coupon Rate:	6.150%
Maturity Date:	5/1/2037
Amount Outstanding ($ 000)	$700,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	122.872	4.43 %
February	124.175	4.34
March	123.714	4.36
April	125.252	4.26
May	127.166	4.13
June	127.484	4.11
July	129.694	3.97
August	129.987	3.94
September	128.313	4.04
October	128.770	4.01
November	128.473	4.02
December	129.746	3.94
Average	127.137	4.13 %

Source: Bloomberg

CSX Corporation

16

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GP2
Coupon Rate:	7.450%
Maturity Date:	4/1/2038
Amount Outstanding ($ 000)	$79,226
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	132.575	4.95 %
February	133.079	4.91
March	132.846	4.92
April	135.295	4.77
May	137.528	4.62
June	136.909	4.66
July	137.382	4.62
August	138.316	4.56
September	135.527	4.73
October	134.709	4.77
November	134.809	4.76
December	136.635	4.64
Average	135.468	4.74 %

Source: Bloomberg

CSX Corporation

17

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GS6
Coupon Rate:	6.220%
Maturity Date:	4/30/2040
Amount Outstanding ($ 000)	$660,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	123.441	4.57 %
February	124.702	4.49
March	124.238	4.52
April	126.600	4.37
May	130.013	4.17
June	130.731	4.13
July	131.091	4.10
August	131.294	4.09
September	129.314	4.20
October	130.233	4.14
November	130.147	4.14
December	131.854	4.04
Average	128.638	4.25 %

Source: Bloomberg

CSX Corporation

18

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GU1
Coupon Rate:	5.500%
Maturity Date:	4/15/2041
Amount Outstanding ($ 000)	$550,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	115.246	4.46 %
February	116.227	4.40
March	115.353	4.45
April	116.968	4.35
May	119.094	4.22
June	120.778	4.12
July	120.416	4.14
August	121.484	4.07
September	119.501	4.19
October	120.132	4.15
November	121.179	4.08
December	122.093	4.03
Average	119.039	4.22 %

Source: Bloomberg

$300,000
250,000
$550,000

same CUSIP

CSX Corporation

19

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GW7
Coupon Rate:	4.750%
Maturity Date:	5/30/2042
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	105.510	4.39 %
February	106.400	4.33
March	105.327	4.40
April	107.130	4.28
May	109.887	4.11
June	110.918	4.05
July	109.998	4.10
August	110.944	4.05
September	109.253	4.15
October	110.661	4.06
November	110.848	4.05
December	112.260	3.96
Average	109.095	4.16 %

Source: Bloomberg

CSX Corporation

20

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GX5
Coupon Rate:	4.400%
Maturity Date:	3/1/2043
Amount Outstanding ($ 000)	$300,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	100.595	4.36 %
February	101.062	4.33
March	100.705	4.35
April	102.720	4.23
May	104.980	4.09
June	105.907	4.03
July	105.591	4.05
August	106.308	4.00
September	104.530	4.11
October	105.398	4.06
November	105.721	4.04
December	107.138	3.95
Average	104.221	4.13 %

Source: Bloomberg

CSX Corporation

21

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GY3
Coupon Rate:	4.100%
Maturity Date:	3/15/2044
Amount Outstanding ($ 000)	$800,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	96.159	4.34 %
February	96.892	4.30
March	96.845	4.30
April	98.241	4.21
May	101.481	4.01
June	102.579	3.94
July	102.331	3.96
August	101.270	4.02
September	100.534	4.07
October	101.660	4.00
November	101.914	3.98
December	104.114	3.85
Average	100.335	4.08 %

Source: Bloomberg

CSX Corporation

22

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HF3
Coupon Rate:	3.800%
Maturity Date:	11/1/2046
Amount Outstanding ($ 000)	$800,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	90.863	4.35 %
February	92.459	4.25
March	91.728	4.30
April	94.497	4.12
May	96.713	3.99
June	97.810	3.93
July	96.011	4.03
August	96.773	3.99
September	96.186	4.02
October	97.413	3.95
November	97.489	3.95
December	99.333	3.84
Average	95.606	4.06 %

Source: Bloomberg

CSX Corporation

23

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HC0
Coupon Rate:	3.950%
Maturity Date:	5/1/2050
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	90.898	4.48 %
February	91.761	4.43
March	91.897	4.42
April	93.431	4.33
May	95.921	4.18
June	97.728	4.08
July	96.038	4.17
August	96.696	4.14
September	95.521	4.20
October	96.710	4.14
November	96.918	4.12
December	99.273	3.99
Average	95.233	4.22 %

Source: Bloomberg

CSX Corporation

24

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HA4
Coupon Rate:	4.500%
Maturity Date:	8/1/2054
Amount Outstanding ($ 000)	$450,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	97.348	4.65 %
February	98.110	4.61
March	97.351	4.65
April	100.602	4.47
May	103.293	4.32
June	105.105	4.23
July	105.512	4.21
August	104.594	4.25
September	103.244	4.32
October	102.913	4.34
November	104.550	4.25
December	106.101	4.17
Average	102.394	4.37 %

Source: Bloomberg

CSX Corporation

25

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HG1
Coupon Rate:	4.250%
Maturity Date:	11/1/2066
Amount Outstanding ($ 000)	$700,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	89.750	4.79 %
February	92.448	4.64
March	91.359	4.70
April	94.456	4.53
May	97.013	4.40
June	100.055	4.25
July	96.951	4.40
August	97.509	4.37
September	96.831	4.41
October	98.607	4.32
November	98.103	4.34
December	101.027	4.20
Average	96.176	4.45 %

Source: Bloomberg

CSX Corporation

26

Type:	Notes
Description:	CSXT - Conrail
CUSIP:	126410LK3
Coupon Rate:	9.750%
Maturity Date:	6/15/2020
Amount Outstanding ($ 000)	$227,171
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	123.146	2.53 %
February	122.641	2.52
March	122.024	2.53
April	122.130	2.34
May	121.358	2.40
June	120.676	2.42
July	120.997	2.16
August	120.126	2.23
September	118.942	2.45
October	118.343	2.47
November	117.579	2.53
December	116.854	2.60
Average	120.401	2.43 %

Source: Bloomberg

CSX Corporation

27

Type:	Notes
Description:	CSXT - Conrail
CUSIP:	126410LL1
Coupon Rate:	7.875%
Maturity Date:	5/15/2043
Amount Outstanding ($ 000)	$99,989
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	140.197	5.09 %
February	142.661	4.95
March	140.138	5.08
April	144.162	4.87
May	146.312	4.75
June	148.600	4.63
July	146.412	4.74
August	147.422	4.68
September	147.552	4.67
October	149.377	4.58
November	149.661	4.56
December	152.551	4.41
Average	146.254	4.75 %

Source: Bloomberg

CSX Corporation

28

Type:	Sec'd Eq Notes
Description:	CSXT
CUSIP:	126410LM9
Coupon Rate:	6.251%
Maturity Date:	1/15/2023
Amount Outstanding ($ 000)	$213,608
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	Not Traded	-
September	Not Traded	-
October	Not Traded	-
November	113.180	3.42
December	112.879	3.44
Average	113.030	3.43 %

Source: Bloomberg

Kansas City Southern Corp.

29

Type:	Sr Note
Description:	KCSR
CUSIP:	485188AN6
Coupon Rate:	4.300%
Maturity Date:	5/15/2043
Amount Outstanding ($ 000)	$1,329
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	86.969	5.22 %
February	88.380	5.11
March	89.944	4.99
April	Not Traded	-
May	89.881	5.00
June	88.519	5.10
July	88.486	5.11
August	91.147	4.91
September	90.134	4.99
October	89.346	5.05
November	89.069	5.07
December	89.692	5.02
Average	89.233	5.05 %

Source: Bloomberg

Kansas City Southern Corp.

30

Type:	Sr Note
Description:	KCSR
CUSIP:	485188AM8
Coupon Rate:	3.850%
Maturity Date:	11/15/2023
Amount Outstanding ($ 000)	$776
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	100.529	3.76 %
February	100.179	3.82
March	100.321	3.79
April	Not Traded	-
May	101.306	3.62
June	100.592	3.74
July	100.870	3.69
August	104.694	3.01
September	99.742	3.90
October	99.423	3.96
November	98.926	4.06
December	98.871	4.07
Average	100.496	3.77 %

Source: Bloomberg

Kansas City Southern Corp.

31

Type:	Sr Note
Description:	KCSR
CUSIP:	485188AP1
Coupon Rate:	4.950%
Maturity Date:	8/15/2045
Amount Outstanding ($ 000)	$792
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	99.044	5.01 %
February	98.804	5.03
March	100.480	4.92
April	102.479	4.79
May	101.902	4.83
June	100.189	4.94
July	100.109	4.94
August	110.711	4.29
September	104.044	4.69
October	103.570	4.72
November	103.234	4.74
December	103.973	4.69
Average	102.378	4.80 %

Source: Bloomberg

Kansas City Southern Corp.

32

Type:	Sr Note
Description:	KCS
CUSIP:	485170AF1
Coupon Rate:	7.000%
Maturity Date:	12/15/2025
Amount Outstanding ($ 000)	$221
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	114.211	5.00 %
February	113.913	5.02
March	113.284	5.09
April	115.046	4.84
May	115.981	4.70
June	115.422	4.76
July	115.396	4.75
August	116.750	4.55
September	115.356	4.72
October	115.362	4.70
November	114.620	4.79
December	114.231	4.82
Average	114.964	4.81 %

Source: Bloomberg

Kansas City Southern Corp.

33

Type:	Sr Note
Description:	KCS
CUSIP:	485170AQ7
Coupon Rate:	4.300%
Maturity Date:	5/15/2043
Amount Outstanding ($ 000)	$448,651
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	93.789	4.71 %
February	93.853	4.71
March	94.305	4.68
April	95.857	4.57
May	97.578	4.46
June	99.097	4.36
July	99.120	4.36
August	102.863	4.12
September	100.902	4.24
October	102.190	4.16
November	102.470	4.14
December	103.801	4.06
Average	98.819	4.38 %

Source: Bloomberg

Kansas City Southern Corp.

34

Type:	Sr Note
Description:	KCS
CUSIP:	485170AR5
Coupon Rate:	3.850%
Maturity Date:	11/15/2023
Amount Outstanding ($ 000)	$199,224
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	102.297	3.47 %
February	102.135	3.49
March	101.679	3.56
April	102.945	3.34
May	103.911	3.17
June	102.979	3.33
July	103.237	3.28
August	104.708	3.01
September	103.292	3.25
October	102.644	3.36
November	102.049	3.47
December	101.890	3.49
Average	102.814	3.35 %

Source: Bloomberg

Kansas City Southern Corp.

35

Type:	Sr Note
Description:	KCS
CUSIP:	485170AS3
Coupon Rate:	4.950%
Maturity Date:	8/15/2045
Amount Outstanding ($ 000)	$499,165
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	101.271	4.87 %
February	101.151	4.88
March	100.940	4.89
April	103.530	4.72
May	106.726	4.53
June	109.237	4.38
July	110.416	4.31
August	113.794	4.12
September	111.108	4.27
October	111.721	4.23
November	111.698	4.23
December	114.251	4.08
Average	107.987	4.46 %

Source: Bloomberg

Kansas City Southern Corp.

36

Type:	Sr Note
Description:	KCS
CUSIP:	485170AU8
Coupon Rate:	2.350%
Maturity Date:	5/15/2020
Amount Outstanding ($ 000)	$257,346
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	98.778	2.74 %
February	98.697	2.78
March	99.053	2.67
April	100.188	2.29
May	100.315	2.24
June	100.170	2.29
July	100.454	2.18
August	100.684	2.09
September	100.397	2.19
October	100.138	2.29
November	99.689	2.48
December	99.650	2.50
Average	99.851	2.40 %

Source: Bloomberg

Kansas City Southern Corp.

37

Type:	Sr Note
Description:	KCS
CUSIP:	485170AV6
Coupon Rate:	3.000%
Maturity Date:	5/15/2023
Amount Outstanding ($ 000)	$439,123
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	97.775	3.40 %
February	97.258	3.50
March	97.718	3.42
April	99.317	3.13
May	100.440	2.92
June	100.212	2.96
July	100.644	2.88
August	101.567	2.70
September	100.404	2.92
October	100.241	2.95
November	99.640	3.07
December	99.421	3.12
Average	99.553	3.08 %

Source: Bloomberg

Kansas City Southern Corp.

38

Type:	Sr Note
Description:	KCS
CUSIP:	485170BA1
Coupon Rate:	3.125%
Maturity Date:	6/1/2026
Amount Outstanding ($ 000)	$250,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	94.654	3.81 %
February	94.126	3.89
March	94.373	3.86
April	95.548	3.71
May	96.563	3.58
June	96.245	3.62
July	96.546	3.58
August	97.818	3.42
September	97.080	3.52
October	96.948	3.54
November	96.479	3.61
December	96.914	3.55
Average	96.108	3.64 %

Source: Bloomberg

Kansas City Southern Corp.

39

Type:	Sr Note
Description:	KCSM
CUSIP:	485161AQ6
Coupon Rate:	2.350%
Maturity Date:	5/15/2020
Amount Outstanding ($ 000)	$17,594
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	99.869	2.40
June	99.602	2.50
July	99.720	2.45
August	99.892	2.39
September	100.613	2.11
October	98.843	2.83
November	98.081	3.17
December	97.957	3.25
Average	99.322	2.64 %

Source: Bloomberg

Kansas City Southern Corp.

40

Type:	Sr Note
Description:	KCSM
CUSIP:	485161AS2
Coupon Rate:	3.000%
Maturity Date:	5/15/2023
Amount Outstanding ($ 000)	$10,877
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	97.117	3.52 %
February	95.335	3.85
March	95.494	3.83
April	97.257	3.51
May	97.694	3.43
June	96.990	3.57
July	97.075	3.56
August	97.944	3.40
September	97.214	3.55
October	97.571	3.49
November	96.414	3.73
December	96.411	3.74
Average	96.876	3.60 %

Source: Bloomberg

Norfolk Southern Corp.

41

Type:	Debenture
Description:	Southern Railway
CUSIP:	655855FA7
Coupon Rate:	9.750%
Maturity Date:	6/15/2020
Amount Outstanding ($ 000)	$313,741
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	123.495	2.49 %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	122.183	2.14
June	121.203	2.26
July	121.137	2.11
August	120.346	2.16
September	119.416	2.29
October	118.852	2.34
November	117.768	2.46
December	116.900	2.59
Average	120.144	2.32 %

Source: Bloomberg

Norfolk Southern Corp.

42

Type:	Debenture
Description:	Southern Railway
CUSIP:	655855FB5
Coupon Rate:	7.875%
Maturity Date:	5/15/2043
Amount Outstanding ($ 000)	$138,085
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	148.249	4.67 %
February	149.968	4.58
March	148.872	4.63
April	150.442	4.55
May	150.863	4.52
June	153.191	4.41
July	153.982	4.37
August	156.714	4.23
September	154.136	4.35
October	157.812	4.17
November	158.204	4.15
December	157.132	4.19
Average	153.297	4.40 %

Source: Bloomberg

Norfolk Southern Corp.

43

Type:	Notes
Description:	Series A NSC
CUSIP:	655844AA6
Coupon Rate:	9.000%
Maturity Date:	3/1/2021
Amount Outstanding ($ 000)	$83,372
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	118.442	4.05 %
February	121.439	3.24
March	121.071	3.21
April	121.108	3.11
May	121.031	3.01
June	120.343	3.07
July	120.300	2.98
August	120.241	2.86
September	119.094	3.06
October	118.574	3.09
November	118.265	3.04
December	117.659	3.09
Average	119.797	3.15 %

Source: Bloomberg

Norfolk Southern Corp.

44

Type:	Notes
Description:	Senior
CUSIP:	655844AQ1
Coupon Rate:	7.250%
Maturity Date:	2/15/2031
Amount Outstanding ($ 000)	$284,028
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	131.500	4.25 %
February	134.094	4.03
March	133.598	4.06
April	134.552	3.97
May	135.705	3.87
June	136.411	3.80
July	137.716	3.69
August	140.264	3.48
September	136.517	3.75
October	136.641	3.73
November	141.515	3.34
December	141.957	3.29
Average	136.706	3.77 %

Source: Bloomberg

Norfolk Southern Corp.

45

Type:	Notes
Description:	Senior
CUSIP:	655844BC1
Coupon Rate:	5.900%
Maturity Date:	6/15/2019
Amount Outstanding ($ 000)	$500,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	108.950	2.01 %
February	108.507	2.07
March	108.320	2.00
April	108.134	1.96
May	107.873	1.92
June	107.467	1.96
July	107.286	1.91
August	107.110	1.81
September	106.566	1.95
October	106.228	1.97
November	105.572	2.18
December	105.179	2.25
Average	107.266	2.00 %

Source: Bloomberg

Norfolk Southern Corp.

46

Type:	Notes
Description:	Senior
CUSIP:	655844BG2
Coupon Rate:	3.250%
Maturity Date:	12/1/2021
Amount Outstanding ($ 000)	$500,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	102.945	2.60 %
February	102.565	2.67
March	102.685	2.63
April	103.224	2.50
May	103.680	2.38
June	103.482	2.41
July	103.721	2.34
August	103.954	2.27
September	103.184	2.44
October	103.123	2.44
November	102.421	2.61
December	102.337	2.62
Average	103.110	2.49 %

Source: Bloomberg

Norfolk Southern Corp.

47

Type:	Notes
Description:	Senior
CUSIP:	655844BJ6
Coupon Rate:	3.000%
Maturity Date:	4/1/2022
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	101.285	2.73 %
February	101.293	2.73
March	101.349	2.71
April	102.254	2.51
May	102.689	2.41
June	102.225	2.50
July	102.572	2.41
August	103.114	2.28
September	102.163	2.49
October	102.160	2.48
November	101.507	2.63
December	101.396	2.65
Average	102.001	2.54 %

Source: Bloomberg

Norfolk Southern Corp.

48

Type:	Notes
Description:	Senior
CUSIP:	655844BL1
Coupon Rate:	2.903%
Maturity Date:	2/15/2023
Amount Outstanding ($ 000)	$596,450
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	99.550	2.99 %
February	99.527	2.99
March	99.541	2.99
April	100.716	2.77
May	101.671	2.59
June	101.034	2.70
July	101.590	2.59
August	102.363	2.44
September	101.748	2.55
October	101.186	2.66
November	100.612	2.78
December	100.481	2.80
Average	100.835	2.74 %

Source: Bloomberg

Note: This is the exchange-traded portion of these notes. The Rule 144-A notes similar to these have a different CUSIP, and are shown on the next page.

Norfolk Southern Corp.

49

Type:	Notes
Description:	Senior 144A
CUSIP:	655844BK3
Coupon Rate:	2.903%
Maturity Date:	2/15/2023
Amount Outstanding ($ 000)	$3,550
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	99.450	3.00 %
February	99.494	3.00
March	99.525	2.99
April	100.689	2.77
May	101.694	2.58
June	101.068	2.70
July	101.546	2.60
August	102.432	2.42
September	101.603	2.58
October	101.182	2.66
November	100.575	2.78
December	100.381	2.82
Average	100.803	2.74 %

Source: Bloomberg

Note: These are Rule 144-A notes, which trade among qualified institutional buyers and have their own CUSIP. The exchange-traded notes similar to these are on the proceeding page.

Norfolk Southern Corp.

50

Type:	Notes
Description:	Senior
CUSIP:	655844BD9
Coupon Rate:	6.000%
Maturity Date:	5/23/2111
Amount Outstanding ($ 000)	$121,731
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	116.851	5.13 %
February	120.091	4.99
March	116.900	5.13
April	116.821	5.13
May	119.449	5.02
June	120.813	4.96
July	121.693	4.92
August	128.382	4.66
September	124.595	4.80
October	122.867	4.87
November	134.936	4.43
December	136.620	4.37
Average	123.335	4.87 %

Source: Bloomberg

$97,602
24,129
$121,731

same CUSIP

Norfolk Southern Corp.

51

Type:	Notes
Description:	Senior 2105
CUSIP:	655844AV0
Coupon Rate:	6.000%
Maturity Date:	3/15/2105
Amount Outstanding ($ 000)	$184,118
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	116.860	5.13 %
February	118.932	5.04
March	116.996	5.12
April	116.405	5.15
May	118.722	5.04
June	120.015	4.99
July	120.945	4.95
August	123.673	4.84
September	123.954	4.83
October	123.232	4.86
November	135.396	4.41
December	126.147	4.74
Average	121.773	4.93 %

Source: Bloomberg

$100,428
83,690
$184,118

same CUSIP

Norfolk Southern Corp.

52

Type:	Notes
Description:	Senior
CUSIP:	655844AX6
Coupon Rate:	5.640%
Maturity Date:	5/17/2029
Amount Outstanding ($ 000)	$210,316
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	114.573	4.12 %
February	114.636	4.10
March	115.545	4.01
April	116.362	3.92
May	117.097	3.84
June	116.336	3.91
July	117.474	3.79
August	120.127	3.53
September	118.339	3.69
October	118.329	3.68
November	117.664	3.73
December	118.065	3.68
Average	117.046	3.83 %

Source: Bloomberg

Norfolk Southern Corp.

53

Type:	Notes
Description:	Senior
CUSIP:	655844AW8
Coupon Rate:	5.590%
Maturity Date:	5/17/2025
Amount Outstanding ($ 000)	$251,172
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	114.073	3.61 %
February	113.938	3.61
March	113.689	3.63
April	114.717	3.48
May	115.215	3.39
June	114.569	3.46
July	115.114	3.37
August	116.428	3.17
September	114.714	3.38
October	114.766	3.36
November	115.251	3.27
December	115.192	3.26
Average	114.806	3.42 %

Source: Bloomberg

Norfolk Southern Corp.

54

Type:	Notes
Description:	Senior
CUSIP:	655844BH0
Coupon Rate:	4.837%
Maturity Date:	10/1/2041
Amount Outstanding ($ 000)	$595,504
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	109.232	4.23 %
February	110.651	4.14
March	109.215	4.23
April	110.103	4.17
May	111.193	4.11
June	112.121	4.05
July	113.513	3.96
August	115.960	3.82
September	112.654	4.01
October	113.237	3.97
November	113.041	3.98
December	115.865	3.82
Average	112.232	4.04 %

Source: Bloomberg

$595,502
2
$595,504

same CUSIP

Norfolk Southern Corp.

55

Type:	Notes
Description:	Senior
CUSIP:	655844BM9
Coupon Rate:	3.950%
Maturity Date:	10/1/2042
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	96.931	4.15 %
February	98.138	4.07
March	96.685	4.16
April	97.639	4.10
May	98.952	4.02
June	99.272	4.00
July	100.823	3.90
August	102.365	3.80
September	99.506	3.98
October	101.278	3.87
November	101.015	3.89
December	102.628	3.79
Average	99.603	3.98 %

Source: Bloomberg

Norfolk Southern Corp.

56

Type:	Notes
Description:	Senior
CUSIP:	655844BN7
Coupon Rate:	4.800%
Maturity Date:	8/15/2043
Amount Outstanding ($ 000)	$291,829
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	108.941	4.24 %
February	110.095	4.17
March	108.957	4.23
April	109.965	4.17
May	111.533	4.08
June	112.574	4.02
July	113.269	3.98
August	114.482	3.91
September	112.704	4.01
October	114.097	3.93
November	112.467	4.02
December	114.239	3.91
Average	111.944	4.06 %

Source: Bloomberg

Norfolk Southern Corp.

57

Type:	Notes
Description:	Senior
CUSIP:	655844BP2
Coupon Rate:	3.850%
Maturity Date:	1/15/2024
Amount Outstanding ($ 000)	$400,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	104.325	3.15 %
February	104.696	3.09
March	104.491	3.11
April	105.395	2.96
May	106.051	2.84
June	105.892	2.85
July	106.207	2.79
August	106.884	2.67
September	105.897	2.82
October	106.106	2.77
November	105.515	2.86
December	105.686	2.82
Average	105.595	2.89 %

Source: Bloomberg

Norfolk Southern Corp.

58

Type:	Notes
Description:	Senior
CUSIP:	655844BQ0
Coupon Rate:	4.450%
Maturity Date:	6/15/2045
Amount Outstanding ($ 000)	$500,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	104.883	4.16 %
February	105.555	4.12
March	104.232	4.19
April	105.497	4.12
May	106.685	4.05
June	106.948	4.03
July	108.583	3.94
August	109.874	3.87
September	107.600	3.99
October	108.981	3.92
November	109.517	3.88
December	111.400	3.78
Average	107.480	4.00 %

Source: Bloomberg

Norfolk Southern Corp.

59

Type:	Notes
Description:	Senior
CUSIP:	655844BR8
Coupon Rate:	4.650%
Maturity Date:	1/15/2046
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	107.451	4.20 %
February	108.856	4.12
March	106.895	4.23
April	108.622	4.13
May	109.877	4.06
June	110.997	4.00
July	111.914	3.95
August	113.587	3.86
September	110.738	4.01
October	112.488	3.91
November	112.919	3.89
December	114.181	3.82
Average	110.710	4.02 %

Source: Bloomberg

Norfolk Southern Corp.

60

Type:	Notes
Description:	Senior
CUSIP:	655844BS6
Coupon Rate:	2.900%
Maturity Date:	6/15/2026
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	96.309	3.36 %
February	96.717	3.31
March	96.525	3.34
April	97.704	3.19
May	98.599	3.08
June	98.293	3.12
July	99.372	2.98
August	100.325	2.86
September	99.116	3.02
October	99.198	3.01
November	98.114	3.15
December	98.374	3.12
Average	98.221	3.13 %

Source: Bloomberg

Norfolk Southern Corp.

61

Type:	Notes
Description:	Senior (New)
CUSIP:	655844BT4
Coupon Rate:	3.150%
Maturity Date:	6/1/2027
Amount Outstanding ($ 000)	$300,000
Months Outstanding	7.5

End of Month in 2017	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	100.319	3.11
June	99.844	3.17
July	100.713	3.07
August	101.572	2.96
September	100.071	3.14
October	100.774	3.06
November	99.593	3.20
December	99.946	3.16
Average	100.354	3.11 %

Source: Bloomberg

Announcement Date: 5/22/2017

Norfolk Southern Corp.

62

Type:	Notes
Description:	Senior 144A (New)
CUSIP:	655844BW7
Coupon Rate:	3.942%
Maturity Date:	11/1/2047
Amount Outstanding ($ 000)	$749,997
Months Outstanding	2.0

End of Month in 2017	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	Not Traded	-
September	Not Traded	-
October	Not Traded	-
November	101.680	3.85
December	102.706	3.79
Average	102.193	3.82 %

Source: Bloomberg

Announcement Date: 10/30/2017

Note: These are Privately Placed Rule 144-A notes, which trade among qualified institutional buyers and have their own CUSIP.

Norfolk Southern Corp.

63

Type:	Notes
Description:	Senior 144A (New)
CUSIP:	655844BU1
Coupon Rate:	4.050%
Maturity Date:	8/15/2052
Amount Outstanding ($ 000)	$749,994
Months Outstanding	5.0

End of Month in 2017	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	99.767	4.06
September	98.036	4.16
October	101.492	3.97
November	101.404	3.98
December	103.661	3.86
Average	100.872	4.01 %

Source: Bloomberg

Announcement Date: 7/31/2017

Note: These are Privately Placed Rule 144-A notes, which trade among qualified institutional buyers and have their own CUSIP.

Norfolk Southern Corp.

64

Type:	Conrail Notes
Description:	CR NSC 2027
CUSIP:	655844AJ7
Coupon Rate:	7.800%
Maturity Date:	5/15/2027
Amount Outstanding ($ 000)	$319,135
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	132.760	3.90 %
February	132.581	3.90
March	132.190	3.91
April	132.912	3.82
May	134.561	3.63
June	133.695	3.69
July	134.621	3.57
August	136.219	3.38
September	133.788	3.61
October	133.617	3.60
November	136.666	3.26
December	136.624	3.24
Average	134.186	3.63 %

Source: Bloomberg

Norfolk Southern Corp.

65

Type:	Conrail Notes
Description:	CR NSC 2037
CUSIP:	655844AF5
Coupon Rate:	7.050%
Maturity Date:	5/1/2037
Amount Outstanding ($ 000)	$178,995
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	132.483	4.57 %
February	132.237	4.58
March	132.909	4.54
April	135.139	4.39
May	136.337	4.31
June	134.650	4.41
July	136.277	4.30
August	139.034	4.13
September	135.563	4.34
October	135.868	4.31
November	137.753	4.19
December	138.696	4.13
Average	135.579	4.35 %

Source: Bloomberg

Norfolk Southern Corp.

66

Type:	Conrail Notes
Description:	CR NSC 2097
CUSIP:	655844AK4
Coupon Rate:	7.900%
Maturity Date:	5/15/2097
Amount Outstanding ($ 000)	$225,222
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	146.679	5.36 %
February	146.518	5.37
March	144.518	5.44
April	144.703	5.44
May	148.636	5.29
June	151.099	5.20
July	150.040	5.24
August	171.900	4.54
September	168.810	4.63
October	164.035	4.77
November	166.605	4.69
December	169.792	4.60
Average	156.111	5.05 %

Source: Bloomberg

Union Pacific Corp.

67

Type:	Debentures
Description:	UP Corp.
CUSIP:	907818CS5
Coupon Rate:	5.375%
Maturity Date:	6/1/2033
Amount Outstanding ($ 000)	$182,467
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	113.785	4.20 %
February	114.132	4.17
March	113.926	4.18
April	115.336	4.07
May	116.568	3.97
June	115.813	4.02
July	117.131	3.91
August	118.479	3.80
September	117.005	3.91
October	117.708	3.85
November	117.205	3.89
December	120.447	3.63
Average	116.461	3.97 %

Source: Bloomberg

Union Pacific Corp.

68

Type:	Debentures
Description:	UP Corp.
CUSIP:	907818CX4
Coupon Rate:	6.150%
Maturity Date:	5/1/2037
Amount Outstanding ($ 000)	$108,739
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	123.458	4.39 %
February	123.958	4.35
March	123.651	4.37
April	125.346	4.26
May	126.777	4.16
June	126.126	4.20
July	127.309	4.12
August	128.956	4.01
September	127.596	4.09
October	127.313	4.10
November	127.037	4.11
December	129.170	3.97
Average	126.391	4.18 %

Source: Bloomberg

Union Pacific Corp.

69

Type:	Debentures
Description:	UP Corp.
CUSIP:	907818CU0
Coupon Rate:	6.250%
Maturity Date:	5/1/2034
Amount Outstanding ($ 000)	$175,749
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	126.396	4.10 %
February	126.752	4.07
March	126.482	4.08
April	128.031	3.97
May	129.387	3.87
June	128.730	3.90
July	128.872	3.89
August	130.489	3.77
September	128.705	3.89
October	128.312	3.91
November	128.322	3.90
December	132.048	3.63
Average	128.544	3.92 %

Source: Bloomberg

Union Pacific Corp.

70

Type:	Debentures
Description:	UP Corp.
CUSIP:	907818CF3
Coupon Rate:	6.625%
Maturity Date:	2/1/2029
Amount Outstanding ($ 000)	$393,457
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	129.903	3.54 %
February	130.009	3.52
March	130.111	3.49
April	131.141	3.39
May	132.054	3.29
June	131.015	3.37
July	132.135	3.25
August	133.146	3.14
September	131.520	3.27
October	131.134	3.29
November	130.486	3.33
December	130.892	3.28
Average	131.129	3.35 %

Source: Bloomberg

Union Pacific Corp.

71

Type:	Debentures
Description:	UP Corp.
CUSIP:	907818BY3
Coupon Rate:	7.125%
Maturity Date:	2/1/2028
Amount Outstanding ($ 000)	$173,467
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	130.108	3.76 %
February	129.993	3.75
March	130.053	3.73
April	131.078	3.61
May	132.081	3.49
June	131.458	3.53
July	132.454	3.42
August	133.351	3.31
September	131.868	3.43
October	131.388	3.46
November	130.732	3.50
December	130.737	3.48
Average	131.275	3.54 %

Source: Bloomberg

Union Pacific Corp.

72

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EA2
Coupon Rate:	1.800%
Maturity Date:	2/1/2020
Amount Outstanding ($ 000)	$249,000
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	99.523	1.97 %
February	99.528	1.97
March	99.616	1.94
April	99.788	1.88
May	99.950	1.82
June	99.792	1.88
July	100.023	1.79
August	100.132	1.74
September	99.999	1.80
October	99.924	1.83
November	99.473	2.05
December	99.423	2.09
Average	99.764	1.90 %

Source: Bloomberg

Union Pacific Corp.

73

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DW5
Coupon Rate:	2.250%
Maturity Date:	2/15/2019
Amount Outstanding ($ 000)	$299,399
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	101.029	1.73 %
February	101.166	1.64
March	101.043	1.68
April	101.002	1.68
May	101.045	1.62
June	100.929	1.66
July	101.057	1.55
August	101.025	1.53
September	100.839	1.63
October	100.701	1.70
November	100.398	1.91
December	100.248	2.02
Average	100.874	1.70 %

Source: Bloomberg

Union Pacific Corp.

74

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EE4
Coupon Rate:	2.250%
Maturity Date:	6/19/2020
Amount Outstanding ($ 000)	$398,402
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	100.438	2.12 %
February	100.345	2.14
March	100.632	2.05
April	100.826	1.98
May	100.865	1.96
June	100.659	2.02
July	101.239	1.81
August	101.363	1.75
September	100.789	1.95
October	100.771	1.95
November	100.391	2.09
December	100.175	2.18
Average	100.708	2.00 %

Source: Bloomberg

Union Pacific Corp.

75

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DN5
Coupon Rate:	2.750%
Maturity Date:	4/15/2023
Amount Outstanding ($ 000)	$322,522
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	99.937	2.76 %
February	99.855	2.78
March	99.852	2.78
April	101.051	2.56
May	101.595	2.46
June	101.024	2.56
July	101.716	2.43
August	102.337	2.30
September	101.463	2.47
October	101.411	2.47
November	101.094	2.53
December	100.971	2.55
Average	101.026	2.55 %

Source: Bloomberg

Union Pacific Corp.

76

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EH7
Coupon Rate:	2.750%
Maturity Date:	3/1/2026
Amount Outstanding ($ 000)	$647,005
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	97.130	3.12 %
February	97.536	3.07
March	97.638	3.06
April	98.842	2.90
May	99.528	2.81
June	98.939	2.89
July	99.401	2.83
August	100.171	2.73
September	99.128	2.87
October	99.256	2.85
November	98.851	2.91
December	98.887	2.90
Average	98.776	2.91 %

Source: Bloomberg

Union Pacific Corp.

77

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DM7
Coupon Rate:	2.950%
Maturity Date:	1/15/2023
Amount Outstanding ($ 000)	$298,752
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	101.225	2.73 %
February	101.075	2.75
March	101.444	2.68
April	102.141	2.54
May	102.603	2.45
June	102.104	2.54
July	102.680	2.42
August	103.287	2.29
September	102.557	2.43
October	102.493	2.44
November	102.065	2.52
December	101.983	2.53
Average	102.138	2.53 %

Source: Bloomberg

Union Pacific Corp.

78

Type:	Notes
Description:	UP Corp. (New)
CUSIP:	907818EP9
Coupon Rate:	3.000%
Maturity Date:	4/15/2027
Amount Outstanding ($ 000)	$489,860
Months Outstanding	9.0

End of Month in 2017	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	98.913	3.13
April	100.142	2.98
May	100.768	2.91
June	100.251	2.97
July	100.643	2.92
August	101.507	2.82
September	100.660	2.92
October	100.629	2.92
November	100.422	2.95
December	100.668	2.92
Average	100.460	2.94 %

Source: Bloomberg

Announcement Date: 3/29/2017

Union Pacific Corp.

79

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DY1
Coupon Rate:	3.250%
Maturity Date:	1/15/2025
Amount Outstanding ($ 000)	$347,336
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	101.945	2.97 %
February	101.477	3.04
March	101.963	2.97
April	102.623	2.87
May	103.578	2.73
June	102.984	2.81
July	103.372	2.75
August	104.126	2.63
September	103.126	2.77
October	103.071	2.78
November	102.650	2.84
December	102.332	2.88
Average	102.771	2.84 %

Source: Bloomberg

Union Pacific Corp.

80

Type:	Notes
Description:	UP Corp.
CUSIP:	907818ED6
Coupon Rate:	3.250%
Maturity Date:	8/15/2025
Amount Outstanding ($ 000)	$498,782
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	101.331	3.07 %
February	101.728	3.02
March	101.606	3.03
April	102.676	2.88
May	103.195	2.81
June	102.827	2.86
July	103.539	2.76
August	104.296	2.65
September	103.176	2.80
October	103.097	2.80
November	102.714	2.85
December	102.670	2.86
Average	102.738	2.87 %

Source: Bloomberg

Union Pacific Corp.

81

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EK0
Coupon Rate:	3.350%
Maturity Date:	8/15/2046
Amount Outstanding ($ 000)	$295,937
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	89.772	3.94 %
February	90.935	3.87
March	90.277	3.91
April	90.917	3.87
May	92.066	3.80
June	92.835	3.76
July	93.478	3.72
August	95.234	3.62
September	93.726	3.71
October	94.584	3.66
November	94.133	3.68
December	96.099	3.57
Average	92.838	3.76 %

Source: Bloomberg

Union Pacific Corp.

82

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EB0
Coupon Rate:	3.375%
Maturity Date:	2/1/2035
Amount Outstanding ($ 000)	$444,800
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	95.597	3.71 %
February	96.507	3.64
March	96.684	3.63
April	97.660	3.55
May	98.810	3.47
June	98.865	3.46
July	99.809	3.39
August	100.073	3.37
September	98.851	3.46
October	99.154	3.44
November	99.607	3.41
December	100.644	3.33
Average	98.522	3.49 %

Source: Bloomberg

Union Pacific Corp.

83

Type:	Notes
Description:	UP Corp. (New)
CUSIP:	907818EQ7
Coupon Rate:	3.600%
Maturity Date:	9/15/2037
Amount Outstanding ($ 000)	$494,568
Months Outstanding	3.5

End of Month in 2017	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	Not Traded	-
September	101.075	3.52
October	101.761	3.48
November	101.393	3.50
December	103.050	3.39
Average	101.820	3.47 %

Source: Bloomberg

Announcement Date: 9/12/2017

Union Pacific Corp.

84

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DR6
Coupon Rate:	3.646%
Maturity Date:	2/15/2024
Amount Outstanding ($ 000)	$376,494
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	104.195	2.98 %
February	104.281	2.96
March	104.847	2.86
April	105.442	2.76
May	105.752	2.70
June	105.533	2.73
July	105.925	2.65
August	106.464	2.55
September	105.602	2.68
October	105.606	2.67
November	105.396	2.69
December	105.255	2.71
Average	105.358	2.75 %

Source: Bloomberg

Union Pacific Corp.

85

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DV7
Coupon Rate:	3.750%
Maturity Date:	3/15/2024
Amount Outstanding ($ 000)	$396,016
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	104.944	2.97 %
February	105.020	2.95
March	105.199	2.92
April	105.950	2.79
May	106.351	2.72
June	106.109	2.74
July	106.401	2.69
August	106.988	2.58
September	106.145	2.71
October	106.079	2.70
November	105.971	2.71
December	105.781	2.73
Average	105.912	2.77 %

Source: Bloomberg

Union Pacific Corp.

86

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EM6
Coupon Rate:	3.799%
Maturity Date:	10/1/2051
Amount Outstanding ($ 000)	$693,192
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	93.321	4.17 %
February	94.918	4.07
March	93.789	4.14
April	95.417	4.05
May	96.715	3.98
June	97.715	3.92
July	98.672	3.87
August	99.479	3.83
September	98.655	3.87
October	99.755	3.81
November	99.965	3.80
December	101.697	3.71
Average	97.508	3.94 %

Source: Bloomberg

Union Pacific Corp.

87

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EC8
Coupon Rate:	3.875%
Maturity Date:	2/1/2055
Amount Outstanding ($ 000)	$443,838
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	90.845	4.37 %
February	92.190	4.29
March	92.160	4.30
April	95.298	4.12
May	96.121	4.08
June	96.459	4.06
July	97.949	3.98
August	99.951	3.88
September	98.796	3.94
October	99.488	3.90
November	98.987	3.93
December	101.166	3.82
Average	96.618	4.06 %

Source: Bloomberg

Union Pacific Corp.

88

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DG0
Coupon Rate:	4.000%
Maturity Date:	2/1/2021
Amount Outstanding ($ 000)	$497,952
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	106.072	2.40 %
February	105.974	2.39
March	105.988	2.35
April	106.472	2.19
May	106.693	2.09
June	106.200	2.19
July	106.376	2.10
August	106.437	2.03
September	105.794	2.19
October	105.507	2.23
November	105.046	2.33
December	104.776	2.38
Average	105.945	2.24 %

Source: Bloomberg

Union Pacific Corp.

89

Type:	Notes
Description:	UP Corp. (New)
CUSIP:	907818EN4
Coupon Rate:	4.000%
Maturity Date:	4/15/2047
Amount Outstanding ($ 000)	$488,440
Months Outstanding	9.0

End of Month in 2017	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	98.882	4.07
April	100.232	3.99
May	102.231	3.87
June	102.407	3.86
July	104.199	3.76
August	104.662	3.74
September	104.455	3.75
October	105.081	3.72
November	104.852	3.73
December	108.065	3.55
Average	103.507	3.80 %

Source: Bloomberg

Announcement Date: 3/29/2017

Union Pacific Corp.

90

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EF1
Coupon Rate:	4.050%
Maturity Date:	11/15/2045
Amount Outstanding ($ 000)	$489,636
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	100.124	4.04 %
February	101.426	3.97
March	99.555	4.08
April	100.992	3.99
May	102.303	3.92
June	103.583	3.84
July	104.817	3.77
August	105.350	3.74
September	103.971	3.82
October	105.148	3.75
November	105.429	3.74
December	107.609	3.61
Average	103.359	3.86 %

Source: Bloomberg

Union Pacific Corp.

91

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EJ3
Coupon Rate:	4.050%
Maturity Date:	3/1/2046
Amount Outstanding ($ 000)	$586,590
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	100.430	4.03 %
February	102.438	3.91
March	99.409	4.09
April	100.958	3.99
May	102.595	3.90
June	103.259	3.86
July	104.407	3.80
August	105.548	3.73
September	104.235	3.81
October	105.534	3.73
November	105.284	3.75
December	107.661	3.61
Average	103.480	3.85 %

Source: Bloomberg

Union Pacific Corp.

92

Type:	Notes
Description:	UP Corp. (New)
CUSIP:	907818ER5
Coupon Rate:	4.100%
Maturity Date:	9/15/2067
Amount Outstanding ($ 000)	$494,280
Months Outstanding	3.5

End of Month in 2017	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	Not Traded	-
September	100.441	4.08
October	102.236	4.00
November	101.845	4.01
December	104.254	3.91
Average	102.194	4.00 %

Source: Bloomberg

Announcement Date: 9/12/2017

Union Pacific Corp.

93

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DZ8
Coupon Rate:	4.150%
Maturity Date:	1/15/2045
Amount Outstanding ($ 000)	$341,798
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	101.052	4.09 %
February	102.233	4.02
March	100.612	4.11
April	102.073	4.03
May	103.716	3.93
June	104.351	3.89
July	106.529	3.77
August	107.180	3.73
September	105.679	3.81
October	106.339	3.78
November	107.710	3.70
December	108.803	3.64
Average	104.690	3.88 %

Source: Bloomberg

Union Pacific Corp.

94

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DK1
Coupon Rate:	4.163%
Maturity Date:	7/15/2022
Amount Outstanding ($ 000)	$666,392
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	107.559	2.66 %
February	107.545	2.65
March	107.950	2.54
April	108.421	2.43
May	108.723	2.34
June	108.249	2.41
July	108.587	2.32
August	108.801	2.24
September	107.910	2.40
October	108.025	2.35
November	107.575	2.42
December	107.200	2.47
Average	108.045	2.44 %

Source: Bloomberg

Union Pacific Corp.

95

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DP0
Coupon Rate:	4.250%
Maturity Date:	4/15/2043
Amount Outstanding ($ 000)	$317,954
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	102.165	4.11 %
February	103.113	4.06
March	102.448	4.10
April	103.967	4.00
May	105.289	3.92
June	105.322	3.92
July	106.633	3.84
August	108.116	3.75
September	107.323	3.80
October	107.308	3.80
November	107.159	3.81
December	109.404	3.68
Average	105.687	3.90 %

Source: Bloomberg

Union Pacific Corp.

96

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DL9
Coupon Rate:	4.300%
Maturity Date:	6/15/2042
Amount Outstanding ($ 000)	$297,060
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	102.493	4.14 %
February	104.143	4.04
March	103.167	4.10
April	104.846	3.99
May	105.581	3.95
June	106.490	3.89
July	107.482	3.83
August	108.551	3.77
September	107.583	3.82
October	107.705	3.81
November	108.018	3.80
December	110.048	3.67
Average	106.342	3.90 %

Source: Bloomberg

Union Pacific Corp.

97

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EG9
Coupon Rate:	4.375%
Maturity Date:	11/15/2065
Amount Outstanding ($ 000)	$568,915
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	99.549	4.40 %
February	102.058	4.27
March	100.168	4.37
April	102.344	4.26
May	104.263	4.17
June	106.305	4.08
July	108.086	4.00
August	109.873	3.92
September	106.860	4.05
October	107.420	4.03
November	106.709	4.06
December	110.288	3.90
Average	105.327	4.13 %

Source: Bloomberg

Union Pacific Corp.

98

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DJ4
Coupon Rate:	4.750%
Maturity Date:	9/15/2041
Amount Outstanding ($ 000)	$316,134
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	108.456	4.20 %
February	109.823	4.11
March	109.174	4.15
April	109.975	4.10
May	111.617	4.00
June	112.167	3.96
July	114.229	3.84
August	115.118	3.79
September	113.695	3.87
October	114.253	3.83
November	114.564	3.81
December	116.363	3.71
Average	112.453	3.95 %

Source: Bloomberg

Union Pacific Corp.

99

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DU9
Coupon Rate:	4.750%
Maturity Date:	12/15/2043
Amount Outstanding ($ 000)	$292,929
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	108.572	4.21 %
February	109.613	4.15
March	107.844	4.26
April	110.181	4.12
May	112.264	4.00
June	111.795	4.02
July	112.671	3.97
August	114.459	3.87
September	113.024	3.95
October	112.896	3.95
November	112.580	3.97
December	114.539	3.86
Average	111.703	4.03 %

Source: Bloomberg

Union Pacific Corp.

100

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DT2
Coupon Rate:	4.821%
Maturity Date:	2/1/2044
Amount Outstanding ($ 000)	$221,084
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	110.945	4.14 %
February	111.661	4.10
March	110.429	4.17
April	112.497	4.05
May	113.615	3.99
June	113.875	3.97
July	115.104	3.90
August	116.459	3.83
September	115.116	3.90
October	115.347	3.88
November	116.061	3.84
December	117.654	3.75
Average	114.064	3.96 %

Source: Bloomberg

Union Pacific Corp.

101

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DX3
Coupon Rate:	4.850%
Maturity Date:	6/15/2044
Amount Outstanding ($ 000)	$143,843
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	110.962	4.17 %
February	111.859	4.12
March	111.293	4.15
April	112.089	4.11
May	113.628	4.02
June	113.804	4.01
July	114.802	3.95
August	116.343	3.87
September	114.696	3.95
October	114.736	3.95
November	114.885	3.94
December	116.182	3.87
Average	113.773	4.01 %

Source: Bloomberg

Union Pacific Corp.

102

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DF2
Coupon Rate:	5.780%
Maturity Date:	7/15/2040
Amount Outstanding ($ 000)	$62,860
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	117.800	4.54 %
February	118.530	4.49
March	119.879	4.41
April	121.667	4.30
May	123.188	4.20
June	122.525	4.24
July	123.707	4.17
August	125.498	4.06
September	123.874	4.15
October	123.570	4.16
November	123.324	4.18
December	125.777	4.03
Average	122.445	4.24 %

Source: Bloomberg

Note: This is the exchange-traded portion of these notes. The Rule 144-A notes similar to these have a different CUSIP, and are shown on the next page.

Union Pacific Corp.

103

Type:	Notes
Description:	UP Corp. 144A
CUSIP:	907818DE5
Coupon Rate:	5.780%
Maturity Date:	7/15/2040
Amount Outstanding ($ 000)	$10
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	118.045	4.52 %
February	118.481	4.49
March	120.213	4.39
April	122.349	4.25
May	120.625	4.36
June	122.433	4.24
July	123.267	4.19
August	125.804	4.04
September	123.480	4.17
October	123.354	4.18
November	122.861	4.20
December	125.226	4.06
Average	122.178	4.26 %

Source: Bloomberg

Note: These are Rule 144-A notes, which trade among qualified institutional buyers and have their own CUSIP. The exchange-traded notes similar to these are on the proceeding page.

Union Pacific Corp.

104

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DD7
Coupon Rate:	6.125%
Maturity Date:	2/15/2020
Amount Outstanding ($ 000)	$162,061
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	110.799	2.41 %
February	110.311	2.48
March	110.488	2.31
April	110.730	2.13
May	110.637	2.05
June	110.203	2.09
July	110.240	1.96
August	109.963	1.93
September	109.330	2.06
October	108.916	2.11
November	108.311	2.23
December	107.715	2.37
Average	109.804	2.18 %

Source: Bloomberg

Union Pacific Corp.

105

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DB1
Coupon Rate:	7.875%
Maturity Date:	1/15/2019
Amount Outstanding ($ 000)	$158,326
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	110.775	2.20 %
February	110.272	2.22
March	110.368	1.91
April	110.030	1.85
May	109.555	1.83
June	108.834	1.97
July	108.625	1.82
August	108.053	1.84
September	107.627	1.83
October	106.967	1.98
November	106.302	2.12
December	105.683	2.28
Average	108.591	1.99 %

Source: Bloomberg

Union Pacific Corp.

106

Type:	Notes
Description:	UP Corp. Series B
CUSIP:	90782ECK8
Coupon Rate:	9.300%
Maturity Date:	1/17/2020
Amount Outstanding ($ 000)	$310
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	116.290	3.46 %
February	116.079	3.38
March	115.496	3.41
April	115.339	3.32
May	114.992	3.27
June	114.358	3.34
July	114.132	3.27
August	113.797	3.19
September	113.032	3.34
October	112.548	3.35
November	111.665	3.54
December	111.061	3.62
Average	114.066	3.37 %

Source: Bloomberg

Note: These are Medium Term Notes, referred to as Series B.

Union Pacific Corp.

107

Type:	Notes
Description:	UP Corp. Series C
CUSIP:	90782EDE1
Coupon Rate:	9.940%
Maturity Date:	4/1/2020
Amount Outstanding ($ 000)	$4,100
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	119.740	3.31 %
February	119.479	3.24
March	118.804	3.28
April	118.645	3.18
May	118.266	3.13
June	117.556	3.19
July	117.304	3.11
August	116.937	3.04
September	116.071	3.19
October	115.524	3.20
November	114.545	3.38
December	113.867	3.46
Average	117.228	3.23 %

Source: Bloomberg

Note: These are Medium Term Notes, referred to as Series C.

Union Pacific Corp.

108

Type:	Notes
Description:	UP Corp. Series C
CUSIP:	90782ECU6
Coupon Rate:	10.000%
Maturity Date:	4/10/2020
Amount Outstanding ($ 000)	$2,500
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	119.767	3.40 %
February	119.518	3.33
March	118.845	3.37
April	118.691	3.27
May	118.319	3.21
June	117.612	3.28
July	117.366	3.20
August	117.006	3.13
September	116.139	3.28
October	115.595	3.29
November	114.617	3.47
December	113.941	3.55
Average	117.285	3.32 %

Source: Bloomberg

Note: These are Medium Term Notes, referred to as Series C.

Union Pacific Corp.

109

Type:	Notes
Description:	UP Corp. Series C
CUSIP:	90782EDG6
Coupon Rate:	9.900%
Maturity Date:	4/15/2020
Amount Outstanding ($ 000)	$250
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	119.059	3.55 %
February	118.839	3.47
March	118.195	3.51
April	118.058	3.41
May	117.703	3.36
June	117.017	3.42
July	116.791	3.34
August	116.454	3.27
September	115.608	3.42
October	115.084	3.43
November	114.127	3.61
December	113.471	3.69
Average	116.701	3.46 %

Source: Bloomberg

Note: These are Medium Term Notes, referred to as Series C.

Note: UP bond numbers 109 and 110 are listed together on the source document from UP, totalling 775, but they are found under two separate CUSIPs in Bloomberg's data.

UP bond number 109	250
UP bond number 110	525
Total	775

Union Pacific Corp.

110

Type:	Notes
Description:	UP Corp. Series C
CUSIP:	90782EDJ0
Coupon Rate:	9.900%
Maturity Date:	4/15/2020
Amount Outstanding ($ 000)	$525
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	119.059	3.55 %
February	118.839	3.47
March	118.192	3.51
April	118.055	3.41
May	117.702	3.36
June	117.017	3.42
July	116.791	3.34
August	116.453	3.27
September	115.606	3.42
October	115.082	3.44
November	114.125	3.61
December	113.470	3.69
Average	116.699	3.46 %

Source: Bloomberg

Note: These are Medium Term Notes, referred to as Series C.

Note: UP bond numbers 109 and 110 are listed together on the source document from UP, totalling 775, but they are found under two separate CUSIPs in Bloomberg's data.

UP bond number 109	250
UP bond number 110	525
Total	775

Union Pacific Corp.

111

Type:	Mort. Bond
Description:	UPRR-MP
CUSIP:	606198LF4
Coupon Rate:	4.750%
Maturity Date:	1/1/2020
Amount Outstanding ($ 000)	$29,905
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	100.190	4.68 %
February	100.162	4.69
March	100.159	4.69
April	100.166	4.69
May	100.172	4.68
June	100.153	4.68
July	100.052	4.72
August	100.167	4.67
September	100.165	4.67
October	100.178	4.66
November	100.152	4.67
December	100.142	4.67
Average	100.155	4.68 %

Source: Bloomberg

Union Pacific Corp.

112

Type:	Mort. Bond
Description:	UPRR-MP
CUSIP:	606198LG2
Coupon Rate:	4.750%
Maturity Date:	1/1/2030
Amount Outstanding ($ 000)	$27,381
Months Outstanding	12.0

End of Month in 2017	Price	Yield
January	96.432	5.13 %
February	98.119	4.95
March	97.907	4.98
April	97.186	5.06
May	97.179	5.06
June	97.100	5.07
July	97.387	5.04
August	97.550	5.02
September	96.316	5.16
October	99.082	4.85
November	96.640	5.13
December	97.065	5.08
Average	97.330	5.04 %

Source: Bloomberg

Union Pacific Corp.

113

Type:	Debentures
Description:	UPRR-MP
CUSIP:	606198LH0
Coupon Rate:	5.000%
Maturity Date:	1/1/2045
Amount Outstanding ($ 000)	$96,025
Months Outstanding	12.0

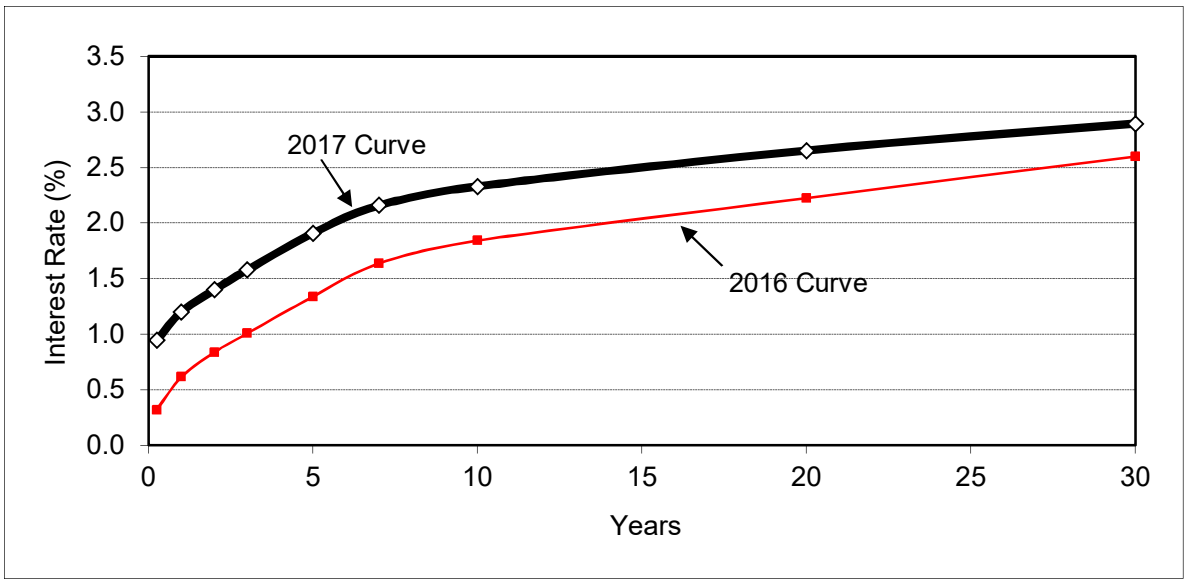
End of Month in 2017	Price	Yield
January	95.002	5.35 %
February	96.327	5.25
March	96.300	5.26
April	95.484	5.32
May	94.887	5.36
June	95.621	5.31
July	99.054	5.06
August	97.984	5.14
September	98.247	5.12
October	98.184	5.12
November	99.570	5.03
December	99.203	5.05
Average	97.155	5.20 %

Source: Bloomberg

Interest Rates on Selected Government Instruments

Yield in Percent Per Annum, Constant Maturity Rates for 2017

	3 Mo.	1 Yr	2 Yr	3 Yr	5 Yr	7 Yr	10 Yr	20 Yr	30 Yr
January	0.52	0.83	1.21	1.48	1.92	2.23	2.43	2.75	3.02
February	0.53	0.82	1.20	1.47	1.90	2.22	2.42	2.76	3.03
March	0.75	1.01	1.31	1.59	2.01	2.30	2.48	2.83	3.08
April	0.81	1.04	1.24	1.44	1.82	2.10	2.30	2.67	2.94
May	0.90	1.12	1.30	1.48	1.84	2.11	2.30	2.70	2.96
June	1.00	1.20	1.34	1.49	1.77	2.01	2.19	2.54	2.80
July	1.09	1.22	1.37	1.54	1.87	2.13	2.32	2.65	2.88
August	1.03	1.23	1.34	1.48	1.78	2.03	2.21	2.55	2.80
September	1.05	1.28	1.38	1.51	1.80	2.03	2.20	2.53	2.78
October	1.09	1.40	1.55	1.68	1.98	2.20	2.36	2.65	2.88
November	1.25	1.56	1.70	1.81	2.05	2.23	2.35	2.60	2.80
December	1.34	1.70	1.84	1.96	2.18	2.32	2.40	2.60	2.77
Average	**0.95**	**1.20**	**1.40**	**1.58**	**1.91**	**2.16**	**2.33**	**2.65**	**2.90**



Source: Federal Reserve statistical release H.15, Treasury Constant Maturities, Nominal

Equipment Trust Certificates for CSX

Modeled ETCs

	ETC ID	Maturity	Balance For 2017 ($000) Beg.	Ending	Avg O/S	Current Valuation Interest Rate	Valuation Factor	Current Market Value	Interest
1.	[None]				--			--	--
2.					--			--	--
3.					--			--	--
4.					--			--	--
5.					--			--	--
6.					--			--	--
7.					--			--	--
8.					--			--	--
9.					--			--	--
10.					--			--	--
11.					--			--	--
12.					--			--	--
13.					--			--	--
14.					--			--	--
15.					--			--	--
	Total		$0	$0	$0	--		**$0**	$0

Non-Modeled ETCs

	ETC ID	Maturity	Balance For 2017 ($000) Beg.	Ending
1.	[None]			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Equipment Trust Certificates for CSX (continued)

Entire ETC Current – Not Used for Cost or Market Value

	ETC ID	Maturity	Balance 2017 ($000) Beg.	Ending
1.	[None]			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Grand Totals (for reconciliation to carrier data)

	Balance For 2017 ($000) Beg.	Ending
Total Modeled	$0	$0
Total Non-Modeled	0	0
Sub Total	0	0
Total All Current	0	0
Grand Total	$0	$0
From CSX:		
Total ETCs		$0
Difference		$0

Equipment Trust Certificates for KCS

Modeled ETCs

	ETC ID	Maturity	Balance For 2017 ($000) Beg.	Ending	Avg O/S	Current Valuation Interest Rate	Valuation Factor	Current Market Value	Interest
1.	[None]				--			--	--
2.					--			--	--
3.					--			--	--
4.					--			--	--
5.					--			--	--
6.					--			--	--
7.					--			--	--
8.					--			--	--
9.					--			--	--
10.					--			--	--
11.					--			--	--
12.					--			--	--
13.					--			--	--
14.					--			--	--
15.					--			--	--
	Total		$0	$0	$0	--		**$0**	$0

Non-Modeled ETCs

	ETC ID	Maturity	Balance For 2017 ($000) Beg.	Ending
1.	[None]			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Equipment Trust Certificates for KCS (continued)

Entire ETC Current – Not Used for Cost or Market Value

	ETC ID	Maturity	Balance 2017 ($000) Beg.	Ending
1.	[None]			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Grand Totals (for reconciliation to carrier data)

	Balance For 2017 ($000) Beg.	Ending
Total Modeled	$0	$0
Total Non-Modeled	0	0
Sub Total	0	0
Total All Current	0	0
Grand Total	$0	$0
From KCS:		
Total ETCs		$0
Difference		$0

Equipment Trust Certificates for NS

Modeled ETCs

	ETC ID	Maturity	Balance For 2017 ($000) Beg.	Ending	Avg O/S	Current Valuation Interest Rate	Valuation Factor	Current Market Value	Interest
1.	[None]				--			--	--
2.					--			--	--
3.					--			--	--
4.					--			--	--
5.					--			--	--
6.					--			--	--
7.					--			--	--
8.					--			--	--
9.					--			--	--
10.					--			--	--
11.					--			--	--
12.					--			--	--
13.					--			--	--
14.					--			--	--
15.					--			--	--
	Total		$0	$0	$0	--		**$0**	$0

Non-Modeled ETCs

	ETC ID	Maturity	Balance For 2017 ($000) Beg.	Ending
1.	[None]			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Equipment Trust Certificates for NS (continued)

Entire ETC Current – Not Used for Cost or Market Value

	ETC ID	Maturity	Balance 2017 ($000) Beg.	Ending
1.	[None]			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Grand Totals (for reconciliation to carrier data)

	Balance For 2017 ($000) Beg.	Ending
Total Modeled	$0	$0
Total Non-Modeled	0	0
Sub Total	0	0
Total All Current	0	0
Grand Total	$0	$0
From NS:		
Total ETCs		$0
Difference		$0

Equipment Trust Certificates for UP

Modeled ETCs

	ETC ID	Maturity	Balance For 2017 ($000) Beg.	Ending	Avg O/S	Current Valuation Interest Rate	Valuation Factor	Current Market Value	Interest
1.	ETC UPC Series I	2/23/2019	13,518	6,049	9,784	2.228%	1.08695	10,634	237
2.	ETC UPC Series J	1/2/2031	53,122	45,779	49,451	3.100%	1.21144	59,907	1,857
3.	ETC UPC Series A	5/14/2026	462,699	445,828	454,264	2.928%	1.01583	461,454	13,512
4.	ETC UPC Series 2015 A	5/12/2027	382,227	368,808	375,518	2.973%	0.98634	370,388	11,010
5.	ETC UPC Series 2016 A	11/9/2029	149,532	144,425	146,979	3.046%	0.96782	142,249	4,332
6.					--			--	--
7.					--			--	--
8.					--			--	--
9.					--			--	--
10.					--			--	--
11.					--			--	--
12.					--			--	--
13.					--			--	--
14.					--			--	--
15.					--			--	--
	Total		$1,061,098	$1,010,889	$1,035,994	**2.963%**		**$1,044,632**	$30,949

Non-Modeled ETCs

	ETC ID	Maturity	Balance For 2017 ($000) Beg.	Ending
1.	[None]			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Equipment Trust Certificates for UP (continued)

Entire ETC Current – Not Used for Cost or Market Value

	ETC ID	Maturity	Balance 2017 ($000) Beg.	Ending
1.	[None]			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Grand Totals (for reconciliation to carrier data)

	Balance For 2017 ($000) Ending
Total Modeled	$1,010,889
Total Non-Modeled	0
Sub Total	1,010,889
Total All Current	0
Grand Total	$1,010,889
From UP:	
Total ETCs	$1,010,889
Difference	$0

2017 Market Value of Debt ($000)

Type of Debt	Market Value: Traded or Modeled	Market Value: Non-Traded or Non-Modeled	Market Value: Total	Percent of: Subtotal	Percent of: Total
Bonds, Notes & Debentures	$37,980,454	$506,173	$38,486,628	97.36%	96.75%
Equipment Trust Certificates	1,044,632		1,044,632	2.64%	2.63%
Conditional Sales Agreements	0		0	0.00%	0.00%
Sub Total	$39,025,086	$506,173	$39,531,260	100.00%	99.38%
All Other — Capital Leases		$896,687	$896,687	363.42%	2.25%
All Other — Misc. Debt		-649,953	-649,953	-263.42%	-1.63%
All Other — Non-Modeled ETC		0	0	0.00%	0.00%
All Other — Non-Modeled CSA		0	0	0.00%	0.00%
Sub Total			$246,734	100.00%	0.62%
Total Market Value			**$39,777,994**		100.00%

General Notes:

Bonds, Notes, and Debentures from Appendix A. Securities that did not trade were assigned a market value equal to their book value. The traded portion accounts for 98.68 percent of the total market value for this category.

Equipment Trust Certificates from Appendix C.

All Conditional Sales Agreements have been retired.

Capital Leases and Miscellaneous Debt listed in work papers.

The capital leases and miscellaneous debt portion of the All Other debt category was assigned a market value equal to its book value, and totals to $246,734 thousand. The non-modeled ETCs and CSAs are typically also assigned a market value equal to their book value, but there were none for this year. The All Other category totals to $246,734 thousand, or 0.6 percent of total debt.

If negative numbers appear in Miscellaneous Debt, they typically are related to debt premiums and discounts.

2017 Flotation Costs for Bonds

	CSX Notes	NSC Notes	UNP Notes	UNP Notes	UNP Notes	UNP Notes
From 424(b)	**4/26/2017**	**5/22/2017**	**3/29/2017**	**3/29/2017**	**9/12/2017**	**9/12/2017**
Face Amount	$850,000,000	$300,000,000	$500,000,000	$500,000,000	$500,000,000	$500,000,000
Coupon Rate	3.250%	3.150%	3.000%	4.000%	3.600%	4.100%
Maturity Date	6/1/2027	6/1/2027	4/15/2027	4/15/2047	9/15/2037	9/15/2067
Frequency of Coupon Payment	2	2	2	2	2	2
Interest Accrual Date	5/1/2017	5/31/2017	4/5/2017	4/5/2017	9/19/2017	9/19/2017
Price To Investors	99.878	99.847	98.608	98.655	99.901	99.852
Proceeds from Sale (before expenses)	$848,963,000	$299,541,000	$493,040,000	$493,275,000	$499,505,000	$499,260,000
Underwriter Fee as % of Gross Proceeds	0.650%	0.650%	0.650%	0.875%	0.875%	0.875%
Underwriter's Fee	$5,525,000	$1,950,000	$3,250,000	$4,375,000	$4,375,000	$4,375,000
Railroad Expenses Excluding Fee	$300,000.00	$500,000.00	$37,500.00	$37,500.00	$37,500.00	$37,500.00
Page in 424(b) for Expenses	S-19	S-17	S-8	S-8	S-9	S-9
Calculated						
Yield Based on Price to Investors	3.264%	3.168%	3.163%	4.078%	3.607%	4.107%
Issue Price Per $100 Less Flotation	$99.19	$99.03	$97.95	$97.77	$99.02	$98.97
Yield on New Issue Including Flotation	3.345%	3.264%	3.241%	4.130%	3.670%	4.149%
Flotation Costs (Diff. in Pct Pts)	**0.081%**	**0.096%**	**0.078%**	**0.052%**	**0.063%**	**0.042%**
Avg. Flotation Cost (Pct. Points)	**0.069%**					
Previous Year's Average	0.067%					

Source: SEC 424(b)(5) or 424(b)(2) filings.

Example of Source for Bond Flotation Costs

PROSPECTUS SUPPLEMENT
(To Prospectus Dated May 28, 2015)

$300,000,000

NORFOLK SOUTHERN®

3.150% Senior Notes due 2027

We are offering $300 million aggregate principal amount of our 3.150% senior notes due 2027 (the "Notes"). The Notes will bear interest at a rate of 3.150% per year. We will pay interest semi-annually in arrears on the Notes on June 1 and December 1 of each year, beginning on December 1, 2017. The Notes will mature on June 1, 2027. We may redeem the Notes prior to maturity in whole at any time or in part from time to time, at our option, as described in this prospectus supplement.

The Notes will be unsecured obligations and rank equally with our other unsecured senior indebtedness. The Notes will be issued only in registered form in denominations of $2,000 and integral multiples of $1,000 in excess thereof.

Investing in the notes involves risks that are described in the "Risk Factors" section beginning on page S-4 of this prospectus supplement and similar sections in our filings with the Securities and Exchange Commission that are incorporated or deemed incorporated by reference herein.

	Price to Public (1)	Underwriting Discount	Proceeds to us (before expenses) (1)
Per Note	99.847%	0.650%	99.197%
Total	$299,541,000	$ 1,950,000	$ 297,591,000

(1) Plus accrued interest, if any, from May 31, 2017.

The Securities and Exchange Commission and state securities regulators have not approved or disapproved these securities or determined if this prospectus supplement or the accompanying prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

The Notes will be ready for delivery in book-entry form through the facilities of The Depository Trust Company and its participants, including Euroclear Bank, S.A./N.V., and Clearstream Banking, *société anonyme*, on or about May 31, 2017.

Example of Source for Bond Flotation Costs

UNDERWRITING

Under the terms and subject to the conditions contained in the underwriting agreement dated the date of this prospectus supplement, the underwriters named below, for whom Citigroup Global Markets Inc. and Wells Fargo Securities, LLC are acting as representatives, have severally agreed to purchase, and we have agreed to sell to them, severally, the respective principal amount of the Notes set forth opposite their names below:

Underwriters	Principal Amount of Notes
Citigroup Global Markets Inc.	$ 112,500,000
Wells Fargo Securities, LLC	112,500,000
Capital One Securities, Inc.	18,750,000
Fifth Third Securities, Inc.	18,750,000
MUFG Securities Americas Inc.	18,750,000
U.S. Bancorp Investments, Inc.	18,750,000
Total	$ 300,000,000

The underwriting agreement provides that the obligations of the underwriters to pay for and accept delivery of the Notes offered hereby are subject to the approval of certain legal matters by their counsel and to certain other conditions. The underwriters are obligated to take and pay for all of the Notes if any Notes are taken. The offering of the Notes by the underwriters is subject to receipt and acceptance and subject to the underwriters' right to reject any order in whole or in part.

The underwriters have advised us that they propose initially to offer the Notes to the public at the public offering price on the cover page of this prospectus supplement, and to dealers at that price less a concession not in excess of 0.40% of the principal amount of the Notes. The underwriters may allow, and the dealers may reallow, a discount not in excess of 0.25% of the principal amount of the Notes to other dealers. After the Notes are released to the public, the offering price and other selling terms may from time to time be varied by the underwriters.

The expenses of the offering payable by us, not including the underwriting discount, are estimated to be $500,000.

We have agreed to indemnify the several underwriters against certain liabilities, including liabilities under the Securities Act, or to contribute to payments that the underwriters may be required to make in respect of those liabilities.

In order to facilitate the offering of these securities, the underwriters may engage in transactions that stabilize, maintain or otherwise affect the price of the Notes or any other notes the prices of which may be used to determine payments on the Notes. Specifically, the underwriters may sell more Notes than they are obligated to purchase in connection with the offering, creating a short position for their own accounts. A short sale is covered by purchasing the Notes in the open market. A short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of the Notes in the open market after pricing that could adversely affect investors who purchase in the offering. As an additional means of facilitating the offering, the underwriters may bid for, and purchase, the Notes or any other notes in the open market to stabilize the price of the Notes or of any other notes. Finally, in any offering of the Notes through a syndicate of underwriters or dealer group, the underwriters acting on behalf of the underwriting syndicate or for themselves may impose a penalty bid, whereby the underwriters reclaim selling concessions allowed to an underwriter or a dealer for distributing the Notes in the offering, if the underwriters repurchase previously distributed Notes to cover syndicate short positions or to stabilize the price of the Notes. Any of these activities may raise or maintain the market price of the Notes above independent market levels or prevent or retard a decline in the market price of the Notes. The underwriters are not required to engage in these activities, and may end any of these activities at any time without notice.

2017 Current Cost of Debt

Type of Debt	Cost Reference	Appendix D Weight	Current Cost	Weighted Cost
Type of Instrument				
Bonds, Notes & Debentures	App. A & Table 3	97.36%	3.510%	3.417%
Equipment Trust Certificates	App. C & Table 5	2.64%	2.963%	0.078%
Conditional Sales Agreements	Railroad Data	0.00%	--	--
Total Without Floatation Costs		100.00%		3.496%
Floatation Costs				
Bonds, Notes & Debentures	App. F & Table 8	97.36%	0.069%	0.067%
Equipment Trust Certificates	Tables 7 and 8	2.64%	0.074%	0.002%
Conditional Sales Agreements	Table 8	0.00%	not calculated	--
Total Floatation Costs		100.00%		0.069%
Weighted Cost of Debt				3.565%
Weighted Cost of Debt (rounded)				**3.57%**

Historical Weighted Cost of Debt (for comparison purposes only)

Item	Year	Reference	Weighted Cost
Previous Year	2016	EP 558 (Sub-No. 20) Served August 7, 2017	3.43%
Highest	1982	EP 436 Decided July 22, 1983	14.0%
Lowest	2012	EP 558 (Sub-No. 16) Served August 30, 2013	3.29%

Market Value for Common Equity

CSX Data from Yahoo Finance 1-11-2018

Beg. of Wk. Date	Open	High	Low	End of Wk Close	Volume	Shares Outstanding	Capitalization ($000)
1/2/2017	36.15	37.73	35.59	37.52	37724300	936,661,112	35,143,525
1/9/2017	37.57	38.82	36.78	38.80	47414700	936,661,112	36,342,450
1/16/2017	38.75	45.61	36.21	44.33	182672400	936,661,112	41,522,189
1/23/2017	44.66	49.13	44.56	48.06	89171300	926,446,993	44,525,043
1/30/2017	47.80	48.09	46.06	46.79	63818600	926,446,993	43,348,456
2/6/2017	46.55	48.93	46.54	47.77	53789100	926,446,993	44,256,373
2/13/2017	48.11	48.63	46.22	48.54	55122600	926,446,993	44,969,738
2/20/2017	48.53	49.00	47.55	48.48	33414800	926,446,993	44,914,150
2/27/2017	48.28	49.79	47.99	49.48	45965300	926,446,993	45,840,597
3/6/2017	49.12	50.31	47.48	47.80	59383000	926,446,993	44,284,165
3/13/2017	47.90	48.41	46.88	46.88	53903800	926,446,993	43,431,836
3/20/2017	46.96	47.20	45.41	46.32	44928700	926,446,993	42,913,025
3/27/2017	45.88	47.69	45.53	46.55	28622300	922,687,144	42,951,086
4/3/2017	46.66	48.17	46.37	47.43	24749200	922,687,144	43,763,051
4/10/2017	47.60	47.93	46.04	46.42	22146400	922,687,144	42,831,135
4/17/2017	46.66	51.28	46.39	50.77	57643400	922,687,144	46,844,826
4/24/2017	51.48	51.66	50.07	50.84	44953600	922,687,144	46,909,414
5/1/2017	50.87	52.50	50.86	52.50	31758300	922,687,144	48,441,075
5/8/2017	52.50	52.65	51.35	52.14	28238700	922,687,144	48,108,907
5/15/2017	52.11	52.27	48.77	50.38	45809200	922,687,144	46,484,979
5/22/2017	50.63	54.23	50.48	53.96	40702100	922,687,144	49,788,197
5/29/2017	53.98	55.06	53.75	54.54	31095400	922,687,144	50,323,358
6/5/2017	54.59	55.00	52.37	53.05	35708400	922,687,144	48,948,552
6/12/2017	53.08	54.11	52.49	52.74	34587700	922,687,144	48,662,522
6/19/2017	53.00	53.67	51.76	52.65	49579900	922,687,144	48,579,480
6/26/2017	53.10	54.86	52.80	54.56	31893300	913,313,010	49,830,359
7/3/2017	54.75	55.31	54.37	54.85	17050800	913,313,010	50,095,217
7/10/2017	54.65	55.48	53.92	55.08	20554500	913,313,010	50,305,282
7/17/2017	55.00	55.00	50.33	51.68	75830400	913,313,010	47,200,016
7/24/2017	51.54	52.40	48.86	49.99	57285600	913,313,010	45,656,519
7/31/2017	49.95	50.10	47.99	48.74	42808100	913,313,010	44,514,878
8/7/2017	48.81	50.76	48.45	50.27	32467100	913,313,010	45,912,245
8/14/2017	50.66	51.38	48.16	48.78	31777000	913,313,010	44,551,408
8/21/2017	48.70	50.00	48.11	48.85	26523700	913,313,010	44,615,339
8/28/2017	49.00	50.86	48.90	49.78	28083900	913,313,010	45,464,721
9/4/2017	49.67	51.58	48.69	51.14	31370700	913,313,010	46,706,826
9/11/2017	51.46	52.51	51.43	52.48	29079300	913,313,010	47,930,667
9/18/2017	52.44	53.23	51.18	53.10	24033300	913,313,010	48,496,919
9/25/2017	53.04	54.30	52.67	54.26	23425500	913,313,010	49,556,362
10/2/2017	52.81	53.46	51.51	52.35	29305200	893,723,083	46,786,402
10/9/2017	52.45	53.94	52.02	52.83	19754900	893,723,083	47,215,392
10/16/2017	52.80	54.98	52.10	54.52	35135200	893,723,083	48,725,782
10/23/2017	54.54	54.99	50.68	52.54	35763400	893,723,083	46,956,212
10/30/2017	52.41	52.55	49.77	51.31	29990700	893,723,083	45,856,932
11/6/2017	51.05	52.42	49.77	50.08	22900200	893,723,083	44,757,654
11/13/2017	49.36	50.15	48.26	49.92	28000100	893,723,083	44,614,655
11/20/2017	49.75	51.32	49.30	50.90	15751700	893,723,083	45,490,507
11/27/2017	50.91	56.32	50.22	56.14	47343500	893,723,083	50,173,613
12/4/2017	56.45	58.25	55.37	56.46	34447400	893,723,083	50,459,604
12/11/2017	56.40	58.35	51.63	52.93	75941200	893,723,083	47,304,763
12/18/2017	51.70	56.08	51.50	55.00	63896000	893,723,083	49,154,770
12/25/2017	55.07	55.46	54.47	55.01	18763900	893,723,083	49,163,705

Note: Capitalization calulated using close of week price multiplied by the number of shares outstanding.

Market Value for Common Equity

KSU Data from Yahoo Finance 1-16-2018

Beg. of Wk. Date	Open	High	Low	End of Wk Close	Volume	Shares Outstanding	Capitalization ($000)
1/2/2017	85.52	85.64	79.05	83.81	11682200	107,579,057	9,016,201
1/9/2017	83.30	84.08	80.38	83.89	7823500	107,579,057	9,024,807
1/16/2017	84.41	89.09	83.36	87.91	10559200	106,643,666	9,375,045
1/23/2017	86.07	89.06	84.97	86.00	10312100	106,643,666	9,171,355
1/30/2017	85.74	86.84	84.50	85.61	8431900	106,643,666	9,129,764
2/6/2017	85.49	86.49	83.65	85.80	6792800	106,643,666	9,150,027
2/13/2017	86.35	87.28	85.59	86.89	6295700	106,643,666	9,266,268
2/20/2017	87.23	88.47	86.33	88.33	6565400	106,643,666	9,419,835
2/27/2017	88.57	90.82	87.86	89.50	6152700	106,643,666	9,544,608
3/6/2017	89.44	89.44	86.88	87.32	5888400	106,643,666	9,312,125
3/13/2017	87.33	88.13	84.02	84.13	8116100	106,643,666	8,971,931
3/20/2017	84.17	84.45	81.54	82.64	6694300	106,643,666	8,813,032
3/27/2017	81.87	87.87	81.81	85.76	6261000	106,643,666	9,145,761
4/3/2017	85.93	87.72	84.92	87.63	4899800	106,643,666	9,345,184
4/10/2017	88.06	89.31	87.08	88.00	5275500	106,643,666	9,384,643
4/17/2017	88.31	91.24	87.89	87.99	8674500	106,083,719	9,334,306
4/24/2017	89.13	91.50	86.15	90.07	13121900	106,083,719	9,554,961
5/1/2017	90.37	91.75	89.05	91.62	3896400	106,083,719	9,719,391
5/8/2017	91.40	92.89	89.92	91.17	4613100	106,083,719	9,671,652
5/15/2017	91.72	92.10	88.66	90.27	4584800	106,083,719	9,576,177
5/22/2017	90.52	96.23	89.98	95.95	5734800	106,083,719	10,178,733
5/29/2017	95.49	96.82	94.70	95.59	3868700	106,083,719	10,140,542
6/5/2017	95.85	100.13	95.32	99.59	6747700	106,083,719	10,564,877
6/12/2017	99.51	103.88	99.01	103.83	6050800	106,083,719	11,014,673
6/19/2017	103.87	104.47	99.78	101.86	5310500	106,083,719	10,805,688
6/26/2017	102.50	105.15	101.95	104.65	3231300	106,083,719	11,101,661
7/3/2017	105.10	105.33	102.86	104.34	3260700	106,083,719	11,068,775
7/10/2017	104.35	105.92	103.11	104.84	3876800	105,421,172	11,052,355
7/17/2017	105.08	105.50	100.17	105.25	6267000	105,421,172	11,095,578
7/24/2017	105.59	106.35	101.03	103.12	5163800	105,421,172	10,871,032
7/31/2017	103.32	104.19	100.66	102.43	7421000	105,421,172	10,798,291
8/7/2017	102.56	104.52	102.00	102.97	3800300	105,421,172	10,855,218
8/14/2017	103.37	109.13	103.30	105.80	5750300	105,421,172	11,153,560
8/21/2017	106.31	108.78	103.63	104.37	6050600	105,421,172	11,002,808
8/28/2017	104.29	104.72	101.92	103.76	7746800	105,421,172	10,938,501
9/4/2017	103.63	104.47	102.26	104.43	3589300	105,421,172	11,009,133
9/11/2017	105.00	107.26	104.96	107.26	3826900	105,421,172	11,307,475
9/18/2017	107.26	108.24	105.98	107.74	2569900	105,421,172	11,358,077
9/25/2017	107.75	108.85	106.93	108.68	3052800	105,421,172	11,457,173
10/2/2017	108.27	108.50	103.21	103.74	6076200	105,421,172	10,936,392
10/9/2017	103.75	105.99	103.69	104.17	3993500	103,543,121	10,786,087
10/16/2017	104.35	107.28	99.70	105.19	8441500	103,543,121	10,891,701
10/23/2017	106.57	107.69	102.00	104.26	5609200	103,543,121	10,795,406
10/30/2017	103.93	106.75	103.26	104.86	5399000	103,543,121	10,857,532
11/6/2017	104.86	106.90	103.84	104.80	3819500	103,543,121	10,851,319
11/13/2017	104.55	105.19	102.03	102.67	3219400	103,543,121	10,630,772
11/20/2017	102.93	107.09	102.18	106.42	2139800	103,543,121	11,019,059
11/27/2017	106.40	112.88	105.34	110.39	5906500	103,543,121	11,430,125
12/4/2017	113.51	114.85	110.52	111.74	6187100	103,543,121	11,569,908
12/11/2017	111.56	111.81	109.19	110.96	6694500	103,543,121	11,489,145
12/18/2017	111.70	112.77	107.77	108.19	4904500	103,543,121	11,202,330
12/25/2017	108.43	108.74	105.18	105.22	3311300	103,543,121	10,894,807

Note: Capitalization calulated using close of week price multiplied by the number of shares outstanding.

Market Value for Common Equity

NSC Data from Yahoo Finance 1-11-2018

Beg. of Wk. Date	Open	High	Low	End of Wk Close	Volume	Shares Outstanding	Capitalization ($000)
1/2/2017	108.91	112.99	106.15	111.66	9620100	291,942,235	32,598,271
1/9/2017	110.89	111.85	108.28	111.59	7909100	291,942,235	32,577,833
1/16/2017	111.18	116.00	105.89	113.59	12962500	291,942,235	33,161,717
1/23/2017	113.70	122.17	112.38	120.35	14021300	291,942,235	35,135,247
1/30/2017	119.27	121.22	117.11	120.46	12888200	290,553,713	35,000,100
2/6/2017	120.13	122.50	118.60	121.12	9398200	290,553,713	35,191,867
2/13/2017	121.33	123.42	121.16	122.78	7926100	290,553,713	35,674,185
2/20/2017	123.09	125.00	118.65	120.08	7970400	290,553,713	34,889,690
2/27/2017	120.20	124.50	118.93	122.40	7658000	290,553,713	35,563,775
3/6/2017	121.34	123.17	118.89	119.66	8333500	290,553,713	34,767,658
3/13/2017	119.74	120.26	114.21	114.71	15110200	290,553,713	33,329,416
3/20/2017	114.89	115.63	110.14	110.66	11960300	290,553,713	32,152,675
3/27/2017	109.51	115.39	109.27	111.97	8662400	289,782,660	32,446,965
4/3/2017	112.23	117.63	111.90	115.90	9756700	289,782,660	33,585,811
4/10/2017	115.99	117.00	111.07	111.58	7125600	289,782,660	32,333,950
4/17/2017	111.89	117.00	111.38	116.37	8793100	289,782,660	33,722,009
4/24/2017	118.00	120.74	115.49	117.49	11358200	289,782,660	34,046,564
5/1/2017	117.65	118.46	116.50	117.01	7718300	289,782,660	33,907,470
5/8/2017	117.00	117.41	115.33	116.96	6269200	289,782,660	33,892,980
5/15/2017	117.14	117.86	111.21	113.27	7285500	289,782,660	32,823,681
5/22/2017	113.79	122.90	113.27	122.33	10598500	289,782,660	35,449,113
5/29/2017	121.89	125.31	121.22	123.64	8327900	289,782,660	35,828,728
6/5/2017	123.85	123.87	117.40	118.92	9594000	289,782,660	34,460,953
6/12/2017	118.99	121.44	116.93	119.14	8932900	289,782,660	34,524,706
6/19/2017	119.53	120.27	116.30	119.29	7502300	289,782,660	34,568,174
6/26/2017	119.94	122.30	118.50	121.70	5430300	288,181,852	35,071,731
7/3/2017	122.32	123.70	120.28	122.34	4854300	288,181,852	35,256,167
7/10/2017	122.27	124.24	121.13	124.00	4959400	288,181,852	35,734,550
7/17/2017	123.82	124.02	116.69	117.85	9817000	288,181,852	33,962,231
7/24/2017	117.93	121.00	112.25	114.23	12329300	288,181,852	32,919,014
7/31/2017	113.73	115.00	111.44	114.61	12073400	288,181,852	33,028,522
8/7/2017	115.15	118.36	114.89	116.56	8361800	288,181,852	33,590,476
8/14/2017	117.30	121.32	116.77	118.63	7329500	288,181,852	34,187,012
8/21/2017	118.75	120.55	117.10	118.21	5962800	288,181,852	34,065,976
8/28/2017	118.58	122.42	116.90	121.16	7093400	288,181,852	34,916,114
9/4/2017	121.20	124.35	120.13	123.92	7612000	288,181,852	35,711,495
9/11/2017	124.79	128.09	124.04	128.04	6677900	288,181,852	36,898,802
9/18/2017	128.42	131.32	126.87	130.99	5704100	288,181,852	37,748,942
9/25/2017	131.00	133.81	129.49	132.24	6085700	288,181,852	38,109,170
10/2/2017	132.65	132.80	129.78	130.46	10081400	286,148,766	37,330,970
10/9/2017	130.50	134.52	129.51	131.65	5402300	286,148,766	37,671,483
10/16/2017	130.85	132.88	128.64	132.75	8486400	286,148,766	37,986,249
10/23/2017	133.01	134.42	125.80	133.65	10969700	286,148,766	38,243,781
10/30/2017	132.91	133.91	129.72	130.36	5907400	286,148,766	37,302,353
11/6/2017	130.48	130.74	126.96	127.15	5917200	286,148,766	36,383,816
11/13/2017	126.47	133.25	125.59	127.54	5988200	286,148,766	36,495,414
11/20/2017	127.68	131.09	126.54	130.01	3231300	286,148,766	37,202,200
11/27/2017	128.37	139.98	126.40	137.50	12314700	286,148,766	39,345,455
12/4/2017	139.00	142.76	138.36	140.82	8291800	286,148,766	40,295,471
12/11/2017	141.27	143.35	138.51	141.11	7795700	286,148,766	40,378,453
12/18/2017	142.45	145.54	141.03	144.52	6783200	286,148,766	41,354,221
12/25/2017	144.48	146.33	144.05	144.90	2656000	286,148,766	41,462,954

Note: Capitalization calulated using close of week price multiplied by the number of shares outstanding.

Market Value for Common Equity

UNP Data from Yahoo Finance 1-11-2018

Beg. of Wk. Date	Open	High	Low	End of Wk Close	Volume	Shares Outstanding	Capitalization ($000)
1/2/2017	104.48	105.29	101.20	103.19	15535400	824,112,432	85,040,164
1/9/2017	103.73	105.45	101.90	105.25	14536500	824,112,432	86,737,833
1/16/2017	104.70	108.98	101.53	108.60	25306200	824,112,432	89,498,608
1/23/2017	108.64	111.38	106.93	109.20	21797600	813,795,240	88,866,438
1/30/2017	108.94	108.96	105.90	108.51	21718800	813,795,240	88,304,923
2/6/2017	108.36	108.76	106.27	107.87	16634800	813,795,240	87,784,095
2/13/2017	108.09	110.00	107.74	109.82	15940600	813,795,240	89,370,993
2/20/2017	110.00	110.82	105.17	107.74	17885000	813,795,240	87,678,298
2/27/2017	107.82	110.65	106.48	109.02	16154600	813,795,240	88,719,955
3/6/2017	108.76	109.64	105.72	106.28	17222600	813,795,240	86,490,157
3/13/2017	106.36	106.79	104.10	105.99	26355400	813,795,240	86,254,156
3/20/2017	105.75	105.98	103.07	103.96	16714800	813,795,240	84,602,152
3/27/2017	102.90	107.46	102.41	105.92	16803400	813,795,240	86,197,190
4/3/2017	106.16	109.54	104.77	107.03	16033600	813,795,240	87,100,504
4/10/2017	107.57	108.39	104.78	104.78	10349600	813,795,240	85,269,464
4/17/2017	104.90	109.35	104.12	108.28	16230800	807,439,232	87,429,519
4/24/2017	109.50	115.15	109.06	111.96	22214300	807,439,232	90,400,896
5/1/2017	112.43	112.68	110.12	110.72	15111800	807,439,232	89,399,673
5/8/2017	110.39	110.79	108.74	110.48	16848500	807,439,232	89,205,889
5/15/2017	110.56	111.83	105.50	107.05	17733500	807,439,232	86,436,372
5/22/2017	107.53	110.75	106.81	110.57	16462200	807,439,232	89,278,556
5/29/2017	110.07	112.26	109.36	111.20	14171600	807,439,232	89,787,240
6/5/2017	111.40	111.47	108.48	109.75	13824600	807,439,232	88,616,456
6/12/2017	109.73	111.72	108.82	111.38	15924600	807,439,232	89,932,579
6/19/2017	111.70	112.11	106.59	108.10	28582900	807,439,232	87,284,179
6/26/2017	108.43	109.55	107.33	108.91	15627700	807,439,232	87,938,210
7/3/2017	109.02	110.38	106.84	108.35	10262100	807,439,232	87,486,039
7/10/2017	108.00	110.22	107.70	109.53	12576000	800,384,902	87,666,158
7/17/2017	109.39	109.57	104.27	104.85	21315600	800,384,902	83,920,355
7/24/2017	104.76	105.42	101.06	103.30	23442600	800,384,902	82,679,763
7/31/2017	103.46	103.97	101.72	102.48	22009800	800,384,902	82,023,447
8/7/2017	102.35	104.59	101.90	103.57	15739600	800,384,902	82,895,864
8/14/2017	104.31	106.13	102.87	103.90	15263200	800,384,902	83,159,993
8/21/2017	104.03	106.45	103.37	105.25	13354100	800,384,902	84,240,511
8/28/2017	105.40	106.27	103.41	105.47	13641000	800,384,902	84,416,596
9/4/2017	105.09	107.29	103.85	107.21	13828500	800,384,902	85,809,265
9/11/2017	107.30	113.40	107.20	113.40	20788200	800,384,902	90,763,649
9/18/2017	113.20	115.68	111.93	115.34	17096700	800,384,902	92,316,391
9/25/2017	115.45	116.93	114.73	115.97	12679100	800,384,902	92,820,638
10/2/2017	115.38	115.55	112.88	113.95	14247300	800,384,902	91,203,857
10/9/2017	113.79	114.74	112.17	112.28	12022800	800,384,902	89,867,216
10/16/2017	112.52	113.29	108.71	112.99	19500900	787,168,815	88,942,203
10/23/2017	113.00	119.71	109.83	117.08	26990500	787,168,815	92,161,726
10/30/2017	116.96	118.70	115.34	117.18	14069700	787,168,815	92,240,442
11/6/2017	117.34	118.17	116.05	116.70	10817000	787,168,815	91,862,598
11/13/2017	115.63	117.13	115.19	115.63	13557700	787,168,815	91,020,328
11/20/2017	115.94	118.87	115.16	118.25	9483200	787,168,815	93,082,712
11/27/2017	118.09	127.86	115.69	124.62	28774900	787,168,815	98,096,980
12/4/2017	126.08	132.00	125.56	129.11	26187800	787,168,815	101,631,366
12/11/2017	129.52	132.39	128.06	130.60	29292400	787,168,815	102,804,252
12/18/2017	131.35	135.30	131.10	134.47	24100900	787,168,815	105,850,591
12/25/2017	135.00	136.32	134.04	134.10	14731500	787,168,815	105,559,343

Note: Capitalization calulated using close of week price multiplied by the number of shares outstanding.

Market Value for Common Equity

Total Market Value for CSX, KSU, NSC, and UNP combined

Based on close price on last trading day of week and shares outstanding from 10-K and 10-Q.

	Days For Week		Capitalization
	Beginning	End	($000)
1.	Tuesday, January 3, 2017	Friday, January 6, 2017	$161,798,160
2.	Monday, January 9, 2017	Friday, January 13, 2017	$164,682,923
3.	Tuesday, January 17, 2017	Friday, January 20, 2017	$173,557,560
4.	Monday, January 23, 2017	Friday, January 27, 2017	$177,698,084
5.	Monday, January 30, 2017	Friday, February 3, 2017	$175,783,243
6.	Monday, February 6, 2017	Friday, February 10, 2017	$176,382,361
7.	Monday, February 13, 2017	Friday, February 17, 2017	$179,281,184
8.	Tuesday, February 21, 2017	Friday, February 24, 2017	$176,901,973
9.	Monday, February 27, 2017	Friday, March 3, 2017	$179,668,935
10.	Monday, March 6, 2017	Friday, March 10, 2017	$174,854,106
11.	Monday, March 13, 2017	Friday, March 17, 2017	$171,987,339
12.	Monday, March 20, 2017	Friday, March 24, 2017	$168,480,885
13.	Monday, March 27, 2017	Friday, March 31, 2017	$170,741,002
14.	Monday, April 3, 2017	Friday, April 7, 2017	$173,794,550
15.	Monday, April 10, 2017	Thursday, April 13, 2017	$169,819,192
16.	Monday, April 17, 2017	Friday, April 21, 2017	$177,330,661
17.	Monday, April 24, 2017	Friday, April 28, 2017	$180,911,835
18.	Monday, May 1, 2017	Friday, May 5, 2017	$181,467,608
19.	Monday, May 8, 2017	Friday, May 12, 2017	$180,879,428
20.	Monday, May 15, 2017	Friday, May 19, 2017	$175,321,209
21.	Monday, May 22, 2017	Friday, May 26, 2017	$184,694,599
22.	Tuesday, May 30, 2017	Friday, June 2, 2017	$186,079,868
23.	Monday, June 5, 2017	Friday, June 9, 2017	$182,590,838
24.	Monday, June 12, 2017	Friday, June 16, 2017	$184,134,480
25.	Monday, June 19, 2017	Friday, June 23, 2017	$181,237,521
26.	Monday, June 26, 2017	Friday, June 30, 2017	$183,941,961
27.	Monday, July 3, 2017	Friday, July 7, 2017	$183,906,197
28.	Monday, July 10, 2017	Friday, July 14, 2017	$184,758,345
29.	Monday, July 17, 2017	Friday, July 21, 2017	$176,178,181
30.	Monday, July 24, 2017	Friday, July 28, 2017	$172,126,327
31.	Monday, July 31, 2017	Friday, August 4, 2017	$170,365,138
32.	Monday, August 7, 2017	Friday, August 11, 2017	$173,253,804
33.	Monday, August 14, 2017	Friday, August 18, 2017	$173,051,973
34.	Monday, August 21, 2017	Friday, August 25, 2017	$173,924,634
35.	Monday, August 28, 2017	Friday, September 1, 2017	$175,735,932
36.	Tuesday, September 5, 2017	Friday, September 8, 2017	$179,236,718
37.	Monday, September 11, 2017	Friday, September 15, 2017	$186,900,594
38.	Monday, September 18, 2017	Friday, September 22, 2017	$189,920,329
39.	Monday, September 25, 2017	Friday, September 29, 2017	$191,943,343
40.	Monday, October 2, 2017	Friday, October 6, 2017	$186,257,621
41.	Monday, October 9, 2017	Friday, October 13, 2017	$185,540,178
42.	Monday, October 16, 2017	Friday, October 20, 2017	$186,545,935
43.	Monday, October 23, 2017	Friday, October 27, 2017	$188,157,125
44.	Monday, October 30, 2017	Friday, November 3, 2017	$186,257,259
45.	Monday, November 6, 2017	Friday, November 10, 2017	$183,855,388
46.	Monday, November 13, 2017	Friday, November 17, 2017	$182,761,168
47.	Monday, November 20, 2017	Friday, November 24, 2017	$186,794,477
48.	Monday, November 27, 2017	Friday, December 1, 2017	$199,046,173
49.	Monday, December 4, 2017	Friday, December 8, 2017	$203,956,350
50.	Monday, December 11, 2017	Friday, December 15, 2017	$201,976,612
51.	Monday, December 18, 2017	Friday, December 22, 2017	$207,561,912
52.	Tuesday, December 26, 2017	Friday, December 29, 2017	$207,080,810
		Average	**$181,367,577.50**

Historical Risk Free Rates and Market Risk Premiums

The Surface Transportation Board (STB) has used a Capital Asset Pricing Model (CAPM) as part of its cost of capital determination since 2006. Two major components of the STB's CAPM are the Risk-Free Rate, which is based on 20-Year U.S. Government Bonds, and the Market Risk Premium (a.k.a. Equity Risk Premium), as calculated by Ibbotson Associates using data beginning in 1926. The table below lists the rates used by the STB (since 2006), the rate for the current year, and earlier rates that would have been used as part of the current STB specifications.

Year	Risk-Free Rate	Market Risk Premium
1980	11.36 %	7.60 %
1981	13.72	7.20
1982	12.92	7.20
1983	11.34	7.30
1984	12.49	7.10
1985	10.97	7.30
1986	7.84	7.40
1987	n.a.	7.20
1988	n.a.	7.20
1989	n.a.	7.50
1990	n.a.	7.20
1991	n.a.	7.40
1992	n.a.	7.30
1993	6.29	7.20
1994	7.49	7.00
1995	6.95	7.40
1996	6.83	7.50
1997	6.69	7.80
1998	5.72	8.00
1999	6.20	8.10
2000	6.23	7.80
2001	5.63	7.40
2002	5.43	7.00
2003	4.96	7.20
2004	5.04	7.20
2005	4.64	7.10
2006	5.00	7.13
2007	4.91	7.05
2008	4.36	6.47
2009	4.11	6.67
2010	4.03	6.72
2011	3.62	6.62
2012	2.54	6.70
2013	3.12	6.96
2014	3.07	7.00
2015	2.55	6.90
2016	2.22	6.94
2017	2.65	7.07

Sources: Federal Reserve Board for U.S. government 20-year bonds (Risk-Free Rate) and Morningstar's *Ibbotson SBBI Valuation Yearbook* Table A-1 for Market Risk Premiums through 2012. Morningstar's *Ibbotson SBBI Classic Yearbook* is the source for premiums beginning 2013. The Duff & Phelps *Valuation Handbook Guide to Cost of Capital* is the source for premiums in 2015 and 2016. Values for 2017 are from the Duff & Phelps online Cost of Capital Navigator. 2006 through 2016 match decisions by the STB. The U.S. Government did not issue 20-Year bonds in 1987 through 1992.

Historical Risk Free Rates and Market Risk Premiums

The Surface Transportation Board (STB) has always used a long-term historical equity risk premium (a.k.a. market risk premium) for its Capital Asset Pricing Model, and Duff & Phelps was the source used last year. Duff & Phelps calculates this premium using the same method as the earlier source used by the STB, Morningstar/Ibbotson as found in its *Ibbotson SBBI Valuation Yearbook*. The portion of the page shown below is from the Duff & Phelps 2018 *Cost of Capital Navigator*, page 14 of Chapter 5. The latest long-term equity risk premium, as shown below, is 7.07 percent. The years used for this calculation are 1926 through 2017.

- Three industry risk premia calculated, using different ERP estimates:[5.15]

  Long-term, "historical" (i.e., realized) ERP: As of the end of 2017, the long-horizon historical equity risk premium was 7.07%.[5.16]

  Long-term "supply-side" ERP: As of the end of 2017, the long-horizon supply-side equity risk premium was 6.04%.[5.17]

  Duff & Phelps Recommended ERP: As of the end of 2017, the Duff & Phelps recommended ERP is 5.0% (developed in conjunction with a "normalized" long-term risk-free rate of 3.5%).[5.18]

The industry risk premia previously published in Table 3-5 of the *SBBI Valuation Yearbook* were full-information betas converted to industry risk premia using only the long-term "historical" ERP in Formula 5.5. Duff & Phelps also calculates industry risk premia using the long-term "historical" ERP. These industry risk premia are equivalent to the ones previously published in Table 3-5 of the former *SBBI Valuation Yearbook*.

In recognition that valuation analysts may use different ERP estimates, industry risk premia may be calculated using additional ERP estimates provided in the Cost of Capital Navigator like (i) the long-term "supply-side" ERP, and (ii) the Duff & Phelps Recommended ERP.

For example, if you select SIC 281(Industrial Inorganic Chemicals), the full-information beta equals 1.14. Using the three ERP estimates mentioned above, the following displays the calculation of the corresponding industry risk premia:

5.15 The industry risk premia *previously* published in Table 3-5 of the Morningstar/Ibbotson *SBBI Valuation Yearbook* were full-information betas converted to industry risk premia using only the "historical" long-term equity risk premium.

5.16 Calculated as the average annual return of the S&P 500 total return index minus the average annual return of the SBBI long-term (20-year) government bond income return series over the 1926–2017 time period. The long-horizon historical equity risk premium was previously published on the "back page" of the Morningstar/Ibbotson *SBBI Valuation Yearbook* (discontinued).

5.17 The supply-side equity risk premium was also previously published on the "back page" of the Morningstar/Ibbotson *SBBI Valuation Yearbook* (discontinued).

5.18 To learn more about cost of capital issues, and to ensure that you are using the most recent Duff & Phelps Recommended ERP, visit www.duffandphelps.com/CostofCapital.

AAR Regression for 2017 Beta

AAR Regression for 2017 Beta
STB-Style 5-Year Beta using SP 500 Price Index, Weighted RR Returns, 90-Day T-Bill as RF
CSX, KSU, NSC, and UNP

The GLM Procedure

Dependent Variable: ZRR

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.07823344	0.07823344	171.96	<.0001
Error	259	0.11783162	0.00045495		
Corrected Total	260	0.19606506			

R-Square	Coeff Var	Root MSE	ZRR Mean
0.399018	552.5197	0.021330	0.003860

Source	DF	Type I SS	Mean Square	F Value	Pr > F
ZSP5	1	0.07823344	0.07823344	171.96	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
ZSP5	1	0.07823344	0.07823344	171.96	<.0001

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	0.000959495	0.00133867	0.72	0.4742
ZSP5	1.143839687	0.08722681	13.11	<.0001

Cost of Common Equity using the Multi-Stage Discounted Cash Flow Model

The cost of equity for each firm (r_i) in the Surface Transportation Board's interpretation of the Morningstar/Ibbotson three-stage DCF model is the solution to the following equation:[1]

$$\mathrm{MV}_{i0} = \sum_{t=1}^{5} \frac{\mathrm{CF}_{i0}(1+g_{i1})^t}{(1+r_i)^t} + \sum_{t=6}^{10} \frac{\mathrm{CF}_{i5}(1+g_{i2})}{(1+r_i)^t} + \frac{\dfrac{\mathrm{IBEI}_{i10}(1+g_{i3})}{r_i - g_{i3}}}{(1+r_i)^{10}} ,$$

where

MV_{i0} = market value of equity for firm i in year 0 (i.e., the year for which the cost of equity is being estimated);

CF_{it} = average cash flow for firm i at the end of year t;

g_{ij} = earnings growth rate for firm i in stage j (j = 1, 2, or 3);

r_i = the cost of equity for firm i; and

$\mathrm{IBEI}_{10} = \mathrm{IBEI}_0(1+g_1)^5(1+g_2)^5$.

Note that IBEI_0 is determined by the same process as CF_0 (See Table 13 in text).

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1 *Cost of Capital Yearbook*, 2008, Morningstar, Inc., p. 24.

Cash Flow Calculation

CSX, Corp.	1	2	3	4	5	Total
	2013	2014	2015	2016	2017	
($ in millions)						
Revenue	12,026	12,669	11,811	11,069	11,408	58,983
Net Income	1,864	1,927	1,968	1,714	5,471	12,944
Extraordinary Items	0	0	0	0	0	0
Depreciation	1,104	1,151	1,208	1,301	1,315	6,079
Deferred Taxes	300	298	456	405	-3,233	-1,774
Capital Expenditures	2,313	2,449	2,562	2,398	2,040	11,762
Cash Flow	955	927	1,070	1,022	1,513	5,487
Cash Flow / Revenue	0.07941	0.07317	0.09059	0.09233	0.13263	0.09303
NIBEI / Revenue	0.15500	0.15210	0.16662	0.15485	0.47958	0.21945

Ibbotson Smoothed Cash Flow = $11,408 x 0.09303 = $1,061.25
Ibbotson Smoothed Net Income BEI = $11,408 x 0.21945 = $2,503.52

Cash Flow Calculation

Kansas City Southern	1	2	3	4	5	Total
	2013	2014	2015	2016	2017	
($ in millions)						
Revenue	2,369.3	2,577.1	2,418.8	2,334.2	2,582.9	12,282
Net Income	351.2	502.4	483.3	477.9	961.8	2,777
Extraordinary Items	0.0	0.0	0.0	0.0	0.0	0
Depreciation	223.3	258.1	284.6	305.0	320.9	1,392
Deferred Taxes	111.2	140.1	135.8	104.8	-301.3	191
Capital Expenditures	838.2	997.0	849.6	623.6	654.0	3,962
Cash Flow	-153	-96	54	264	327	397
Cash Flow / Revenue	-0.06437	-0.03741	0.02237	0.11314	0.12676	0.03230
NIBEI / Revenue	0.14823	0.19495	0.19981	0.20474	0.37237	0.22607

Ibbotson Smoothed Cash Flow = $2,583 x 0.03230 = $83.42
Ibbotson Smoothed Net Income BEI = $2,583 x 0.22607 = $583.90

Note: Net Income is net available to common stockholders after preferred dividends and non-KCS portion of Meridian Speedway.

Capital Expenditures					
Core CapX	594.8	668.2	688.0	563.9	585.4
Special programs	211.8	302.1	144.2	26.6	42.6
Meridian Speedway	31.6	26.7	17.4	33.1	26.0
Meridian, Otr RR	0.0	0.0	0.0	0.0	
Total CapX	838.2	997.0	849.6	623.6	654.0

Cash Flow Calculation

Norfolk Southern	1	2	3	4	5	Total
	2013	2014	2015	2016	2017	
($ in millions)						
Revenue	11,245	11,624	10,511	9,888	10,551	53,819
Net Income	1,910	2,000	1,556	1,668	5,404	12,538
Extraordinary Items	0	0	0	0	0	0
Depreciation	922	956	1,059	1,030	1,059	5,026
Deferred Taxes	262	294	320	227	-2,859	-1,756
Capital Expenditures	1,971	2,118	2,385	1,887	1,723	10,084
Cash Flow	1,123	1,132	550	1,038	1,881	5,724
Cash Flow / Revenue	0.09987	0.09738	0.05233	0.10498	0.17828	0.10636
NIBEI / Revenue	0.16985	0.17206	0.14804	0.16869	0.51218	0.23297

Ibbotson Smoothed Cash Flow = $10,551 x 0.10636 = $1,122.17
Ibbotson Smoothed Net Income BEI = $10,551 x 0.23297 = $2,458.02

Cash Flow Calculation

Union Pacific Corp.	1	2	3	4	5	Total
	2013	2014	2015	2016	2017	
($ in millions)						
Revenue	21,963	23,988	21,813	19,941	21,240	108,945
Net Income	4,388	5,180	4,772	4,233	10,712	29,285
Extraordinary Items	0	0	0	0	0	0
Depreciation	1,777	1,904	2,012	2,038	2,105	9,836
Deferred Taxes	723	895	765	831	-5,067	-1,853
Capital Expenditures	3,496	4,346	4,650	3,505	3,238	19,235
Cash Flow	3,392	3,633	2,899	3,597	4,512	18,033
Cash Flow / Revenue	0.15444	0.15145	0.13290	0.18038	0.21243	0.16552
NIBEI / Revenue	0.19979	0.21594	0.21877	0.21228	0.50433	0.26881

Ibbotson Smoothed Cash Flow = $21,240 x 0.16552 = $3,515.73
Ibbotson Smoothed Net Income BEI = $21,240 x 0.26881 = $5,709.43

2017 Median Growth Rates for MSDCF

Company	Rate 1	Rate 2	Rate 3	Rate 4	Rate 5	Rate 6	Rate 7	Rate 8	Median
CSX	19.31	12.00	21.00	12.00	--	--	--	--	**15.66**
KSU	14.91	11.40	--	--	--	--	--	--	**13.16**
NSC	10.50	12.19	12.00	12.00	11.30	15.00	--	--	**12.00**
UNP	13.82	12.00	12.90	14.47	--	--	--	--	**13.36**

Simple Average of Medians = 13.55 percent.

2017 Median Growth Rates for MSDCF
CSX

Detail Estimates - Period Summary

Enter RIC : CSX.O **CSX Corp**

Measure : Earnings Per Share

Period : Long Term Growth

Currency: USD *(in millions except for per share items)*

	Ests	Mean	High	Low
Earnings Per Share	4	16.08	21.00	12.00
Filtered/Preliminary Mean**:	1	19.31	19.31	19.31
30 Day Ago Mean	4	15.81	21.00	12.00

	12/2016I	3/2017I	6/2017I	9/2017I	12/2016A
Reported	0.49	0.51	0.64	0.51	1.81
Surprise Mean	0.50	0.43	0.59	0.51	1.81
Surprise (%)	-1.72	19.24	8.25	-0.65	-0.21

* Only selected brokers below are included in the filtered mean

Check/Uncheck	Contributor	Analyst	Current Estimate	Current Estimate Date	Previous Estimate	Previous Estimate Date	Review Date
✓	CREDIT SUISSE - NORTH AMERICA	Landry, Allison M	19.31 ↑	Dec 14, 17	18.25	Oct 12, 17	Dec 14, 17
	WELLS FARGO SECURITIES, LLC	Troy, Matthew	12.00	Mar 13, 17	NA	NA	Dec 18, 17
	Permission Denied 398136	Permission Denied	21.00 ↓	Sep 07, 17	22.20	Mar 24, 17	Dec 08, 17
	Permission Denied 32	Permission Denied	12.00 ↑	Apr 19, 17	10.00	Apr 13, 16	Dec 14, 17

Thomson Reuters – Eikon
1/2/2018

2017 Median Growth Rates for MSDCF
KSU

Detail Estimates - Period Summary

Enter RIC : KSU **Kansas City Southern**

Measure : Earnings Per Share

Period : Long Term Growth

Currency: USD *(In millions except for per share items)*

	Ests	Mean	High	Low
Earnings Per Share	2	13.15	14.91	11.40
Filtered/Preliminary Mean*:	1	14.91	14.91	14.91
30 Day Ago Mean	2	13.15	14.91	11.40

* Only selected brokers below are included in the filtered mean

	12/2016A	3/2017A	6/2017A	9/2017A	12/2016A
Reported	1.12	1.17	1.33	1.35	4.48
Surprise Mean	1.17	1.16	1.28	1.31	4.52
Surprise (%)	-4.00	0.84	3.86	3.19	-0.91

Check/Uncheck	Contributor	Analyst	Current Estimate	Current Estimate Date	Previous Estimate	Previous Estimate Date	Review Date
✔	CREDIT SUISSE - NORTH AMERICA	Landry, Allison M	14.91 ↑	Oct 23, 17	14.37	Oct 12, 17	Oct 23, 17
	Permission Denied 398136	Permission Denied	11.40 ↑	Oct 20, 17	11.10	Oct 13, 17	Dec 08, 17

Thomson Reuters – Eikon
1/2/2018

2017 Median Growth Rates for MSDCF
NSC

Detail Estimates - Period Summary

Enter RIC : NSC **Norfolk Southern Corp**

Measure : Earnings Per Share

Period : Long Term Growth

Currency: USD *(in millions except for per share items)*

	Ests	Mean	High	Low
Earnings Per Share	6	12.16	15.00	10.50
Filtered/Preliminary Mean**:	1	10.50	10.50	10.50
30 Day Ago Mean	6	12.16	15.00	10.50

* Only selected brokers below are included in the filtered mean

	12/2016\	3/2017\	6/2017\	9/2017\	12/2016A
Reported	1.42	1.48	1.71	1.75	5.62
Surprise Mean	1.36	1.36	1.65	1.64	5.59
Surprise (%)	4.28	8.50	3.62	6.48	0.61

Check/Uncheck	Contributor	Analyst	Current Estimate	Current Estimate Date	Previous Estimate	Previous Estimate Date	Review Date
✔	Permission Denied 54992	Permission Denied	10.50 ↓	Jul 26, 17	11.10	Apr 26, 17	Jul 26, 17
	CREDIT SUISSE - NORTH AMERICA	Landry, Allison M	12.19 ↑	Oct 26, 17	12.14	Oct 12, 17	Oct 26, 17
	WELLS FARGO SECURITIES, LLC	Troy, Matthew	12.00	Mar 13, 17	NA	NA	Oct 25, 17
	Permission Denied 398136	Permission Denied	12.00 ↓	Jul 26, 17	12.20	Apr 26, 17	Dec 08, 17
	Permission Denied 392	Permission Denied	11.30 ↑	Oct 27, 17	8.00	Oct 08, 88	Dec 03, 17
	Permission Denied 32	Permission Denied	15.00	Apr 13, 16	NA	NA	Nov 14, 17

Thomson Reuters – Eikon
1/2/2018

2017 Median Growth Rates for MSDCF
UNP

Detail Estimates - Period Summary

Enter RIC : UNP **Union Pacific Corp**

Measure : Earnings Per Share

Period : Long Term Growth

Currency: USD *(in millions except for per share items)*

	Ests	Mean	High	Low
Earnings Per Share	4	13.30	14.47	12.00
Filtered/Preliminary Mean**:	1	13.82	13.82	13.82
30 Day Ago Mean	4	13.29	14.45	12.00

	12/2016A	3/2017A	6/2017A	9/2017A	12/2016A
Reported	1.39	1.32	1.45	1.50	5.07
Surprise Mean	1.33	1.23	1.39	1.49	5.01
Surprise (%)	4.58	7.15	4.37	0.60	1.29

* Only selected brokers below are included in the filtered mean

Check/Uncheck	Contributor	Analyst	Current Estimate	Current Estimate Date	Previous Estimate	Previous Estimate Date	Review Date
✔	CREDIT SUISSE - NORTH AMERICA	Landry, Allison M	13.82 ↑	Oct 27, 17	13.57	Oct 12, 17	Oct 27, 17
	WELLS FARGO SECURITIES, LLC	Troy, Matthew	12.00 ↓	Mar 13, 17	15.00	Dec 16, 09	Oct 26, 17
	Permission Denied 398136	Permission Denied	12.90 ↓	Oct 13, 17	13.20	Jul 20, 17	Dec 08, 17
	Permission Denied 392	Permission Denied	14.47 ↑	Dec 03, 17	14.45	Oct 27, 17	Dec 03, 17

Thomson Reuters – Eikon
1/2/2018

Stage 3 Growth Rate for MS-DCF
Summary

The Surface Transportation Board's Multi-Stage Discounted Cash Flow model for estimating the cost of common equity uses 3 stages of growth. The third stage is the long-run nominal growth rate of the U.S. economy, and it is estimated by adding the long-term expected growth in output (represented by the historical growth rate for U.S. Real Gross Domestic Product since 1929) to the long-run expected U.S. inflation rate.

Long Term Expected Growth in Output			3.21 %
Historical Growth Rate for Real GDP, 1929-2016		(page 2)	
Long Term Expected Inflation Rate			1.97
Rate for Long-Term U.S. Government Bonds	2.58	(page 5)	
Rate for 20-year U.S. Inflation-Indexed Bonds	0.61	(page 5)	
	1.97		
Stage 3 Growth Rate (real growth + inflation)			**5.18 %**

The purpose of this appendix is to replicate Morningstar's Stage 3 Growth Rate used by the Surface Transportation Board in its version of the Multi-Stage Discounted Cash Flow model used to estimate the cost of common equity for the railroad industry.

Morningstar's Ibbotson SBBI Valuation Yearbook has annually been used as a source for the Stage 3 growth rate of the Surface Transportation Board's Multi-Stage Discounted Cash Flow (MSDCF) model. On September 19, 2013, Morningstar customers were notified that the *SBBI Valuation Yearbook* was being discontinued, but much of the same data could be found in a different publication -- the *Ibbotson SBBI Classic Yearbook*.

Customer Service said **"We won't be publishing the long-term growth rate anymore, however it's pretty simple to calculate using data that will be in the Classic Yearbook and publicly available data."** They also said "Essentially, you would take the long-term government yield as of December (which would be included in the Classic Yearbook) and subtract the Treasury Real Yield for 20 year bonds (http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=realyield) as of the same date. This value is called the inflation estimate." "From there, you need the GDP growth rate, which you can calculate from the Current-dollar and "real" GDP link in this website: http://www.bea.gov/national/index.htm#gdp. Using the GDP in billions of chained 2005 dollars column, calculate an annual growth rate. One thing, however, is that we've always used GDP chained to 2005 dollars and it looks like they've since changed it to be chained to 2009 dollars. This may cause a slight change in the historical growth rates."

Beginning in 2016, Morningstar stopped publishing its Ibbotson SBBI Classic Yearbook. Calculations on page 5 of this appendix use 20-Year U.S. Treasury Bonds in lieu of the Ibbotson Long-Term Government Yields.

Stage 3 Growth Rate for MS-DCF
Long-Term Expected Growth in Output

AAR Replicates Morningstar

Year	(a) GDP in billions of chained 2005 dollars	(b) Years of Growth	(c) AAR Calc. Growth Rate	(d) SBBI Text Growth Rate
1929	976.1			
2009	12,757.9	80	3.27%	3.3%
2010	13,063.0	81	3.25%	3.3%
2011	13,299.1	82	3.24%	3.24%
2012	13,591.1	83	3.22%	3.22%

The Bureau of Economic Analysis rebased Real GDP from 2005 dollars to 2009 dollars, and may have revised recent year data. Therefore, GDP data in 2005 $ were not available for 2013.

(a) Real GDP in 2005 $ - 2009-2012 are from the Economic Report of the President 2013, Table B-11
1929 is from BEA table dated August 2011
(b) Year minus 1929 = number of years of growth from 1929 to year
(c) Compound growth rate from 1929 to year
(d) Ibbotson SBBI Valuation Yearbook, chapter 4. For 2012 data, 2013 edition, page 52.

AAR Calculates Growth Rate using GDP in 2009 dollars

Year	(e) GDP in billions of chained 2009 dollars	(f) Years of Growth	(g) AAR Calc. Growth Rate
1929	1,056.6		
2010	14,783.8	81	3.31%
2011	15,020.6	82	3.29%
2012	15,354.6	83	3.28%
2013	15,612.2	84	3.26%
2014	16,013.3	85	3.25%
2015	16,471.5	86	3.25%
2016	16,716.2	87	3.22%
2017	17,096.2	88	3.21%

(e) Real GDP in 2009 $ downloaded from BEA 4/2/2018.
(f) Year - 1929 = number of years of growth from 1929 to year
(g) Compound growth rate from 1929 to year

Stage 3 Growth Rate for MS-DCF
Data Sources for Real GDP in 2005 $

186 GDP and Other Major NIPA Series August 2011

Table 2A. Real Gross Domestic Product—Continues

[Billions of chained (2005) dollars; quarterly estimates are seasonally adjusted at annual rates]

Year and quarter	Gross domestic product	Personal consumption expenditures	Gross private domestic investment	Exports and imports of goods and services		Government consumption expenditures and gross investment	Residual	Final sales of domestic product	Gross domestic purchases	Final sales to domestic purchasers	Gross national product	Percent change from preceding period				
				Exports	Imports							Gross domestic product	Final sales of domestic product	Gross domestic purchases	Final sales to domestic purchasers	Gross national product
1929	976.1	736.3	101.4	37.9	49.1	146.5	3.1	986.8	994.1	1,005.2	984.6	.....	.....	.....	.....	.....
1930	892.0	696.8	67.6	31.3	42.7	161.4	−22.4	919.2	911.1	939.2	900.0	−8.6	−6.8	−8.4	−6.6	−8.6
1931	834.2	674.9	42.5	26.1	37.2	168.2	−40.3	865.2	853.9	885.9	840.7	−6.5	−5.9	−6.3	−5.7	−6.6
1932	725.2	614.4	12.8	20.4	30.9	162.6	−54.1	766.6	743.9	786.5	730.5	−13.1	−11.4	−12.9	−11.2	−13.1
1933	715.8	600.8	18.9	20.5	32.2	157.2	−49.4	743.2	735.1	763.4	720.3	−1.3	−3.1	−1.2	−2.9	−1.4
1934	793.7	643.7	34.1	22.8	32.9	177.3	−51.3	814.0	812.7	833.7	797.7	10.9	9.5	10.6	9.2	10.7
1935	864.2	683.0	63.1	24.1	43.1	182.2	−45.1	864.5	892.2	892.7	868.9	8.9	6.2	9.8	7.1	8.9
1936	977.0	752.5	80.9	25.3	42.6	212.6	−51.7	978.9	1,006.1	1,008.1	981.1	13.1	13.2	12.8	12.9	12.9
1937	1,027.1	780.4	101.1	31.9	47.9	203.6	−42.0	1,019.8	1,052.9	1,045.5	1,032.5	5.1	4.2	4.7	3.7	5.2
1938	991.8	767.8	66.8	31.5	37.3	219.3	−56.3	1,005.2	1,007.3	1,021.0	997.4	−3.4	−1.4	−4.3	−2.3	−3.4
1939	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.4	8.1	7.4	8.1

Table B–2. Real gross domestic product, 1964–2012

[Billions of chained (2005) dollars, except as noted; quarterly data at seasonally adjusted annual rates]

Year or quarter	Gross domestic product	Personal consumption expenditures			Gross private domestic investment				
						Fixed investment			
							Nonresidential		
		Total	Goods	Services	Total	Total	Total	Structures	Equipment and software
1964	3,389.4	2,107.5	.....	.....	382.1	.....	.....	.....	.....
1965	3,607.0	2,240.8	.....	.....	435.7	.....	.....	.....	.....
1966	3,842.1	2,367.9	.....	.....	474.1	.....	.....	.....	.....
1967	3,939.2	2,438.8	.....	.....	452.4	.....	.....	.....	.....
1968	4,129.9	2,579.6	.....	.....	478.7	.....	.....	.....	.....
1969	4,258.2	2,676.2	.....	.....	506.6	.....	.....	.....	.....
1970	4,266.3	2,738.9	.....	.....	473.4	.....	.....	.....	.....
1971	4,409.5	2,843.3	.....	.....	527.3	.....	.....	.....	.....
1972	4,643.8	3,018.1	.....	.....	589.8	.....	.....	.....	.....
1973	4,912.8	3,167.7	.....	.....	658.9	.....	.....	.....	.....
1974	4,885.7	3,141.4	.....	.....	610.3	.....	.....	.....	.....
1975	4,875.4	3,212.6	.....	.....	502.2	.....	.....	.....	.....
1976	5,136.9	3,391.5	.....	.....	603.7	.....	.....	.....	.....
1977	5,373.1	3,534.3	.....	.....	694.9	.....	.....	.....	.....
1978	5,672.8	3,690.1	.....	.....	778.7	.....	.....	.....	.....
1979	5,850.1	3,777.8	.....	.....	803.5	.....	.....	.....	.....
1980	5,834.0	3,764.5	.....	.....	715.2	.....	.....	.....	.....
1981	5,982.1	3,821.6	.....	.....	779.6	.....	.....	.....	.....
1982	5,865.9	3,874.9	.....	.....	670.3	.....	.....	.....	.....
1983	6,130.9	4,096.4	.....	.....	732.8	.....	.....	.....	.....
1984	6,571.5	4,313.6	.....	.....	948.7	.....	.....	.....	.....
1985	6,843.4	4,538.3	.....	.....	939.8	.....	.....	.....	.....
1986	7,080.5	4,722.4	.....	.....	933.5	.....	.....	.....	.....
1987	7,307.0	4,868.0	.....	.....	962.2	.....	.....	.....	.....
1988	7,607.4	5,064.3	.....	.....	984.9	.....	.....	.....	.....
1989	7,879.2	5,207.5	.....	.....	1,024.4	.....	.....	.....	.....
1990	8,027.1	5,313.7	.....	.....	989.9	.....	.....	.....	.....
1991	8,006.3	5,321.7	.....	.....	909.4	.....	.....	.....	.....
1992	8,280.0	5,503.2	.....	.....	983.1	.....	.....	.....	.....
1993	8,516.2	5,698.6	.....	.....	1,070.9	.....	.....	.....	.....
1994	8,863.1	5,916.2	.....	.....	1,216.4	.....	.....	.....	.....
1995	9,086.0	6,076.2	1,896.0	4,208.5	1,254.3	1,231.2	787.9	342.0	489.4
1996	9,425.8	6,288.3	1,980.9	4,331.7	1,365.3	1,341.6	861.5	361.4	541.4
1997	9,845.9	6,520.4	2,075.3	4,465.3	1,535.2	1,465.4	965.5	387.9	615.9
1998	10,274.7	6,862.3	2,215.5	4,662.1	1,688.9	1,624.4	1,081.4	407.7	705.2
1999	10,770.7	7,237.6	2,392.0	4,853.1	1,837.6	1,775.5	1,194.3	408.2	805.0
2000	11,216.4	7,604.6	2,518.2	5,093.6	1,963.1	1,906.8	1,311.3	440.0	889.2
2001	11,337.5	7,810.3	2,597.3	5,219.1	1,825.2	1,870.7	1,274.8	433.3	860.6
2002	11,543.1	8,018.3	2,702.9	5,318.5	1,800.4	1,791.5	1,173.7	356.6	824.2
2003	11,836.4	8,244.5	2,827.2	5,418.2	1,870.1	1,854.7	1,189.6	343.0	850.0
2004	12,246.9	8,515.8	2,953.3	5,562.7	2,058.2	1,992.5	1,263.0	346.7	917.3
2005	12,623.0	8,803.5	3,076.7	5,726.8	2,172.3	2,122.3	1,347.3	351.8	995.6
2006	12,958.5	9,054.5	3,178.9	5,875.6	2,231.8	2,172.7	1,455.5	384.0	1,071.1
2007	13,206.4	9,262.9	3,273.5	5,990.2	2,159.5	2,130.6	1,550.0	438.2	1,106.8
2008	13,161.9	9,211.7	3,192.9	6,017.0	1,939.8	1,978.6	1,537.6	466.4	1,059.4
2009	12,757.9	9,032.6	3,098.2	5,930.6	1,458.1	1,602.2	1,259.8	368.1	885.2
2010	13,063.0	9,196.2	3,209.1	5,987.6	1,658.0	1,598.7	1,268.5	310.6	963.9
2011	13,299.1	9,428.8	3,331.0	6,101.5	1,744.0	1,704.5	1,378.2	319.2	1,070.0
2012 p	13,591.1	9,604.9	3,433.0	6,178.0	1,911.0	1,850.1	1,484.9	351.3	1,143.5

"Survey of Current Business", August 2011, U.S. Bureau of Economic Analysis

"Economic Report of the President", March 2013

Stage 3 Growth Rate for MS-DCF
Data Sources for Real GDP in 2009 $

Current-Dollar and "Real" Gross Domestic Product						28-Mar-18
Annual			Quarterly (Seasonally adjusted annual rates)			
	GDP in billions of current dollars	GDP in billions of chained 2009 dollars		GDP in billions of current dollars	GDP in billions of chained 2009 dollars	
1929	104.6	1,056.6	1947Q1	243.1	1,934.5	
1930	92.2	966.7	1947Q2	246.3	1,932.3	
1931	77.4	904.8	1947Q3	250.1	1,930.3	
1932	59.5	788.2	1947Q4	260.3	1,960.7	
2006	13,855.9	14,613.8	1966Q2	807.2	4,219.1	
2007	14,477.6	14,873.7	1966Q3	820.8	4,249.2	
2008	14,718.6	14,830.4	1966Q4	834.9	4,285.6	
2009	14,418.7	14,418.7	1967Q1	846.0	4,324.9	
2010	14,964.4	14,783.8	1967Q2	851.1	4,328.7	
2011	15,517.9	15,020.6	1967Q3	866.6	4,366.1	
2012	16,155.3	15,354.6	1967Q4	883.2	4,401.2	
2013	16,691.5	15,612.2	1968Q1	911.1	4,490.6	
2014	17,427.6	16,013.3	1968Q2	936.3	4,566.4	
2015	18,120.7	16,471.5	1968Q3	952.3	4,599.3	
2016	18,624.5	16,716.2	1968Q4	970.1	4,619.8	
2017	19,390.6	17,096.2				

Download for Bureau of Economic Analysis web site. Middle years and some quarters omitted to enable data to fit on this page. Use the 2009 dollars column, circled values.

http://www.bea.gov/national/Index.htm

Stage 3 Growth Rate for MS-DCF
Long-Term Inflation Rate

	(a)	(b)	(c)	(d)	(e)	(f)	(g)
	Long-Term Gov. Yields			Inflation Indexed		Long Term	
	From SBBI		T-Bonds	20-Yr T-Bonds		Inflation Rate	
Year	Text	Appendix	20-Yr	SBBI Text	Daily	SBBI Text	AAR Calc
2008	3.0 %	3.03 %	3.05 %	2.4 %	2.36 %	0.6 %	0.67 %
2009	4.6	4.58	4.58	2.0	2.03	2.6	2.55
2010	4.1	4.14	4.13	1.6	1.59	2.6	2.55
2011	2.48	2.48	2.57	0.53	0.53	1.95	1.95
2012	2.41	2.41	2.54	0.15	0.15	2.26	2.26
2013	n/a	3.67	3.72	n/a	1.36	n/a	2.31
2014	n/a	2.40	2.47	n/a	0.68	n/a	1.72
2015	n/a	n/a	2.67	n/a	1.07	n/a	1.60
2016	n/a	n/a	2.79	n/a	0.82	n/a	1.97
2017	n/a	n/a	2.58	n/a	0.61	n/a	**1.97**

n/a = no longer available

Sources:

(a) Ibbotson SBBI Valuation Yearbook, chapter 4. For 2012 data, 2013 edition, page 52.

(b) SBBI Appendix B, Table B-9 (Long-Term Government Bonds), December
Beginning in 2014, data from Ibbotson® SBBI® Classic Yearbook (Classic Yearbook).
2013 is from Table 2-2 of the Classic Yearbook, on page 42. The 2013 and 2014 numbers are also found in the Ibbotson SBBI Market Report with data as of December, in Table 3 on page 9.

(c) Treasury Constant Maturities, Nominal, 20-Year, Business Day, last day of year
https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H15 (See workpapers)

(d) Ibbotson SBBI Valuation Yearbook, chapter 4. For 2012 data, 2013 edition, page 52.

(e) Treasury Constant Maturities, Inflation Indexed, 20-Year, Business Day,
last (business) day of year
https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H15 (See workpapers)

(f) Ibbotson SBBI Valuation Yearbook, chapter 4. For 2012 data, 2013 edition, page 52.

(g) Column (b) less column (e) except for 2015, 2016, and 2017, which is column (c) less column (e)

List of Stage 3 Growth Rates for MS-DCF

The Surface Transportation Board's Multi-Stage Discounted Cash Flow model for estimating the cost of common equity uses 3 stages of growth. The third stage is the long-run nominal growth rate of the U.S. economy, and it is estimated by adding the long-term expected real growth in output (represented by the historical growth rate for U.S. Real Gross Domestic Product since 1929) to the long-run expected U.S. inflation rate. Listed below are the rates used by the Board since it began using the MSDCF in the 2008 Cost of Capital determination, plus the numbers calculated for 2017.

	Long-Term Expected		Stage 3
Year	Real Growth in Output	Inflation Rate	Growth Rate
2008	3.3 %	0.6 %	3.90 %
2009	3.3	2.6	5.80
2010	3.3	2.6	5.80
2011	3.24	1.95	5.19
2012	3.22	2.26	5.48
2013	3.27	2.31	5.58
2014	3.26	1.72	4.98
2015	3.24	1.60	4.84
2016	3.22	1.97	5.19
2017	3.21 %	1.97 %	5.18 %

Notes:
The Stage 3 Growth Rate for years 2008 through 2012 are from the Ibbotson SBBI Valuation Yearbooks for those years. Ibbotson displayed 1 digit after the decimal for years 2008 through 2010 for the long-term expected growth rate in output and inflation rate. Figures for 2009 and 2010 rounded to the same numbers.

Market Value Data for MSDCF
Stock Price for CSX - End of 2017

CSX Corporation (CSX)
NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

59.16 -0.10 (-0.17 %)
As of 10:20AM EST. Market open.

Summary Chart NEW Conversations Statistics Profile

TD Ameritrade DON'T LIMIT YOUR MARKET OPPORTUNITIES. ESSENT AUTOMA BROAD

Time Period: Jan 10, 2017 - Jan 10, 2018 Show: Historical P

Frequency: Daily

Currency in USD

Date	Open	High	Low	Close*
Jan 09, 2018	58.78	59.76	58.60	59.26
Jan 08, 2018	57.34	58.97	57.34	58.74
Jan 05, 2018	57.58	57.95	56.92	57.72
Jan 04, 2018	57.35	57.96	56.64	56.78
Jan 03, 2018	56.16	57.25	56.06	57.05
Jan 02, 2018	55.63	56.63	55.02	56.34
Dec 29, 2017	55.00	55.37	54.94	55.01
Dec 28, 2017	55.36	55.46	54.47	55.00
Dec 27, 2017	55.09	55.41	54.76	55.14
Dec 26, 2017	55.07	55.37	54.77	54.87
Dec 22, 2017	54.86	55.29	54.61	55.00
Dec 21, 2017	55.85	56.08	54.82	54.88
Dec 20, 2017	55.35	55.90	55.00	55.41
Dec 19, 2017	53.93	54.95	53.40	54.85

Retrieved January 10, 2018.
Link to web page: http://finance.yahoo.com/quote/CSX/history

Market Value Data for MSDCF
Stock Price for KSU - End of 2017

Kansas City Southern (KSU)
NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

112.03 +1.63 (+1.48 %)
As of 12:18PM EST. Market open.

Summary Chart Conversations Statistics Profile Financials

Time Period: Dec 20, 2012 - Jan 16, 2018 Show: Historical Prices
Frequency: Daily

Currency in USD

Date	Open	High	Low	Close*
Jan 12, 2018	107.53	110.67	107.40	110.40
Jan 11, 2018	106.81	108.68	106.75	107.65
Jan 10, 2018	110.27	111.81	105.36	106.54
Jan 09, 2018	110.26	111.23	110.02	110.47
Jan 08, 2018	109.00	110.42	108.81	109.94
Jan 05, 2018	107.75	109.69	107.55	109.19
Jan 04, 2018	107.58	107.89	106.43	107.00
Jan 03, 2018	107.12	107.36	106.42	107.09
Jan 02, 2018	106.28	107.18	105.22	107.16
Dec 29, 2017	105.97	106.43	105.18	105.22
Dec 28, 2017	106.56	107.16	105.41	105.61
Dec 28, 2017			**0.36** Dividend	
Dec 27, 2017	107.54	108.00	106.91	107.10
Dec 26, 2017	108.43	108.74	107.48	107.64
Dec 22, 2017	108.71	108.91	107.77	108.19

Retrieved January 16, 2018.
Link to web page: http://finance.yahoo.com/quote/KSU/history

Market Value Data for MSDCF
Stock Price for NSC - End of 2017

Norfolk Southern Corporation (NSC)
NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

153.43 -0.17 (-0.11%)
As of 10:27AM EST. Market open.

Summary Chart NEW Conversations Statistics Profile Finar

Time Period: Jan 10, 2017 - Jan 10, 2018 Show: Historical Price

Frequency: Daily

Currency in USD

Date	Open	High	Low	Close*
Jan 09, 2018	152.97	154.61	152.72	153.60
Jan 08, 2018	150.00	152.84	149.99	152.57
Jan 05, 2018	148.44	151.85	148.44	150.27
Jan 04, 2018	147.73	148.59	146.91	147.38
Jan 03, 2018	146.86	147.54	145.89	146.97
Jan 02, 2018	145.96	146.97	144.83	146.96
Dec 29, 2017	145.52	146.07	144.90	144.90
Dec 28, 2017	146.00	146.32	144.37	145.31
Dec 27, 2017	144.99	146.33	144.30	145.91
Dec 26, 2017	144.48	145.46	144.05	144.60
Dec 22, 2017	144.61	144.79	143.50	144.52
Dec 21, 2017	145.54	145.54	142.89	144.28
Dec 20, 2017	144.43	145.43	143.70	144.84
Dec 19, 2017	144.35	144.63	142.55	143.72

Retrieved January 10, 2018.
Link to web page: http://finance.yahoo.com/quote/NSC/history

Market Value Data for MSDCF
Stock Price for UNP - End of 2017

Union Pacific Corporation (UNP)
NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

140.80 -0.20 (-0.14 %)
As of 10:32AM EST. Market open.

Summary Chart New Conversations Statistics Profile Financ

CHANTIX (varenicline) TABLETS The #1 prescribed Rx quit-smoking aid
LEARN MORE ▶

Time Period: Jan 10, 2017 - Jan 10, 2018 Show: Historical Prices
Frequency: Daily

Currency in USD

Date	Open	High	Low	Close*	A
Jan 10, 2018	140.17	141.02	139.26	140.74	
Jan 09, 2018	139.81	141.17	139.22	141.00	
Jan 08, 2018	137.48	139.63	137.46	139.44	
Jan 05, 2018	137.65	139.72	136.06	137.53	
Jan 04, 2018	136.84	137.88	135.52	135.80	
Jan 03, 2018	136.11	136.60	135.26	136.54	
Jan 02, 2018	134.71	135.78	134.18	135.78	
Dec 29, 2017	135.28	135.64	134.10	134.10	
Dec 28, 2017	136.04	136.17	134.61	135.12	
Dec 27, 2017	134.59	136.32	134.04	136.32	
Dec 26, 2017	135.00	135.76	134.33	134.65	
Dec 22, 2017	133.80	134.70	132.78	134.47	
Dec 21, 2017	135.00	135.00	133.38	133.73	
Dec 20, 2017	134.34	135.30	133.09	134.68	

Retrieved January 10, 2018.
Link to web page: http://finance.yahoo.com/quote/UNP/history

Market Value Data for MSDCF
Shares Outstanding for CSX - End of 2017

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-Q

(X) QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the quarterly period ended September 30, 2017

OR

( ) TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____

Commission File Number 1-8022

CSX CORPORATION

(Exact name of registrant as specified in its charter)

Virginia		62-1051971
(State or other jurisdiction of incorporation or organization)		*(I.R.S. Employer Identification No.)*
500 Water Street, 15th Floor, Jacksonville, FL	32202	(904) 359-3200
(Address of principal executive offices)	*(Zip Code)*	*(Telephone number, including area code)*

No Change

(Former name, former address and former fiscal year, if changed since last report.)

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.
Yes (X) No ( )

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).
Yes (X) No ( )

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer", "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (check one)

Large Accelerated Filer (X) Accelerated Filer ( ) Non-accelerated Filer ( ) Smaller Reporting Company ( ) Emerging growth company ( )

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ( )

Indicate by a check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).
Yes ( ) No (X)

There were 893,723,083 shares of common stock outstanding on September 30, 2017 (the latest practicable date that is closest to the filing date).

Market Value Data for MSDCF
Shares Outstanding for KSU - End of 2017

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Form 10-Q

☒ QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the quarterly period ended September 30, 2017

or

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from to

Commission File Number 1-4717

KANSAS CITY SOUTHERN

(Exact name of registrant as specified in its charter)

Delaware *(State or other jurisdiction of incorporation or organization)*		**44-0663509** *(I.R.S. Employer Identification No.)*
427 West 12th Street, Kansas City, Missouri *(Address of principal executive offices)*		**64105** *(Zip Code)*

816.983.1303
(Registrant's telephone number, including area code)

No Change
(Former name, former address and former fiscal year, if changed since last report.)

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer (Do not check if a smaller reporting company) ☐

Smaller reporting company ☐ Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

Indicate the number of shares outstanding of each of the issuer's classes of common stock, as of the latest practicable date.

Class	October 13, 2017
Common Stock, $0.01 per share par value	103,543,121 Shares

Market Value Data for MSDCF
Shares Outstanding for NSC - End of 2017

10-Q 1 nsc09301710-q.htm 10-Q

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549
FORM 10-Q

(X) QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 for the quarterly period ended **SEPTEMBER 30, 2017**

( ) TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 for the transition period from _____ to_____

Commission file number 1-8339

NORFOLK SOUTHERN CORPORATION
(Exact name of registrant as specified in its charter)

Virginia (State or other jurisdiction of incorporation)	**52-1188014** (IRS Employer Identification No.)
Three Commercial Place **Norfolk, Virginia** (Address of principal executive offices)	**23510-2191** (Zip Code)

(757) 629-2680
(Registrant's telephone number, including area code)

No Change
(Former name, former address and former fiscal year, if changed since last report)

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.
Yes [X] No [ ]

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).
Yes [X] No [ ]

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.
Large accelerated filer [X] Accelerated filer [ ] Non-accelerated filer [ ] Smaller reporting company [ ] Emerging growth company [ ]

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act [ ]

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).
Yes [ ] No [X]

Indicate the number of shares outstanding of each of the issuer's classes of common stock, as of the latest practicable date.

Class	Outstanding at September 30, 2017
Common Stock ($1.00 par value per share)	286,148,766 (excluding 20,320,777 shares held by the registrant's consolidated subsidiaries)

Market Value Data for MSDCF
Shares Outstanding for UNP - End of 2017

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-Q

(Mark One)

☒ QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the quarterly period ended September 30, 2017

OR

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____

Commission File Number 1-6075

UNION PACIFIC CORPORATION

(Exact name of registrant as specified in its charter)

UTAH	13-2626465
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

1400 DOUGLAS STREET, OMAHA, NEBRASKA
(Address of principal executive offices)

68179
(Zip Code)

(402) 544-5000
(Registrant's telephone number, including area code)

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

☒ Yes ☐ No

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).

☒ Yes ☐ No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act).

☐ Yes ☒ No

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§240.12b-2 of this chapter).

Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

As of October 20, 2017, there were 787,168,815 shares of the Registrant's Common Stock outstanding.

2017 Cost of Equity Using STB's MSDCF

Company	CSX		KSU		NSC		UNP	
Year	2017		2017		2017		2017	
Inputs								
Initial Cash Flow	$1,061.25		$83.42		$1,122.17		$3,515.73	
Input for Terminal C.F.	$2,503.52		$583.90		$2,458.02		$5,709.43	
Stage One Growth	15.660%		13.160%		12.000%		13.360%	
Stage Two Growth	13.550%		13.550%		13.550%		13.550%	
Stage Three Growth*	5.180%		5.180%		5.180%		5.180%	
Year	Val. 12/31	Pres Val.	Val. 12/31	Pres Val.	Val. 12/31	Pres Val.	Val. 12/31	Pres Val.
1	$1,227	$1,085	$94	$84	$1,257	$1,110	$3,985	$3,509
2	1,420	1,109	107	85	1,408	1,097	4,518	3,502
3	1,642	1,133	121	86	1,577	1,085	5,121	3,495
4	1,899	1,159	137	87	1,766	1,073	5,806	3,488
5	2,197	1,184	155	88	1,978	1,061	6,581	3,482
6	2,494	1,188	176	89	2,246	1,064	7,473	3,481
7	2,832	1,193	200	90	2,550	1,067	8,486	3,480
8	3,216	1,197	227	91	2,895	1,070	9,636	3,479
9	3,652	1,201	257	92	3,288	1,073	10,941	3,478
10	4,146	1,205	292	94	3,733	1,075	12,424	3,477
Terminal	129,054	37,510	31,260	10,010	106,531	30,687	252,592	70,689
Sum of Pres. Values		$49,163.71		$10,894.81		$41,462.96		$105,559.34
Market Value (input)		$49,163.71		$10,894.81		$41,462.96		$105,559.34
Cost of Equity	**13.15%**		**12.06%**		**13.25%**		**13.58%**	
Prev. Yr. Cost of Equity	10.13%		9.61%		11.04%		10.43%	

Preferred Stock

Cost of Preferred Equity Capital

Step 1: Calculate Average Stock Price and Annual Dividend

			Stock Price			
KSU	$25 par pref., 4%, noncumm.		**High**	**Low**	**Avg.**	**Dividend**
		Q1	$29.35	$26.75	$28.050	$0.25
		Q2	$29.50	$25.45	$27.475	$0.25
		Q3	$29.14	$27.35	$28.245	$0.25
		Q4	$28.91	$26.96	$27.935	$0.25
		Year			**$27.926**	**$1.00**

Step 2: Calculate Cost of Preferred Equity Capital Using Dividend Yield method

		Annual Dividend	Average Price	Yield
KSU	$25 par preferred, 4%, noncummulative	$1.00	$27.926	3.581%
Cost of Preferred Equity	→			**3.58%**
Previous Year Cost of Preferred Equity				3.64%

Market Value of Preferred Equity

		Outstanding Shares	Average Price	Market Value
KSU	$25 par preferred, 4%, noncummulative	242,170	$27.926	**$6,762,900**

Sources: Kansas City Southern Form 10-K for 2017, Part II Item 5 and Balance Sheet