BEFORE THE
SURFACE TRANSPORTATION BOARD

DOCKET NO. FD 36873

UNION PACIFIC CORPORATION AND UNION PACIFIC RAILROAD COMPANY
—CONTROL—
NORFOLK SOUTHERN CORPORATION AND NORFOLK SOUTHERN
RAILWAY COMPANY

RAILROAD CONTROL APPLICATION

VOLUME 2 OF 4

STATEMENTS CONCERNING MARKET IMPACTS, COMPETITION, AND SHIPPER BENEFITS; TRAFFIC STUDY; OPERATING PLAN (EXHIBIT 13); SERVICE ASSURANCE PLAN; RELATED APPLICATIONS; DENSITY CHARTS (EXHIBIT 14)

RAYMOND A. ATKINS
CARRIE C. MAHAN
MATTHEW J. WARREN
ALLISON C. DAVIS
MARC A. KORMAN
Sidley Austin LLP
1501 K Street, NW
Washington, DC 20005
(202) 736-8000

JASON M. MORRIS
JOSEPH H. CARPENTER IV
THOMAS E. ZOELLER
HANNA M. CHOUEST
T. MATTHEW LOCKHART
Norfolk Southern Railway Company
650 W. Peachtree Street NW
Atlanta, GA 30308

Attorneys for Norfolk Southern Corporation and Norfolk Southern Railway Company

MICHAEL L. ROSENTHAL
DEREK LUDWIN
JAMES J. O'CONNELL
MATTHEW J. GLOVER
PEGAH NABILI
Covington & Burling LLP
One CityCenter
850 Tenth Street, NW
Washington, DC 20001
(202) 662-6000

CHRISTINA B. CONLIN
JAMES B. BOLES
TONYA W. CONLEY
TANYA L. SPRATT
Union Pacific Railroad Company
1400 Douglas Street
Omaha, NE 68179

Attorneys for Union Pacific Corporation and Union Pacific Railroad Company

December 19, 2025

VOLUME 2

STATEMENTS CONCERNING MARKET IMPACTS, COMPETITION, AND SHIPPER BENEFITS; TRAFFIC STUDY; OPERATING PLAN (EXHIBIT 13); SERVICE ASSURANCE PLAN; RELATED APPLICATIONS; DENSITY CHARTS (EXHIBIT 14)

STATEMENTS CONCERNING MARKET IMPACTS, COMPETITION, AND SHIPPER BENEFITS

TRAFFIC STUDY

OPERATING PLAN

SERVICE ASSURANCE PLAN

RELATED APPLICATIONS

DENSITY CHARTS

BEFORE THE

SURFACE TRANSPORTATION BOARD

Finance Docket No. 36873

UNION PACIFIC CORPORATION AND UNION PACIFIC RAILROAD COMPANY
—CONTROL—
NORFOLK SOUTHERN CORPORATION AND NORFOLK SOUTHERN RAILWAY COMPANY

Verified Statement
Of Elizabeth M. Bailey, Ph.D.

December 17, 2025

TABLE OF CONTENTS

List of Exhibits

1 QUALIFICATIONS, ASSIGNMENT AND SUMMARY OF CONCLUSIONS

1.1 Qualifications

1. My name is Elizabeth M. Bailey. I am a Vice President at Charles River Associates ("CRA"), a global consulting firm that offers economic, financial, and strategic expertise to law firms, corporations, accounting firms, and governments. I have over 20 years of experience in antitrust and competition matters across a wide variety of industries.

2. I have advised clients on mergers and acquisitions proceedings before antitrust regulators in the United States and Canada. My expertise includes a wide variety of industries including trucking, rail, barge, ocean-going cargo tankers and vessels, intermodal containers, coal, oil and natural gas, electricity, consumer retail goods, among many others.

3. I have taught advanced corporate finance to executives at The Wharton School at the University of Pennsylvania and have been a lecturer in the Finance Group at the Haas School of Business at the University of California, Berkeley, and a clinical associate professor at the W.P. Carey School of Business at Arizona State University.

4. I have published articles in the American Economic Review, The Journal of Industrial Organization, Managing IP, and The Electricity Journal, among others. I was a senior editor of the ABA Antitrust Law Section's Antitrust Law Journal. I have been appointed an editor of other ABA antitrust publications, including the Antitrust Magazine and The Antitrust Source.

5. I hold a BA in Economics and Mathematics from Colgate University and a PhD in Economics from the Massachusetts Institute of Technology. My curriculum vitae is attached as Appendix A. A list of the materials that I relied upon is attached as Appendix B. I include

a description of how I construct my data sets in Appendix C. I reserve the right to update my opinions as I receive additional information.

1.2 Background and Assignment

6. I have been asked by counsel for Union Pacific Corporation and Union Pacific Railroad Company (collectively referred to as "UP") to analyze the competitive effects of the proposed merger between UP and Norfolk Southern Corporation and Norfolk Southern Railway Company (collectively referred to as "NS"). The proposed merger between UP and NS (collectively, the "Applicants") would create a post-transaction integrated railroad (referred to as the "combined railroad") that connects the western United States to the eastern United States.

7. My assignment in this matter is to evaluate the potential benefits from the proposed merger, and to analyze whether there are any potential horizontal competitive impacts. Train routes can be single line where one railroad moves traffic on all segments of the route from origin to destination. Train routes can also be interlined, where different railroads operate along different segments to move traffic from origin to destination. In this matter, I have analyzed whether there is any competitive impact in situations where UP and NS each operate the same segment of competing routes.

8. I also was asked to undertake analyses addressing parts of the Surface Transportation Board ("STB") regulations describing the information that applicants proposing mergers of Class I

railroads must provide to the STB.[1] Specifically, I was asked to provide certain data and analyses specified in 49 CFR § 1180.7 (b) (2), (3), and (4). These are discussed further in Section 6.

9. At my direction, CRA staff assisted me in performing these analyses and preparing this statement. Neither CRA's compensation nor my compensation depends on my opinions or the outcome of this matter.

1.3 Summary of Conclusions

10. I find that the substantial competitive benefits and greater economic efficiency that are expected to result from the transaction outweigh the limited potential horizontal anticompetitive effects. The reasons for my conclusion are, in summary, as follows:

11. First, the proposed merger of the Applicants' railroad networks is a predominantly vertical merger with little horizontal overlap. I explain this further in Section 2.

12. Second, combining these complementary networks would likely generate benefits affecting over 2.777 million loaded cars and intermodal container units ("carloads") every year, benefiting shippers and potentially reducing prices for consumers for a broad range of goods.[2] I explain this further in Section 3.

    a. In 2023, UP and NS interchanged approximately 913,000 carloads on interline services connecting shippers in the Eastern United States with shippers in the

---

[1] *See* 49 CFR § 1180.7 ("Market analyses").

[2] 913,000 carloads on UP/NS interline routes + 1.864 million carloads diverted to the combined railroad = 2.777 million.

Western United States. In a post-merger world, shippers using these services would likely benefit from faster, more reliable single line services. I find that the proposed combined railroad will have incentives to make operating improvements, offer more competitive terms, and prioritize reliability for the single line services that UP and NS acting independently do not for the interline services today. Moreover, it is unlikely that UP and NS could replicate these incentives in the absence of the proposed merger by remaining separate railroads and attempting to coordinate their activities through contracts. My conclusion draws on standard, well-accepted industrial organizational concepts from the economic analysis of the limitations of coordination by contract. I explain this further in Section 3.1.

b. The Applicants estimate that additional benefits would accrue to shippers of approximately 1.864 million carloads that would be diverted to the improved single line services. Achieving these benefits requires investments in expanded and upgraded infrastructure. I find that UP and NS would have limited incentives to make these investments without the proposed merger due to hold-up problems that have been extensively studied in economics. I explain this further in Section 3.2.

13. Third, compared to the expected pro-competitive benefits of the proposed merger, there is limited scope for harm from the loss of horizontal competition between UP and NS.

a. The Applicants report limited scope for harm in the short term to shippers that have direct access to railroad networks at the shippers' own facilities. The Applicants identified only three customer facilities for which the number of railroads serving the facility would fall from two to one following the proposed merger. The Applicants have offered commitments that would preserve competition for these customer facilities. Even without effective commitments, the proposed merger would impact only {{ }} carloads at these customer facilities. I describe this further in Section 4.1.

b. The limited horizontal geographic overlap between the Applicants' networks means there is limited scope for an impact on horizontal competition to serve the same areas (origins and destinations) more broadly. Across the entire United States, there are no business economic areas ("BEAs")[3] for which the number of railroads declines from two to one as a result of the proposed merger. There is only one BEA for which the number of railroads that serve the geographic area would decline from three to two as a result of the proposed merger. In 2023, the total rail traffic was only 6,000 carloads to or from this area. I explain this further in Section 4.3.

c. The limited horizontal geographic overlap between UP's and NS's networks also means there is little scope for a negative impact on horizontal competition to transport freight across overlapping parts of the same corridor. Approximately {{ }} carloads of freight were carried on corridors where UP and NS were either the only two options at the start or end of the corridor or were two of only three options and which were flagged as potentially vulnerable to a loss of horizontal competition post-merger. I explain this further in Section 4.4.

d. The scope for a negative impact on horizontal origin and destination geographic competition between UP and NS is also limited and is likely outweighed by the benefits to shippers of the proposed merger. In theory, it is possible for railroads to

[3] See Section 2.3 and Section 4.2 for more information on BEAs.

be horizontal geographic competitors even if their networks do not overlap. This can happen, for example, if the railroads originate traffic from shippers in different geographic areas that are bound for customers at the same destination. Applying an initial screen to flag potential horizontal geographic competition concerns at origins and destinations for specific commodities identifies approximately 140,000 carloads where UP and NS each had more than a 10 percent share and combined more than a 50 percent share of either originating or terminating flows (excluding intermodal and automotive traffic, which the STB has acknowledged face substantial competition from trucks). This small number of initial flags is substantially smaller than the scope of projected benefits, and further analysis of them would be likely to reduce the extent of potential horizontal competition concerns even more. I explain this further in Section 4.5.

14. In addition to conducting an assessment of the benefits and the scope for potential harm from a loss of horizontal competition, I provide certain data and analyses responsive to STB regulation 49 CFR § 1180.7(b)(2), (3) and (4) as follows:

    a. First in relation to STB regulation 49 CFR § 1180.7(b)(2), I provide tables of actual and projected market shares of originated and terminated traffic volume by railroad for each major point on the proposed combined railroad and list points where the number of serving railroads would drop from 2-to-1 or from 3-to-2, respectively, as a result of the proposed merger. These tables are based on the same data, and many of the same analytical steps, as the analysis of potential loss of horizontal competition to serve points (origins and destinations) discussed in Section 4.3. I discuss this further in Section 6 and Appendix D.

b. Second in relation to STB regulation 49 CFR § 1180.7(b)(3), I provide tables of actual and projected market shares based on revenues and traffic volumes for major corridor-commodity group pairs. These tables also provide information on the gateways used, single line vs. interline rail, and rail vs. non-rail modes. These tables are based on the same data, and many of the same analytical steps, as the analysis of the scope for potential harm from the loss of horizontal competition to transport freight over overlapping segments of the same corridor discussed in Section 4.4. I discuss this further in Section 6 and Appendix E.

c. Third in relation to STB regulation 49 CFR § 1180.7(b)(4), I provide tables showing, for each major origin-commodity pair, the actual and projected revenues and traffic volumes to each destination from that origin by railroad. I provide analogous tables for each major destination-commodity pair. These tables are based on the same data, and many of the same analytical steps, as the analysis of the scope for harm from the potential loss of geographic horizontal competition discussed in Section 4.5. I discuss this further in Section 6 and Appendix F.

* * *

15. The remainder of my statement explains these conclusions in greater detail and provides the facts and details that support them.

2 OVERVIEW OF THE INDIVIDUAL AND COMBINED RAILROADS

16. In this section of my statement, I briefly describe the current operations of UP and NS railroads, the limited amount of horizontal overlap between the two railroads, and the expanded transcontinental reach of the proposed combined railroad. I also discuss the

competition that these railroads currently face and will continue to face after the proposed merger.

2.1 Individual UP and NS Railroads

17. UP's rail network spans approximately 33,000 route miles and serves 23 states in the western and central United States.[4] UP "serves many of the fastest-growing U.S. population centers, operates from all major West Coast and Gulf Coast ports to Eastern gateways, connects with Canada's rail systems, and is the only railroad serving all six major Mexico gateways."[5] UP is headquartered in Omaha, Nebraska.[6] Exhibit 1 shows the UP railroad map.[7]

---

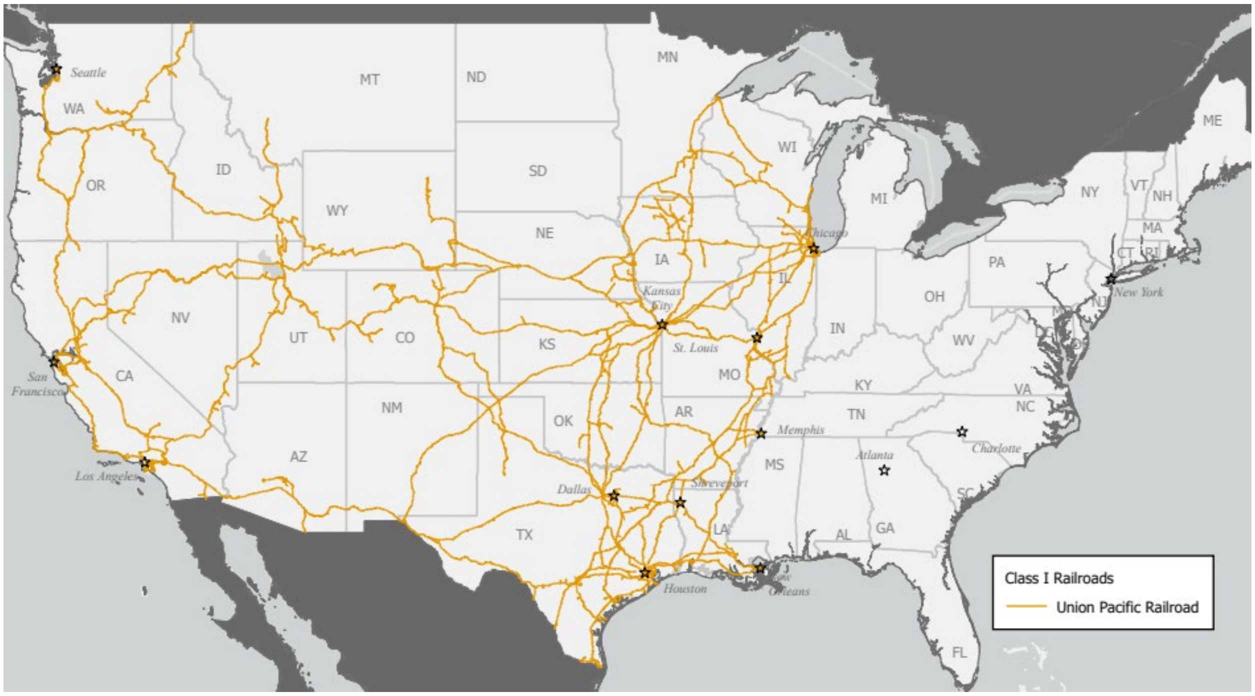
[4] *See* Union Pacific, "Company Overview," available at https://www.up.com/aboutup/corporate_info/uprrover/index.htm (accessed October 28, 2025); UP owns over 26,000 route miles and operates the approximately 6,500 remaining route miles via trackage rights or leases. *See* Union Pacific Corporation, 10-K, Fiscal Year Ended December 31, 2024, at pp. 17-18.

[5] *See* Union Pacific Corporation, 10-K, Fiscal Year Ended December 31, 2024, at p. 5.

[6] *See* Union Pacific Corporation, 10-K, Fiscal Year Ended December 31, 2024, at p. 18.

[7] The map identifies selected cities with a star marker.

Exhibit 1: UP Railroad Map



Source: Surface Transportation Board, "Railroad Map Depot," available at https://www.stb.gov/resources/railroad-map-depot/ (accessed November 20, 2025).

18. NS's rail network spans approximately 19,000 route miles and serves 22 states in the eastern portion of the country.[8] It connects the Southeast, East, and Midwest of the United States and includes rail lines to and from several Atlantic and Gulf Coast ports.[9] NS is headquartered in Atlanta, Georgia.[10] Exhibit 2 shows the NS railroad map.

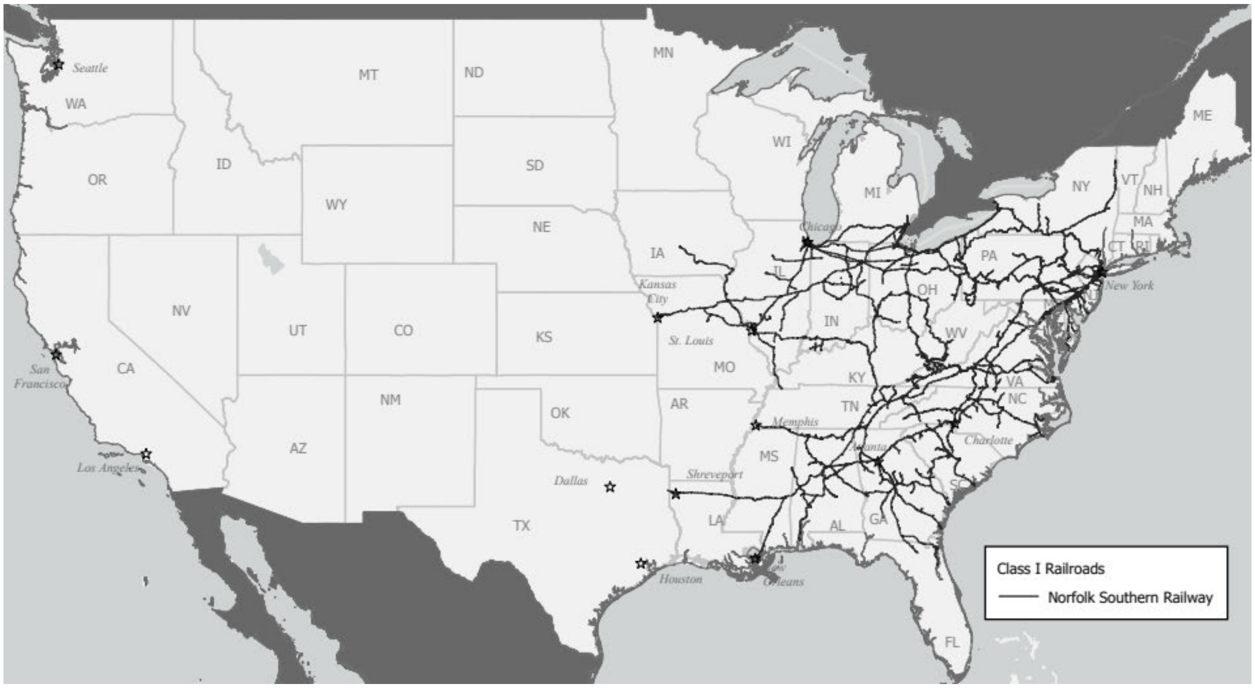
---

[8] NS also serves the District of Columbia. NS owns approximately 14,500 route miles and operates under lease, contract, or trackage rights another 4,500 route miles. *See* Norfolk Southern Corporation, 10-K, Fiscal Year Ended December 31, 2024, at K4 and K5.

[9] *See* Norfolk Southern Corporation, 10-K, Fiscal Year Ended December 31, 2024, at K3.

[10] *See* Norfolk Southern Corporation, 10-K, Fiscal Year Ended December 31, 2024, at K3.

Exhibit 2: NS Railroad Map



Source: Surface Transportation Board, "Railroad Map Depot," available at https://www.stb.gov/resources/railroad-map-depot/ (accessed November 20, 2025).

19. Both UP and NS are Class I freight railroads.[11] They provide rail freight service along with four other Class I freight railroads operating in the United States: BNSF Railway ("BNSF"), CSX Transportation ("CSX"), Canadian National Railway ("CN"), and Canadian Pacific

[11] Class I railroads are the largest railroads in the United States. In 2024, Class I railroads are those with annual operating revenues of at least $1,074,600,816. *See* Surface Transportation Board, "Economic Data," available at https://www.stb.gov/reports-data/economic-data/ (accessed October 28, 2025). In 2024, UP's and NS's gross freight revenues were $24.1 and $12.1 billion, respectively. *See,* Surface Transportation Board, "Freight Commodity Statistics," 2024, available at https://www.stb.gov/reports-data/economic-data/freight-commodity-statistics/ (accessed November 19, 2025) (QCS-UP-2024.xlsx, sheet "QCS_Annual," cell AB481; QCS-NS-2024.xlsx, sheet "QCS Page 12," cell L18).

Kansas City ("CPKC").[12] Like UP, NS, and other Class I railroads, Class II and Class III short line railroads also provide rail freight services.[13]

20. Exhibit 3 shows 2024 volume (by carloads[14] and tons) and gross freight revenue for each Class I railroad in the United States. In 2024, UP transported 8.3 million carloads, earning $24.1 billion in freight revenues[15] and NS transported 7.1 million carloads, earning $12.1 billion in freight revenues.[16] According to annual reports published by UP and NS, in 2023 UP transported approximately 8.1 million carloads and NS transported approximately 6.7 million carloads.[17]

---

[12] *See* U.S. Department of Transportation Federal Railroad Administration, "Freight Rail Overview," available at https://railroads.dot.gov/rail-network-development/freight-rail-overview (accessed October 28, 2025). Kansas City Southern Railway and Canadian Pacific completed their merger in 2023 and are now known as Canadian Pacific Kansas City. *See* Canadian Pacific Kansas City, "About CPKC," available at https://www.cpkcr.com/en/about-cpkc (accessed October 28, 2025).

[13] The other types of railroads are Class II and Class III, which are also classified based on the annual operating revenues of the railroad. *See* Surface Transportation Board, "Economic Data," available at https://www.stb.gov/reports-data/economic-data/ (accessed October 28, 2025). As of 2025, there are 22 regional railroads and 584 local/short line railroads in the United States. *See* U.S. Department of Transportation Federal Railroad Administration, "Freight Rail Overview," available at https://railroads.dot.gov/rail-network-development/freight-rail-overview (accessed October 28, 2025).

[14] Most of the analysis concerns loaded movements. Some commodities are transported in intermodal containers and a freight railcar may carry more than one intermodal container unit at once. For the purposes of my analyses, I count loaded cars and individual intermodal container units as one and throughout this statement use "carloads" to represent loaded cars plus loaded individual intermodal container units.

[15] Surface Transportation Board, "Freight Commodity Statistics," 2024, available at https://www.stb.gov/reports-data/economic-data/freight-commodity-statistics/ (accessed November 19, 2025) (QCS-UP-2024.xlsx, sheet "QCS_Annual," cells T481 and AB481).

[16] Surface Transportation Board, "Freight Commodity Statistics," 2024, available at https://www.stb.gov/reports-data/economic-data/freight-commodity-statistics/ (accessed November 19, 2025) (QCS-NS-2024.xlsx, sheet "QCS Page 12," cells J18 and L18).

[17] Union Pacific Corporation, 10-K, Fiscal Year Ended December 31, 2023, at p. 27; Norfolk Southern, "Annual Report," 2023, available at https://filecache.investorroom.com/mr5ir_nscorp/928/NSC%20Annual%20Report%202023.pdf (accessed December 17, 2025) at K26.

Exhibit 3: Class I Railroads' Gross Revenues, Carloads, Tons, and Mileage in 2024

Company	Carloads (000)	Tons (000)	Mileage Operated (000)	Gross Freight Revenue (000)
BNSF	9,589	486,590	33	$24,126,994
UP	8,334	451,217	33	$24,135,427
NS	7,094	320,045	19	$12,143,528
CSX	6,190	342,916	20	$13,147,519
GTC (CN)	2,254	171,136	5	$3,457,229
SOO/KCSR (CPKC)	1,910	135,810	8	$3,561,929
Total	***35,371***	***1,907,714***	***118***	***$80,572,625***

Notes:
Gross freight revenue, carloads, and tons figures include less-than-container loads. Carloads and tons figures are for total revenue freight carried. Data for CN and CPKC were published by Grand Trunk Corporation ("GTC") (for CN) and Soo Line Railroad Company ("SOO")/Kansas City Southern Railway Company ("KCSR") (for CPKC). CN and CPKC data are limited to U.S. operations. Mileage operated is limited to U.S. mileage.

Sources:
Surface Transportation Board, "Freight Commodity Statistics," 2024, available at https://www.stb.gov/reports-data/economic-data/freight-commodity-statistics/ (accessed November 19, 2025) (QCS-BNSF-2024.xlsx, sheet "QCS Page 12," cells J18, K18, and L18; QCS-UP-2024.xlsx, sheet "QCS_Annual," cells T481, W481, and AB481; QCS-NS-2024.xlsx, sheet "QCS Page 12," cells J18, K18, and L18; QCS-CSX-2024.xlsx, sheet "ACS," cells J487, K487, and L487; QCS-GTC-2024.xlsx, sheet "QFCS," K637, L638, and M638; QCS-SOO-KCSR-2024.xlsx, sheet "CPKC - QCS," cells N424, O424, and P424). Surface Transportation Board, "Annual Report Financial Data," 2024, available at https://www.stb.gov/reports-data/economic-data/annual-report-financial-data/ (accessed November 19, 2025) (R1-BNSF-2024.xlsx, sheet "702," cells J14-J16, J18-J25, J27-J36, and J38-J44; R1-UP-2024 Sch 702 Final.xlsx, sheet "702," cell J46; R1-NS-2024.xlsx, sheet "702," cell J17 and J19-J41; R1-CSX-2024 Sch 702 Final.xlsx, sheet "702," cell J45; R1-GTC-2024.xlsx, sheet "702-P64," cell J45; R1-SOO-KCSR-2024.xlsx, sheet "64 S702," cell Q49). GTC was created by CN in 1970, *see* Trains, "Canadian National merger family tree," available at https://www.trains.com/trn/railroads/history/canadian-national-merger-family-tree/ (accessed November 19, 2025). Soo Line Railroad Company and the Kansas City Southern Railway Company are wholly-owned subsidiaries of CPKC, *see,* CPKC, "2024 Annual Report," available at https://s21.q4cdn.com/736796105/files/doc_financials/2024/ar/CPKC-2024-Annual-Report-Web_Final.pdf, at p. 47. *See* workpaper "Exhibit 3.xlsx."

2.2 Combined Railroad

21. The proposed merger of UP's and NS's railroad networks would create a unified transcontinental network, the only one of its kind in the United States.[18] Because of the limited horizontal overlap between UP's and NS's railroad networks, this is a largely end-to-end, vertical merger of railroads that meet at several interchanges near the center of the

continental United States. The combined network would stretch from Seattle, San Francisco, and Los Angeles to the Northeast and Mid-Atlantic regions, as well as southeast to cities such as Atlanta and Jacksonville.[19] It would also encompass rail lines in the center of the country from Minneapolis, Chicago, and Detroit in the north to Dallas, Houston, and the United States-Mexico border in the south.[20] The proposed combined railroad would connect over 50,000 route miles across 43 states, linking the West Coast to the East Coast of the United States.[21] As a result, the combined railroad network would connect major ports, border crossings, and railroad hubs providing shippers and consignees a new single line railroad service between points in the eastern and western U.S. that today can be served only by interline service. New single line service will benefit customers by creating efficiencies that cannot otherwise be achieved without the proposed merger.[22]

---

[18] *See* Union Pacific, "Union Pacific and Norfolk Southern to Create America's First Transcontinental Railroad," available at https://www.up.com/press-releases/growth/norfolk-southern-transcontinental-nr-250729 (accessed October 28, 2025).

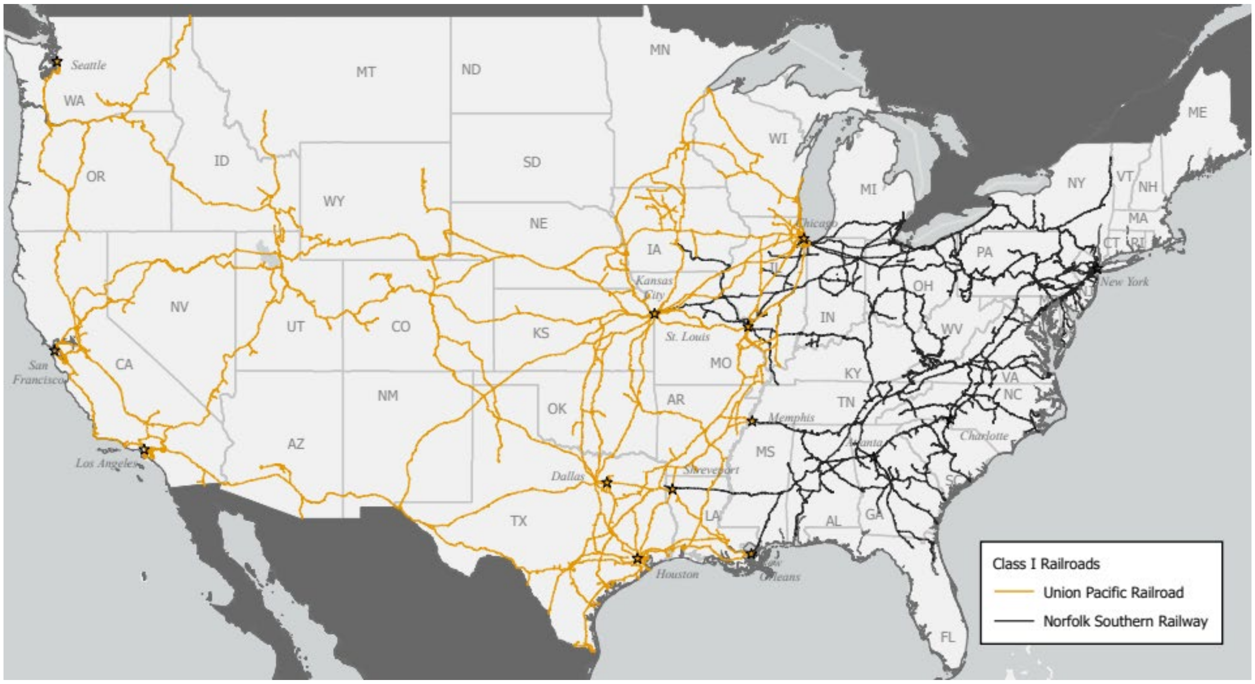
[19] *See* Exhibit 4.

[20] *See* Exhibit 4.

[21] *See* Union Pacific, "Union Pacific and Norfolk Southern to Create America's First Transcontinental Railroad," available at https://www.up.com/press-releases/growth/norfolk-southern-transcontinental-nr-250729 (accessed October 28, 2025).

[22] *See* Section 3 for further discussion.

Exhibit 4: Combined Railroad (UP + NS) Map



Source: Surface Transportation Board, "Railroad Map Depot," available at https://www.stb.gov/resources/railroad-map-depot/ (accessed November 20, 2025).

2.3 Geographic Overlaps Between the UP and NS Railroads Are Limited

22. As discussed earlier in Section 2.1, UP and NS mostly serve distinct geographic areas, with little horizontal overlap between the UP and the NS railroad networks.

23. The primary horizontal geographical overlap between UP's and NS's railroad networks is in just four states—Illinois, Iowa, Missouri, and Louisiana—with a small additional horizontal overlap in Memphis, TN. Exhibit 4 shows the states that UP and NS railroads run through and which of these states are common to both.

24. When assessing competitive horizontal overlaps, I first review the geographic areas where the networks of UP and NS are both present. I consider the STB's BEA areas, which represent areas that are considered economically integrated by the U.S. Department of

Commerce, Bureau of Economic Analysis.[23] BEAs do not follow the same geographic boundaries as states and some BEAs are part of two or more states.[24] There are 172 BEAs in the United States,[25] and 168 of them where at least one Class I railroad operates.[26] UP operates in 80 BEAs and NS operates in 74 BEAs, but they both operate in only 10 BEAs.[27]

---

[23] Each BEA represents one or more metropolitan area and their surrounding counties that are considered economically integrated – typically identified based on commuting patterns. See Bureau of Economic Analysis, "Survey of Current Business," February 1995, available at https://fraser.stlouisfed.org/files/docs/publications/SCB/1990-99/SCB_021995.pdf?utm_source=direct_download (accessed December 8, 2025) at p. 75; Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf at p. 42. Prior railroad transactions also conducted economic analyses at the BEA level. See, Verified Statement of W. Robert Majure, "Canadian Pacific Railway Limited, et al. – Control – Kansas City Southern, et al.," Finance Docket No. 36500, October 29, 2021, ("Majure VS"). See also, Verified Statement of Christopher A. Vellturo, "An Analysis of the Competitive Effects of the Proposed Combination of the Canadian National and Wisconsin Central Railroads," April 6, 2001 ("Vellturo 2001 VS") and Verified Statement of Christopher A. Vellturo, "Canadian National Railway Company and Grand Trunk Corporation – Control – EJ&E West Company," Finance Docket No. 35087, October 29, 2007 ("Vellturo 2007 VS").

[24] *See*, for example, the Chicago-Gary-Kenosha, IL-IN-WI; New Orleans, LA-MS; and Reno, NV-CA BEAs. See, Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf at pp. 83-84.

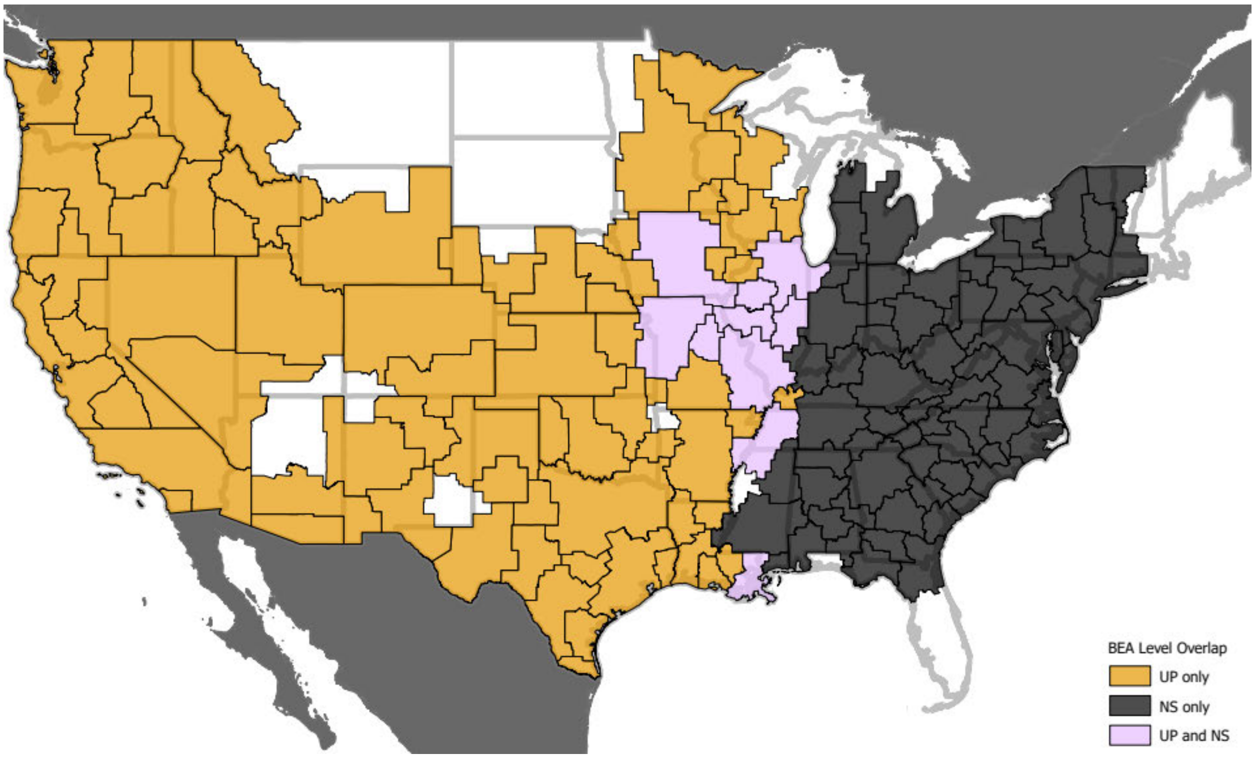
[25] The 2023 Surface Transportation Board's Carload Waybill Sample Reference Guide defines 172 BEAs in the United States. See Table 4-4 "STB BEA Codes" in Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf at pp. 83-85.

[26] A BEA is reported as being served by a Class I railroad if a Class I railroad has a freight station in the BEA. See workpaper "In-Text Calculations.xlsx." There are two BEAs listed in Surface Transportation Board's Carload Waybill Sample Reference Guide that do not map to a SPLC in the file "1-A-Raw_UPRR_AAR_Station_Master.txt": Honolulu, HI and Farmington, NM-CO. The horizontal geographic overlap analysis based on where freight stations are located may differ from that based on the waybill data discussed in Section 4. These differences are likely attributable to at least two reasons: first, the waybill data provides routes that are used and second, some waybill data used in the analysis is based on a sample as opposed to the full set of waybill data.

[27] *See* workpaper "In-Text Calculations.xlsx."

Exhibit 5 is a map of the BEAs in the United States identifying which BEAs are served by UP, which are served by NS, and which are served by both UP and NS.[28]

Exhibit 5: Map of BEAs Served by UP or NS



Sources: See workpaper "Exhibit 05.do."

2.4 UP and NS Overlaps Are Limited to the Central Region of the United States

25. As discussed above, UP and NS both operate in the Midwest and south-central regions of the United States where the two railroads connect. The horizontal overlap between UP and

---

[28] Even though UP and NS both interchange in Shreveport, LA, NS neither serves Shreveport nor operates there. NS has haulage in Shreveport for interchange only. For this reason, the Shreveport-Bossier City, LA-AR BEA is not considered a BEA where UP and NS both operate. NS has a "longstanding agreement" with CPKC in which "NS has rights to use the Meridian Speedway, which connects UP in Shreveport and NS in Meridian. Under the agreement, UP and NS can commercially interchange intermodal traffic at Shreveport, with CPKC providing the transportation between Shreveport and Meridian." *See* the Joint Verified Statement of Eric Gehringer and John F. Orr, ("Gehringer-Orr VS"), at ¶ 175.

NS is limited to the central region of the US, regardless of whether one considers the UP and NS railway networks or the common BEAs. There will continue to be competition in the geographic areas served by both UP and NS post-merger because at least two other Class I railroads operate in all of these areas.[29]

26. Exhibit 5 shows the 10 BEAs where UP and NS both operate. In each of the 10 BEAs where UP and NS both operate, there are at least two additional Class I railroads that serve the BEA. Indeed, five of these 10 BEAs are served by all six Class I railroads, and another three are served by five Class I railroads.[30]

27. In addition, within the BEAs where both UP and NS operate, UP and NS currently have five main points of traffic interchange where freight is transferred between the two railroads. After the proposed merger, these interchange points will become points of vertical integration and will create single routes from pre-merger interline routes. These interchange points are Chicago, IL; St. Louis, MO; Kansas City, MO; Memphis, TN; and New Orleans, LA.[31] All six Class I railroads serve three of these five interchange points – Chicago, St. Louis, and New Orleans. Five Class I railroads serve Memphis, and four serve Kansas City. Exhibit 6 summarizes this information.

---

[29] *See* workpaper "In-Text Calculations.xlsx."

[30] *See* workpaper "In-Text Calculations.xlsx."

[31] *See* Gehringer-Orr VS at ¶ 152.

Exhibit 6: Class I Railroads Serving Main UP/NS Interchange Locations

Location	Number of Class I Railroads	UP	NS	BNSF	CN	CPKC	CSX
Chicago, IL	6	Y	Y	Y	Y	Y	Y
New Orleans, LA	6	Y	Y	Y	Y	Y	Y
St. Louis, MO	6	Y	Y	Y	Y	Y	Y
Memphis, TN	5	Y	Y	Y	Y		Y
Kansas City, MO	4	Y	Y	Y		Y	

Notes:
Whether a Class I railroad has a presence in each city is identified by SPLC (Standard Point Location Code). Chicago, IL is identified by SPLC 380000. St. Louis, MO is identified by SPLC 567500. Kansas City, MO is identified by SPLC 566900. Memphis, TN is identified by SPLC 439900. New Orleans, LA is identified by SPLC 647000. Railroad providers are identified by unique SCACs (Standard Carrier Alpha Code).

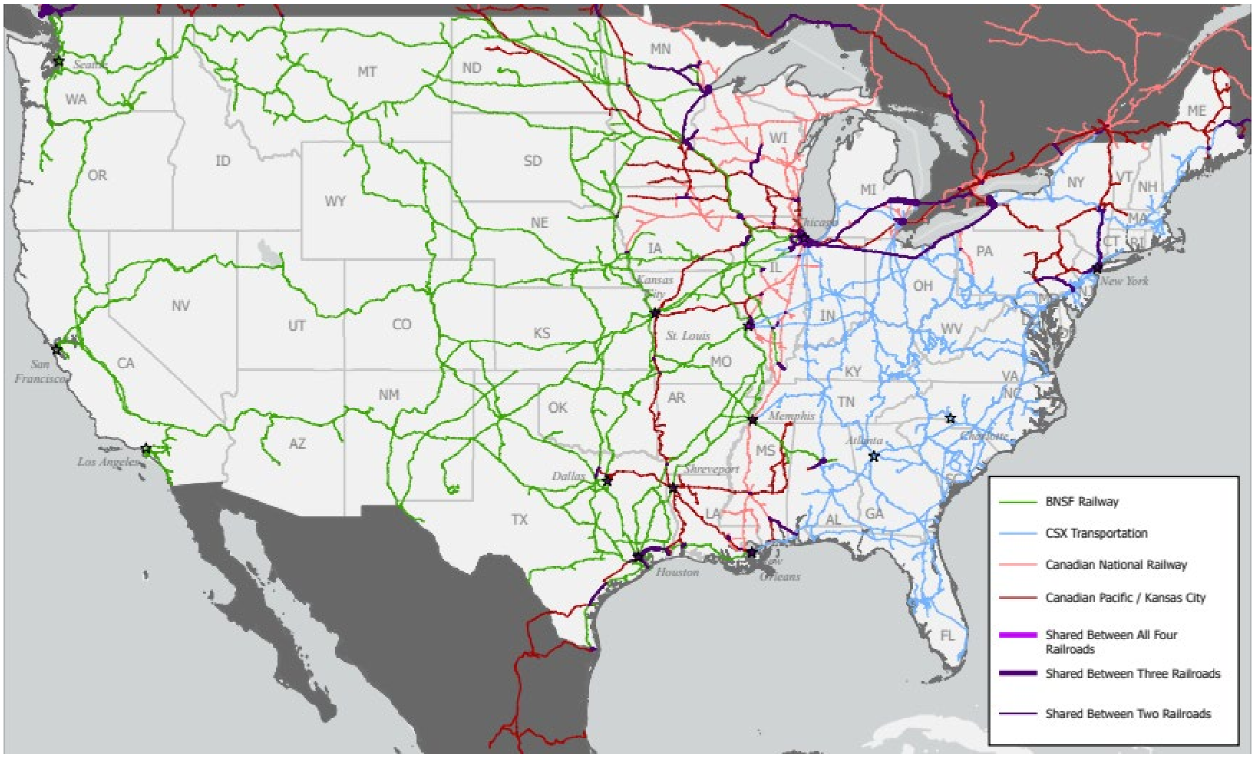
Sources: See workpaper "Exhibit 6.xlsx." Main interchange locations are identified in Gehringer-Orr VS at ¶152.

28. To summarize, although UP and NS are large railroad networks that cover significant portions of the United States, their points of horizontal overlap are limited, confined to the central region of the United States. The Applicants are never the only two Class I railroads in the BEAs in which they both operate, and at least two other Class I railroads will continue to serve each of these BEAs post-merger.

2.5 Horizontal Competition

29. As discussed earlier, in addition to UP and NS, BNSF, CSX, CN and CPKC are the four other Class I railroads in the United States. The map in Exhibit 7 shows that these four Class I railroads have a combined network that spans the United States. Exhibit 7 shows BNSF routes in green, CSX routes in blue, CN routes in pink, and CPKC routes in dark red. BNSF's railroads span the western United States. CSX's railroads cover the eastern United States. CN's and CPKC's railroads each connect the northern and southern portions of the central United States and extend through Canada. CPKC connects Canada to Mexico. CPKC also has some routes in the northern portion of the eastern United States.

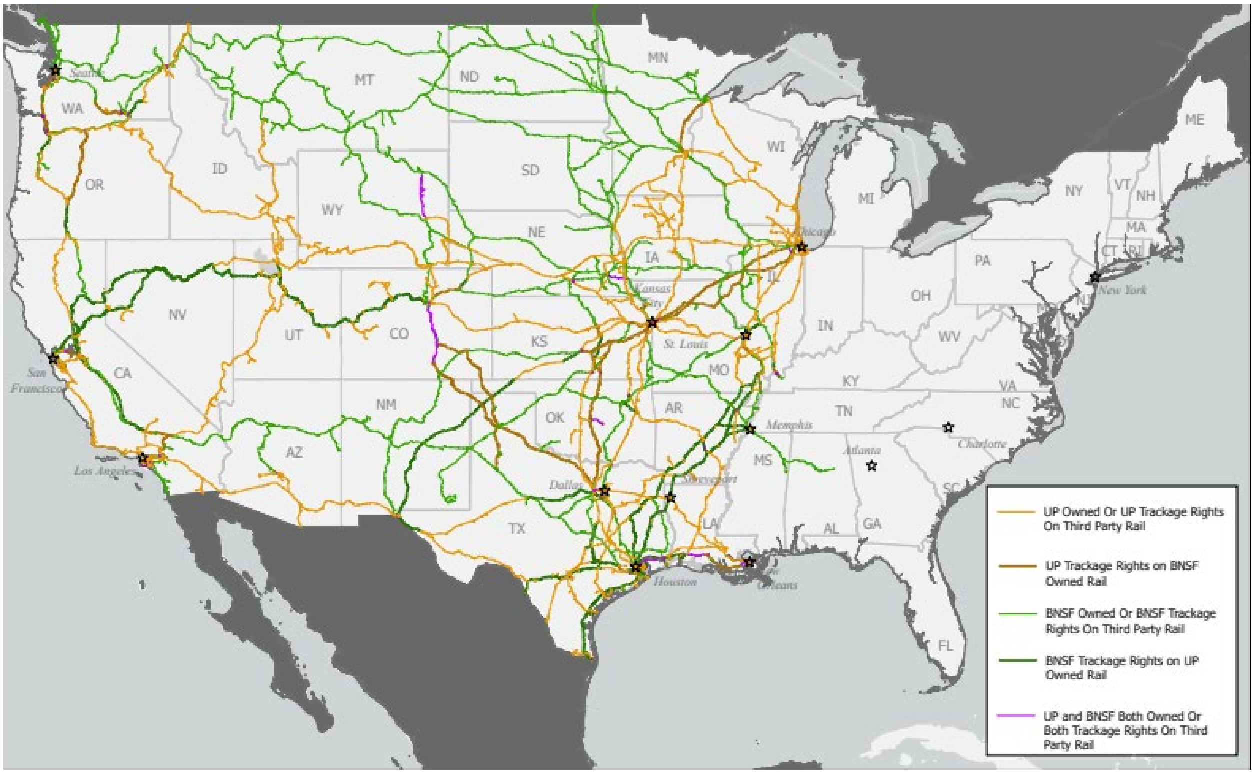
Exhibit 7: BNSF, CSX, CN, and CPKC Railroad Routes Map



Source: Surface Transportation Board, "Railroad Map Depot," available at https://www.stb.gov/resources/railroad-map-depot/ (accessed November 20, 2025).

30. BNSF operates largely in the same geographic area as UP. The map in Exhibit 8 shows that both BNSF and UP operate on rail lines spanning the western portion of the country. The lighter shades of green and yellow represent rail lines that BNSF and UP respectively own or have a right to operate on per agreements with third-party railroads (i.e., all other railroads other than BNSF and UP). The darker shades of green and yellow represent rail lines that UP and BNSF respectively own but on which the other party can operate. Routes in purple represent rail lines owned or operated on by both BNSF and UP.

Exhibit 8: BNSF and UP Railroad Route Map

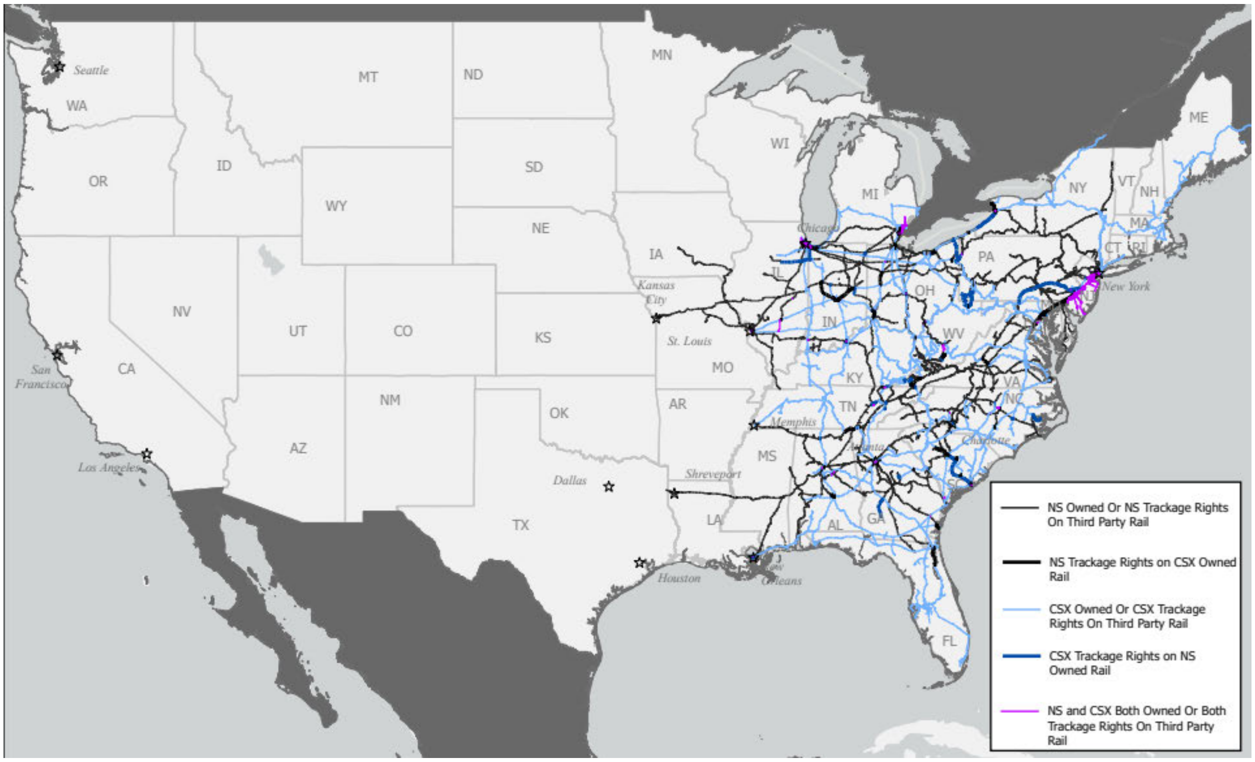


Source: Surface Transportation Board, “Railroad Map Depot,” available at https://www.stb.gov/resources/railroad-map-depot/ (accessed November 20, 2025).

31. CSX operates largely in the same geographic area as NS. The map in Exhibit 9 shows that both CSX and NS operate on rail lines spanning the eastern portion of the country. The light blue and thin black lines represent rail lines that CSX and NS respectively own or have a right to operate on per agreements with third-party railroads (i.e., all other railroads other than CSX and NS). The dark blue and thick black lines represent rail lines that NS and CSX respectively own but on which the other party can operate. Routes in purple represent rail lines owned or operated on by both CSX and NS.

32. As shown in Exhibit 7, Exhibit 8, and Exhibit 9, BNSF, CPKC, CN, and CSX all operate in the central region of the country, where UP and NS also operate.

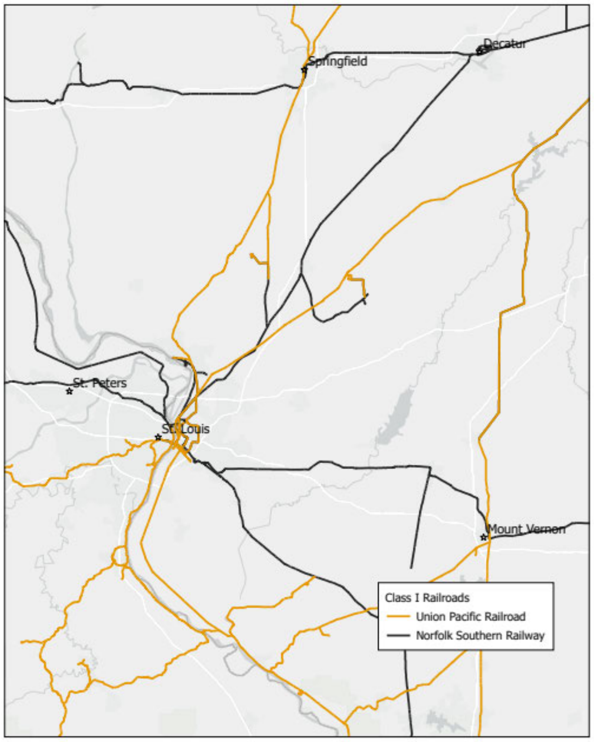
Exhibit 9: CSX and NS Railroad Route Map

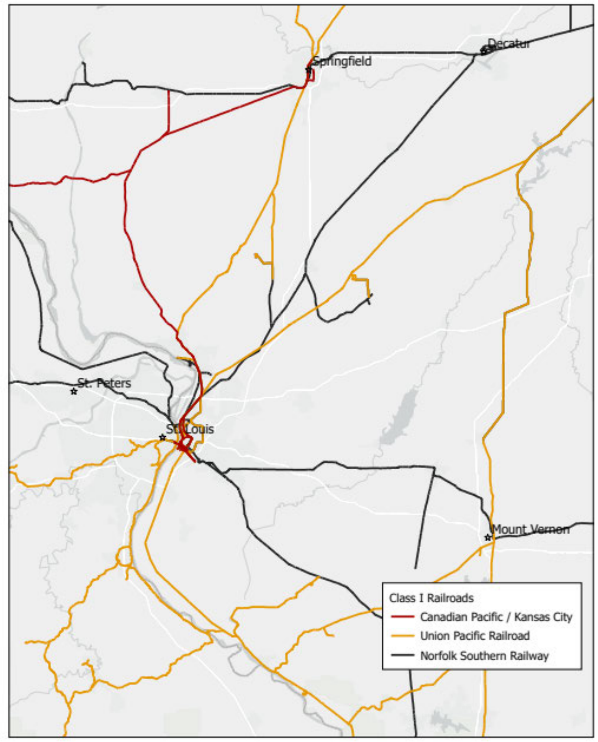


Source: Surface Transportation Board, "Railroad Map Depot," available at https://www.stb.gov/resources/railroad-map-depot/ (accessed November 20, 2025).

33. As a result, shippers will continue to have a choice of competing Class I rail service providers post-merger. For example, while both UP (orange) and NS (black) currently offer service between Springfield, IL and St. Louis, MO (left panel of Exhibit 10), another Class I railroad (CPKC; dark red), also connects those two cities (right panel of Exhibit 10). As a result, the shippers located in Springfield, IL and St. Louis, MO will continue to have competing Class I rail service options after the proposed merger.

Exhibit 10: Springfield, IL - St. Louis, MO Route Served by UP, NS, and CPKC





Source: Surface Transportation Board, "Railroad Map Depot," available at https://www.stb.gov/resources/railroad-map-depot/ (accessed November 20, 2025).

34. After the proposed merger, both BNSF and CSX will continue to compete with the combined railroad to carry freight across the United States. In addition, CN and CPKC will continue to compete with the combined railroad in the central region of the United States, since they both often operate in the geographies where UP and NS operate. [32] And, as discussed above, for each of the 10 BEAs where UP and NS both operate, at least two other Class I railroads also compete in each of these 10 BEAs.

[32] BNSF and CPKC each operate in 9 of the 10 BEAs where UP and NS both operate. CN operates in 8 of the 10 BEAs where UP and NS both operate. CSX operates in 7 of the 10 BEAs where UP and NS both operate. *See* workpaper "In-Text Calculations.xlsx."

3 BENEFITS FROM THE PROPOSED MERGER

35. Section 2 relied on station location data to show that the railroad networks of UP and NS are largely complementary and not horizontally overlapping. This section assesses the extent to which combining these complementary assets under common ownership could strengthen competition to transport freight to the benefit of customers. The scope for benefits from better service (such as increased availability of single line options) or heightened competition resulting from the proposed combined railroad is measured by the number of carloads transported by UP and NS in 2023.

36. My assessment of the benefits from combining the networks under common ownership starts with the fact that the combined railroad will replace interline services where UP and NS currently must interact independently to transport freight between points on their respective networks, with single line services operated by one railroad. Viewed through the lens of economics, and based on my review of the evidence provided in the Verified Statements from other experts in this matter, I find that:

   a. In 2023, UP and NS interchanged approximately 1,240,000 cars and intermodal units[33] on interline services, of which approximately 913,000[34] were loaded. The combined railroad will have stronger incentives to seek and implement operating efficiencies for the single line services that would carry these cars than UP and NS acting independently do. The combined railroad will also have stronger incentives to

---

[33] "In 2023, the two railroads interchanged approximately 1,637 cars of manifest traffic, 1,648 containers of intermodal traffic, and 122 cars of bulk shipments per day." *See* Gehringer-Orr VS at ¶ 152. (364 × (1,637 + 1,648 + 122) = 1,240,148).

[34] *See* workpaper "In-Text Calculations.xlsx."

market and price single line services aggressively and to ensure reliability, compared to the Applicants' independent incentives when marketing and delivering interline services today. The benefits from the improved incentives are unlikely to be achieved in full without the proposed merger. I discuss this further in Section 3.1.

b. Many shippers that currently use other railroads or trucks to transport their freight would benefit from having a single line option from the proposed combined railroad. The Application includes one measure of the potential scope of this benefit: an estimate that roughly 1.864 million carloads would divert from truck or other railroads to take advantage of better services.[35] Those diversions are far less likely to happen absent the proposed merger, nor is the full range of investments needed to support this additional traffic likely to be forthcoming if the proposed merger does not proceed. I discuss this further in Section 3.2.

37. In developing my opinions, I rely on (1) the Joint Verified Statement of Eric Gehringer and John F. Orr ("Gehringer-Orr VS"), which describes the Operating Plan of the combined railroad; (2) the Joint Verified Statement of Kenny Rocker and Claude E. Elkins ("Rocker-Elkins VS"), which describes the benefits from a marketing perspective; (3) the Joint Verified Statement of David T. Hunt and Matthew Schabas ("Hunt-Schabas VS") which estimates the diversion of traffic from truck and from other railroads to take advantage of improved services; and (4) the Verified Statement of John W. Turner ("Turner VS") which describes the investments that the combined railroad intends to make to support the growth in traffic which UP and NS expect to attract as a result of the proposed merger.

---

[35] *See* the Hunt-Schabas VS at Exhibit 2-3.

3.1 Scope for Benefits on Existing Traffic

38. The combined railroad is likely to have stronger incentives to make single line services faster and more reliable, and more competitive, compared to the incentives of UP and NS in relation to the interline services they replace. This is because the proposed merger would internalize externalities that currently exist between UP and NS when they operate interline services. An externality occurs when the decision one party makes imposes a benefit or cost on a third party. Independent firms producing complementary goods or complementary services do not account for how their actions affect other parties. Acting independently (i.e., choosing decisions based only on the firm's own interest), the first firm ignores the effects of its actions on the second firm. A merger between these two firms aligns incentives: a common owner internalizes externalities as the combined entity will, post-transaction, take into account the effect of each firm's actions on the overall combined firm.[36] The next sections describe these changes to the combined railroads' incentives in more detail.

3.1.1 Incentives to implement operating improvements

39. The combined railroad would have stronger incentives to seek and implement ways to make its single line services faster and more reliable. The Gehringer-Orr VS describes the changes that the proposed combined railroad plans to make to the planning and operation of its services. The statement describes two versions of the Operating Plan for the combined railroad: the Optimized Plan, which identifies operating changes that the combined railroad could implement immediately following the merger, assuming current volumes and patterns

[36] For a discussion of externalities, *see, among others,* Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*, HarperCollins (1994) ("Carlton and Perloff"), at pp. 115-123.

of traffic; and a Growth Plan, which identifies additional changes to accommodate the extra traffic that the Applicants expect to be diverted from truck and other rail operators, based on the Hunt-Schabas VS.[37] In this section I focus on the operational changes described in the Optimized Plan.

40. One reason why single line services operated by the proposed combined railroad likely will be faster and more reliable is that cars will be handled fewer times during their journey under the Optimized Plan.[38] Trains are typically comprised of blocks of cars bound for different destinations.[39] Individual railcars may be switched into yards to be sorted and classified or reclassified into blocks and blocks may be removed and attached to different trains multiple times over the course of their journey. These "handlings" introduce delay and variability.[40] Interchanges on interline routes can be particularly time consuming as they often involve two (or more) handlings, one on each of the interchanging networks.[41] The Rocker-Elkins VS reports that interchange points between carriers can add between 24 and 48 hours of

---

[37] *See* Gehringer-Orr VS at ¶¶ 15, 27, 31.

[38] *See* Gehringer-Orr VS at ¶¶ 8 and 27.

[39] For a description of how freight trains are built, *see* Association of American Railroads, "Freight Rail FAQs," available at https://www.aar.org/faqs/ (accessed November 21, 2025).

[40] *See* Gehringer-Orr VS at ¶ 27. "Reducing intermediate handlings improves service reliability for customers by eliminating events that introduce variability into the system."

[41] *See* Hunt-Schabas VS at Section 3.4. "Even at large gateways, most railcars must be handled twice (at the originating and terminating railroads' terminals) before continuing."

dwell time.[42] Interchanges also make services less reliable as the hand-off between two independent railroads creates operational risk.[43]

41. Under the Optimized Plan, the proposed combined railroad is expected to eliminate over 873,000 handlings per year by converting current interline services into single line services.[44] The Optimized Plan also describes changes to the way that some formerly interline services between UP and NS will be routed, which, together results in reductions in handling.

42. These improvements derive from multiple operational changes. For example, under the Optimized Plan, the combined railroad is anticipated to introduce new, more efficient routes that will have trains pass through the current interchange points without the need for any handling there at all.[45] One example is the combined railroad will introduce a new direct train from North Platte, NE to Conway, PA, that will run through Chicago without any handling.[46] To implement these plans, the combined railroad will assemble blocks at yards

---

[42] *See* Rocker-Elkins VS at ¶ 51. "Transfers between carriers can add 24 to 48 hours of dwell time and reduce the utilization of locomotives and cars that should be moving freight."

[43] "[The] more interchanges, the greater the risk that a railroad will not be able to meet its service hand-off plan for a railcar." Hunt-Schabas VS at Section 3.3. The Hunt-Schabas VS Section 3.3 reports empirical analysis that uses the number of interchanges as a proxy for service reliability.

[44] *See* Gehringer-Orr VS at ¶ 6. "Applicants project implementation of their optimized plan will remove approximately 2,400 handlings of cars and containers per day."

[45] *See* Gehringer-Orr VS at ¶¶ 27, 182-184.

[46] *See* Gehringer-Orr VS at ¶ 190.

within UP's legacy network that are destined for points within NS's legacy network, and vice versa.[47]

43. Another change is that some interchanges between UP and NS involve the same railcar or intermodal unit being handled multiple times. The combined railroad will reduce some of these. For example, the proposed combined railroad anticipates consolidating some of the UP and NS yards in Chicago, which would allow the Applicants to reduce the number of handlings for traffic passing through the gateway.[48]

44. An example illustrates how the proposed merger would likely create stronger incentives to improve services by internalizing externalities between UP and NS. One type of improvement in the Optimized Plan is to operate existing trains on more efficient routes that run through the points of interchange between UP's and NS's legacy network without needing any handling. Before the proposed merger, this routing would involve one of the Applicants (e.g., UP) using its yards to assemble blocks destined for points within the other Applicant's (e.g., NS's) network.[49] When creating blocks at its yards, UP's economic incentive is to consider the commercial implications only for its own business. Its incentives will differ from those of the combined railroad for at least two reasons. First, UP receives only a part of the profit for interline services with NS as independent entities, but the

[47] *See* Gehringer-Orr VS at ¶¶ 183-184, 230. "In addition, Applicants will change the way traffic currently flows through current interchanges to implement more efficient train and blocking concepts they have developed in the planning process…The planned changes to current traffic flows centrally involve creating new trains with deeper network blocking while optimizing movements through mid-continent gateways."

[48] Gehringer-Orr VS at ¶¶ 203-204, 207. "UP/NS also will reduce complexity and consolidate automotive shipment distribution by shifting operations from UP's Chicago Heights automotive facility into NS's Hegewisch automotive facility, eliminating intermediate handlings between the two facilities."

[49] *See* Gehringer-Orr VS at ¶ 183.

combined railroad would receive all of the profit from single line services. Second, UP has little incentive to incur costs itself in order to reduce NS's costs of delivering interline services. As a result, as an independent entity pre-transaction, UP has weak economic incentives to divert activities from its own direct services in order to sort and reclassify cars to better serve NS's interests. However, a combined railroad would have the full incentive to optimize UP's and NS's combined network.

3.1.2 Incentives to offer improved service terms

45. The combined railroad would also have stronger incentives to compete for business. Shippers typically contract with railroads for interline services in one of two ways. They may contract with one railroad, which arranges for carriage for part of the journey using interline agreements with other railroads on the route. Alternatively, shippers may contract separately with each railroad using Rule 11, an accounting rule set by the Association of American Railroads that allows each railroad on an interline service route to issue its own invoice to the shipper for the services it provides. With interline pricing, shippers negotiate a single rate with one of the carriers and receives a single invoice for the full route. With Rule 11 pricing, on the other hand, shippers negotiate separately with each of the railroads that serve portions of the overall route and receive a separate segment-specific invoice from each carrier.[50]

[50] *See*, for example, Rick LaGore, "Rule 11 vs. Railroad Interline Agreements - A shipping comparison," InTek Logistics, June 18, 2025, available at https://www.inteklogistics.com/blog/rule-11-railroad-interline-agreement-comparison (accessed November 24, 2025). *See also*, Association of American Railroads, "Railway Accounting Rules," December 2, 2025, available at https://public.railinc.com/sites/default/files/documents/RAR.pdf.

46. From an economic perspective, both of these options are inefficient because they involve at least two separate negotiations. Single line services are anticipated to result in customers being able to obtain quotes for shipments more quickly. UP and NS typically provide quotes for single line shipments within one business day, but it can take up to seven days to get quotes for interline shipments.[51]

47. Moreover, there is an externality between the two (or more) railroads that could slow down negotiations and lead to worse terms for shippers. There are at least two ways in which the rate offered by one railroad for its part of a route could affect the profits of railroads operating other parts of the route:

a. The prices offered by one railroad can affect whether a shipper decides to use a particular route, rather than a competing rail option or truck, and thereby affecting the profits of other railroads that would participate on that route.

b. Once a shipper has accepted the terms for a route, those prices affect the volume shipped, because prices affect the marginal price the shipper pays for transporting additional units; as a result, the profits of other railroads that would participate on that route are affected.

48. Each railroad would prefer the other railroad to offer price concessions on its part of the service in order to reach an agreement with the shipper, or to offer terms with a lower marginal rate to encourage the customer to ship more freight. A railroad that offers better terms bears the full cost of making the concession, but the benefits – the additional contract

---

[51] *See* Rocker-Elkins VS at ¶ 10.

or extra volume that results – are shared with the other railroad. There is an externality between the railroads because more attractive terms offered by one of them benefit the other, leading to an incentive misalignment.

49. The proposed merger is likely to address both problems – separate negotiations and the relatively weaker incentives to offer price concessions. The shipper will negotiate with a single sales team from the combined railroad that will be able to offer terms for the full route, avoiding a second negotiation with a different team at another railroad. Moreover, post-merger the combined railroad will internalize the externality between UP and NS because the combined railroad would get the full benefit of any additional business or volume won through offering better terms. All else equal, internalization of the externality increases the economic incentive to offer better terms compared to independent railroads in negotiations over interline services. Consistent with economic theory, higher quality services (such as faster service) coupled with enhanced incentives to compete can result in lower quality-adjusted prices.

50. My conclusion that the proposed combined railroad is likely to have enhanced incentives to compete is based on well-accepted principles in the economics literature on price effects when complements come under common ownership. These ideas appear in several forms, including the elimination of double marginalization. Double marginalization arises when two firms with market power in the same supply chain successively set their own price. The upstream firm will often charge the downstream firm a price that includes a profit margin above its costs. The downstream firm will treat this margin as part of its own costs (since that is the price it pays the upstream firm), and may charge a margin on top of that, resulting in customers paying a price that includes two margins (this is the "double marginalization").

If the firms merge, however, the combined firm bases its pricing decision on the costs of the upstream input, rather than a price that includes a markup on those costs, thereby eliminating the double marginalization, which is then expected to result in lower prices.[52]

3.1.3 Incentives to ensure reliable services

51. Post-transaction, the combined railroad will also have enhanced incentives to ensure reliable single line services in the face of operating difficulties. Compared to a combined entity, standard economic reasoning shows that a standalone UP will generally put less weight on ensuring that interline services arrive on time for two reasons. First, UP shares the benefits (i.e., gets partial benefits) of meeting the expectations of interline customers with NS, whereas the proposed combined railroad would gain the full benefit. Second, shippers pre-merger may be unsure which railroad is responsible for late deliveries, so NS might bear some of the consequences when UP prioritizes its own direct services (and vice versa). The combined railroad, on the other hand, cannot blame-shift responsibilities. According to the Rocker-Elkins VS this is a material consideration.[53]

3.1.4 These benefits are unlikely without the proposed merger

52. Independent firms can attempt to coordinate activities using a contract that specifies the obligations of each and allocates the benefits from better coordination. However, evidence

---

[52] On the double marginalization and a double markup, *see*, for example, Carlton and Perloff at pp. 523-527.

[53] Rocker-Elkins VS at ¶ 52. "The problem isn't just time—it's accountability. When two carriers share a shipment, it's harder for customers to get clear pricing, tracking, and service commitments. If a delay occurs, no single railroad owns the full responsibility for addressing the problem. That fragmented accountability undermines the consistency that customers expect and erodes confidence in rail's reliability."

and economic theory show that UP and NS could not achieve all the potential benefits of the combined railroad.

53. Evidence that contracts cannot achieve all the benefits of the merger includes the simple point that, while the operating changes in the Optimized Plan would be jointly profitable today, UP and NS have been unable to achieve them though contractual or other means. The frustration of shippers with split accountability for interline services mentioned in the Rocker-Elkins VS,[54] and the evidence in the Rocker-Elkins VS that rail has a smaller share compared to truck on corridors where rail services are interline rather than single line[55], are also consistent with it being difficult to achieve fully aligned services when independent railroads cooperate to provide services under interline agreements.

54. Economic literature describes the limitations of organizing economic activity through arms-length negotiations between independent firms in an environment of changing circumstances.[56] One important concept is the transaction costs associated with negotiating the obligations and allocation of benefits in the contract. These costs can be high when the setting is complex and changeable. Contracts may be unable to specify the actions that would be efficient in all contingencies because there are too many, or they are hard to contemplate. Taking the example of UP using its yard to assemble blocks for points within NS's network,

---

[54] Rocker-Elkins VS at ¶ 52.

[55] *See* Rocker-Elkins VS at Figure 2.

[56] *See* Ronald H. Coase, "The Nature of the Firm," *Economica,* vol. 4 (1937), pp. 386-405; Oliver E. Williamson, "The Vertical Integration of Production: Market Failure Considerations," *Papers and Proceedings of the Eighty-Third Annual Meeting of the American Economic Association*, vol. 61, no. 2 (1971), pp. 112-123; On the limitations of contracts as commitment devices, *see*, for example, Benjamin Hermalin, Avery Katz, and Richard Craswell, "The Law and Economics of Contracts," in *Handbook of Law and Economics,* editors A. Mitchell Polinsky and Steven Shavell (New York: Elsevier, 2007), at pp. 5-7.

UP may experience increased demand for services on its own network that use the same yard for handling. That could make it more costly for UP to divert capacity at the yard to assemble blocks for NS and UP may no longer be willing to abide by the original agreement. Subsequent renegotiations are costly and time-consuming and can trigger legal disputes as parties strategically bargain over which entity bears the changed costs or receives changed benefits. In contrast, a merger allows for flexible internal coordination without repeated negotiation, thereby preserving efficiencies that are lost when using contracts.

3.2 Scope for Benefits to Other Shippers

55. Improved single line services offered by the combined railroad are also likely to benefit many shippers that currently use other railroads or other transport options (e.g., truck) as well as existing UP and NS customers. Competing railroads may improve their own terms or service quality to remain competitive. Likewise, shippers can switch from their current options to take advantage of the better services and quality-adjusted pricing from the combined railroad.

56. The Hunt-Schabas VS includes an estimate of the additional traffic that the Applicants expect to attract to the single line services of the combined railroad. It estimates an additional 1.864 million carloads and intermodal units per year.[57]

57. These benefits are unlikely to be achieved in full without the proposed merger. As discussed earlier, many of the improvements to services that result in these benefits are unlikely without the proposed merger. In addition, UP and NS would not be able to accommodate the

[57] *See* Hunt-Schabas VS at Exhibit 2-3.

additional traffic that the Hunt-Schabas VS anticipates without additional investments in infrastructure.[58] The Turner VS provides a summary table of expected infrastructure projects needed to support the anticipated increase in traffic on the single line services operated by the combined railroad: These investments total over $1 billion, and include investments in yard and terminal expansion, siding extensions, and signal updates.[59]

58. Based on well-understood principles from the economic literature, it is unlikely that UP and NS would make these investments without the proposed merger. The economic concept of a hold-up problem is key to understanding why a firm may not make investments that would benefit both it and its vertical trading partners when the two firms are coordinating by contract.[60] Hold-up arises when one firm must invest in relationship-specific assets; for example adding a mile of track to a yard to facilitate interchange with a second railroad.[61] Once invested, the first railroad risks opportunism: if the second railroad is contacted by a shipper seeking an interline service, it may threaten to interline with a rival of the first

---

[58] Turner VS at ¶ 6. "Part IV identifies the infrastructure improvements Applicants currently anticipate they will need to produce the projected service improvements and accommodate projected merger-related traffic growth, and their plan for timely completion of those improvements." *See also*, Turner VS at ¶ 82. "Applicants have planned extensive capital improvements to main lines and yard and terminal facilities on the combined UP/NS network that are projected to experience merger-related traffic growth. These investments will allow the combined railroad to accommodate anticipated traffic growth while also improving safety and service quality."

[59] Turner VS at Table 14.

[60] *See* Oliver E. Williamson, "Transaction-Cost Economics: The Governance of Contractual Relations," *The Journal of Law and Economics*, vol. 22, no. 2 (1979), pp. 233-261. *See also*, the property rights theory of Sanford J. Grossman and Oliver D. Hart, "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration," *Journal of Political Economy,* vol. 94, no. 4 (1986), pp. 691-719 and Oliver D. Hart and John Moore, "Property Rights and the Nature of the Firm," *Journal of Political Economy*, vol. 98, no. 6 (1990), pp. 1119-1158.

[61] Yards are typically surrounded by residential and/or commercial construction and rarely have land available for expansion. Even when land is available, the process of obtaining the right to add capacity to a yard is convoluted. *See, for example,* United States Government Accountability Office, "Freight Transportation: National Policy and Strategies Can Help Improve Freight Mobility," January 2008, available at https://www.gao.gov/assets/gao-08-287.pdf, at p. 14. "Freight movement in population centers and along major corridors is also constrained by the physical barriers created by urban land-use development patterns and the built-up urban environment, such as buildings and other facilities that are adjacent to ports, rail yards, and highways."

railroad unless the first railroad agrees to unfavorable conditions for its part of the through-billed interline shipment, thereby removing some of the first railroad's benefits from its investments.

59. Anticipating the possibility of hold-up, the economic literature shows firms under-invest, or even avoid investing altogether, leading to inefficient outcomes for all parties. Contracts cannot eliminate hold-up risk because contracts are incomplete, and enforcement is imperfect. Vertical integration aligns ownership rights and residual profits, thereby internalizing the hold-up risk which thereby enables efficient levels of relationship-specific investments.

60. In the context of the proposed merger of UP and NS, the hold-up problem provides an informative context as to why UP and NS acting independently may fail to invest in the infrastructure needed to accommodate additional traffic. In particular, with each of UP and NS acting independently, investments made by UP (for example) would only be profitable to UP if NS cooperated to channel additional traffic on interline services with UP rather than one of UP's rivals: needing NS's cooperation enhances NS's bargaining position when negotiating with UP over how to allocate the benefits of the additional traffic volume and could result in UP choosing unilaterally not to make the infrastructure investment.

4 HORIZONTAL COMPETITIVE EFFECTS ANALYSES

61. This section analyses the scope for adverse horizontal competitive effects. I find that, compared to the scope for benefits of the proposed merger, there is limited scope for potential harm from the loss of horizontal competition between UP and NS.

62. Horizontal competition between railroads can take different forms. Some shippers are served by railroads that have lines that connect the shippers' facilities directly to the railroad's network. These shippers might find it costly to switch in the short run to a railroad that does not already serve its facilities. Assessing the effect of the proposed merger on these shippers involves a local analysis of which railroads serve individual customer facilities. Section 4.1 reports the results of an investigation by the Applicants of this issue and describes the commitments the Applicants are offering to shippers whose short run options may be changed by the proposed merger.

63. Other forms of horizontal competition involve freight transport options at a broader geographic level. Shippers that need direct access may be able to choose between different railroads with track or facilities within a broad area when choosing a site for a new facility or when they are considering expanding or replacing existing facilities. In addition, some shippers deliver their freight to railroads by truck and have access to alternatives within ready driving distance. To assess these types of horizontal competition, I conduct analyses using waybill data on actual movements of loaded railcars. These analyses identify routes that are not merely theoretical paths through the rail networks but instead reflect actual routes and existing traffic volumes that flow between areas. Section 4.2 describes the data used for the analysis.

64. Using waybill data, I conduct three analyses of the scope for adverse competitive effects at this broader level. These analyses are:

   a. The scope for potential harm from a loss of horizontal competition between UP and NS where they currently serve the same origins or same destinations (identified by BEAs). I discuss this further in Section 4.3.

b. The scope for potential harm from a loss of horizontal competition between UP and NS to transport freight within the same corridor between any two origins and destinations. I discuss this further in Section 4.4.

c. The scope for potential harm from a loss of horizontal geographic competition between UP and NS. Railroads can be geographic competitors even if their railroad networks overlap at only an origin or destination if, for example, the railroads originate traffic from shippers in different areas that is bound for customers at the same destination. I discuss this further in Section 4.5.

65. These analyses show that there is limited scope for potential harm from adverse competitive effects. The following sections discuss these different analyses and describe the data on which they are based.

4.1 UP and NS Commitments to 2-to-1 Customers

66. The Verified Statement of Katherine N. Novak ("Novak VS") describes the analysis the Applicants undertook to identify instances in which UP and NS are the only railroads serving individual customers. The Applicants identified three customer facilities for which the number of serving railroads would decline from 2-to-1 following the proposed merger. The three customer facilities described in the Novak VS are: AgRail LLC, at Bloomington, Illinois; Hillsboro Energy LLC, at Hillsboro, Illinois; and Macoupin Energy LLC, at Carlinville, Illinois. Macoupin Energy and Hillsboro Energy are both operated by Foresight Energy LLC.[62]

---

[62] *See* Novak VS at ¶¶ 51-52.

67. To preserve horizontal competition for these three shipper facilities, the Applicants have committed to entering into agreements that would allow another existing Class I railroad to serve the facilities using haulage rates under established industry terms and conditions.[63] The number of carloads affected across these three customer facilities is small: {{ }}[64] in 2023. If these commitments are effective at preserving horizontal competition for these customers, the affected shippers will not be harmed by the proposed merger.

4.2 Data

68. Short run competition between railroads with direct connections to customer facilities is not the only way in which railroads compete. This section discusses the data that is used to assess horizontal competition with a broader lens for three separate analyses, described in sections 4.3, 4.4 and 4.5.

4.2.1 Data sources

69. For the horizontal competition analyses, data on loaded railcar movements is used.[65] These analyses rely on three sources of data.

70. <u>First</u>, I use the STB's Confidential Carload Waybill Sample ("CWS").[66] The CWS is a stratified sample of U.S. rail traffic waybills, containing detailed information on an

---

[63] *See* Novak VS at ¶ 53.

[64] *See* workpaper "In-Text Calculations.xlsx."

[65] Railroads also transport empty railcars back to shippers; the vast majority of revenues are earned on movement of loaded railcars not empty cars. I analyze waybills for revenue movement of loaded cars only. I focus on linehaul movements and linehaul revenues (e.g., reciprocal switching moves are excluded). *See* Appendix C.

[66] A waybill is a shipping document that accompanies freight during transport and includes detailed information about the shipment.

individual shipment for the reporting railroad including origin, destination, commodity, carloads, tons, and revenue, among others.[67] Each record in the CWS represents a separate waybill and the sample is designed to be representative of the universe of rail freight waybills terminated by the reporting railroads.[68] While CWS records cover only a sample of all freight rail movements, the CWS also includes expansion factors provided by the STB to scale up the CWS so that the data are representative of the U.S. population of waybills.[69] I have access to CWS data for 2019-2023.[70] The STB modified sampling methodology for year 2021, so overall fewer records are sampled in years 2019 and 2020.[71]

71. Second, I have traffic tape data provided by UP, NS, and BNSF for 2019-2024. I also have traffic tape data provided by CN for 2023.[72] Each record in the traffic tape data includes information on the origin, destination, commodity codes, carloads, and revenue, among others, for each respective railroad.

---

[67] *See* Surface Transportation Board, "Carload Waybill Sample," available at https://www.stb.gov/reports-data/waybill/ (accessed November 24, 2025).

[68] CWS "is a stratified sample of carload waybills for all U.S. rail traffic submitted by those rail carriers terminating 4,500 or more revenue carloads annually." *See,* Surface Transportation Board, "Carload Waybill Sample," available at https://www.stb.gov/reports-data/waybill/ (accessed November 24, 2025). Surface Transportation Board, "Procedure for Sampling Waybill Records," January 1, 2021, available at https://www.stb.gov/wp-content/uploads/STB-Statement-81-1-Procedures-for-Sampling-Waybill-Records-2021-Edition.pdf.

[69] The STB provides two types of expansion factors – a theoretical expansion factor and an exact expansion factor. I use the theoretical expansion factor because it is available for all observations. *See,* Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf, at pp. 61 and 77. CWS records also include freight moves that originate in Mexico or Canada if they terminate in the U.S.

[70] As of the date of my report, the most recent CWS data available is for the year 2023.

[71] *See,* Surface Transportation Board, "Carload Waybill Sample," available at https://www.stb.gov/reports-data/waybill/ (accessed November 24, 2025).

[72] Traffic tape data from CSX were not available. CPKC traffic tape data only became available on November 19, 2025, and November 21, 2025 and were therefore not incorporated into these analyses.

72. Third, I use S&P Global Market Intelligence—Transearch data for freight movements shipped by non-rail modes (e.g., trucks, pipeline, water) in 2023. These data contain information on the tons of freight transported by different modes between origins and destinations where either the origin or destination is in the United States. Each record reports the tons of 4-digit standard transportation commodity codes ("STCC") shipped between a pair of BEAs by each transportation mode such as truck, water, or pipeline.[73]

4.2.2 The combined waybill data

73. The combined waybill data consolidates the following waybill data: (1) 2019-2024 traffic tapes for UP, NS, and BNSF, (2) 2023 CN traffic tapes, and (3) 2019-2023 CWS data ("combined waybill data").

74. My analyses rely on data for 2023, the year for which the most complete data are available, namely, traffic tapes from UP, NS, BNSF, and CN and the 2023 CWS which provides information for all other railroads. Although 2024 U.S. traffic tape data provided by UP, NS, and BNSF are available, information on other railroads for 2024 are not available since the most recent CWS data available is for 2023 and CN data are only available for 2023. The Transearch data on freight traffic by non-rail modes of transport, such as trucks and water, used to supplement the waybill data is also only available for 2023.

[73] The Transearch data identifies whether movements are transported by truck, air, pipeline, water, and "other" non-rail freight modes. For a detailed description of these data, *see* S&P Global Market Intelligence, "Transearch Tutorial Documentation," December 19, 2024, at p. 7; S&P Global Market Intelligence, "Transearch Reference Guide 2023"; *see also*, S&P Global Market Intelligence, "Transearch 2023 Modelling Methodology Documentation," April 16, 2025.

75. Combined waybill data for 2019-2022 and 2024 are also used to supplement findings for 2023, for example to determine whether or not other railroads transported freight along a route where they are not observed doing so in the 2023 data, as will be discussed in more detail later in this section.

76. Appendix C describes how the combined waybill data set is constructed. The primary analyses discussed in Sections 4.3, 4.4, and 4.5 use data for 2023. In addition, traffic tape data for UP, NS, and BNSF, as well as the CWS for other available years, are used to supplement these analyses.

77. Using the combined waybill data for a competitive analysis is conservative. Horizontal competitive concerns are likely to be over-identified because while there is complete 2023 information for UP, NS, BNSF, and CN movements, there is only information from the CWS for all other railroads, including the two other Class I railroads (CPKC and CSX), as well as Class II and Class III railroads. Records in CWS are sampled with different frequencies (e.g., some are at a rate of 1 out of 40) so information on movements in the CWS is particularly limited.[74] For example, if waybills for movements from some origins and destinations were not among waybills sampled for the CWS or not included in the traffic tape data from UP, NS, BNSF, and CN, then there is no further information available to identify those movements. Importantly, movements by CPKC or CSX as well as Class II and Class III railroads are underrepresented in these data and therefore the analyses described below would understate competition from CPKC and CSX or Class II or Class III railroads.

---

[74] *See* Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf, at p. 53.

4.2.3 Quantity measurement

78. My analyses use information on traffic volumes to identify potential horizontal competitive concerns. Depending on the specific analysis, traffic is measured either in counts of carloads or tons shipped. Whenever possible, carloads are used because there are some discrepancies in how tons are recorded among different sources.[75] Because data for non-rail movement from Transearch reports freight flows in tons, in the analyses where I incorporate non-rail movements, I also rely on tons as units of measurement of both rail and non-rail traffic. Measures of carloads include both railcars and individual intermodal container units.[76]

79. Although revenues are not used for these analyses, revenue information is included in Appendices E and F to respond to 49 CFR § 1180.7(b)(3) and (4).[77] Due to unique data limitations in the waybill data, revenues for other railroads for interlined movements are often unobserved. For example, for interline route moves (e.g., a route involving UP-CPKC-CSX), CSX revenues are not observed unless Rule 11 pricing is used and CSX's segment is sampled in the CWS. Given the sparsity of data in the CWS and the prevalence of non-Rule 11 interlined movements, more often than not, railroad revenues for interlined movements are not observed for either CSX and/or CPKC.[78] As a result, while there are revenues for UP, NS, BNSF, and CN, revenue measures for other railroads are far less complete, resulting in revenue-based analyses that are likely to be less reliable. See Appendix C for further details.

---

[75] *See* Appendix C.

[76] *See supra* n. 14 for a discussion about railcars and individual intermodal container units.

[77] *See* Appendix E and F for additional details.

[78] *See* Appendix C for details.

4.2.4 Level of geographic aggregation

80. The CWS data provides various geographic classifications for the origins and destinations of each waybill record. The analysis of horizontal competition in sections 4.3, 4.4 and 4.5 considers the freight transportation options available to shippers and consignees within BEAs, which is an economic-based geography area in the CWS.[79]

81. The Bureau of Economic Analysis describes these BEAs as consisting "of one or more economic nodes—metropolitan areas or similar areas that serve as centers of economic activity—and the surrounding counties that are economically related to the nodes."[80] Since "[t]he main factor used in determining the economic relationships among counties is commuting patterns…each economic area includes, as far as possible, the place of work and the place of residence of its labor force."[81]

82. BEAs are an appropriate basis for evaluating important dimensions of competition between alternatives for freight rail movements:

    a. BEAs capture competition when freight is delivered to or from rail by truck. Points within BEAs are linked by roads, such that shippers are able to choose between

[79] BEAs are also discussed in Section 2, *see* Section 2.3 for more information on BEAs. Traffic tape data do not include BEAs, but instead provide SPLC information for each origin and destination which are aggregated to the BEA level, as discussed in Appendix C.

[80] Bureau of Economic Analysis, "Survey of Current Business," February 1995, available at https://fraser.stlouisfed.org/files/docs/publications/SCB/1990-99/SCB_021995.pdf?utm_source=direct_download (accessed December 8, 2025) at p. 75.

[81] Bureau of Economic Analysis, "Survey of Current Business," February 1995, available at https://fraser.stlouisfed.org/files/docs/publications/SCB/1990-99/SCB_021995.pdf?utm_source=direct_download (accessed December 8, 2025) at p. 75.

nearby freight rail stations within a BEA, recognizing that the geographic scope of competitive rail alternatives include more than just the station closest to the shipper.

b. BEAs also capture longer term competition for customers that benefit from direct access between railroads active in the same general area, but not necessarily close to each other or currently serving the same customers, i.e., competitors for the same business. This is because shippers with a presence in that area can decide to develop new facilities near one railroad or the other.

83. Analyzing BEA-level data is consistent with the analysis of competition in prior mergers.[82] Routes or corridors are analyzed by BEA to BEA movements, not movements within each BEA.

4.2.5 Commodities

84. The analysis in Section 4.5 focuses on geographic competition. The geographic pattern of supply and demand will vary by commodity, so the traffic flows are analyzed separately by commodity. Commodities are classified by railroads using STCCs and these analyses use 4-digit STCCs.

85. The 4-digit codes represent a group of commodities (e.g., “Cotton, Raw,” “Bituminous coal,” “Wool or mohair,” “Lead ores”) each of which aggregates together 7-digit commodities. For example, the 4-digit code “Cotton, Raw” (0112) aggregates 5 commodities

[82] BEAs were used as the relevant geographic area in prior railroad mergers. *See,* Vellturo 2001 VS, Vellturo 2007 VS, and Majure VS.

defined at the 7-digit level, including “Cotton Bolls” (0112915), “Cotton Fiber, Bleached” (0112911), and “Cotton, Unginned” (0112930).

86. An example of the STCC structure is provided below, demonstrating how the digits in the 7-digit codes move from aggregated (2-digit) to disaggregated (7-digit) product levels.

Example of STCC Structure[83]

STCC Digits	Description
01	Farm Products
01 1	Field Crops
01 12	Cotton, Raw
01 129	Raw Cotton, NEC
01 129 15	Cotton Bolls

87. Two practical reasons merit the use of 4-digit STCC level commodities.

88. The analyses in this statement include an evaluation of competition by commodity between corridors. Traffic data are split between the separate analyses for each origin-commodity or destination-commodity pair. Using 4-digit STCCs allows for more observations in each analysis. For example, there are over 15,000 7-digit STCCs as compared to around 485 at the 4-digit STCC level.[84] Using 7-digit STCCs results in too few data points to support

[83] Railinc, “2023 Surface Transportation Board Carload Waybill Sample Reference Guide,” March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf; Canadian National, “List of Bulk STCCs – Applicable Under CN 7403 and CN 7402,” available at https://www.cn.ca/-/media/files/customer-centre/shipping/bulk-stcc-en.pdf.

[84] *See* Railinc, “2023 Surface Transportation Board Carload Waybill Sample Reference Guide,” March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf at pp. 118-161 and “93-A-stcc_comm.xlsx”. *See* workpaper “In-Text Calculations.xlsx.”

statistically reliable conclusions for many of the analyses. In addition, the data may not show an overlap between UP and NS at the 7-digit STCC level even though both UP and NS may be revealed to be commercially viable options for that commodity when using the 4-digit STCC level. Even using 4-digit commodities, there are many instances for which the traffic flows at the 4-digit level are likely too few to support reliable statistical conclusions about competition.[85] The problem would be even more pervasive using 7-digit STCC data.

89. An assessment of competition includes consideration of whether non-rail freight transport (truck or other non-rail modes) is a competitive alternative for shippers and consignees. The Transearch data for non-rail traffic flows used for my analyses includes 4-digit STCC commodities but does not provide information at the more granular 7-digit STCC level.

4.2.6 Data quality screens

90. Traffic tapes provided by UP, NS, BNSF, and CN contain records from business operations which include certain inconsistencies and discrepancies described in Appendix C. Data from STB is a sample, so is incomplete. To ensure that the analyses described below include sufficient data to draw meaningful conclusions the following screens are applied.

91. **Other years' data**. As described above, analyses are conducted using 2023 data and actual traffic patterns. If a particular origin or destination or corridor is served by two railroads, it is possible that in the single year 2023 a third railroad is not observed moving any traffic. Therefore, I also examine traffic flows in other years to determine if another railroad has moved such traffic during 2019-2022 or in 2024. Despite augmenting with available traffic

[85] *See* Appendix C.

data from additional years, this screen will not fully identify all competitors on any given route or at any given origin or destination because information for other railroads for other years is less complete relative to 2023 as described above.

92. **Small sample.** Three distinct filters are applied to account for small sample size. To draw meaningful conclusions about competition, a sufficient traffic volume needs to be observed at a point or along a corridor. First, a minimum carload volume of 365 carloads per year is applied. This minimum volume requirement of 365 carloads per year is similar to one carload per day in prior rail mergers.[86]

93. Second, a "minimum 10 waybills in year" requirement is applied for similar reasons. This minimum size restriction has been used in previous railroad transactions to account for the CWS sampling and its limitations, resulting in a dataset that can be used for analyzing the impact of a railroad merger.[87] With the lowest waybill sample rate being 1 out of 40 (for

[86] An alternative minimum carload shipment of 100 do not meaningfully change results.

[87] *See* Majure VS at ¶ 90. "[M]easurement of shares as a reliable description of choices, has been recognized in the Board's recent decision to adjust the Waybill sampling methodology to better capture smaller shipments. With the thin observation of these shipments that was still used in the 2019 Waybill Sample, the initial screen can be triggered by shares based on as few as 2 observed shipments which mathematically has to give one carrier at least 50 percent even if that is not an accurate representation of competition. This issue was indirectly addressed in past implementations of this test by imposing a minimum of one carload per day on candidate BEA area-commodity pairs. I will use an equivalent threshold for reliability of the screen." *See also*, Vellturo 2001 VS at pp. 11-12. "For example, there are only 21 product/DBEA pairs where the combined volumes of the two railroads amount to more than a carload a day… I understand that the Board has stated that it must approve a transaction of this type 'unless there will be adverse competitive impacts that are both 'likely' and 'substantial.'' The small CN/WC volumes within the 50/10 product/DBEA pairs indicate that this Transaction will not entail any such anticompetitive effects." *See also*, Vellturo 2007 VS at p. 88.

single car records), limiting the analysis to corridors with at least 10 waybills in a year is similar to 365 carload shipments in a year for reliability.[88]

94. Third, routings with fewer than 10 carloads in a year are excluded from analyses that use observed carloads to identify which operators are present. Routings with fewer than 10 carloads often appear to be idiosyncratic and most likely involve a record, movement, or billing error.[89]

4.3 Analysis of Railroads Serving Origins and Destinations

4.3.1 Overview

95. The first analysis using the waybill data seeks to identify the BEAs that are most at risk because the proposed merger will reduce the number of railroads that serve the BEA from 2-to-1 or from 3-to-2.[90] This analysis looks at the options available to customers who wish to ship from a particular origin, regardless of the destination, or to receive shipments in a particular destination, regardless of origin.

96. The limited horizontal geographic overlap between UP and NS rail networks means that there is little scope for potential horizontal harm. Looking across the whole of the United States, there is only one BEA where the number of railroads that serve the area declines from

---

[88] The lowest sample rate of waybills in the CWS Reference Guide is 1 out of 40. Using the 1 out of 40 sample rate, the minimum whole number of waybills that would be functionally equivalent to requiring 365 carloads per year would be 10 waybills. *See* Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf at p. 53.

[89] Sensitivity analysis was conducted, as described in Section 4.4.2. Omitting routings with fewer than 10 carloads in a year does not affect the substance of my conclusions.

[90] *See* Section 2.3 and Section 4.2 for more on BEAs.

3-to-2 as a result of the proposed merger. In 2023, railroads carried nearly 6,000 carloads to or from this area in total. There are no BEA origins or destinations for which the number of railroads declines from 2-to-1.

4.3.2 Analysis and results

97. For each BEA, the analysis uses the combined waybill data to identify the railroads that originate traffic of any commodity in that BEA and separately also the railroads that terminate traffic of any commodity in that BEA. The BEAs for which the proposed merger may result in the number of railroads changing from 2-to-1 or 3-to-2, either when considering traffic originating at the BEA, or terminating at the BEA, are reported in Exhibit 11.[91] The table also reports the total 2023 railroad carloads of traffic associated with each record.

Exhibit 11: Combined Railroad's 2-to-1 or 3-to-2 Points (All Commodities, Origins and Destinations)

BEA Name	BEA Number	Origin or Destination	2-to-1 or 3-to- 2	Carloads
Columbia, MO	98	Origin	3-to-2	{{ }}
Columbia, MO	98	Destination	3-to-2	{{ }}
Total				***5,956***

Notes: All 2023 traffic. Data for 2019-2022, 2024 are used for prior year comparisons.
Sources: Combined Waybill Data; *See* workpaper "Exhibit 11.xlsx."

98. Exhibit 11 shows that there are no BEAs for which the number of serving railroads changes from 2-to-1.

99. There is one BEA, Columbia, MO, that is identified by the 3-to-2 screen, and it is flagged as both an origin and destination. {{ }} is the other Class I railroad serving this BEA

[91] Columbia, MO is the only BEA identified in 2023. An examination of waybill data from years other than 2023 had no impact on the results of this analysis.

accounting for over {{ }} of total originating traffic and approximately {{ }} of terminating traffic.[92] Significant competitive harm is unlikely in this BEA for the following reasons:

a. Concerns about competitive harm are less acute when shippers and consignees have a Class I alternative to the combined UP and NS, as they do here. In the STB's decision in a prior merger, with regard to 3-to-2 points, the STB stated that "Competition at 3-to-2 Points Not Diminished" and that there was "little potential for significant, merger-related competitive harm" at these points.[93]

b. While the focus of this analysis is on railroads, UP and NS also compete with non-rail options like truck and water.

100. In any case, the total volume of shipments to and from this BEA is small, just under 6,000 carloads of combined originating and terminating traffic.[94] For all these reasons, horizontal competition at origins and destinations is unlikely to be substantially harmed after the proposed merger.

---

[92] *See* workpaper "In-Text Calculations.xlsx."

[93] *See* Surface Transportation Board, "Union Pacific Corporation, Union Pacific Railroad Company, and Missouri Pacific Railroad Company—Control and Merger—Southern Pacific Rail Corporation, Southern Pacific Transportation Company, St. Louis Southwestern Railway Company, SPCSL Corp., and The Denver and Rio Grande Western Railroad Company," Finance Docket No. 32760, Decision No. 44, STB Decided August 6, 1996, at p. 72.

[94] *See* Exhibit 11.

4.4 Analysis of Competition Within Corridors

4.4.1 Overview

101. The second analysis using the waybill data considers the options available to shippers to transport freight along a specific origin-destination corridor. There is horizontal competition between UP and NS within the corridor if each operates the originating segment (the segment that starts at the origin) of different routes within the corridor or if each operates the terminating segment (the segment that ends at the destination point) of different routes within the corridor. Horizontal competition may also occur if each operates as a bridge between originating and terminating segments.[95]

102. The analysis shows that there is little scope for potential horizontal harm. Around {{ }} carloads of freight were carried on corridors where UP and NS were either the only two options at the start or end of the corridor or were two of only three options.[96]

4.4.2 Analysis and results

103. A corridor is identified as an origin BEA and destination BEA pair. Within each corridor the analysis considers the options to shippers for moving freight from one BEA to another BEA for all commodities in aggregate. If a route is a viable option for one commodity, then it is a

---

[95] The evaluation of prior railroad mergers has included analyses of the effect on the number of options that shippers have within corridors. *See* Majure VS at ¶¶ 49-53. My approach differs in that it focuses on horizontal overlaps.

[96] *See* Exhibits 12 and 13.

viable option for others when the focus is long run competition or competition for shipments that start or end their journey by truck.[97]

104. This analysis considers the number of railroad options that shippers have at the start of the corridor, the number of railroad options that shippers have to terminate traffic at the end of the corridor, and the number of railroad options that shippers have as a bridge between originating and terminating segments. The corridor pair is flagged if UP and NS are either the only railroad options (2-to-1) or are two of only three options (3-to-2) at either the start or end of the corridor. The corridor is also flagged if (1) both UP and NS operated as a bridge between the originating segment and the terminating segment and (2) either no other railroads operated as a bridge on the corridor (2-to-1) or only one other did so (3-to-2).

105. Shippers of some traffic within a flagged corridor are protected from horizontal anticompetitive harm because they have other transport options or because rail competition is particularly effective. The reported carloads in the flagged corridors excludes this protected traffic in two ways.

106. Transearch data are used to assess whether shippers have a viable non-rail option to move freight within a given corridor. The most common non-rail option in the data is trucking, although water movements are important for some origins and destinations and pipelines are important for certain commodities.[98] This analysis looks only at trucking and water transport as competing non-rail modes, meaning pipeline, air and "other" are excluded.[99] Trucking is

---

[97] Using all commodities to assess competition within a corridor is consistent with prior transactions. *See, for example,* Majure VS ¶¶ 42 and 61.

[98] *See* workpaper "In-Text Calculations.xlsx."

[99] Including these other modes does not alter the conclusions. *See also* Appendix E where all modes are reported.

fragmented, which means shippers in corridors where trucks are a viable alternative have numerous competing truck options in addition to rail.[100] Shippers in corridors where barges are a viable alternative also have waterway options in addition to rail.[101] These options may vary across commodities. To capture this competition, traffic on a flagged corridor for a particular commodity is excluded from the carloads reported in Exhibits 12 and 13 if truck and water non-rail volume (measured in tons) accounts for 50 percent or more of the combined freight tonnage by rail and non-rail for that commodity on that corridor.[102]

107. The reported carloads also exclude traffic that is carried in intermodal containers and motor vehicle and motor vehicle parts traffic. Previous STB and Interstate Commerce Commission ("ICC") (predecessor to the STB) decisions have stated that there is "effective competition"

---

[100] According to the U.S. Department of Transportation, as of June 2025, nearly 580,000 active U.S. motor carriers were registered with the Federal Motor Carrier Safety Administration ("FMCSA") that owned or leased at least one tractor. Among those carriers, 91.5 percent operate 10 or fewer trucks and 99.3 percent operate no more than 100 trucks. *See* American Trucking Associations, "Economics and Industry Data," available at https://www.trucking.org/economics-and-industry-data (accessed December 8, 2025). *See also*, USDA Agricultural Marketing Service, "Study of Rural Transportational Issues, Chapter 13: Truck Transportation," available at https://www.ams.usda.gov/sites/default/files/media/RTIReportChapter13.pdf, at p. 404. "[T]he average ratio of operating cost to operating revenue is a tight 95 percent in over-the-road long-haul truckloads, demonstrating that the sector is highly competitive."

[101] *See* USDA Agricultural Marketing Service, "Study of Rural Transportational Issues, Chapter 12: Barge Transportation," available at https://www.ams.usda.gov/sites/default/files/media/RTIReportChapter12.pdf, at p. 377. "[The] barge industry is generally considered to be highly competitive—perhaps not as competitive as the truck industry, but more competitive than rail. Rates are determined by market conditions and no one company dominates the market."

[102] The Interstate Commerce Commission ("ICC") stated that effective competition can be created from alternative modes with shares as low as 28 percent. In addition, in one decision, the STB expanded an ICC decision that exempted the transportation of hydraulic cement from regulation in part because there is "effective competition" to railroads if alternative modes to railroad transport (including trucks) have a 57 percent share of freight. *See* Surface Transportation Board, "Rail General Exemption Authority—Exemption of Hydraulic Cement," Ex Parte No. 346 (Sub-No. 34), STB Decided December 4, 1996, at pp. 3-4.

in the transport of intermodal shipments, motor vehicles (STCC 3711), and motor vehicle parts or accessories (STCC 3714).[103, 104]

108. The 2023 corridors that are flagged as 2-to-1 or 3-to-2 are reported below. The tables include the origins and destinations for each corridor and total carloads shipped, adjusted as described above. As discussed earlier, these results use waybill data from years other than 2023 to determine if there are other additional railroads that served the corridor in other years. Since these additional railroads can serve and have served those corridors, such corridors are removed from the 2-to-1 or 3-to-2 lists.[105]

---

[103] The ICC exempted "from its regulation the rail transportation of motor vehicles (STCC 37-11) and motor vehicle parts or accessories (STCC 37-14)" since "such regulation is not needed to protect shippers from an abuse of market power." The ICC stated that "[o]n account of motor carrier competition, geographic competition generally, and various shipper options and powers, there is, overall, effective competition for the rail transportation of motor vehicles and motor vehicle parts and accessories." *See* Surface Transportation Board, "Rail General Exemption Authority—Transportation Equipment," Ex Parte No. 346 (Sub-No. 27), ICC Decided December 30, 1992 (9 I.C.C. 2d) at pp. 1-2.

Trailer-on-flatcar ("TOFC") and container-on-flatcar ("COFC") transportation had "long been exempted from economic regulation" by the ICC. "The basis for the ICC's exemption of TOFC/COFC traffic from economic regulation was the agency's finding that transportation of these intermodal shipments is market-driven and subject to widespread and effective competition from both motor carriers and other railroads. Shippers can truck their freight to any railroad intermodal ramp, or move it entirely over the highways, enabling them to choose the most effective and commercially responsive service and price offerings." *See* Surface Transportation Board, "WTL Rail Corporation Petition for Partial Revocation of Exemption," Ex Parte No. 230 (Sub-No. 9), STB Decided February 15, 2006, at p. 1.

The ICC considers trucks to "compete effectively" over a distance of 200-250 miles and that other non-rail options can also compete effectively for longer hauls. *See* Surface Transportation Board, "Rail General Exemption Authority—Exemption of Hydraulic Cement," Ex Parte No. 346 (Sub-No. 34), STB Decided December 4, 1996, at pp. 2-3.

[104] A sensitivity test was run which reported all traffic for corridors flagged as 2-to-1, including traffic from intermodal commodities, motor vehicles, motor vehicle parts or accessories, and commodities where non-rail volume accounts for at least half of all tonnage. This added {{ }} carloads to the count of 2-to-1 carloads. This finding does not affect the substance of my conclusions. *See* workpaper "In-Text Calculations.xlsx."

[105] Note that there are {{ }} carloads associated with corridors that were initially flagged as 2-to-1 but which featured at least one railroad other than UP or NS in another year (and accordingly do not appear in Exhibit 12). This finding does not alter the substance of my conclusions. *See* workpaper "In-Text Calculations.xlsx."

109. The 2-to-1 results are reported in Exhibit 12. The records are ordered from highest to lowest total carloads involved.

Exhibit 12: Combined Railroad's 2-to-1 Corridors

Corridors				Carloads
Origin		Destination		
BEA Name	BEA Number	BEA Name	BEA Number	
Kansas City, MO-KS	99	Toledo, OH	56	{{ }}
Kansas City, MO-KS	99	Fort Wayne, IN	66	{{ }}
Kansas City, MO-KS	99	Champaign-Urbana, IL	68	{{ }}
Kansas City, MO-KS	99	Orlando, FL	30	{{ }}
Guanajuato, Mexico	196	St. Louis, MO-IL	96	{{ }}
Total				{{ }}

Notes: All 2023 traffic. Data for 2019-2022, 2024 are used for prior year comparisons.
Sources: Combined Waybill Data; Transearch Data; *See* workpaper "Exhibit 12, 13.xlsx."

110. There are thousands of corridors in the data where either UP or NS provide service, but there are only five 2-to-1 corridors shown in Exhibit 12 which carry {{ }} carloads in total.[106] For these carloads, UP and NS are the only railroad options (2-to-1) at either the start or end of the corridor. In addition, there are {{ }} 2-to-1 carloads not shown in Exhibit 12 for which both UP and NS operated as a bridge between the originating segment and the terminating segment.[107] Further detailed analyses were not undertaken given the small volume of traffic involved.

[106] Some of the corridors in Exhibit 12 may be flagged because competitive options were underrepresented in the combined waybill data rather than because they reflect real horizontal competitive concerns. Four of the flagged corridors originate at Kansas City, and a fifth one terminates at St Louis. Both are served by CPKC (in addition to BNSF, UP, NS), and St Louis is also served by CSX and CN. Movements by CPKC, CSX, and CN are underrepresented in the data (see Section 4.2).

[107] *See* workpaper "In-Text Calculations.xlsx."

111. Concerns are less acute when shippers continue to have at least one railroad alternative to the Applicants after the proposed merger (as discussed in section 4.3 above). Nevertheless, I report results for the 3-to-2 analysis in Exhibit 13.

Exhibit 13: Combined Railroad's 3-to-2 Corridors

Corridors				Carloads
Origin		Destination		
BEA Name	**BEA Number**	**BEA Name**	**BEA Number**	
New Orleans, LA-MS	83	Alberta, Canada	181	{{ }}
Kansas City, MO-KS	99	Nuevo Leon, Mexico	202	{{ }}
Kansas City, MO-KS	99	Charlotte-Gastonia-Rock Hill, NC-SC	23	{{ }}
New Orleans, LA-MS	83	Johnson City-Kingsport-Bristol, TN-VA	45	{{ }}
Champaign-Urbana, IL	68	Little Rock-North Little Rock, AR	90	{{ }}
Indianapolis, IN-IL	67	Kansas City, MO-KS	99	{{ }}
Kansas City, MO-KS	99	Des Moines, IA-IL-MO	100	{{ }}
St. Louis, MO-IL	96	Baton Rouge, LA-MS	84	{{ }}
St. Louis, MO-IL	96	Cleveland-Akron, OH-PA	55	{{ }}
Huntsville, AL-TN	74	Kansas City, MO-KS	99	{{ }}
Chicago-Gary-Kenosha, IL-IN-WI	64	Western Oklahoma, OK	126	{{ }}
St. Louis, MO-IL	96	Savannah, GA-SC	28	{{ }}
St. Louis, MO-IL	96	Chattanooga, TN-GA	43	{{ }}
Davenport-Moline-Rock Island, IA-IL	102	St. Louis, MO-IL	96	{{ }}
Greenville, NC	21	Kansas City, MO-KS	99	{{ }}
Kansas City, MO-KS	99	Indianapolis, IN-IL	67	{{ }}
Cedar Rapids, IA	103	St. Louis, MO-IL	96	{{ }}
St. Louis, MO-IL	96	Boise City, ID-OR	150	{{ }}
Kansas City, MO-KS	99	San Luis Potosi, Mexico	207	{{ }}
Jacksonville, FL-GA	29	St. Louis, MO-IL	96	{{ }}
New Orleans, LA-MS	83	Lincoln, NE	119	{{ }}
Houston-Galveston-Brazoria, TX	131	Columbia, MO	98	{{ }}
Other BEA to BEA				{{ }}
Total				{{ }}

Notes: All 2023 traffic. Data for 2019-2022, 2024 are used for prior year comparisons.
Sources: Combined Waybill Data; Transearch Data; *See* workpaper "Exhibit 12, 13.xlsx."

112. In Exhibit 13, there are 41 corridors and only {{ }} carloads identified as shifting from 3-to-2 competitors post-merger.[108] Exhibit 13 combines small corridors together. There are

[108] Note that if routings of fewer than 10 carloads in a year are not omitted from the analysis shown in Exhibits 12 and 13 that the total number of 2-to-1 carloads decreases from {{ }} to {{ }} and the total number of 3-to-2 carloads increases from {{ }} to {{ }}. Therefore, omission of the fewer than 10 carload requirement does not affect the substance of my conclusions. *See* workpaper "In-Text Calculations.xlsx."

18 such corridors and their combined number of carloads is shown in Exhibit 13 as {{ }}. For the carloads identified in Exhibit 13, UP and NS are two of only three options (3-to-2) at either the start or end of the corridor. In addition, there are {{ }} 3-to-2 carloads not shown in Exhibit 13 for which both UP and NS operated as a bridge between the originating segment and the terminating segment.[109] Further detailed analyses were not undertaken given the small volume of traffic involved.

4.5 Analysis of Competition Between Corridors – Geographic Competition

4.5.1 Overview

113. Section 4.4 focuses on the role of competition in providing shippers more options for rail transportation from a specific origin to consignees at a specific destination ("within corridor competition"). This section considers the second way that rail competition could benefit shippers at an origin by connecting them to customers in different destinations, providing options to shift freight between corridors in response to price changes. For example, Exhibit 14 below shows a hypothetical shipper of lumber[110] located in Seattle, WA, that may currently ship lumber to Houston, TX. Another destination for lumber may be Denver, CO, which means that the Seattle, WA, shipper could ship its lumber to Denver, CO, if the price of shipping lumber to Houston, TX, were to hypothetically increase. The ability to shift

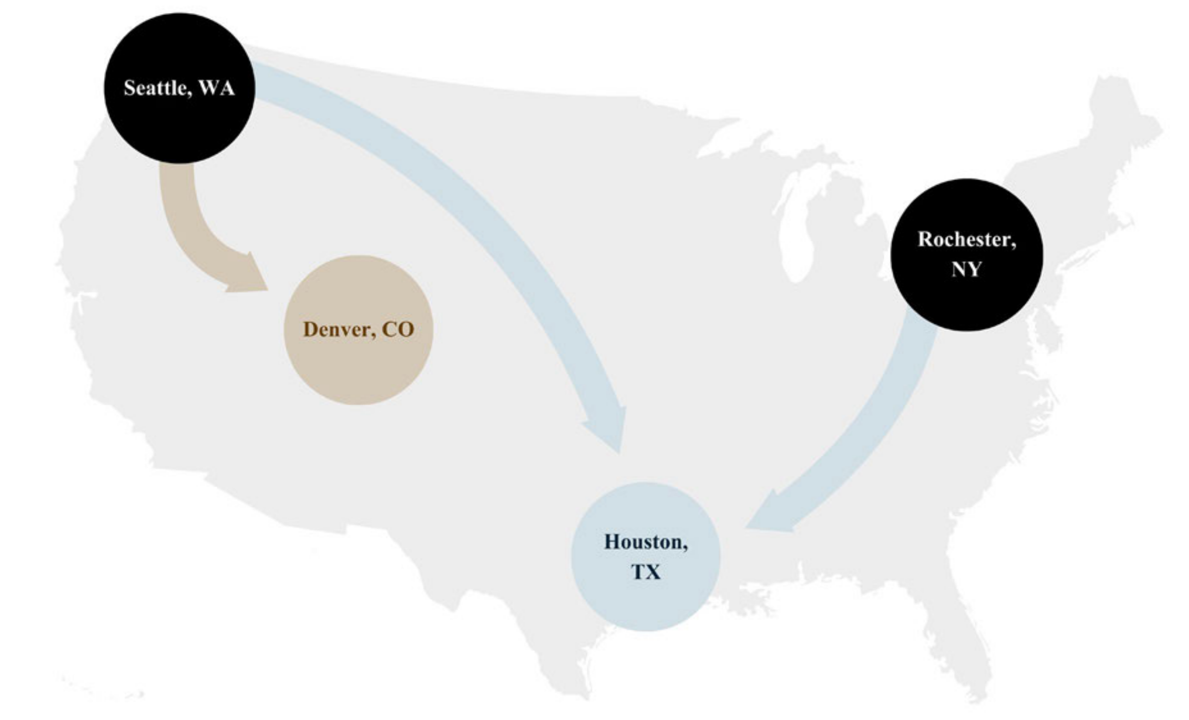
[109] *See* workpaper "In-Text Calculations.xlsx."

[110] The term "lumber" refers to the 4-digit STCC 2411 ("Primary Forest or Wood Raw Materials"). *See* Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf, at p. 131.

freight creates destination competition between Houston, TX, and Denver, CO, as well as other locations where lumber is used or processed.

114. Similarly, competition could also benefit customers at a specific destination by connecting them to shippers at different origins. For example, as shown in Exhibit 14, a customer of lumber in Houston, TX, may currently buy from Seattle, WA. Another supplier for lumber could be near Rochester, NY. If the price of lumber from Seattle, WA, increases due to hypothetically higher shipping costs, the Houston, TX, customer could choose to purchase from Rochester, NY, instead. The ability to shift freight creates origin competition between Seattle, WA, and Rochester, NY, as well as other locations where lumber is harvested.

Exhibit 14: Illustrative Example of Origin and Destination Competition



115. Applying an initial screen to flag the potential harm to horizontal geographic competition at origins and destinations due to the proposed merger identifies approximately 140,000

carloads.[111] Further analysis would likely show that many of these initial flags do not raise competition concerns but, in any case, they are not a concern in aggregate after considering the expected benefits from the proposed merger. This total excludes roughly 71,000 carloads of automotive and intermodal commodities where harm is less likely than other commodities in light of statements by the STB about the importance of competition from trucking.[112]

4.5.2 Analysis and results

116. There is horizontal destination competition between UP and NS at an origin when they each originate traffic on routes that connect shippers at that origin to customers located at different destinations. There could also be horizontal destination competition between UP and NS if they both terminate traffic from the origin to customers at any destination.[113] To continue the example from the introduction above, there could be horizontal destination competition between two railroads to serve shippers of lumber in Seattle, WA if one delivered lumber from Seattle to customers in Denver, while the other delivered lumber from Seattle to customers in Houston. Horizontal origin competition between UP and NS at a destination is identified analogously.

117. The between corridor analysis is based on information in the combined waybill data on traffic volume. Information on traffic volume is important because it incorporates the role

[111] *See* Exhibits 16 and 17.

[112] *See* discussion in Section 4.4.

[113] There could also be horizontal competition if they both operate as a bridge between originating and terminating segments of routes to any destination.

The evaluation of prior railroad mergers has included analyses of the effect of a proposed merger on geographical competition between corridors. *See* Majure VS at ¶¶ 72-86. My approach differs in that I focus on horizontal geographic overlaps.

of geography. If only a few carloads of a commodity come from a specific BEA, that origin may be a less effective competitive constraint than a railroad that can originate shipments from a BEA that produces a large amount of the same commodity.

118. The analysis of the scope for potential harm from the loss of geographic competition uses BEAs to identify origins and destinations. Since demand by shippers and consignees for transportation of freight is specific to a commodity, the analysis is conducted by commodity using 4-digit commodity codes. For example, lumber is only shipped from and to certain areas of the United States, so only those origins and destinations are evaluated when assessing railroad competition for lumber. Some commodity codes cover many miscellaneous and potentially unrelated products. These are excluded from the analysis because the results would be uninformative.[114] Consider a final customer at a destination trying to source a specific commodity from different origins. Observing shipments of that commodity from one origin is evidence that there are shippers of the commodity there that the final customer can buy from. But observing shipments of an entirely different commodity from the origin, with different supply conditions, does not provide evidence about the availability of the first commodity.

119. Trucking and water are also included as transport alternatives, and accordingly the analysis uses tons shipped as the measure of volume so that shipments via truck and water are included. Because this analysis is based on traffic volume rather than the number of options,

---

[114] These commodity codes include 4611 Freight of all kind, 0119 Miscellaneous Field Crops, 0129 Miscellaneous Fresh Fruits or Tree Nuts, 2818 Miscellaneous Industrial Organic Chemicals, 1092 Miscellaneous Metal Ores, 4711 Small Packaged Freight Shipments among others. *See* Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf, at pp. 117-161.

there is no need to specify a minimum traffic volume for truck. Instead, non-rail modes are treated in the same way an additional railroad on a corridor is treated, attributing non-rail volumes for that commodity on that corridor as an additional option. If non-rail volumes are small, then they are unlikely to affect the results.

120. A 50/10 screen is used to identify instances that require additional review as follows.115

121. Destination **Focus:** For each destination-commodity pair, two screens are used.

a. Measure the shares of all shipments of the individual commodity delivered to the individual destination from any origin that were originated by UP and NS. If UP and NS combined originated 50 percent of the traffic, and if they each originated at least 10 percent, the destination-commodity pair is flagged.

b. Conduct the same exercise using the shares that UP and NS terminated instead. Specifically, the analysis measures the shares of all shipments of the individual commodity that were delivered to the individual destination from any origin and were terminated by UP and NS. If UP and NS combined terminated 50 percent of the traffic of the traffic, and if they each terminated at least 10 percent of the traffic, the destination-commodity pair is flagged.

122. **Origin Focus:** For each origin-commodity pair, two analogous screens are used.

a. Measure the shares of all shipments of the individual commodity that originated at the individual origin, bound for any destination, that were originated by UP and NS. If UP and NS combined originated 50 percent of the traffic, and if they each

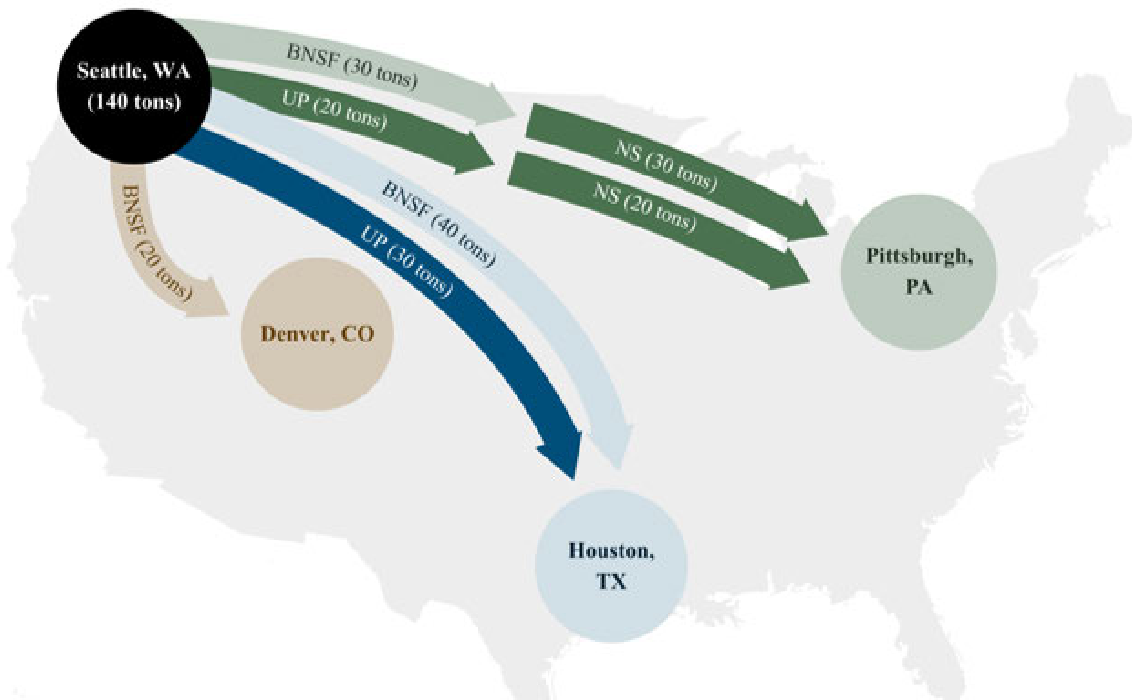
[115] The evaluation of prior railroad mergers also relied on the 50/10 screen. My approach differs in that it focuses on horizontal overlaps.

originated at least 10 percent of the traffic, the origin-commodity pair is flagged for further review.

b. Conduct the same exercise using the shares that UP and NS terminated instead. Specifically, the analysis measures the shares of all shipments of the individual commodity that originated at the individual origin and were terminated by UP and NS at any destination. If UP and NS combined terminated 50 percent of the traffic, and if they each terminated at least 10 percent of the traffic, the origin-commodity pair is flagged for further review.

123. A stylized example provided in Exhibit 15 shows how UP, NS, and combined shares for an origin-commodity pair are calculated for the two Origin Focus screens discussed above: (a) the origination screen and (b) the termination screen. In the example, 140 tons of lumber are shipped from Seattle, WA to three destinations – Denver, CO (20 tons), Houston, TX (70 tons), and Pittsburgh, PA (50 tons) – meaning there are three separate destination corridors. This means that a denominator of 140 tons is used for each of the screens (origination and termination) with only their numerators changing depending on the screen. As shown in Exhibit 15, there can be multiple routes within a corridor from an origin to a destination and each route can be served by more than one railroad (e.g., lumber can be transported from Seattle, WA to Pittsburgh, PA by two routes: BNSF-NS and UP-NS).

Exhibit 15: Illustrative Example of Origin Focus 50:10 Screens



<u>Shipments from Seattle, WA</u>

- 140 tons of lumber (30 + 20 + 40 + 30 + 20 = 140)

<u>Origination Screen Shares:</u>

- NS originates 0 tons of lumber
  - 0 / 140 = 0% share
- UP originates 50 tons of lumber
  - 20 + 30 = 50 tons
  - 50 / 140 = 35.7% share
- UP & NS originate 50 tons of lumber
  - 0 + 50 = 50 tons
  - 50 / 140 = 35.7% share

<u>Termination Screen Shares:</u>

- NS terminates 50 tons of lumber
  - 30 + 20 = 50 tons
  - 50 / 140 = 35.7% share
- UP terminates 30 tons of lumber
  - 30 / 140 = 21.4% share
- UP & NS terminate 80 tons of lumber
  - 50 + 30 = 80 tons
  - 80 / 140 = 57.1% share

<u>A UP-NS combination does not trigger the origination screen</u>
<u>A UP-NS combination triggers the termination screen</u>

124. The gray box in Exhibit 15 shows the tons for UP, NS, and the combined railroad when using the Origin Focus origination screen. The originating carriers in Seattle, WA are BNSF (30, 40, and 20 tons) and UP (20 and 30 tons). UP's and NS's origination volume are their aggregate lumber volume where they are the originating carrier from Seattle, WA. For UP,

this would be the sum of 30 tons (Houston, TX) and 20 tons (Pittsburgh, PA), and for NS, this would be zero since NS does not originate any tons from Seattle – NS carries 50 tons to Pittsburgh, PA, but UP and BNSF are assigned those origination tons since they are the originating carriers for that destination. In this example, UP's share is 35.7 percent (50/140), NS's share is 0 percent (0/140), and their combined share is 35.7 percent (50/140). Here, the combined share is less than 50 percent and the lower of the two shares is less than 10 percent (NS's share is 0 percent), so it does not trigger the 50/10 origination screen.

125. Similarly, the blue box in Exhibit 15 shows the Origin Focus termination screen calculations based on the railroads that are the terminating carrier at the destinations from the Seattle, WA lumber origin. For example, the terminating carriers in Houston, TX are BNSF (40 tons) and UP (30 tons). UP's terminating volume across all the destinations is 30 tons (Houston, TX) and NS's terminating volume is 50 tons (Pittsburgh, PA). As a result, UP's termination share is 21.4 percent (30/140), NS's termination share is 35.7 percent (50/140), and the combined railroad's termination share is 57.1 percent (80/140). The combined share is greater than 50 percent and both UP and NS have shares greater than 10 percent, so the 50/10 termination screen would be triggered for this origin-commodity pair.

126. Summarized below are the origin-commodity pairs and destination-commodity pairs flagged by the 50/10 screen for the year 2023. As discussed above, some routings may not be observed in each year. Therefore, I use data for other years to check where these flagged origin-commodity pairs or destination-commodity pairs would pass the 50/10 screen in other years. If they pass the screen in another year, they are not included in Exhibit 16 and Exhibit 17.

127. Exhibit 16 shows the origin-commodity pairs that are flagged by the 50/10 screens. The table includes the origin, the commodity shipped, the carloads shipped, and the originating and terminating shares for UP and NS. The highlighting indicates whether the screen is triggered by originating shares or terminating shares, or both. For example, UP and NS have combined shares of more than 50 percent at both the originating end and terminating ends of corridors carrying tires and inner tubes from Memphis.

128. The table includes two parts. Part II includes commodities typically carried in intermodal containers as well as motor vehicles and motor vehicle parts, while Part I includes all other commodities. Within each part of the table, records are ordered from highest to lowest carloads shipped. The potential for concerns is greater for origins and destinations flagged in Part I, because the STB has indicated that for commodities included in Part II, there is "effective competition" in the transport of intermodal shipments, motor vehicles, and motor vehicle parts or accessories (as discussed in Section 4.4).

Exhibit 16: Railroad Shares for Combined Railroad's Origins by Commodity Flagged by 50/10 Screen

Commodity		Origin		Total Carloads	Originating Shares		Terminating Shares	
STCC Category	STCC Number	BEA Name	BEA Number		UP	NS	UP	NS
Part I								
Primary Iron or Steel Products	3312	Toledo, OH	56	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Nonmetal Minerals, Processed	3295	St. Louis, MO-IL	96	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Flour or Other Grain Mill Products	2041	Wichita, KS-OK	122	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Canned or Pres Food, Mixed	2039	San Francisco-Oakland-San Jose, CA	163	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Bauxite or Other Alum Ores	1051	Little Rock-North Little Rock, AR	90	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Primary Iron or Steel Products	3312	Roanoke, VA-NC-WV	17	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Primary Iron or Steel Products	3312	Jackson, MS-AL-LA	77	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Flour or Other Grain Mill Products	2041	Cedar Rapids, IA	103	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Primary Copper Smelter Products	3331	Salt Lake City-Ogden, UT-ID	152	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Aluminum or Alloy Basic Shapes	3352	Quebec, Canada	177	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Primary Lead Smelter Products	3332	Los Angeles-Riverside-Orange County, CA-AZ	160	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Inorganic Pigments	2816	Lake Charles, LA	86	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Subtotal Part I				***44,898***				
Part II								
Motor Vehicles	3711	Lexington, KY-TN-VA-WV	47	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Motor Vehicle Parts or Accessories	3714	Coahuila De Zaragoza, Mexico	192	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Tires or Inner Tubes	3011	Memphis, TN-AR-MS-KY	73	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Electric Housewares or Fans	3634	San Antonio, TX	134	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Cereal Preparations	2043	Harrisburg-Lebanon-Carlisle, PA	11	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Soap or Other Detergents	2841	Salt Lake City-Ogden, UT-ID	152	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Field Seeds	115	Portland-Salem, OR-WA	167	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Paper	2621	Kansas City, MO-KS	99	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Mens or Boys Clothing	2311	Atlanta, GA-AL-NC	40	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Subtotal Part II				***59,679***				

Notes: All 2023 traffic. Net tons are used for rail to non-rail comparisons. Data for 2019-2022, 2024 are used for prior year comparisons. Originating and terminating share must be 10 percent or greater for UP and NS and combined share must exceed 50 percent.
Sources: Combined Waybill Data; *See* workpaper "Exhibit 16, 17.xlsx."

129. Out of more than 7,000 origin-commodity pairs involving UP or NS there are 21 origin-commodity pairs served by the combined railroad that are flagged by the 50/10 methodology – 12 are in Part I and 9 are in Part II.[116] All of these are flagged by the terminating screen. None are flagged by the originating screen alone. The flagged origin-commodity pairs span a variety of BEAs and a variety of commodities.

130. Exhibit 17 shows the destination-commodity pairs that are flagged by the 50/10 screen.

[116] *See* workpaper "In-Text Calculations.xlsx."

Exhibit 17: Railroad Shares for Combined Railroad's Destinations by Commodity Flagged by 50/10 Screen

Commodity		Destination		Total Carloads	Originating Shares		Terminating Shares	
STCC Category	STCC Number	BEA Name	BEA Number		UP	NS	UP	NS
Part I								
Bituminous Coal	1121	Chicago-Gary-Kenosha, IL-IN-WI	64	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Plastic Mater or Synth Fibres	2821	Indianapolis, IN-IL	67	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Wet Corn Milling or Milo	2046	Memphis, TN-AR-MS-KY	73	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Potassium or Sodium Compound	2812	Kansas City, MO-KS	99	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Flour or Other Grain Mill Products	2041	St. Louis, MO-IL	96	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Oil Kernels, Nuts or Seeds	114	Twin Falls, ID	149	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Flour or Other Grain Mill Products	2041	Harrisburg-Lebanon-Carlisle, PA	11	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Potassium or Sodium Compound	2812	Macon, GA	38	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Potassium or Sodium Compound	2812	Augusta-Aiken, GA-SC	27	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Gum or Wood Chemicals	2861	New Orleans, LA-MS	83	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Potassium or Sodium Compound	2812	State College, PA	9	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Prepared or Canned Feed	2042	Queretaro, Mexico	205	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Flour or Other Grain Mill Products	2041	Queretaro, Mexico	205	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Subtotal Part I				***87,384***				
Part II								
Soap or Other Detergents	2841	Harrisburg-Lebanon-Carlisle, PA	11	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Wine, Brandy or Brandy Spirit	2084	Norfolk-Virginia Beach-Newport News, VA-NC	20	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Motor Vehicles	3711	Queretaro, Mexico	205	{{ }}	{{ }}	{{ }}	{{ }}	{{ }}
Subtotal Part II				***10,954***				

Notes: All 2023 traffic. Net tons are used for rail to non-rail comparisons. Data for 2019-2022, 2024 are used for prior year comparisons. Originating and terminating share must be 10 percent or greater for UP and NS and combined share must exceed 50 percent.
Sources: Combined Waybill Data; *See* workpaper "Exhibit 16, 17.xlsx."

131. Out of approximately 10,000 destination-commodity pairs involving UP or NS, there are 16 destination-commodity pairs served by the combined railroad that are flagged by the 50/10 screen – 13 are in Part I and 3 are in Part II.[117] Almost all of these are triggered by the originating screen and few by the terminating screen. The flagged destination-commodity pairs span a variety of BEAs and a variety of commodities.

132. Exhibit 17 does not take account of the possibility that UP and NS might compete to provide bridges between originating and terminating segments of competing routes. To gauge the possible scope of these concerns, results were screened for destinations where both UP and

[117] *See* workpaper "In-Text Calculations.xlsx."

NS operated as bridge segments of competing routes.[118] This flagged an additional 8,131 carloads in Part I and no carloads in Part II.[119]

133. Between them these horizontal geographical competition analyses flagged 140,413 carloads,[120] excluding 70,633 carloads[121] of automotive and intermodal commodities that both railroads and trucks compete to carry (which was discussed in Section 4.4). The scope for potential horizontal harm represented by the flagged carloads is small compared to the scope of the transaction's projected benefits.

5 CONCLUSION

134. I have analyzed the scope for benefits and the potential for adverse horizontal competitive effects from the proposed merger by looking at the carloads that could be affected by either type of effect.

135. There is substantial scope for benefits from combining the complementary networks of UP and NS. The proposed combined railroad would replace existing UP-NS interline services with single line service, including between points in the eastern and western U.S. that today

[118] This screen considered the traffic flows of specific commodities to that destination that UP and NS participated in regardless of whether they were originating, terminating, or acting as a bridge for that flow. A destination-commodity pair was flagged using this participation screen if (1) the combined railroad would participate in more than 50% of traffic of that commodity to that destination, (2) the share of the combined railroad would be at 10% more than the share of either UP or NS before the merger, (3) the destination-commodity pair was not already flagged with the originating or terminating screen, and (4) UP and NS both operated as a bridge between originating and terminating segments for that destination-commodity pair. Note that an analogous screen was also applied to origin-commodity pairs, but that screen did not yield any flagged carloads.

[119] *See* workpaper "In-Text Calculations.xlsx."

[120] *See* Exhibit 16 Part I and Exhibit 17 Part I: 140,413 carloads = 44,898 (Exhibit 16, Part I) + 87,384 (Exhibit 17, Part I) + 8,131 (UP and NS bridge segments).

[121] *See* Exhibit 16 Part II and Exhibit 17 Part II: 70,633 carloads = 59,679 (Exhibit 16, Part II) + 10,954 (Exhibit 17, Part II).

can be served only by interline service. The proposed combined railroad would also have stronger incentives to make operating improvements, offer more competitive terms, and ensure reliable delivery on these services than UP and NS have today. The proposed merger's benefits could reach not only existing interline traffic (913,000 carloads in 2023), but also traffic attracted to the new interline services from truck and other rail operators (estimated at 1,864,000 carloads), for a combined 2.8 million carloads.

136. The limited geographic overlap of the two networks means there is little scope for adverse horizontal competitive effects. There is only one BEA where the number of railroads that serve the area would fall from 3-to-2, which accounted for only 6,000 carloads in 2023, and none where it would fall from 2-to-1. Traffic that is flagged by 3-to-2 and 2-to-1 BEA-to-BEA corridor screens totals {{ }} carloads. My analysis of geographic competition between origins or between destinations flags a further 140,000 carloads, for a combined {{ }} carloads.

137. Based on this analysis, I find that the substantial competitive benefits and greater economic efficiency that are expected to result from the transaction outweigh the limited potential horizontal anticompetitive effects.

6 CERTAIN ANALYSES REQUIRED BY STB REGULATION 49 CFR § 1180.7 (B)

138. In addition to the analyses described above, Appendices D, E, and F provide certain data and analyses detailed in STB's regulations 49 CFR § 1180.7(b)(2), (3), and (4), respectively. These responses are based on the same data and many of the same analytical steps as the analysis of the scope for potential harm from the loss of horizontal competition. In particular,

the responses to 49 CFR § 1180.7(b)(2), (3), and (4) are related to the analysis in Sections 4.3, 4.4, and 4.5 respectively.

139. The main difference between the analysis of the scope for harm to horizontal competition on the one hand, and the responses to 49 CFR § 1180.7(b)(2), (3), and (4) on the other, is that the STB limits the scope of its requests to “major” groupings in three ways: by major points, major commodities, and major corridors. For the purpose of the Appendices, “major” is interpreted as a practical measure to focus the information reported to the STB to the set of points, corridors, and commodities that account for most, but not all, traffic volume. Importantly, the way “major” groupings are identified does not affect the analysis of the effects of the proposed merger on competition, since those analyses are not limited to “major” categories.

140. In general, the approach to identifying “major” points, corridors, and commodities is, for each type of group, to first rank them from highest to lowest based on UP and NS traffic and then limit the results reported in Appendices D, E, and F to those for the points, corridors, or commodities that account for at least 80 percent of such traffic by volume.

141. See Appendices D, E, and F for details about the data and analyses to address STB’s regulations 49 CFR § 1180.7(b)(2), (3), and (4).

I declare under penalty of perjury that the foregoing is true and correct.

December 17, 2025

CRA Charles River Associates

APPENDIX A

Elizabeth M. Bailey

Vice President

PhD, Economics
Massachusetts Institute of Technology

BA, Economics and Mathematics,
Colgate University

Dr. Elizabeth Bailey is a vice president at Charles River Associates with over 20 years of experience in antitrust and competition matters. She is an expert on antitrust, competition policy, and intellectual property issues across a wide variety of industries.

She has advised clients on M&A proceedings before antitrust regulators in the US, Canada, and Europe. Her extensive industry expertise includes retail, packaged consumer goods, healthcare and medical devices, information and data technology, oil and gas, wholesale and retail electricity, among many others.

Dr. Bailey is recognized as a Global Elite Thought Leader by Who's Who Legal, described as "a market leader who 'can gain the trust of c-suite and board-level clients'," an economist that can 'get deals over the line,'" and an "economist who sits among the best in the market." She is "'an absolute go-to for retail mergers' thanks to her 'efficient econometric analysis and strong client-oriented approach.'"

Outside of her consulting practice, Dr. Bailey has taught advanced corporate finance to executives at The Wharton School. She has also been a lecturer in the Finance Group at the Haas School of Business at the University of California, Berkeley, and was an award-winning teacher at the W.P. Carey School of Business at Arizona State University.

Dr. Bailey is frequently invited to speak about issues relating to antitrust and has published many articles on the topic. She was the Editorial Board Economics Vice Chair of the *Antitrust Law Journal* and has edited other ABA antitrust publications, including the *Antitrust Magazine*, and *The Antitrust Source*. She has also published articles in the *American Economic Review*, *The Journal of Industrial Organization*, *Managing IP*, and *The Electricity Journal*, among others.

Publications

Antitrust

"Gender Diversity in Experts: A Reply to and Extension of Rafkin and Kuykendall." *Antitrust Magazine Online*, 2021.

"Top 10 Antitrust Issues in CPG Mergers." With Alexis James Gilman. *Retail Leader*, 2019.

"Assessing Antitrust Risk in Retail Mergers." With Alexis James Gilman. *Thomson Reuters Practical Law (Practical Note)*, 2019.

"Behavioral Firms: Does Antitrust Economics Need a Theoretical Update?" *CPI Antitrust Chronicle*, 2019.

"A Modern Approach to M&A." With Alexis James Gilman. *Retail Leader*, 2018.

"Throw Me a Lifeline! Regression Analysis Explained for Antitrust Practitioners." *Antitrust Source*, vol. 17, no. 6, 2018.

"Improving Merger Analysis with Randomized Control Trials." *Competition Law 360*, 2016.

"Behavioral Economics and U.S. Antitrust Policy." *Journal of Industrial Organization*, vol. 47, no. 3, 2015.

"Nancy Rose, New Deputy Assistant Attorney General for Economics." With Tracy Orcholski. *Antitrust Source*, vol. 14, no. 1, 2014.

"Non-Spock Economics in Antitrust." *Competition Law 360*, 2011.

"Anticipating Merger Guidelines from Mexico's Commission on Competition." With A. Ros. *International Antitrust Bulletin* (American Bar Association, Section of Antitrust Law, International Committee Newsletter), vol. 4, 2010.

"Comments on the Canadian Merger Enforcement Guidelines." With G. Steven Olley. Submitted to the Canadian Competition Bureau in response to public comments requested on revisions to the September 2004 Merger Enforcement Guidelines, 2010.

"Unilateral Competitive Effects of Mergers Between Firms with High Profit Margins." With G. Leonard and L. Wu. *Antitrust Magazine*, vol. 25, no. 1, 2010.

"Behavioral Economics: Implications for Antitrust Practitioners." *Antitrust Source*, vol. 9, no. 5, 2010.

"Comments on the 2010 Proposed Horizontal Merger Guidelines." With Gregory K. Leonard and Lawrence Wu. Submitted in response to the U.S. Department of Justice and Federal Trade Commission Horizontal Merger Guidelines Revision Project (Project No. P092900), 2010.

"Minimum Resale Price Maintenance: Some Empirical Evidence from Maryland." With Gregory K. Leonard. *The B.E. Journal of Economic Analysis & Policy* (Contributions), vol. 10, no. 1, 2010.

"Merger Screens: Market Share-Based Approaches Versus 'Upward Pricing Pressure'." With Gregory K. Leonard. G. Steven Olley and Lawrence Wu, *Antitrust Source*, vol. 9, no. 3, 2010.

"Are Private Equity Consortia Anticompetitive? The Economics of Club Bidding." *Antitrust Source*, vol. 6, no. 4, 2007.

"A Shopping List for Assessing the Competitive Effects of Retail Chain Mergers." With T. Daniel and R. Rubinovitz. *Antitrust Magazine*, vol. 20, no. 1, 2005.

Energy

"Energy Efficiency Needs More Research." With Chris Knittel and Catherine Wolfram. *USA Today*, 2013.

"Economists' Comments in Response to Assigned Commissioner's November 13, 2012 Scoping Memo and Ruling Amending Scope of Proceeding." With Severin Borenstein and Catherine Wolfram, before the California Public Utility Commission, 2012.

"Cap and Trade Should Look to Broader Goals." With Frank Wolak. *Sacramento Bee*, 2012.

"A Whole Different Kind of Innovation." With Catherine Wolfram. *Wall Street Journal*, 2012.

"The FTC's Report on Gasoline Price Manipulation and Post-Katrina Gasoline Price Increases: Some Comments." *Antitrust Source*, vol. 6, no. 1, 2006.

"The Oil Industry Controversy: It's Not the Assumptions You Make, But What You Make of Them." *The Threshold* (American Bar Association. Section of Antitrust Law, Mergers and Acquisitions Newsletter), vol. 5, no. 2, 2005.

Markets for Clean Air: The U.S. Acid Rain Program. With R. Schmalensee, A.D. Ellerman, P. Joskow, and J.P. Montero. Cambridge University Press. June 2000.

"Summary Evaluation of the U.S. Sulfur Dioxide Emissions Trading Program as Implemented in 1995." With R. Schmalensee. A.D. Ellerman, P. Joskow, and J.P. Montero. In *Pollution for Sale: Emissions Trading and Joint Implementation*, edited by Steve Sorrell and Jim Skea. Edward Elgar Publishing, 1999.

"The Market for Sulfur Dioxide Emissions." With P. Joskow and R. Schmalensee. *American Economic Review*, vol. 88, no. 4, 1998.

"An Interim Evaluation of Sulfur Dioxide Emissions Trading." With R. Schmalensee. A.D. Ellerman, P. Joskow, and J.P. Montero, *Journal of Economic Perspectives*, vol. 12, no. 3, 1998.

"Electricity Markets in the Western United States." *Electricity Journal*, vol. 11, no. 6, 1998.

"Allowance Trading and State Regulatory Rulings: Evidence from the U.S. Acid Rain Program." Massachusetts Institute of Technology Center for Energy and Environmental Policy Research Working Paper 98-005, 1998.

"Inter-temporal Pricing of Sulfur Dioxide Allowances." Massachusetts Institute of Technology Center for Energy and Environmental Policy Research Working Paper 98-006, 1998.

Intellectual property

"Apportionment Treats the Symptom, Not the Disease." With G. Leonard and M. Lopez. *Law 360*, 2011.

"Making Sense of 'Apportionment' in Patent Damages." With G. Leonard and M. Lopez. *Columbia Science and Technology Law Review*, vol. 12, 2011.

"Three Cases Reshaping Patent Licensing Practice." With Alan Cox and Gregory K. Leonard. *Managing Intellectual Property*, 2010. A condensed version was reprinted in *Commercial Dispute Resolution*, 2010.

Selected Presentations

Antitrust

Panelist, New York State Bar Association, "Taking Aim at Vertical Mergers - A Twin or King-Sized Problem?" 2025 (Virtual).

Panelist, ABA Antitrust Section Spring Meetings, "Has Competition in the U.S. Been Declining," 2025 (Washington DC).

Panelist, GCR Law Leaders Global, "Mergers: Trend Towards Consolidation and Serial Acquisitions: When Are Many Acquisitions Too Many?," 2025 (Miami).

Panelist, ABA Antitrust Section Women's Roundtable, "One Year into the 'New' Merger Guidelines," 2025 (New York City).

Panelist, ABA Antitrust Section Fall Forum, "Are Merger Efficiencies Over-Promised and Under-Delivered," 2024 (Washington DC).

Panelist, GCR Women in Antitrust, "Expanding Merger Control Tools for Non-Traditional Deals and Non-Traditional Theories of Harm," 2024 (Washington DC).

Plenary Session Speaker, ABA Antitrust Section Masters Course, Philadephia, Pennsylvania, 2024.

Panelist, GCR Law Leaders Global, "Mergers: Evolution or Revolution in Evidentiary Trends," 2024 (Miami).

Panelist, Association of General Counsel, "Antitrust in the Biden Administration," Washington DC, 2023.

Speaker, ABA Antitrust Section Judicial Antitrust Law and Economics Institute for Federal Judges, "Antitrust and Intellectual Property," University of Chicago Law School, Chicago, Illinois, 2023.

Panelist, GCR Law Leaders Global, "Mergers: The structural presumption: A path to predicted outcomes or to nowhere at all?" 2023 (Miami).

Panelist, Fourth Annual George Washington University Competition Law Center and Crowell & Moring Antitrust and Tech Conference, "Lessons Learned from Agency Merger Challenges and Policy Developments," 2022 (Virtual Zoom).

Plenary Session Speaker, ABA Antitrust Section Masters Course, Philadephia, Pennsylvania, 2022.

Panelist, GCR Live: Global Merger Control 2022, "Back to the Future: Does There Remain a Role for Economics in Merger Review" 2022 (Brussels, Belgium).

Panelist, "Economic Storytelling with NPR's Planet Money," 2022 ABA Antitrust Law Spring Meetings, April 2022 (Washington DC).

Panelist, Global Antitrust Institute: George Mason Law Review 25th Annual Antitrust Symposium, "Proposals to Change the Antitrust Laws," 2022 (Virtual Zoom).

Panelist, GCR Law Leaders Global, "Mergers: Risk Allocation, Review Strategy and Deal Disputes," 2022 (Virtual Zoom/Miami).

Panelist, Third Annual George Washington University Competition Law Center and Crowell & Moring Antitrust and Tech Conference, "Ignited by Tech: The Next Wave of Merger Guidelines," 2021 (Virtual Zoom).

Panelist, GCR Live Women in Antitrust, "What Role Does Competition Policy Have in Achieving Sustainable Economic Development?," Washington DC and Virtual Zoom, 2021.

Panelist, "Expert Depositions: Just the Facts Ma'am," 2021 ABA Antitrust Law Section Mock Deposition Series, 2021.

Panelist, "Fundamentals—Economics," 2021 ABA Antitrust Law Spring Meetings, 2021.

Panelist, "Dissecting the FTC v. Peabody/Arch Coal Merger Challenge," ABA Antirust Law Section (Transportation & Energy Industries Committee), 2020.

Panelist, "Vertical, Conglomerate, National Champion and Killer Acquisitions: Has Merger Review Abandoned the Chicago School?" Canadian Bar Association Competition Law Fall Conference, 2019.

Panelist, "Antitrust Lawyer and Economist Best Practices," Women@CompetitionAmericas, 2019.

Speaker, "Mergers: Practical Considerations for In-house Counsel," Antitrust Texas – KNect365, 2019.

Speaker, The Women's Antitrust Forum, "Vertical Merger Enforcement Trends," 2019, Washington DC.

Speaker, ABA Brown Bag, "Engaging an Economist on a Merger: Fundamentals of Antitrust Economics Series" (Economics Committee), 2019.

Speaker/Defendant Expert, 2019 ABA Antitrust Law Spring Meetings, "Mock No-Poach Trial" (Trial Practice Committee), 2019, Washington DC.

Panelist, GCR Live Second Annual Women in Antitrust, "Non-Horizontal Mergers," Washington DC, 2018.

Faculty, ABA Antitrust Law Section Merger Practice Workshop in San Francisco, 2018.

Speaker, ABA Antitrust Section Judicial Antitrust Law and Economics Institute for Judges, "Antitrust and Intellectual Property," Boalt Law School at UC Berkeley, Berkeley, California, 2018.

Plenary Session Speaker, ABA Antitrust Section Masters Course, Cambridge, Maryland, 2018.

Speaker, 2018 ABA Antitrust Law Spring Meetings, “Antitrust/Intellectual Property: The Basics,” Washington DC, 2018.

Speaker, 2017 Antitrust Judicial Law & Economics Institute for Judges, “Law and Economics of Horizontal Restraints,” Chicago, 2017.

Speaker, 2017 Antitrust Judicial Law & Economics Institute for Judges, “Market Definition, Market Power, and Competitive Effects,” Chicago, 2017.

Faculty, ABA Antitrust Law Section Merger Practice Workshop in Washington DC, 2017.

Panelist, Eighth Annual Federal Trade Commission Microeconomic Conference, Washington DC, 2015.

Speaker, “The Big Swap: Financial Derivatives Agreements and Alleged Anticompetitive Conduct in US v. KeySpan,” 10th Annual Harvard Law Seminar: Current Developments in EU and US Antitrust Law. Cambridge, Massachusetts, 2011.

Speaker, "Predatory Pricing Conduct," Antitrust Law & Economics Institute for Judges sponsored by the American Bar Association Section of Antitrust Law and the George Mason Judicial Education Program, Arlington, Virginia, 2011.

Panelist, “The Proper Role of Economic Experts" Antitrust Law & Economics Institute for Judges sponsored by the American Bar Association Section of Antitrust Law and the George Mason Judicial Education Program, Arlington, Virginia, 2011.

Energy

Speaker, “California Greenhouse Gas Cap and Trade Program: The First Six Months,” Power Association of Northern California 2013 Annual Seminar. San Francisco, California, 2013.

Panelist, “Panel 2: Benefits of an Energy Data Center to Ratepayers and CA Energy Policy“ as part of the Energy Data Access Workshop (Rulemaking 08-12-009), California Public Utility Commission, San Francisco, California, 2013.

Speaker, “The Big Swap: Using Financial Derivatives to Create Anticompetitive Conduct,” 2011. Energy Institute at Haas Energy Camp 2012, Berkeley, California, 2012.

Speaker, “The Big Swap: Financial Derivatives and Alleged Anticompetitive Conduct.“ In “*U.S. v. KeySpan*, Current Developments in EU & US Antitrust Law,” Tenth Annual Harvard Law School Seminar, Cambridge, MA, 2011.

Intellectual property

Speaker, ABA Antitrust Section Judicial Antitrust Law and Economics Institute for Judges, “Antitrust and Intellectual Property,” Boalt Law School at UC Berkeley, Berkeley, California, 2018.

Speaker, 2018 ABA Antitrust Law Spring Meetings, “Antitrust/Intellectual Property: The Basics”, Washington DC, 2018.

Panelist, “Economic Damages Experts’ Panel,” Conference on Patent Damages (PatDam2) at the University of Texas School of Law. Austin, Texas, 2017.

Speaker, "Economic Lessons from the CAFC on Reasonable Royalty Damage Awards," The Knowledge Group Congress Live Webcast Series on "Recent Developments in Patent Infringement Damage Awards," 2010.

Moderator, "New Case Law of Patent Damages: Key Recent Federal Circuit Decisions," Law Seminars International, 2010.

Professional activities

Board Member, W@CompetitionAmericas.

Editorial Board Economics Vice Chair, *Antitrust Law Journal,* a publication of the American Bar Association's Section of Antitrust Law, 2023–2024.

Economic Editor, Senior Editor, Associate Editor, *Antitrust Law Journal,* a publication of the American Bar Association's Section of Antitrust Law, 2018–2024.

Member, American Bar Association's Section In-House Counsel Task Force, 2023-2024.

Advisory Board Member, American Bar Association's Section of Antitrust Law Women.Connected Committee (formerly the Women's Initiative).

Advisory Board Member, American Bar Association's Section of Antitrust Law Diversity.Advanced Committee.

Associate Editor, *Antitrust Magazine,* a publication of the American Bar Association's Section of Antitrust Law, 2010–2013.

Member, American Bar Association's Section of Antitrust Law and Economic Task Force, 2010–2012.

Editor, *The Antitrust Source,* a publication of the American Bar Association's Section of Antitrust Law, 2006–2010.

Editorial Board, *Issues in Competition Law and Policy*, American Bar Association's Section of Antitrust Law, 2008.

Journal Referee: Cambridge University Press, *Energy Journal*, *Journal of Environmental Economics and Management*, *Journal of Public Economics*, *Journal of Resource and Environmental Economics*, *Land Economics*, *Review of Economics and Statistics*, and *Review of Industrial Organization*

Honors

GCR *Who's Who Legal: Competition Economists Global Thought Leader 2019-2025*

GCR *Who's Who Legal: Competition Future Leader 2017, 2018*

John W. Teets, Outstanding Graduate Teaching Award, 2006/2007

Featured in *Global Competition Review*'s "Young Economists: The Rising Star of Economics," August/September 2006

Fellowship, Massachusetts Institute for Technology CEEPR, 1997–1998

MIT President's Society Fellows in Environment and Sustainability, 1996–1998

National Science Foundation Graduate Fellowship, 1994–1997

Salutatorian, Colgate University, 1994

Summa Cum Laude, Colgate University, 1994

Phi Beta Kappa, Colgate University, 1994

J. Melbourne Shortliffe Prize for excellence in economics, 1994

Professional history

2021–Present *Vice President Antitrust & Competition Economics Practice*, Charles River Associates, Oakland, CA

1998–2021 NERA Economic Consulting, Oakland, CA

2013–2021 *Academic Affiliate*

2009–2012 *Vice President*

2006–2009 *Special Consultant*

2003–2006 *Vice President*

2000–2002 *Senior Consultant*

1998–1999 *Consultant*

2015–2020 *Lecturer*, The Wharton School of the University of Pennsylvania, Philadelphia, PA

2012–2016 *Lecturer, Adjunct Professor*, Haas School of Business, University of California, Berkeley, CA

2012–2013 *Executive Director*, Energy Institute at Haas, University of California, Berkeley, CA

2006–2009 *Teacher*, W.P. Carey School of Business, Arizona State University, Tempe, AZ

- 2009 *Clinical Associate Professor*, Department of Economics
- 2006–2009 *Clinical Assistant Professor*, Department of Economics

APPENDIX B

MATERIALS RELIED ON

Case Materials

Case Filings

- Joint Verified Statement of David T. Hunt and Matthew Schabas
- Joint Verified Statement of Eric Gehringer and John F. Orr
- Joint Verified Statement of Kenny Rocker and Claude E. Elkins
- Verified Statement of John W. Turner
- Verified Statement of Katherine N. Novak

Data

Highly Confidential Data & Instructions

- BNSF Railway Data Dictionary [BNSF Traffic Tape Field Decoder.xlsx]
- BNSF Railway Traffic Tape Data, 2019 – 2024 [BNSF_2019_TrafficTapes_11122025.txt; BNSF_2020_TrafficTapes_11122025.txt; BNSF_2021_TrafficTapes_11122025.txt; BNSF_2022_TrafficTapes_11122025.txt; BNSF_2023_TrafficTapes_09242025_Highly Confidential.txt; BNSF_2024_TrafficTapes_11122025.txt]
- Canadian National Railway Data Dictionary [CN Traffic Tape Fields 2023.xlsx]
- Canadian National Railway Traffic Tape Data, 2023 [WB Exc Canada Domestic 2023 Q1.xlsx; WB Exc Canada Domestic 2023 Q2.xlsx; WB Exc Canada Domestic 2023 Q3.xlsx; WB Exc Canada Domestic 2023 Q4.xlsx]
- Norfolk Southern ABC Nodes Route Traffic [ABC NODES ROUTE TRAFFIC.xlsx]
- Norfolk Southern Instructions for Deduplicating Traffic Tape Data [165-B-Data Dictionary - Duplicate Waybill Flags V2 9-25-25.docx]
- Norfolk Southern Junction Station Tables, 2019 – 2024 [2023 OS Skinny Table.csv; OS Skinny Table.csv]
- Norfolk Southern Market Analysis Common Mapping Files [93-A-stcc_comm.xlsx]
- Norfolk Southern Net Tons for 2023 Traffic Tape Data [Loaded Railhighway Net Weights.csv]
- Norfolk Southern Railway Data Dictionary [180-A-NS Waybills Data Dictionary.xlsx]

- Norfolk Southern Railway Traffic Tape Data, 2019 – 2024 [2019 NS Waybills With Flags.csv; 2020 NS Waybills With Flags.csv; 2021 NS Waybills With Flags.csv; 2022 NS Waybills With Flags.csv; 2023 NS Waybills With Flags Final.csv; 2023 NS Waybills With Flags.csv; 2024 NS Waybills With Flags.csv]

- Oliver Wyman FSAC-SPLC-FIPS-BEA Mapping Table [191-A-FSAC_SPLC_FIPS_BEA.xlsx]

- Oliver Wyman Operating Plan workpapers [C-Traffic data processing_vS.pdf, 2.1 Source of NS Waybill Data]

- Oliver Wyman Operating Plan workpapers [C-Traffic data processing_vS.pdf, 2.1 Source of NS Waybill Data (dbo.2023_OS_Skinny_Table)]

- Oliver Wyman STCC4 Mapping Table [transearch_commodity_lookup.csv]

- Oliver Wyman Unified Station Master [20250902 Unified Station Access Master v1.1_StationMaster.csv]

- Railinc Station Master [1-A-Raw_UPRR_AAR_Station_Master.txt]

- Standard Transportation Commodity Code File Glossary of Terms [Standard Transportation Commodity Code File Glossary of Terms.pdf]

- Surface Transportation Board, Confidential Carload Waybill Sample, 2019 – 2023 [WB2019_913_Unmasked.txt; WB2020_913_Unmasked.txt; WB2021_913_Unmasked.txt; WB2022_913_Unmasked.txt; WB2023_913_Unmasked.txt]

- Union Pacific Railroad Data Dictionary [UPRR_Linehaul_Dtls_2023_DataDef_20250825.xlsx]

- Union Pacific Railroad U.S. Traffic Tape Data, 2019 – 2024 [UPRR_Waybills_2019_to_2024_20250825.txt; UPRR_Waybills_2023_20250825.txt]

- Union Pacific Station Data [2-A-Raw_UPRR_internal_location_master.xlsx]

Publicly Available Data

- SAS Institute Inc., *SASHELP.ZIPCODE* dataset, accessed via SASHELP library in SAS Software, Version 9.4

- Surface Transportation Board, Annual Report Financial Data, 2024, available at https://www.stb.gov/reports-data/economic-data/annual-report-financial-data/

- Surface Transportation Board, Freight Commodity Statistics, 2024, available at https://www.stb.gov/reports-data/economic-data/freight-commodity-statistics/

- Surface Transportation Board, Railroad Map Depot, available at https://www.stb.gov/resources/railroad-map-depot/

- U.S. Department of Transportation Freight Stations Data, available at https://data.transportation.gov/Railroads/Freight-Stations/gag3-mgv7/about_data [Freight_Stations_20250730.csv]

Transearch Data and Documentation

- S&P Global Market Intelligence, Transearch Data, 2023 [251126_Transearch_BEABEA.txt]
- S&P Global Market Intelligence, "Transearch 2023 Modelling Methodology Documentation," April 16, 2025
- S&P Global Market Intelligence, "Transearch Reference Guide 2023"
- S&P Global Market Intelligence, "Transearch Tutorial Documentation," December 19, 2024

<u>Literature and Publications</u>

- Benjamin Hermalin, Avery Katz, and Richard Craswell, "The Law and Economics of Contracts," in *Handbook of Law and Economics*, editors A. Mitchell Polinsky and Steven Shavell (New York: Elsevier, 2007)
- Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*, HarperCollins (1994)
- Oliver D. Hart and John Moore, "Property Rights and the Nature of the Firm," *Journal of Political Economy*, vol. 98, no. 6 (1990), pp. 1119-1158
- Oliver E. Williamson, "The Vertical Integration of Production: Market Failure Considerations," *Papers and Proceedings of the Eighty-Third Annual Meeting of the American Economic Association,* vol. 61, no. 2 (1971), pp. 112-123
- Oliver E. Williamson, "Transaction-Cost Economics: The Governance of Contractual Relations," *The Journal of Law and Economics*, vol. 22, no. 2 (1979), pp. 233-261
- Ronald H. Coase, "The Nature of the Firm," *Economica,* vol. 4 (1937), pp. 386-405
- Sanford J. Grossman and Oliver D. Hart, "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration," *Journal of Political Economy,* vol. 94, no. 4 (1986), pp. 691-719

Publicly Available Materials

- American Trucking Associations, "Economics and Industry Data," available at https://www.trucking.org/economics-and-industry-data (accessed December 8, 2025)
- Association of American Railroads, "Freight Rail FAQs," available at https://www.aar.org/faqs/ (accessed November 21, 2025)
- Association of American Railroads, "Railway Accounting Rules," December 2, 2025, available at https://public.railinc.com/sites/default/files/documents/RAR.pdf
- Bureau of Economic Analysis, "Survey of Current Business," February 1995, available at https://fraser.stlouisfed.org/files/docs/publications/SCB/1990-99/SCB_021995.pdf?utm_source=direct_download (accessed December 8, 2025)
- Canadian National, "List of Bulk STCCs – Applicable Under CN 7403 and CN 7402," available at https://www.cn.ca/-/media/files/customer-centre/shipping/bulk-stcc-en.pdf
- Canadian Pacific Kansas City, "About CPKC," available at https://www.cpkcr.com/en/about-cpkc (accessed October 28, 2025)
- CPKC, "2024 Annual Report," available at https://s21.q4cdn.com/736796105/files/doc_financials/2024/ar/CPKC-2024-Annual-Report-Web_Final.pdf
- CSX, "Railroad Dictionary," available at https://www.csx.com/index.cfm/about-us/company-overview/railroad-dictionary/?i=W (accessed November 24, 2025)
- Linda Glauber, "Use the Waybill Sample Data to Grow Your Business," RSI Logistics, April 11, 2023, available https://www.rsilogistics.com/blog/use-the-waybill-sample-data-to-grow-your-business/ (accessed November 24, 2025)
- Norfolk Southern Corporation, 10-K, Fiscal Year Ended December 31, 2024
- Norfolk Southern, "Annual Report," 2023, available at https://filecache.investorroom.com/mr5ir_nscorp/928/NSC%20Annual%20Report%202023.pdf (accessed December 17, 2025)
- Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf
- Railinc, "Centralized Station Master (CSM) User Guide," January 2024, at https://public.railinc.com/sites/default/files/documents/UG_CSM.pdf
- Rick LaGore, "Rule 11 vs. Railroad Interline Agreements - A shipping comparison," InTek Logistics, June 18, 2025, available at https://www.inteklogistics.com/blog/rule-11-railroad-interline-agreement-comparison (accessed November 24, 2025)

- Surface Transportation Board, "Carload Waybill Sample," available at https://www.stb.gov/reports-data/waybill/ (accessed November 24, 2025)
- Surface Transportation Board, "Economic Data," available at https://www.stb.gov/reports-data/economic-data/ (accessed October 28, 2025)
- Surface Transportation Board, "Procedure for Sampling Waybill Records," January 1, 2021, available at https://www.stb.gov/wp-content/uploads/STB-Statement-81-1-Procedures-for-Sampling-Waybill-Records-2021-Edition.pdf
- Trains, "Canadian National merger family tree," available at https://www.trains.com/trn/railroads/history/canadian-national-merger-family-tree/ (accessed November 19, 2025)
- U.S. Department of Transportation Federal Railroad Administration, "Freight Rail Overview," available at https://railroads.dot.gov/rail-network-development/freight-rail-overview (accessed October 28, 2025)
- Union Pacific Corporation, 10-K, Fiscal Year Ended December 31, 2023
- Union Pacific Corporation, 10-K, Fiscal Year Ended December 31, 2024
- Union Pacific, "Allowable Gross Weight Shipments," available at https://www.up.com/aboutup/reference/maps/allowable_gross_weight/ (accessed December 13, 2025)
- Union Pacific, "Company Overview," available at https://www.up.com/aboutup/corporate_info/uprrover/index.htm (accessed October 28, 2025)
- Union Pacific, "Union Pacific and Norfolk Southern to Create America's First Transcontinental Railroad," available at https://www.up.com/press-releases/growth/norfolk-southern-transcontinental-nr-250729 (accessed October 28, 2025)
- United States Government Accountability Office, "Freight Transportation: National Policy and Strategies Can Help Improve Freight Mobility," January 2008, available at https://www.gao.gov/assets/gao-08-287.pdf
- USDA Agricultural Marketing Service, "Study of Rural Transportational Issues, Chapter 12: Barge Transportation," available at https://www.ams.usda.gov/sites/default/files/media/RTIReportChapter12.pdf
- USDA Agricultural Marketing Service, "Study of Rural Transportational Issues, Chapter 13: Truck Transportation," available at https://www.ams.usda.gov/sites/default/files/media/RTIReportChapter13.pdf

Regulatory Materials

Regulatory Materials

- United States, Code of Federal Regulations, 49 C.F.R. § 1180.7

Surface Transportation Board Dockets

- Surface Transportation Board, "Rail General Exemption Authority—Exemption of Hydraulic Cement," Ex Parte No. 346 (Sub-No. 34), STB Decided December 4, 1996
- Surface Transportation Board, "Rail General Exemption Authority—Transportation Equipment," Ex Parte No. 346 (Sub-No. 27), ICC Decided December 30, 1992 (9 I.C.C. 2d)
- Surface Transportation Board, "Union Pacific Corporation, Union Pacific Railroad Company, and Missouri Pacific Railroad Company—Control and Merger—Southern Pacific Rail Corporation, Southern Pacific Transportation Company, St. Louis Southwestern Railway Company, SPCSL Corp., and The Denver and Rio Grande Western Railroad Company," Finance Docket No. 32760, Decision No. 44, STB Decided August 6, 1996
- Surface Transportation Board, "WTL Rail Corporation Petition for Partial Revocation of Exemption," Ex Parte No. 230 (Sub-No. 9), STB Decided February 15, 2006

Verified Statements

- Verified Statement of Christopher A. Vellturo, "An Analysis of the Competitive Effects of the Proposed Combination of the Canadian National and Wisconsin Central Railroads," April 6, 2001
- Verified Statement of Christopher A. Vellturo, "Canadian National Railway Company and Grand Trunk Corporation – Control – EJ&E West Company," Finance Docket No. 35087, October 29, 2007
- Verified Statement of W. Robert Majure, "Canadian Pacific Railway Limited, et al. – Control – Kansas City Southern, et al.," Finance Docket No. 36500, October 29, 2021

APPENDIX C
DATA

1 Overview of Data Used in Analyses

1. This appendix describes the data used in the analyses prepared for my statement and to address 49 CFR § 1180.7 (b) (2), (3), and (4) of the STB regulations. In addition to describing the data used, this appendix also provides an overview of how the data were prepared and combined for the analyses.

2 Combined Waybill Data

2. A combined data set of waybills was constructed from multiple sources. First, 100 percent traffic tapes for UP, NS, CN, and BNSF for the years of 2019 to 2024 were combined.[1] Next, these were supplemented with the data from the Confidential Waybill Sample ("CWS") provided by the STB for the years of 2019 to 2023.

2.1 Waybill data from 100 percent traffic tapes

3. Applicants provided 100 percent traffic tapes for UP and NS for 2019 to 2024. Subsequently, 100 percent traffic tapes for the year 2023 for CN and 2019 to 2025 for BNSF. I did not receive traffic tape data from CSX. CPKC traffic tape data for 2023 became available on November 19, 2025 and November 21, 2025 and were therefore not incorporated into these analyses.

[1] Note that data from CN is available for 2023 only.

4. These traffic tape data represent carload-level records (for UP, NS, and BNSF) or waybill-level records (for CN) with origins and destinations provided at the station (SPLC) level.[2] A crosswalk provided by Oliver Wyman maps these SPLCs to BEAs.[3]

2.2 Merging the 2023 and 2022-2024 UP and NS data

5. Two versions of the UP-NS waybills merge was shared with Oliver Wyman. The first version is restricted to 2023[4] and the second version covers 2022-2024.[5] In both versions, some light cleaning of the UP and NS datasets was performed before merging.[6]

6. After removing duplicates and cleaning the fields in both data sets, a cascading series of merges were implemented where the UP and NS records merged in one step are not considered for merging in subsequent steps. In total, 22 rounds of merging between the two datasets were implemented, starting with the strictest set of merge keys in step 1 and

[2] BNSF provides a station identifier (<STN_333>) which is then mapped onto SPLC.

[3] *See* "191-A-FSAC-SPLC-FIPS-BEA.xlsx." (hereafter, "Oliver Wyman FSAC-SPLC-FIPS-BEA Mapping Table").

[4] For the 2023 merge, the raw data files "UPRR_Waybills_2023_20250825.txt" and "2023 NS Waybills With Flags Final.csv." were used.

[5] For the 2022-2024 merge, the following raw data files were used: "UPRR_Waybills_2019_to_2024_20250825.txt," "2021 NS Waybills With Flags.csv," "2022 NS Waybills With Flags.csv," "2023 NS Waybills With Flags.csv," and "2024 NS Waybills With Flags.csv." The merge was limited to records from either UP or NS with a Waybill date in December 2021 or later.

[6] For UP data, duplicate records were removedusing <dup_wb_ind> indicator and remove double dashes and spaces in <mvmt_rte_text>. For NS, the route field (<full_route_information>) was parsed by delimiting every 4 or 5 alternating characters. Duplicate records in the NS data were removed using a series of filters provided by NS in the raw data. *See* Section 2.3.3 for more details.

gradually loosen the merge criteria with each subsequent step. Below are the keys used in each step:[7]

Table C.1: Cascading Merges – UP and NS Data

Step	Merge by the following fields that are in both the UP and NS data (Merge keys)
1	Equipment Initial, Equipment Number, Waybill Number, Waybill Date, BOL Number, Origin FSAC, Destination FSAC, STCC Number, Route, first character of AAR car type
2	Equipment Initial, Equipment Number, Waybill Number, Waybill Date, BOL Number, Origin FSAC, Destination FSAC, STCC Number, first character of AAR car type
3	Equipment Initial, Equipment Number, Waybill Number, Waybill Date, BOL Number, STCC Number, Route, first character of AAR car type
4	Equipment Initial, Equipment Number, Waybill Number, BOL Number, Origin FSAC, Destination FSAC, STCC Number, Route, +/- 7 day Waybill Date difference, first character of AAR car type
5	Equipment Initial, Equipment Number, Waybill Date, BOL Number, Origin FSAC, Destination FSAC, STCC Number, Route, first character of AAR car type
6	Equipment Initial, Equipment Number, Waybill Date, Waybill Number, Origin FSAC, Destination FSAC, STCC Number, Route, first character of AAR car type
7	Equipment Initial, Equipment Number, Waybill Number, Waybill Date, BOL Number, Origin FSAC, Destination FSAC, Route, first character of AAR car type
8	Equipment Initial, Equipment Number, Waybill Number, Waybill Date, BOL Number, first character of AAR car type
9	Equipment Initial, Equipment Number, Waybill Number, Waybill Date, first character of AAR car type
10	Equipment Initial, Equipment Number, Waybill Number, Waybill Date
11	Equipment Initial, Equipment Number, Waybill Number, BOL Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type

[7] After merging the UP and NS datasets, a <merge_type> field was created that identifies by which step a set of records is merged in. Neither the UP nor NS data is perfectly unique on the set of merge keys prior to merging. This results in some cases where a single UP record merges to multiple NS records, or vice versa. In a very small number of instances, multiple UP records may merge to multiple NS records. To flag all sets of records that involve a duplicate a decimal place was added to the <merge_type> using the following logic: ".1" for all one-to-one merges, ".2" for many NS records merging to one UP record, ".3" for one NS record merging to many UP records, ".4" for many NS records merging to many UP records.

12	Equipment Initial, Equipment Number, Origin FSAC, Destination FSAC, STCC Number, Route, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
13	Equipment Initial, Equipment Number, Waybill Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
14	Equipment Initial, Equipment Number, Origin FSAC, Destination FSAC, STCC Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
15	Equipment Initial, Equipment Number, Route, STCC Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
16	Equipment Initial, Equipment Number, BOL Number, STCC Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
17	First three letters of Equipment Initial, Equipment Number, Waybill Number, Waybill Date, BOL Number, LE Code, first character of AAR car type
18	Equipment Initial, Equipment Number, BOL Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
19	Equipment Initial, Equipment Number, Waybill Date, STCC Number, LE Code, first character of AAR car type
20	Equipment Initial, Equipment Number, Waybill Date, LE Code, first character of AAR car type
21	Equipment Initial, Equipment Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
22	Equipment Initial, Equipment Number, +/- 7 day Waybill Date difference, LE Code

7. Merges that occur after step 10 are assumed to be "fuzzy" matches and additional filters on these matched waybills are imposed. First, a flag whether the route is explicitly interlined between UP and NS. To do this, UP's route variable (<mvmt_rte_text>) from the matched record is parsed to identify the string for "NS."[8] For any matches that do not satisfy the first

[8] Also parsed is the <mvmt_rte_text> to get information about the direction of the route (i.e., NS to UP or UP to NS) as well as to identify "bridge" movements, where an intermediate carrier falls in between the two merging carriers.

requirement, the fly-out distance[9] between the UP and NS[10] system locations is calculated.[11] Records that are within a 50 mile distance between the UP and NS waybill pair are retained.

8. For intermodal shipments, records include for both the containers and for the intermodal cars on which the containers are transported. In the UP-NS waybills merged data, matches associated with intermodal cars are dropped and containers are kept.[12]

2.3 Waybill Data Processing

2.3.1 General Data Cleaning

9. Prior to combining the UP, NS, CN, BNSF and CWS data, several general data cleaning steps in each data source are applied.

10. First step is to remove observations associated with empty shipments or non-revenue shipments. Railroads transport empty railcars back to shippers. However, the vast majority of revenues are earned on movement of loaded railcars rather than empty cars. Analysis focuses on waybills for revenue movement of loaded cars only. Specifically, the focus is on

---

[9] The fly-out distance represents the shortest distance between two sets of geographic coordinates, calculated using the Haversine formula.

[10] The relevant system location fields in UP are retrieved by using "1-A-Raw_UPRR_AAR_Station_Master.txt." (hereafter, "Railinc Station Master"). The relevant system location fields in the NS data that needed to be adjusted are detailed in instructions provided by NS and Oliver Wyman. *See* "C-Traffic data processing_vS.pdf;" "OS Skinny Table.csv."

[11] For UP records, UP's originating/destination Circ 7 is used, and for NS, the NS on/off junction operating station is adjusted by using the NS-provided table ("2023 OS Skinny Table.csv" for the 2023 merge and "OS Skinny Table.csv" for the 2022-2024 merge) to identify on/off junction operating station locations. Station geo files provided by UP and NS ("2-A-Raw_UPRR_internal_location_master.xlsx" and "ABC NODES ROUTE TRAFFIC.xlsx") were used to look up the latitude/longitude values for the NS and UP locations. Using these pairs of coordinates two distances were computed: UP destination to NS origin and NS destination to UP origin. The assumption is that the shorter distance between the two is the correct routing and determines the direction of the record (i.e., NS to UP or UP to NS).

[12] Intermodal cars are records with an AAR equipment type (<aar_car_type>) value of P, Q, or S.

linehaul movements and linehaul revenues (e.g., excluding reciprocal switching moves when indicated in the data)[13]. Empty shipments are identified using any of the following criteria: a native loaded/empty indicator (if available), an STCC number that denotes empty shipments,[14] or a net weight of 0. Non-revenue shipments are identified using indicators provided in the native data, if available. Records for locomotives and caboose are also removed.[15] Finally, any remaining duplicate records, if applicable, are removed.

11. While the availability of certain data fields vary by data source, the fields in each data source were identified and standardized for key fields such as waybill number, waybill date, bill of lading number, origin and termination FSAC, origin and termination SPLC, route, equipment number/initial, STCC code, tonnage, number of units, system/shipment revenues, and Rule 11 shipment indicators. Table C.2 lists the relevant fields from each data source.

Table C.2: Select Key Fields from each Waybill Data Source

	UP	NS	CN	BNSF	CWS[16]
Waybill Number	wb_nbr	wb_nr	waybill_number	wb_numb	waybill_number
Waybill Date	wb_date	waybill_date	waybill_date	wb_dt	waybill_date

[13] While UP records explicitly identify when a movement is a reciprocal switch movement, traffic tapes for the other railroads are far less comprehensive in that regard.

[14] STCC numbers that typically denote empty shipments include values beginning with "42" (returned empty containers), "37421" (new railway cars), "37422" (used railway cars), "37424" (railway car parts and assemblies), and "3741" (railway cars and parts). See my workpapers.

[15] Locomotives are identifiied as records with an AAR equipment type starting with the value "D" and caboose as records with an AAR equipment type of "M930." *See* Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf, at p. 162.

[16] The CWS data files do not include native field names. *See* workpapers for how the field names are assigned based on the number of positions and data descriptions in Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf, at p. 43.

	UP	NS	CN	BNSF	CWS[16]
Equipment Initial (or Leading Equipment initial)	eqmt_init/ lead_eqmt_init	equip_initial	equipment_initial	eqp_init	car_initial (tofc_initial for intermodal shipments)
Equipment Number (or Leading Equipment Number)	eqmt_nbr/ lead_eqmt_nbr	equip_nr	equipment_number	eqp_numb	car_number (tofc_number for intermodal shipments)
STCC (non-hazardous)	stcc_nbr	Generated using <stcc_wo_hazmat_codes> and <stcc_with_hazmat_codes>	alternate_stcc_code	cmdty_stcc	stcc_no_haz
Origin SPLC	shmt_orig_splc_nbr	osplc	origin_splc	*Identified using ofcl_333_orig, carr_abbr_orig and ofcl_state_orig*	origin_splc
Destination SPLC	shmt_dest_splc_nbr	dsplc	destination_splc	*Identified using ofcl_dest_333, carr_abbr_dest and ofcl_state_dest*	destination_splc
Origin FSAC	shmt_orig_fsac	orig_fsac	origin_station_fsac	N/A	origin_fsac
Destination FSAC	shmt_dest_fsac	term_fsac	destination_station_fsac	N/A	termination_fsac
AAR Equipment Type	aar_car_type	car_type	aar_car_kind	car_kind_aar	aar_equip_type_code
Bill of Lading	bol_nbr	bill_of_lading	N/A	bladg_numb	N/A
Route	mvmt_rte_text	full_route_information	waybill_route_text	*Generated using various native fields*	*Generated using various native fields*
Carloads/ Container Count	*Calculated as the number of unique cars/containers*	*Calculated as the number of unique cars/containers*	calculated_carloads	units	carloads (num_tofc_cofcs for intermodal shipments)
Tonnage	net_wgt	net_tons	actual_tons	cst_car_ladg_ton	billed_weight_tons
System Revenue	up_gross_rev_amt	acctg_ns_prop_tot_amt	system_revenue_in_rate	bnsf_net_revenue	N/A
Shipment Revenue	urrwin_totl_rev_amt	acctg_tot_rev_tot_amt	waybill_revenue_rate	tot_revenue	freight_revenue
Rule 11 Indicator	rule_11_ind	rebill_code	rule_11_code	rule_11_flg	rebill_code
Originating Railroad	shmt_orig_scac	orig_rr	origin_carrier_abbreviation	carr_abbr_orig	origin_rr_alpha
Terminating Railroad	shmt_dest_scac	term_rr	destination_carrier_abbreviation	carr_abbr_dest	termination_rr_alpha

12. To standardize railroad names in the route variables across the various data sources, Class I subsidiary firm names are replaced with the names of their parent railroad.[17]

13. Traffic volume is measured in carload counts and tons shipped. Loaded carloads include either carload counts or counts of individual intermodal container units. While all sources report some measure of tons shipped, there are some discrepancies in how tons are recorded among different sources.[18] For a small number of observations, the net tons per car reported are higher than 157.5 tons, which is the legal gross weight limit for a rail car.[19] For these observations, net tons are set to 157.5 and these waybills are flagged as having censored tonnage.

2.3.2 Processing the 2019 to 2024 UP data

14. The UP data consists of carload-level traffic tape data for UP shipments covering 2019 through 2024.[20]

15. The UP data sometimes contains multiple observations for the same waybill and railcar. These duplicate records are identified and removed using the Duplicate Waybill Indicator (<dup_wb_ind>) native to the UP traffic data. Further identification and removal of empty

---

[17] In particular, the replacements are: "CPRS," "CPUS," "KCS," and "KCSM" are replaced with "CPKC;" "CNUS" and "IANR" with "CN;" and "ST" with "CSXT."

[18] For example, the BNSF data reports lading weights, while the CWS primarily reports billing weight. There are some differences between billed and actual lading weights, which can be more significant for certain commodities. *See* Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf, at pp. 185, 190.

[19] *See,* for example, Union Pacific, "Allowable Gross Weight Shipments," available at https://www.up.com/aboutup/reference/maps/allowable_gross_weight/ (accessed December 13, 2025). The gross weight limit for heavy axle rail cars is 315,000 lbs, which is 157.5 tons.

[20] The following file from UP was used: "UPRR_Waybills_2019_to_2024_20250825.txt."

shipments,[21] non-revenue records[22] as well as shipments reflecting non-line haul movements, such as yard movements or short, local transfers is also performed.[23]

16. While the native route field includes switching and haulage segments, UP also provides a separate field identifying the role of each carrier participating on the route. This field is used to construct a clean route field that excludes switching and haulage segments.[24]

17. The UP data sometimes record a placeholder value ("0000000") in the STCC number (<stcc_nbr>), while the hazardous STCC number field (<hzrd_stcc_nbr>) contains a valid STCC code. To address this, a mapping from hazardous STCC codes to the corresponding standard STCC codes is constructed and used to replace these placeholder values accordingly.

18. To standardize weight, net weight (<net_wgt>) is converted from pounds to tons using the conversion factor of 2,000 pounds per ton.

---

[21] Shipments were identified as empty when the Load Empty Code was "E," the Revenue Empty Flag equaled "1", Net Weight was "0", or STCC number denotes empty shipments.

[22] Non-revenue records are identified as records where <rev_car_cnt> is not equal to 1.

[23] Non-line-haul freight movements within a local area are identified by <mvmt_type_code> values "A", "T", and "P." *See* "UPRR_Linehaul_Dtls_2023_DataDef_20250825.xlsx."

[24] Carriers associated with any of the following movement types were not considered as linehaul carriers and removed from the route: I-Origin Switch, V-Intermediate Switch, D-Delivery Switch, JO-Junction Settlement Origin, JD-Junction Settlement Destination, H-Haulage Rights, HC-Handling Carrier, and M-Haulage Movement. *See* "UPRR_Linehaul_Dtls_2023_DataDef_20250825.xlsx."

2.3.3 Processing the 2019 to 2024 NS data

19. The NS data consists of carload-level traffic tape data for NS shipments covering 2019 through 2024.[25]

20. The NS traffic data often contains multiple observations for the same railcar and waybill. These duplicate records exist for a variety of reasons and represent entries such as "child" records[26] reflecting partial route information, temporary waybills, and reciprocal switch records, among others. Duplicate records are identified following instructions provided by NS and Oliver Wyman.[27] In the process, empty shipments and non-revenue shipments are also identified.[28]

21. A clean route was created by using the native route variable (<full_route_information>) and standardizing its format to better align with the data from other railroads. Additional variables were created, specifically <reporting_rr_on_junc_fixed> and

---

[25] The following files from NS were used: "2019 NS Waybills With Flags.csv," "2020 NS Waybills With Flags.csv," "2021 NS Waybills With Flags.csv," "2022 NS Waybills With Flags.csv," "2023 NS Waybills With Flags.csv," "2024 NS Waybills With Flags.csv."

[26] For example, a single interline shipment can appear in the data under multiple "child" records representing separate revenue waybills used for billing purposes, while the "parent" record for that waybill reflects the full route.

[27] A cascading filtering procedure was performed to identify duplicates in the NS raw data. This filtering procedure was implemented so that the result of filtering procedure step 1 is the input for filtering procedure step 2 and so on. *See* "C-Traffic data processing_vS.pdf;" "165-B-Data Dictionary - Duplicate Waybill Flags V2 9-25-25.docx." *See also,* "180-A-NS Waybills Data Dictionary.xlsx."

[28] Shipment records were identified as empty if one or more of the following holds: the variable <load_empty> equals "E", the variable <net_tons> is equal to 0, or the STCC number starts with "42", "37421", "37422", "37424", or "3741." Shipment records were identified as non-revenue if the variable <rev_non_rev_ind> is not "REVENUE" and <acctg_ns_prop_all_amt> is equal to 0.

<reporting_rr_off_junct_fixed>, which are intended to adjust the raw codes for on and off junctions where NS receives and delivers a shipment.[29]

22. While the raw NS data includes the non-hazardous STCC to indicate the commodity the shipment was classified into (<stcc_wo_hazmat_codes>), this field was sometimes populated with the hazardous STCC code instead (i.e., there were <stcc_wo_hazmat_codes> that begin with "49", a prefix specific to hazardous STCC). A crosswalk between hazardous and non-hazardous STCC codes was constructed as described above to create a new variable (<stcc_wo_hazmat_codes_fixed>) that corrects the native field.[30] For any waybills that still had an unassigned non-hazardous STCC after this step, the CWS data was searched for that waybill and CWS's STCC code was used, if available.[31]

23. From the NS data the following types of records were eliminated: duplicated, intra/inter-terminal switch, empty waybill records, and non-revenue records without any revenue

[29] These adjustment follow instructions provided by NS and Oliver Wyman. *See* "C-Traffic data processing_vS.pdf"; "OS Skinny Table.csv."

[30] To create the crosswalk, the CWS and UP data were used to create pairings of hazardous STCC codes and non-hazardous STCC codes, restricted to those where one or more hazardous STCC codes maps to one non-hazardous STCC code, Hazardous STCC codes are more granular than non-hazardous STCC codes. That is, for a given commodity, there are different ways to classify how that commodity is hazardous. For example, shipments with non-hazardous STCC code 1021210 (Copper Concentrates (RQ-5000/2270)) were classified with hazard STCC code 4966106 (Other Regulated Substances, Solid, N.O.S. Class 9 NA3077)), or hazard STCC codes 4966326 and 4966334 (Environmentally Hazardous Substance, Solid, N.O.S. Class 9 U). *See* my workpapers. Therefore, multiple hazardous STCCs can map to one non-hazardous STCC. However, it is not possible for multiple non-hazardous STCCs to map to one hazardous STCC.

[31] CWS records were matched onto NS observations with <stcc_wo_hazmat_codes_fixed> that starts with "49", using waybill number <wb_nr>, waybill date <wb_date>, and the unassigned non-hazardous STCC code from NS <stcc_wo_hazmat_codes_fixed> to match to CWS' waybill number <waybill_number>, waybill date <waybill_date> and hazardous STCC codes <commodity_stcc>. Then, for those that matches to an observation in the CWS sample, a replacement was made for the <stcc_wo_hazmat_codes_fixed> with the non-hazardous <stcc_no_haz> from the CWS sample.

recorded.[32] The data are further restricted by eliminating records whose routes encompass those of the other records for the same railcar and waybill.[33]

24. Last, a check for observations in the same waybill that have different routes, FSACs, or origin/termination railroadis performed.[34] For these, reconciliation is performed within each waybill.[35]

2.3.4 Processing the 2023 CN data

25. The CN data consists of traffic tape data for CN shipments for the year 2023.[36] Unlike the UP, NS, and BNSF traffic data, which are available at the carload-level, CN's data is aggregated at a waybill level, and lead-car equipment information is provided.

26. The CN data sometimes contain duplicate records for the same waybill. To avoid double-counting, these duplicates are removed from the data.[37] While the CN data does not provide a native field indicating empty shipments, empty shipments are identified and removed if

---

[32] Some of the duplicate observations are flagged for exclusion contain information on revenue and tonnage that complement the observations that were not flagged for exclusion. To ensure that the observations kept have all the relevant information about the shipment, the effort was made to retain the maximum value of the revenue fields (<acctg_tot_rev_all_amt>, <acctg_ns_prop_all_amt>,) and net tons (<net_tons>) for the same waybill number, waybill date, and equipment identifiers prior to removing duplicates.

[33] For records with duplicated <waybill_date>, <wb_nr>, <equip_initial>, and <equip_nr>, the rule is to the records if it is the one with the longest route, or if all the routes are the same, only one record out of the group is kept.

[34] Records in the same waybill are those with common waybill number <wb_nr>, waybill date <waybill_date>, non-hazardous STCC code <stcc_wo_hazmat_codes_fixed>, origin SPLC <osplc>, destination SPLC <dsplc>, and bill of lading number <bill_of_lading>.

[35] *See* workpapers.

[36] The following files from CN traffic tapes were used: "WB Exc Canada Domestic 2023 Q1.xlsx," "WB Exc Canada Domestic 2023 Q2.xlsx," "WB Exc Canada Domestic 2023 Q3.xlsx," "WB Exc Canada Domestic 2023 Q4.xlsx."

[37] Duplicates records were identified when the multi records associated with one single unique waybill number <waybill_number>, waybill date <waybill_date>, equipment number <equipment_number> and equipment initial <equipment_initial>.

the record contains zero "actual tons" is reported or where the STCC value denotes empty shipments.

27. CN's native route field (<waybill_route_text>) appears to include delivery switches, which is identified by searching for routes that end with "-DELY." A clean route variable is then constructed that removes the segment in the route associated with these delivery switches.[38]

2.3.5 Processing the 2019 to 2024 BNSF data

28. The BNSF data consists of carload-level traffic tape data for BNSF shipments covering 2019 through 2024.[39]

29. The BNSF data contains some duplicated records for the same waybill and railcar. To avoid double-counting, these duplicates are removed from the data.[40] In addition, empty shipments are also removed.[41]

30. BNSF did not provide a native route field or complete information allowing me to identify all segments and carriers involved in the shipment. However, BNSF did provide information such as the railroad carrier that originated the shipment, the carrier that BNSF interchanged with or connected to, as well as information on the origin and termination stations and the

---

[38] For example, the <waybill_route_text> entry "CN – CHGO – NS – STLOU – UP – DELY" was changed to "CN – CHGO – NS" in the new variable <waybill_route_text_updated>.

[39] The following files from BNSF traffic tapes were used: "BNSF_2019_TrafficTapes_11122025.txt," "BNSF_2020_TrafficTapes_11122025.txt," "BNSF_2021_TrafficTapes_11122025.txt," "BNSF_2022_TrafficTapes_11122025.txt," "BNSF_2023_TrafficTapes_09242025_Highly Confidential.txt," "BNSF_2024_TrafficTapes_11122025.txt." In addition, BNSF provided a data dictionary. *See* "BNSF Traffic Tape Field Decoder.xlsx."

[40] The duplicates were identified when multiple records shared the same unique waybill number <wb_numb>, waybill date <wb_dt>, equipment number <eqp_numb>, and equipment initial <eqp_init>.

[41] Empty shipments are shipments where <ld_mty_ind> is "E", with zero total lading weight (i.e., <cst_car_ladg_ton>), or STCC number (i.e., < cmdty_stcc>) denotes empty shipments.

interchange locations. Using this information, a route variable is constructed for use in my analysis.[42] For waybills with inconsistent route information across all railcars in the same waybill, the route across all railcars for that waybill is standardized.[43] Since BNSF does not provide SPLCs for the origin station or destination station, the origin/destination SPLCs were determined by using the initials of the originating/destination railroad carrier, the Official 333 spelling for the origin/destination station, and the state code associated with that station. Using this information, Railinc Station Master Data and the Oliver Wyman FSAC-SPLC-FIPS-BEA Mapping Table were used to complete mapping BNSF records to SPLCs and BEAs for origins and destinations.[44]

2.3.6 Processing the 2019 to 2023 STB CWS data

31. The CWS is a stratified sample of U.S. rail traffic waybills, containing detailed information on origin, destination, commodity, tonnage, and revenue, among others, for each waybill.[45],

---

[42] The following variables are relied upon to construct BNSF route (i.e., <route>) from the limited information provided by BNSF: initials of the railroad carrier originating the shipment <carr_abbr_orig>, railroad carrier that BNSF interchanges with to receive the car <carr_abbr_on>, abbreviation of the railroad carrier that BNSF connects with to make deliveries <offjct_road>, initials of the common carrier taking the shipment to its destination <carr_abbr_dest>, official 333 spelling for the origin station <ofcl_333_orig>, 333 spelling of the city where BNSF receives a shipment from a foreign carrier <icr_city_333>, 333 spelling of the city where BNSF delivers a shipment to a foreign carrier <icd_city_333>, and official 333 spelling of the destination <ofcl_dest_333>. *See* workpapers. In addition, I created a parent route variable by replacing subsidiaries of Class I railroads in the route with their parent railroad names.

[43] For records sharing the same <wb_numb>, <wb_dt>, <origin_splc>, <destination_splc>, and <cmdty_stcc>, a standardized route variables are created (i.e., <route> and <route_parent_abbr>) by selecting the longest route and, if there were ties, choosing the one most frequently reported. Then I aligned <origin_rr_alpha> and <termination_rr_alpha> to match the first and last points in the chosen <route>.

[44] *See* workpapers. *See also*, Railinc Station Master; Oliver Wyman FSAC-SPLC-FIPS-BEA Mapping Table.

[45] *See* CSX, "Railroad dictionary," available at https://www.csx.com/index.cfm/about-us/company-overview/railroad-dictionary/?i=W (accessed November 24, 2025); Linda Glauber, "Use the Waybill Sample Data to Grow Your Business," RSI Logistics, April 11, 2023, available https://www.rsilogistics.com/blog/use-the-waybill-sample-data-to-grow-your-business/ (accessed November 24, 2025).

[46] Each record in the CWS represents a separate waybill and the sample is designed to be representative of the universe of rail freight waybills terminated by the reporting railroads.[47] Each railroad provides less than 10 percent of its waybills for the year sampled at specific prices, e.g., one out of forty similar waybills as instructed by the STB. While the CWS contains less than 10 percent of waybills for the year, it also includes expansion factors provided by the STB to scale up the CWS so that the data are representative of the U.S. population of waybills.[48] While the CWS data excludes non-revenue records, it does include empty shipments. Empty shipment waybills are removed from the data set used for analyses.[49]

32. The variable for route <route> was created by concatenating several variables based on Accounting Rule 260 information in CWS records. These include the alpha abbreviation for the origin railroad <origin_rr_alpha_fixed>, the alpha abbreviations for up to six bridge railroads (<first_interchange_rr_alpha_fixed> through <sixth_interchange_rr_alpha_fixed>), the alpha abbreviation for the termination railroad (<termination_rr_alpha_fixed>), and the Rule 260 alpha codes for the interchange stations

---

[46] The CWS does not sample waybills from small railroads. CWS is a stratified sample of carload waybills for all U.S. rail traffic submitted by those rail carriers terminating 4,500 or more revenue carloads annually. *See* Surface Transportation Board, "Carload Waybill Sample," available at https://www.stb.gov/reports-data/waybill/ (accessed November 24, 2025).

[47] *See* Surface Transportation Board, "Carload Waybill Sample," available at https://www.stb.gov/reports-data/waybill/ (accessed November 24, 2025).

[48] The STB provides two types of expansion factors – a theoretical expansion factor and an exact expansion factor, but only the theoretical one is available for all observations, so that is what I use.

[49] Shipments were removed in cases where the loaded or empty status is empty identified as waybills with zero total billed weight, i.e., <billed_weight> = 0, or STCC numbers <stcc_no_haz> denoting empty shipments.

where traffic was transferred to either the terminating carrier or a bridge railroad (<interchange_1_rule260> through <interchange_7_rule260>).[50]

33. The STCC code for records across different segments of the same shipment were standardized and the lead equipment information was replaced with the lead trailer or container information for intermodal shipments.[51] Second, duplicate waybills are removed.[52] Next, waybills for different segments of the same shipment[53] are combined into a single record. The routes are concatenated in sequence based on either the origin/destination SPLCs or the rebill codes[54], and the revenue is summed.

---

[50] The fields <origin_rr_alpha_fixed>, <first_interchange_rr_alpha_fixed> through <sixth_interchange_rr_alpha_fixed>, and <termination_rr_alpha_fixed> are decoded by using <origin_railroad>, <first_bridge_rr> through <sixth_bridge_rr>, and <termination_rr> based on the guidelines on the CWS. *See* Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf.

[51] See workpapers.

[52] Records are considered duplicates if they match on waybill date, lead equipment/container initial and number, STCC code, and rebill code. If reported by the same railroad, sorting of the records in descending order of accounting period and unique serial number is performed and the first record is kept. If reported by different railroads and their origin/destination SPLCs do not indicate a sequential order, the rule is then to keep the record with the more complete route whenever it exists; otherwise, sort the records in descending order of accounting period and unique serial number, and keep the first record.

[53] Records are considered segments of the same shipment if they match on waybill date, lead equipment/container initial and number, and STCC code, but have different waybill numbers. Most cases involve Rule 11 pricing, resulting in multiple waybills. To harmonize these differences, a single waybill number is assigned to all records in the group, prioritizing the number from UP, NS, BNSF, then CN, in that order. If none of the records are reported by these railroads, the group is sorted by accounting period and unique serial number in descending order and use the waybill number from the first record. See workpapers.

[54] "The Rebill Code indicates where in the overall movement of the shipment the reporting railroad participated." *See* Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf, at p. 110. Specifically, a value of 1 indicates an "originated-delivered Rule 11 shipment," 2 indicates a "received-delivered Rule 11 shipment," and 3 indicates a "received-terminated Rule 11 shipment."

2.4 Consolidating the Traffic Tape Waybill Data and the CWS Data

2.4.1 Merging the UP and NS waybill data

34. After processing the UP and NS data using the steps outlined above, the UP and NS railcar level data are combined to identify waybills that interlined between UP and NS. This merge is performed on data for 2019-2024.

35. Implementation involved a cascading series of merges where the records merged in one step are not considered for merging in subsequent steps. The NS data is merged to the UP data by the fields outlined in Table C.1. Records from each railroad that matched were combined as a single, joint record. Any NS observations that remained unmatched were then stacked on to the UP data as additional observations.

2.4.2 Merging BNSF data to the UP/NS waybill data

36. After combining the UP and NS data using the steps outlined above, the data were further merged with the BNSF data to identify waybills that interlined between BNSF and UP or NS. This merge was performed for 2019-2024.

37. Implementation was via a cascading series of merges where the records merged in one step are not considered for merging in subsequent steps. The BNSF data is merged onto the combined UP/NS data by the UP fields, if available, and the NS fields, if available. Records from BNSF that matched to the UP/NS data were consolidated into a single, joint record. Any BNSF observations that remained unmatched were then stacked on to the data as

additional observations. The variables used to merge on the combined UP/NS data at each step are identified in the table below.[55]

Table C.3: Cascading Merges – BNSF and UP/NS

Step	Equipment Number/Initial	Waybill Number	Waybill Date	Origin SPLC	Destination SPLC	STCC 4-digit	Bill of Lading
1	Y	Y	Exact	N	N	Y	N
2	Y	Y	Exact	Y	Y	N	N
3	Y	N	Exact	N	N	Y	Y
4	Y	N	Exact	N	N	N	Y
5	Y	Y	+/- 7 Days	Y	N	Y	N
6	Y	Y	+/- 7 Days	N	Y	Y	N
7	Y	Y	+/- 7 Days	N	N	Y	N
8	Y	N	+/- 7 Days	N	N	Y	Y

[55] *See* Appendix C ¶¶ 55–58 for a discussion on adjustments to SPLC.

2.4.3 Merging CN data to the UP/NS/BNSF waybill data

39. After combining the UP, NS, and BNSF data using the steps outlined above, the data were further merged with the CN data to identify waybills that are interlined between CN and UP, NS, or BNSF. This merge was performed for data for 2023 only since this is the only year with available CN data.

40. Implementation involved a cascading series of merges where the records merged in one step are not considered for merging in subsequent steps. The CN data were merged to the combined UP/NS/BNSF data by the UP fields, if available, the NS fields, if available, and the BNSF fields, if available. Any CN waybills that remained unmatched were then stacked on to the data as additional observations.[56]

41. Unlike the combined UP, NS, and BNSF data, CN's traffic data was not provided at the waybill/car level, but rather at the waybill and lead equipment unit level.

[56] *See* Appendix C ¶¶ 55–58 for a discussion on adjustments to SPLCs.

Table C.4: Cascading Merges - CN and UP/NS/BNSF[57]

Step	Lead Equipment Number/Initial	Waybill Number	Waybill Date	Origin SPLC	Destination SPLC	STCC 4-digit	Bill of Lading
1	Y	Y	Exact	N	N	Y	n/a
2	Y	Y	Exact	Y	Y	N	n/a
3	Y	Y	+/- 7 Days	Y	N	Y	n/a
4	Y	Y	+/- 7 Days	N	Y	Y	n/a
5	Y	Y	+/- 7 Days	N	N	Y	n/a

2.4.4 Merging CWS to the UP/NS/BNSF/CN waybill data

42. The combined UP/NS/BNSF/CN waybill data were further supplemented with the CWS to get waybill data for other Class I railroads such as CSX or CPKC and Class II and Class III railroads. The CWS data also allows to supplement the revenue information for waybills.

43. Implementation involved a cascading series of merges where the records merged in one step are not considered for merging in subsequent steps. The CWS data were merged with the combined UP/NS/BNSF/CN data by the UP, NS, BNSF, and CN fields, where available. Any CWS waybills that remained unmatched were then stacked on to the data as additional observations.[58]

[57] The CN data does not contain a field with the bill of lading. Therefore, bill of lading was dropped as a merge criterion.

[58] *See* Appendix C ¶¶ 55–58 for a discussion on adjustments to SPLCs.

Table C.5: Cascading Merges - CWS and UP/NS/BNSF/CN[59]

Step	Lead Equipment Number/Initial	Waybill Number	Waybill Date	Origin SPLC	Destination SPLC	STCC 4-digit	Bill of Lading
1	Y	Y	Exact	N	N	Y	n/a
2	Y	Y	Exact	Y	Y	N	n/a
3	Y	Y	+/- 7 Days	Y	N	Y	n/a
4	Y	Y	+/- 7 Days	N	Y	Y	n/a
5	Y	Y	+/- 7 Days	N	N	Y	n/a

2.5 Preparing the Combined Waybill Data for Analysis

44. For the analysis, the combined waybill data[60] was aggregated to a shipment level by summing up the revenue, car count, and net tons for each waybill number, waybill date, origin SPLC, ending SPLC, and 7-digit STCC code. For shipments for which the waybill numbers, waybill dates, or STCC codes differed across data sources, the values for the first source available were kept in the following order: UP, NS, BNSF, CN, CWS. When determining the route and origin/destination SPLCs for the shipment, priority was assigned

[59] The CWS data does not contain bill of lading. Therefore, bill of lading was dropped as a merge criterion.

[60] The UP, NS, and BNSF data were provided at the car level, which can be aggregated to a waybill level, but the CN and CWS data were provided at the waybill level.

to take the information reported by CN and CWS over the BNSF's information, when available, given that BNSF's route is incomplete, as explained above.[61]

45. Given the sampling nature of the CWS, tonnage, carloads, and revenues for shipments coming exclusively from the CWS data were expanded using the corresponding theoretical expansion factor provided in the CWS.

2.5.1 Identifying related shipments that were not classified as Rule 11 in the traffic data

46. Certain waybills matched across two or more data sources seem to represent different legs of the same shipment but were not identified as Rule 11 by any of the railroads. In these instances, assessing whether the destination SPLCs reported in one railroad's data corresponded to the origin SPLCs in another railroad's data allows a match.[62] If this was found to be the case, the origin SPLCs and ending SPLCs were adjusted to reflect the true origin and destination and updated the route to reflect the various legs.

2.5.2 Calculating railroad revenue for each waybill

47. Section 4 of the statement discusses challenges with revenues data for waybills due to the sampling process of the CWS and the limited information in Rule 11 shipments. Here, further details on the steps undertaken to calculate revenue for each shipment are provided.

---

[61] In the CWS data, the route information reported for Rule 11 records typically reflects only one leg of the shipment. Therefore, BNSF's information is prioritized over CWS's information for any Rule 11 shipment for which CWS did not sample both the first and last leg of the shipment.

[62] For connecting different legs of a shipment together, an attempt to match is made the origin/destination SPLCs using the finalized 6-digit station SPLCs for each railroad, the rate-based SPLCs to each other and the station SPLCs, and the switch SPLCs to each other and the station SPLCs. *See* Appendix C ¶¶ 55–58 for a discussion on adjustments and additions to SPLCs.

The tape data of the four Class I railroads discussed above (i.e., UP, NS, BNSF, and CN) all have columns representing the revenue attributable to their own segment (hereafter, simply "system revenue") and the total waybill revenue.[63] CWS reports the total waybill revenue.[64] Other railroads' segment revenue can be obtained from CWS (i.e., for CPKC, CSX, and other non-Class I railroads) when the waybill is reported as a single line movement, and therefore, the total waybill revenue and the railroad's system revenue are identical.

48. The total waybill revenue represents revenue generated by the entire movement for non-Rule 11 shipments. However, Rule 11 allows each participating railroad to issue its own waybill; therefore, the total waybill revenue reported in the tape data from UP, NS, BNSF, and CN represents only the revenue attributable to their respective segments. Similarly, the total waybill revenue for Rule 11 shipments provides information only on the reporting railroad's revenue, not on total revenue across the entire route from all participating railroads. When a Rule 11 shipment involves only UP, NS, BNSF, and CN, it is possible to construct the revenue for the entire movement from the data each railroad provides for its respective segments. When part of a Rule 11 shipment is handled by other railroads, e.g.,

---

[63] One caveat is that revenue fields from different data sources may include varying components, and the provided data dictionaries do not always make these components clear. For instance, <up_gross_rev_amt> is used to represent UP's system revenue, which, according to UP's data dictionary, includes total freight, fuel, and other revenue that make up total gross revenue. *See* "UPRR_Linehaul_Dtls_2023_DataDef_20250825.xlsx." However, the system revenue field available in the CN traffic tape data <system_revenue_in_rate> is broadly described as "CN's revenue in USD" in CN's data dictionary. *See* "CN Traffic Tape Fields 2023.xlsx."

[64] In the CWS, the total waybill revenue is stored in the <freight_revenue> field. CWS also includes split revenue fields—such as <origin_rr_split_revenue>, <first_interchange_rr_split_revenue>, …, <termination_rr_split_revenue>—which represent freight revenue expanded by the theoretical expansion factor and allocated based on the number of 100-mile blocks traveled by each participating railroad. These values do not reflect the actual revenue earned by each participating railroad, so I do not rely on them for revenue calculation. *See* Railinc, "2023 Surface Transportation Board Carload Waybill Sample Reference Guide," March 5, 2025, available at https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf, at pp. 51, 64-65.

CPKC, CSX, or some other non-Class I railroad, it is possible to identify total shipment revenues if the Rule 11 record for these railroads happens to be sampled in the CWS.

49. Therefore, because the total shipment revenue is either not available for Rule 11 shipments or not always populated in the data for non-Rule 11 shipments, and limited visibility into the revenue collected for all segments of a shipment, the total shipment revenue is underreported in many cases.

50. For non-Rule 11 interline shipments that appear in multiple data sources, total waybill revenue is used as reported from the first source in the following priority order: UP, NS, BNSF, CN, and CWS. For example, an interlined shipment involving UP and NS would appear in both parties' traffic tapes data, and each source would report the total revenue between UP and NS under interline pricing. When there is any inconsistency, priority is assigned to UP's total waybill revenue. When there is a discrepancy between the sum of each involved railroad's system revenue and the total shipment revenue reported in the prioritized data source, priority is assigned to the sum of system revenue.[65]

51. Then, UP and NS's revenue shares are calculated by dividing the system revenue for each carrier's respective segment (as reported in their tape data) by the total shipment revenue. However, because the total shipment revenue is often underreported for the reasons described above, UP and NS's revenue shares are likely overestimated.

---

[65] Certain additional assumptions were made to reconcile inconsistencies in the revenue fields inter- or intra-data sources. See workpapers.

2.6 Data Quality Controls and Reconciling Discrepancies in these data

52. The data provided by UP, NS, BNSF, and CN, as well as the CWS, are subject to recording errors and inconsistencies. In particular, when the same shipment appears in the traffic tapes data of multiple railroads, certain shipment attributes (e.g., routing, commodity codes, tonnage, or revenue) may differ across sources. In addition, the data dictionaries provided for the 100 percent traffic tape data from UP, NS, BNSF, and CN are limited, requiring the exercise of judgment in interpreting and processing certain fields.

53. To address these issues, extensive quality checks were performed, including comparisons of waybill identifiers, route information, revenue fields, and other shipment attributes across sources, as well as internal consistency checks within each railroad's own traffic tape data. Despite these data quality checks, it is possible that some data issues remain. If material issues are identified in the future, I reserve the right to supplement or update the analyses in my report.

54. Indicator variables, or flags, were created throughout the data construction process to identify records subject to potential limitations, such as incomplete revenue information, censored tonnage, or partial observability due to sampling or Rule 11 treatment. These flags allow the analyses to be restricted, sensitivity-tested, or interpreted appropriately depending on the requirements of each analytical exercise.

55. For instance, the origin and destination SPLCs were validated using station master data from Oliver Wyman.[66] Both station masters map SCAC and FSAC to SPLCs. A combined station master was created by merging the two sources on SCAC and FSAC and, then, verifying that the SPLCs match when a SCAC-FSAC pair appears in both. Additionally, the Railinc Station Master provides switch SPLC, rate base SPLC[67], and an indicator showing whether a station has been purged, along with the related expiration date for each SCAC–FSAC pair.

56. The UP, NS, CN, and CWS data provide the origin and termination FSAC for each waybill. From the routing information, the records identifying the first and last railroads were chosen and treated as the origin and termination railroads. Next the data were cross references with the combined station master on FSAC and origin/termination railroad. If either FSAC–origin railroad or FSAC-termination railroad is missing from the combined station master or marked as purged in the Railinc Station Master, the record is then flagged as unreliable. When SPLCs reported by the sources differ from those associated with the FSAC–railroad pair in the station masters, the reported SPLCs are replaced with those from the combined station master.

---

[66] Specifically, two sources were itegrated: Railinc Station Master and "20250902 Unified Station Access Master v1.1_StationMaster.csv." (hereafter, "Oliver Wyman Unified Station Master"). Certain SCACs that do not appear on the U.S. Department of Transportation's freight station list on the data portal were omitted. *See* U.S. Department of Transportation Freight Stations Data, available at https://data.transportation.gov/Railroads/Freight-Stations/gag3-mgv7/about_data (accessed December 14, 2025).

[67] Switch SPLC, or revenue switch SPLC, refers to an SPLC assigned to a reciprocal revenue switching area, which may include multiple stations. While most stations have their own unique revenue switch area, some, such as Wood Street Yard, fall within the Chicago reciprocal switching limits. Rate base SPLC is the SPLC that identifies the National Rate Base (NRB), a geographic grouping of all rail stations in the United States and Canada used for rating purposes. *See* Railinc, "Centralized Station Master (CSM) User Guide," January 2024, at https://public.railinc.com/sites/default/files/documents/UG_CSM.pdf, p. 14.

57. BNSF's traffic tape data does not provide origin or termination FSACs, but allow one to infer the origin and termination SPLCs using the initials of the originating/destination railroad carrier, the Official 333 spelling for the origin/destination station, and the state code associated with that station. The BNSF traffic tapes data were merged with the combined station master on SPLC and origin/termination railroad. If either SPLC–origin railroad or SPLC-termination is missing from the combined station master or is not associated with any unpurged station according to the Railinc Station Master, the record as flagged unreliable.

58. Further, switch SPLCs and rate base SPLCs associated with each FSAC/SPLC-railroad pair are retained when merging data sources with the combined station master. A shipment appearing in multiple data sources is flagged as having inconsistent origin or termination station information of those sources disagree on SPLCs and the discrepancies cannot be resolved by generalizing to switch SPLCs or rate-based SPLCs.

59. The following type of records were also flagged as unreliable:

- Records with missing, invalid, or indeterminate commodity codes.
- Records with missing or "000000" origin or destination SPLCs, or identical origin and destination SPLCs.
- Records with materially inconsistent route information across railroads' tape data and the CWS.

2.7 Implications of CWS sampling for disaggregated market analysis

60. As discussed in the statement, there is a limitation in the the combined waybill data to support reliable statistical conclusions. This is due to the nature of the CWS being a

stratified sample with each reporting railroad contributing less than 10 percent of its waybills, and some sampling rates as low as one out of 40 waybills (i.e., for single-car shipments). Although the STB provides expansion factors intended to create a dataset with representative shipment volumes, the CWS remains a sample and therefore limits the number of observed waybills available for analysis within narrowly defined markets.

61. This sampling structure has important implications when traffic is disaggregated to analyze STCC4 commodities. Partitioning traffic simultaneously by origin BEA, destination BEA, and 4-digit commodity substantially reduces the expected number of sampled observations within many corridor-commodity pairs. As a result, even where underlying freight activity exists, a given corridor-commodity market may be represented by only a small number of sampled waybills—or none at all—in a particular year. Expansion factors do not mitigate this limitation because they do not increase the underlying number of observations used to measure competitive outcomes or railroad shares.

62. For this reason, analyses that rely on very small numbers of sampled waybills at the corridor-commodity level may yield misleading measures of competition, particularly where market shares can be mechanically driven by only a few observed shipments. This concern has been recognized in prior railroad transactions, and prior analyses thereof (e.g., Vellturo 2001 VS, Vellturo 2007 VS, Majure VS) have imposed minimum traffic thresholds to ensure that competitive screens are applied only to markets with sufficient underlying

activity to support reliable inference.[68] Consistent with this limits of at least 365 carload shipments per year (corresponding to an average of one carload per day) and at least 10 observed waybills per year are used. These thresholds are intended to account for the sampling limitations of the CWS and ensure that market-level measures are not driven by lower observation count.

63. Accordingly, even when using 4-digit commodity definitions, there remain many instances in which corridor-commodity flows are too limited (either in underlying volume or sampled observations) to support reliable statistical conclusions about competition. Results for markets falling below these thresholds should therefore be interpreted with caution and are excluded from formal competitive screening in my analysis.

64. Moreover, because CWS provides information on UP's and NS's competitors (i.e., CPKC, CSX, and other Class II and III railroads; recall I have 100 percent traffic tape data for UP and NS, as well as BNSF and CN), it is more likely that the analysis of these data would lead to overstating, rather than understating, UP's and NS's involvement in a market.

---

[68] *See* Majure VS at ¶ 90. "[Measurement] of shares as a reliable description of choices, has been recognized in the Board's recent decision to adjust the Waybill sampling methodology to better capture smaller shipments. With the thin observation of these shipments that was still used in the 2019 Waybill Sample, the initial screen can be triggered by shares based on as few as 2 observed shipments which mathematically has to give one carrier at least 50 percent even if that is not an accurate representation of competition. This issue was indirectly addressed in past implementations of this test by imposing a minimum of one carload per day on candidate BEA area-commodity pairs. I will use an equivalent threshold for reliability of the screen." *See also*, Vellturo 2001 VS at pp. 11-12. "For example, there are only 21 product/DBEA pairs where the combined volumes of the two railroads amount to more than a carload a day… I understand that the Board has stated that it must approve a transaction of this type 'unless there will be adverse competitive impacts that are both 'likely' and 'substantial.' The small CN/WC volumes within the 50/10 product/DBEA pairs indicate that this Transaction will not entail any such anticompetitive effects." *See also*, Vellturo 2007 VS at p. 88.

3 2023 Transearch Data

65. S&P Global Market Intelligence – Transearch Insights freight flows data provides information on non-rail movements. These data contain information on annual freight movement. Each record reports freight flows by origin and destination BEA, 4-digit STCC, transportation mode (e.g., air, pipeline, rail, truck, water, or other), and trade type (e.g., domestic, import, NAFTA).

66. For the analysis in this statement, a 2023 Transearch extract was provided by Oliver Wyman that reports corridor-level freight flows of STCC4-level commodities from origin to destination BEA pairs. Oliver Wyman supplemented Transearch records with estimated revenues for non-rail modes.

67. The Transearch data was merged onto the combined waybill dataset after aggregating the combined waybill data at a consistent unit of observation (i.e., STCC4 and origin and destination BEAs). Specifically, each waybill shipment was assigned an origin BEA and destination BEA using the SPLC-to-BEA crosswalk described above, and aggregate shipment volumes by 4-digit STCC codes. The Transearch corridor data is subsequently merged to the waybill data using these common fields. This merge augments the waybill data with measure of non-rail freight activity in the commodity and origin and destination BEA pairs to my analysis.

4 Geographic Data

68. For the maps presented in Section 2 of the report (Exhibits 1, 2, 4, 5, and 7 to 10), rely on two primary sources of data.

69. For the maps illustrating railroad networks (Exhibits 1, 2, 4, and 7 to 10), data from the STB Railroad Map Depot is used. These datasets provide the information necessary to map each route for Class I railroads, identify the railroad that owns the tracks along the route, and indicate whether other railroads have trackage rights. To improve readability, label for both the states and several major cities across the United States are added.

70. For the map illustrating the BEAs served by UP and NS (Exhibit 5), data from the Railinc Station Master was used. To map each SPLC's associated county to BEA, the BEA-county mapping from the Oliver Wyman FSAC-SPLC-FIPS-BEA Mapping Table is used.[69]

71. Inactive stations were removed by retaining only observations where the purge indicator (<purg_ind>) value is "N."

72. Finally, a review of instances where the data suggests UP or NS have SPLCs beyond the states in which they are known to operate is performed. These appear to be recording errors and are therefore excluded from the analysis.

[69] To improve the results of this mapping, some SPLC county names were standardized before merging: For SPLCs whose associated county does not merge with the Oliver Wyman FSAC-SPLC-FIPS-BEA Mapping Table, instead the BEA is identified by merging the SCAC-SPLC pair from the Railinc Station Master to the Oliver Wyman FSAC-SPLC-FIPS-BEA Mapping Table.

APPENDIX D
MAJOR ORIGINS AND TERMINATIONS

1. To address 49 CFR § 1180.7(b)(2) of the STB regulations, this appendix reports, by railroad, and for each major origin or destination point on the parties' combined system, actual and projected shares based on traffic (measured in carloads) originated or terminated at each such point. It also identifies each such point where the number of serving Class I railroads would drop from two to one or from three to two as a result of the proposed transaction.

2. Carloads originated or terminated are reported for each major origin and destination point for the year 2023 using combined waybill data from 2023. Major origin points are identified by calculating the combined origination volume for UP and NS in carloads, across all commodity groups, shipped for each origin and summing them from highest to lowest volume until 80 percent of UP and NS origination volume is captured.[1] An analogous approach is used to identify the major destination points using combined UP and NS termination volume.

3. This appendix relies on the combined waybill data.[2] Origin and destination points are defined by BEA and all commodities are combined into one for these calculations.[3] As described in Appendix C, the combined 2023 waybill data includes complete traffic for UP, NS, BNSF, and CN but for CPKC and CSX and other railroads the only information

---

[1] The STB's regulations do not define "major point." I therefore define "major" in response to STB regulations and this definition only affects which information is presented in Appendix Tables D-F. This definition is not used in my competitive assessment of the merger.

[2] See Section 4.2 of my statement for a description of how the combined waybill data was created.

[3] See Section 2.3 of my statement for more information on BEAs.

on traffic comes from CWS. As described in Appendix C, while the use of expanded carloads for CPKC and CSX mitigates lack of complete records, their traffic volumes are less accurate. Furthermore, when records for certain origins or destinations are not sampled, expanded carloads would not exist, and CPKC and CSX traffic would be lower than actual for such origins or destinations and shares for UP, NS, BNSF and CN would be higher than actual. The shares reported should be interpreted with this limitation in mind.

1 Share of all traffic across all commodities that is originated by each railroad and the projected share of the combined railroad

4. Table D1 shows, for each major origin BEA, the total originated traffic volume in carloads across all commodities and the share of originated traffic by railroad (separately for each Class I railroad and all other railroads grouped together).[4] The table also shows the projected share of the combined railroad, which is estimated as the combined share of UP and NS before the proposed merger.

2 Share of all traffic across all commodities that is terminated by each railroad and the projected share of the combined railroad

5. Table D2 shows, for each major destination BEA, the total terminated traffic volume in carloads across all commodities and the share of terminated traffic by railroad (separately for each Class I railroad and all other railroads grouped together). The table also shows the

[4] All other railroads include all non-Class I railroads.

projected share of the combined railroad, which is estimated as the combined share of UP and NS before the proposed merger.

3 Origins and Destinations where the number of Class I railroads serving the origin or destination changes from 2-to-1 or 3-to-2 as a result of the proposed merger

6. There are no major points where the number of Class I railroads serving the point changes from 2-to-1 or 3-to-2 as a result of the proposed merger.

APPENDIX E
WITHIN CORRIDOR

1. To address 49 CFR § 1180.7(b)(3) of the STB regulations, this appendix reports actual and projected shares of revenues and traffic volumes (measured in tons) for major interregional or corridor flows by major commodity group. The data is broken down by mode and, for the railroad portion, by single line and interline routings showing gateways used.

2. Tons and revenues are reported by major corridor-commodity combination using combined waybill data from 2023. Major corridor-commodity combinations are identified by calculating the combined total volume for UP and NS in tons shipped for each corridor-commodity combination and summing them from highest to lowest volume until 80 percent of combined UP and NS volume is captured.[1] Revenue shares are then reported for these same major corridor-commodity combinations.

3. This appendix relies on the combined waybill data for 2023.[2] Corridors are identified by the origin BEA and destination BEA and commodities are identified by the 4-digit STCC.[3] As described in Appendix C, combined waybill data includes complete traffic for UP, NS, BNSF, and CN but for CPKC and CSX and other railroads the only information on traffic comes from CWS. As described in Appendix C, while the use of expanded carloads for CPKC and CSX mitigates lack of complete records, their traffic volumes are less accurate. Furthermore, when records for certain origins or destinations or commodities are not

---

[1] The STB's regulations do not define "major commodity group" or "major interregional or corridor flows." I therefore define "major" in response to STB regulations and this definition only affects which information is presented in Appendix Tables D-F. This definition is not used in my competitive assessment of the merger.

[2] See Section 4.2 of my statement for a description of how the combined waybill data was created.

[3] See Section 2.3 of my statement for more information on BEAs and Section 4.2 for information on 4-digit STCCs.

sampled, expanded carloads would not exist, and CPKC and CSX traffic would be lower than actual for such origins or destinations or commodities and shares for UP, NS, BNSF and CN would be higher than actual. The shares reported should be interpreted with this limitation in mind.

4. Similarly, as described in Appendix C, in the traffic tapes revenues are not readily observed for non-reporting railroads participating in interline routes, unless Rule 11 pricing is used and the participating railroad's segment is sampled in the CWS. In addition, for some interline routes total revenue is missing. Thus, both total revenues and revenues for railroads other than UP, NS, BNSF, or CN are likely understated. Revenue calculations should be interpreted with these limitations in mind.

1 Actual share of all traffic volume by mode for major corridor-commodity combinations

5. Table E1 shows, for each major corridor-commodity combination, the total traffic volume in tons and the share of traffic volume by mode, specifically for rail, truck, water, pipeline, air, and other. Non-rail traffic volumes come from Transearch data described in the Appendix C.

2 Actual and projected shares of rail traffic volume by route for major corridor-commodity combinations

6. Table E2 shows, for each major corridor-commodity combination included in E1, rail traffic volume by single line and interline routings, where for interline routings, I also include gateways. Traffic volumes are reported in tons and shares, and for share calculations, I include non-rail total traffic and shares as well. Projected shares reflect that interlined NS-UP or UP-NS routings will become single line in the combined railroad.

3 Actual shares of all revenues by mode for major corridor-commodity combinations

7. Table E3 shows, for each major corridor-commodity combination included in Table E1, the total revenues and the share of revenues by mode, specifically for rail, truck, water, pipeline, air, and other. Non-rail traffic volumes come from Transearch data and revenues were augmented as described in the Appendix C.

4 Actual and projected shares of revenues for rail by route for major corridor-commodity combinations

8. Table E4 shows, for each major corridor-commodity combination included in E1, rail revenues by single line and interline routings, where for interline routings, gateways are included. Revenues are reported in current (2023) dollars, and for share calculations, non-rail revenues are included in share calculations. Projected shares reflect that interlined NS-UP or UP-NS routings will become single line in the combined railroad.

APPENDIX F
BETWEEN CORRIDORS

1. To address 49 CFR § 1180.7(b)(4) of the STB regulations, this appendix reports, by railroad, actual and projected shares based on originating and terminating traffic (measured in carloads) and revenue for major origins and destinations by major commodity group.

2. Carloads and revenues for origins and destinations by major commodity group[1] are reported by commodity-origin and commodity-destination combinations for the year 2023. Major commodity-origin combinations are identified by calculating the combined origination volume for UP and NS in carloads shipped for each commodity-origin combination and summing them from highest to lowest volume until 80 percent of combined UP and NS origination volume is captured.[2] An analogous approach is used to identify major commodity-destination combinations using combined UP and NS termination volume. Revenues are then reported for these same commodity-origin and commodity-destination combinations.

3. This appendix relies on the combined waybill data.[3] Origins and destinations are defined by BEA and commodities are identified by the 4-digit STCC.[4] As described in Appendix

---

[1] Major commodity groups are identified separately for UP and NS based on their combined volume for each 4-digit STCC commodity, calculated separately for originated and terminated volume. From a ranked list of total originated or terminated volume by 4-digit STCC categories those that account for 80 percent of combined volume are treated as major. In constructing this ranked list, the 4-digit STCC codes that do not represent a distinct commodity such as 4611 Freight of all kinds or 0119 Miscellaneous field crops are not counted towards the 80 percent calculations but are included in the reported list of major commodities. This results in a list that accounts for more than 80 percent by origination or termination volume to ensure that distinct individual 4-digit commodities are represented.

[2] I define "major" in response to STB regulations and this definition only affects which information is presented in Appendix Tables D-F. This definition is not used in my competitive assessment of the merger.

[3] See Section 4.2 of my statement for a description of how the combined waybill data was created.

[4] See Section 2.3 of my statement for more information on BEAs and Section 4.2 for information on 4-digit STCCs.

C, while the use of expanded carloads for CPKC and CSX mitigates lack of complete records, their traffic volumes are less accurate. Furthermore, when records for certain origins or destinations or commodities are not sampled, expanded carloads would not exist, and CPKC and CSX traffic would be lower than actual for such origins or destinations or commodities and shares for UP, NS, BNSF and CN would be higher than actual. The shares reported should be interpreted with this limitation in mind.

4. Similarly, as described in Appendix C, in the traffic tapes revenues are not readily observed for non-reporting railroads participating in interline routes, unless Rule 11 pricing is used and the participating railroad's segment is sampled in the CWS. In addition, for some interline routes total revenue is missing at times. Thus, both total revenues and revenues for railroads other than UP, NS, BNSF, or CN are likely understated. Revenue calculations should be interpreted with these limitations in mind.

1 Major commodities' traffic volume by origin that is originated or terminated by each of the railroads and the projected share of the combined railroad

5. Table F1 shows, for each major commodity group and origin BEA, the originating and terminating traffic volume in carloads by destination BEA and railroad (separately by each Class I railroad and all other railroads grouped together).[5] The projected volume of the combined railroad is also shown, which is estimated as the combined volume of UP and NS before the proposed merger.

[5] All other railroads include railroads other than Class I.

2 Major commodities' traffic volume by destination that is originated or terminated by each of the railroads and the projected share of the combined railroad

6. Table F2 shows, for each major commodity group and destination BEA, the originating and terminating traffic volume in carloads by origin BEA and railroad (separately by each Class I railroad and all other railroads grouped together). The projected volume of the combined railroad is also shown, which is estimated as the combined volume of UP and NS before the proposed merger.

3 Major commodities' revenue by origin that is originated or terminated by each of the railroads and the projected share of the combined railroad

7. Table F3 shows, for each major commodity group and origin BEA shown in Table F1, the originating and terminating revenue by destination BEA and railroad (separately for UP, NS, and all other railroads grouped together). The projected revenue of the combined railroad is also shown, which is estimated as the combined revenue of UP and NS before the proposed merger.

4 Major commodities' revenue by destination that is originated and terminated by each of the railroads and the projected share of the combined railroad

8. Table F4 shows, for each major commodity group and destination BEA shown in Table F3, the originating and terminating revenue by origin BEA and railroad (separately for UP, NS, and all other railroads grouped together). The projected revenue of the combined railroad is also shown, which is estimated as the combined revenue of UP and NS before the proposed merger.

BEFORE THE

SURFACE TRANSPORTATION BOARD

STB Docket No. FD 36873

UNION PACIFIC CORPORATION, ET AL. – CONTROL – NORFOLK SOUTHERN CORPORATION, ET AL.

VERIFIED STATEMENT OF MARK A. ISRAEL

I. INTRODUCTION

A. QUALIFICATIONS

1. My name is Mark Israel. I am a Founding Partner at Econic Partners, an economic consulting firm I joined in April 2025. Prior to joining Econic Partners, I was the President of Compass Lexecon, also an economic consulting firm, where I had worked since 2006. From 2000 to 2008, I served on the faculty at the Kellogg School of Management, Northwestern University. I received my Ph.D. in economics from Stanford University in 2001.

2. I specialize in the economics of industrial organization—the study of competition in imperfectly competitive markets, including the study of antitrust and regulatory issues—and applied econometrics. At Kellogg and Stanford, I taught graduate-level courses covering topics including business strategy, industrial organization/competition economics, and econometrics. My research on these topics has been published in leading peer-reviewed economics journals including the American Economic Review, the Rand Journal of Economics, the Journal of Industrial Economics, the Journal of Law and Economics, and the Journal of Competition Law and Economics, among others.

3. My work focuses on the application of economic theory and econometric methods to competitive analysis of the impact of mergers, antitrust issues including a wide variety of single-firm and multi-firm conduct, class certification, and damages estimation. I have analyzed these competition issues on behalf of a wide range of clients, including private companies and government entities. I have specific expertise in the analysis of vertical mergers and vertical foreclosures cases but have also done extensive work analyzing horizontal mergers. I have submitted expert reports, declarations, and affidavits to government agencies and federal and state courts. I have testified in federal court, multiple state courts, and in many regulatory and arbitration proceedings in the U.S. and other countries. I have presented competitive analyses to the U.S. Department of Justice and the Federal Trade Commission on dozens of occasions. My work has included analysis of competition in many transportation-related cases, including previous submissions to the Surface Transportation Board ("STB" or "the Board"), as well as

cases involving airlines, barges, food distribution, and many others. My complete CV is attached to this statement as Attachment 1.

B. ASSIGNMENT

4. I have been asked to provide an economic analysis of the proposed merger of the Union Pacific Railroad ("UP") and Norfolk Southern Railway Company ("NS"). Specifically, I have been asked to focus my analysis on the vertical effects of the proposed merger, in order to determine whether the combined vertical effects enhance competition and serve the public interest. I have also been asked to assess the additional effects of the Committed Gateway Pricing, including whether it further enhances competition and serves the public interest.

C. BACKGROUND

1. Union Pacific

5. The Union Pacific Railroad is a Class I freight railroad operating in 23 states in the western two-thirds of the United States, meaning it has very little overlap with Norfolk Southern, which operates primarily in the eastern United States.[1] The UP network includes 32,880 route miles, (26,291 miles owned by UP, the rest accessed by UP via trackage rights or other agreements).[2] UP provides service to Pacific and Gulf Coast ports, major US gateways along the Mississippi River, and gateways on the Mexican and Canadian borders.[3] UP also maintains coordinated schedules with other carriers in order to move shipments to and from the eastern U.S.[4]

---

1 Union Pacific Corporation, Form 10-K for Fiscal Year Ended December 31, 2024, filed February 7, 2025, p. 5 (hereinafter "UP 2024 10-K") available at https://investor.unionpacific.com/static-files/8cb99809-9965-4d4d-bd6e-612f0d6149f8.

2 UP 2024 10-K, p. 18.

3 UP 2024 10-K, p. 6.

4 UP 2024 10-K, p. 6.

6. UP categorizes its traffic into three large commodity groups: bulk, industrial, and premium.[5] In 2024, shipments of bulk commodities (grain, fertilizer, food, refrigerated products, and coal and renewables) comprised 32% of UP's freight revenue.[6] Industrial shipments (construction, industrial chemicals, plastics, etc.) accounted for 37% of freight revenues, and premium shipments (intermodal and automobiles) accounted for the remaining 31% of freight revenues.[7]

2. Norfolk Southern

7. The Norfolk Southern Railway Corporation is a Class I freight railroad operating primarily in the eastern United States, meaning that it has very little overlap with UP, which operates primarily in the western United States. NS operates on 35,000 miles of rail track[8] (28,300 miles operated or maintained by NS[9], the rest accessed via trackage rights or other agreements) in 22 states and the District of Columbia.[10] The corridors on the NS network with the heaviest freight volume in 2024 include: New York City to Chicago, Chicago to Macon, Central Ohio to Norfolk, Cleveland to Kansas City, Birmingham to Meridian, and Memphis to Chattanooga.[11] NS also serves 43 ports, including all major container ports between New York and Florida; nine lake ports on the eastern Great Lakes including Detroit and Chicago; and ten river ports connecting the eastern and western US.[12]

---

5 UP 2024 10-K, p. 6.

6 UP 2024 10-K, p. 6.

7 UP 2024 10-K, p. 6.

8 Norfolk Southern Corporation, Form 10-K for Fiscal Year ended December 31, 2024, filed February 10, 2025, p. K8 (hereinafter "NS 2024 10-K") available at https://app.quotemedia.com/data/downloadFiling?webmasterId=101533&ref=318901838&type=PDF&symbol=NSC&cdn=bacf9f720528f8a750cab76320e29c2d&companyName=Norfolk+Southern+Corporation&formType=10-K&dateFiled=2025-02-10.

9 NS 2024 10-K, pp. K4, K8.

10 NS 2024 10-K, p. K4.

11 NS 2024 10-K, p. K4.

12 "Ports and International" available at: https://www.norfolksouthern.com/en/ship-by-rail/our-rail-network/ports-international.

8. NS categorizes their freight shipments into three categories: merchandise, intermodal, and coal.[13] In 2024, merchandise traffic accounted for 62% of NS's railway operating revenues[14] and intermodal and coal shipments accounted for 25% and 13% of railway operating revenue, respectively[15]

3. The Proposed Transaction

9. UP seeks to acquire NS, creating a transcontinental railroad operating over 50,000 route-miles in 43 states, serving nearly 100 ports. The proposed merger is an end-to-end, vertical combination of rail networks, which have little overlap today, but rather which meet at the major gateways along the Mississippi River—Chicago, St. Louis, Memphis, and New Orleans—each of which is served by multiple railroads. Today the separate networks of UP and NS can be used to move traffic across the United States, but only with an interchange in the middle. Post-merger, a single rail network will be able to move that same traffic with no interchange required, an inherently cost-reducing, quality-enhancing change.

10. In economic terms, this would be a merger of complementary products that will generate significant efficiencies. The transaction would introduce single-line rail service between points in the eastern and western US that can be served only by interline rail service today. It would enable shippers to ship goods across the country without the need to stop and make an interchange in the middle with all the associated complications, delays, and costs that such interline service entails.[16] Put simply, it would create a more efficient rail system.

11. Nobel Prize-winning economics developed by Bengt Holmström and others explains why vertical integration is the only way to achieve the "faster, more efficient, more reliable

---

13 NS 2024 10-K, pp. K5-6.

14 NS 2024 10-K, pp. K5-6.

15 NS 2024 10-K, p. K6.

16 Union Pacific, "Union Pacific and Norfolk Southern to Create America's First Transcontinental Railroad," July 29, 2025, available at https://www.up.com/press-releases/growth/norfolk-southern-transcontinental-nr-250729.

and more accessible way[s] to ship goods" that the merged UP and NS have committed to and will have the incentive to provide.[17] As I discuss in detail below, it would be impossible for other alternatives short of a full merger between the parties (e.g., contracts or trackage agreements) to come close to addressing every possible situation that arises in the daily operations of two independent railroads, and thus, those alternatives could not deliver the benefits that this merger will create. These benefits include: more effective competition and service from increased single-line options—an improvement that will allow rail to compete more effectively with trucks and to serve historically underserved areas; improved quality, faster transit times and increased reliability; and increased investment in the rail network, including planned investment of a billion dollars to accommodate merger-related growth on main lines and in yards and terminals.[18] All of these benefits—the inherent quality improvements from single-line service, the cost reductions from eliminating interchanges, and the incentives to invest more because the combined railroad internalizes the combined benefits on the full network—are inherent to the transaction and cannot be obtained without it. Blocking the transaction would deny shippers and downstream consumers these benefits and thus be anti-competitive and welfare destroying, particularly since any potential vertical competitive concerns—to the extent any are valid—can be dealt with via conditions, as discussed below.

12. To ensure further that the proposed merger enhances competition—including on routes that are not directly affected by the merger in the sense that they do not combine UP service on one end and NS service on the other—UP and NS have offered an additional commitment—their Committed Gateway Pricing ("CGP") proposal. CGP would allow BNSF and CSX to quote through rates to customers on routes that are sole served on each

---

17 Union Pacific and Norfolk Southern, "Facts About the Union Pacific and Norfolk Southern Combination," available at https://assets.up-nstranscontinental.com/One%20Pagers/20251107-up-ns-myths-facts-onepager.pdf, accessed November 24, 2025.

18 Union Pacific and Norfolk Southern, "America's First Transcontinental Railroad," July 29, 2025, pp. 5, 7, available at https://assets.up-nstranscontinental.com/One%20Pagers/Investor%20Presentation%20-%20America%27s%20First%20Transcontinental%20Railroad.pdf. See also, Joint Verified Statement of Eric Gehringer and John F. Orr (hereinafter "Gehringer-Orr V.S."), ¶ 271.

end based on CGP and without any concurrence process. Thus, the CGP proposal extends the merger's benefits to certain routes and shippers that would otherwise not benefit as directly from the transaction.

II. SUMMARY OF CONCLUSIONS

13. My primary opinion is that the combined vertical effects of the proposed merger of UP and NS are procompetitive, meaning that they will enhance competition in the rail industry, create downward pressure on price relative to the state of the world that would exist absent the merger, and benefit shippers in the form of greater investment, higher quality service, and a more efficient rail network.

14. More specifically, I find:

- The proposed UP/NS merger is an overwhelmingly complementary "end-to-end" merger. As such, fundamental economics teaches that it will generate significant merger-related benefits. Put simply, whereas mergers of substitute products may, in some cases, create competitive concerns including upward price pressure (among others), mergers of complementary products have the *exact opposite effect* (as a matter of the same profit maximization math). Indeed, for reasons developed throughout this report, a merger is *required* to unlock these benefits.
- The main theories of vertical foreclosure that have been developed in the economic literature are ill-matched to this transaction and the railroad industry. This follows for several reasons.
    - First, as is well recognized, a very large percentage of rail rates are set pursuant to negotiations between shippers and railroads, which generally result in contractual terms that are more complex than simply a price per ton or carload at which shippers can ship as much as they want (a so-called "linear price"). Rather, they generally result in "non-linear" contracts that specify an amount that will be charged for a given amount shipped. In such situations, the usual theories of foreclosure simply do not

apply, and instead, fundamental economics teaches that the merger will benefit shippers (or cause them no harm).

- Second, even in those situations where there is not such negotiation between shippers and railroads—i.e., where shippers use other pricing mechanisms—the usual theories of foreclosure remain ill-suited to this industry. In particular, if those shipments are made via Rule 11 pricing—so that separate prices are obtained from each railroad involved in carrying the shipment from its origin to its ultimate destination—standard vertical foreclosure theories do not apply, but rather the transaction gives rise to inherent benefits ("Cournot Complement effects"). And the sparse economic literature on cases where there may nevertheless be harm in such circumstances does not fit the facts of to this case. And for those shipments made via through rates, I explain below how straightforward empirical tests reject the applicability of standard theories of vertical foreclosure.

- Foreclosure theories that have recently been developed based on the highly counterintuitive claim that a merger that provides the merged railroad more information about its combined costs will generate harms are, unsurprisingly, based on unreasonably restrictive assumptions, with the findings reversed once those restrictions are relaxed.

- This is not to say that no economist opposing this transaction will be able to come up with a theory under which foreclosure is possible. The nature of the economic literature on vertical contracting and mergers is that nearly anything is at least theoretically possible. But basing policy and enforcement decisions on what might be possible *in theory* is a recipe for welfare-harming decisions. It is enough to observe that any such foreclosure theory would at most apply to transactions in which shippers do not negotiate non-linear contracts. And even then, for shipments made under Rule 11, I know of no paper in the current economic literature that would support a theory of harm applicable to such activity. And for through rates, any such theory would be an "edge case," which rests on restrictions on firms' behavior that are unlikely (or rare, at best), as well as other tenuous assumptions. Such a theory should not serve as the basis to block such a beneficial transaction. Rather, the remote possibility of such cases is what the Applicants' Open Gateway Commitments are designed to address.

- With no realistic prospect for material harm to competition from vertical foreclosure and significant demonstrable benefits, the proposed merger unambiguously raises consumer and shipper welfare and enhances competition.
- For multiple reasons, a vertical merger of the Applicants' complementary rail networks is the only means of achieving the significant benefits that this merger will unlock. First, the efficient management of complementary rail networks requires coordinated actions by the railroads that own the networks. Such coordination—such as the ability to eliminate interchanges and provide single-line, cross-country service—requires a single railroad. Second, independent railroads make suboptimal decisions because each railroad considers only its own profit when making decisions and does not appropriately consider the effect of its decisions on the complementary network. So, for example, Union Pacific ignores the benefits that an improved rail network in the West will have on Norfolk Southern in the East. Thus, each separate railroad finds too few such investments profitable from the point of view of the combined railroad or society as a whole. As demonstrated by Nobel Prize-winning economics, in industries with characteristics like those of the railroad industry, there is no way to solve this problem other than a merger; separate railroads will always make suboptimal investment decisions. This follows because:
    - Contracts cannot address the coordination problems created by poor incentives because many of one railroad's actions and activities are

unobservable and/or not verifiable by the other railroad. Unobservable actions imply that contracts cannot prescribe all the actions required for optimal coordination of complementary networks. A contract would have to specify all actions to take in any possible future state of the world, an obviously impossible task.

  - In contrast, the merger of the two complementary networks integrates the complementary networks into a single railroad, creating optimal incentives, eliminating the need to coordinate via contracts, and unleashing significant benefits.

- The Committed Gateway Pricing proposal further enhances competition by providing improved pricing options for certain routes that would not directly participate in the vertical benefits of the merger. And while there is no evidence the proposed merger will lessen competition from other sources or regions, the Committed Gateway Pricing will also expand existing product and geographic competitive options to new routes. I demonstrate via economic modeling that the Committed Gateway Pricing proposal should be expected to generate additional substantial benefits.

III. ECONOMIC THEORIES OF FORECLOSURE PROVIDE NO VALID BASIS TO OPPOSE THE TRANSACTION

15. The proposed UP/NS merger is a merger of complementary rail networks that primarily serve different regions of the United States.[19] Combining UP's and NS's networks into a single coast-to-coast rail network will allow the merged railroad to maximize profits across the integrated network, thus creating downward pressure on prices relative to the situation without the merger; enabling the combined carrier effectively to coordinate operations and thus lowering costs and improving quality through single-line service; and enhancing the incentive to invest in the consolidated network. As one particularly

---

[19] See Verified Statement of Dr. Elizabeth Bailey.

tangible example (but just one of many benefits), integration would allow the merged carrier to bypass congested gateways and thus offer faster, more reliable, lower-cost, single-line service to shippers.

16. In some prior vertical mergers, the STB has indicated a concern that the conditions for vertical foreclosure may be present and questioned whether the merging railroad could foreclose competition post-merger.[20] In particular, the STB has expressed concern regarding foreclosure on routes with one sole-served segment and one competitive segment served by two or more carriers.

17. In this section, I perform a detailed economic analysis of the characteristics of the railroad industry to assess whether any such foreclosure concerns are valid. As outlined in the summary of conclusions above, I find that the economic theories of foreclosure that have been developed in the literature are ill-matched for the railroad industry. In particular

- In a large percentage of cases, shippers are not "price takers," but rather negotiate contracts, generally featuring non-linear pricing (rather than a constant "linear" price at which shippers move each ton or carload of traffic). Standard economic theories of foreclosure do not apply to such cases; rather in these situations the merger will either benefit shippers or leave them unharmed. In particular, economics teaches that shippers and railroads will negotiate efficient contracts pre- and post-merger in such cases, and that those contracts will be as good or better for the shipper post-merger. As I show in Figure 1 below, this case likely covers the clear majority of rail shipments.

- Where there is not negotiation over non-linear contracts, but rather shippers buy according to pricing terms set under Rule 11, the merger generates

---

20 See, for example, *Canadian Pacific Railway Limited et al., - Control – Kansas City Southern, et al.*, Surface Transportation Board Docket No. FD 36500, Decision No. 35, March 14, 2023 (hereinafter "CPKCS Decision") p. 4 ("Even end-to-end mergers, however, can pose competitive risks, and indeed this decision overturns prior agency precedent that did not sufficiently recognize such concerns.").

benefits by combining complementary products ("Cournot complement effects"), and the theories of countervailing harm from the economic literature do not apply.

- Where there is not negotiation over non-linear contracts, but rather shippers buy according to pricing terms set via through rates, one cannot rule out some of the standard theories of foreclosure based on theory alone (as one can do in the above cases). However, in this case, empirical tests reject the standard theories of foreclosure described in the economics literature. In particular, standard theories of foreclosure—at least those that do not depend on unreasonable restrictions on railroad behavior and other assumptions at odds with the reality of the industry—rely on pre-merger rates being below the level that the vertically merged carrier would charge. Said differently, they rely on there being something preventing the vertically dis-integrated railroad from raising prices pre-merger, even though it provides sole-service on one end. In such cases, the merger could create an incentive to foreclose to eliminate that barrier—whatever it may be —to raising prices. In the economic theories where this below-integrated-level pricing occurs, it occurs when shippers receive their through rate from a railroad that faces competition for its part of the service, rather than receiving their through rate from the sole-serving participating railroad. Hence, if those theories hold, one should see shippers strongly preferring to get through rate pricing from railroads on the competitive end, rather than from the sole-served end, and in those cases where they get pricing from the competitive end, prices should be lower than those obtained from the sole-served end. Using data on actual pricing and shipments in the railroad industry, I show that *neither of those conditions hold*, and thus show that the empirical evidence rejects these theories.

18. Some recent theories of foreclosure have taken a different tack, arguing that the harm from vertical mergers can arise because the merging firm obtains better information about the combined firm's costs—specifically, better information about the costs of the railroad that competed along its part of the route prior to the merger—than it had pre-merger.

This result is counterintuitive however, given that better information about costs would generally be expected to increase efficiency of operations. Indeed, even the paper finding harm to *consumer welfare* from increased information finds that total welfare and output go up with the merger, meaning the industry is operating more efficiently. And I show below that, not surprisingly, the negative result on consumer welfare rests on highly restrictive assumptions, and that once those restrictions are relaxed to more closely reflect actual market conditions, consumer welfare also goes up with improved information.

19. As noted above, an economist opposing this transaction may nevertheless be able to come up with a theory under which foreclosure is possible. In the economic literature on vertical contracting, nearly anything is theoretically possible given enough restrictions on the form of contracting and firm behavior. However, any such theory of foreclosure would at most apply to a very limited set of cases (where shippers do not negotiate non-linear pricing terms with railroads, where they do not obtain pricing directly from the sole-served railroad in the pre-merger case, and—at least according to any economic papers I am aware of—where they do not use Rule 11 pricing) and would depend on restrictions on firm behavior and other assumptions that do not fit the facts of the railroad industry. I deal with many such "edge cases" in Appendix A, explaining why they are ill-suited for the railroad industry and should not raise concerns. More generally, such edge cases based on economic models that do not fit the railroad industry certainly should not serve as the basis to block such a beneficial transaction. Rather, the remote possibility of such cases is what the Applicants' Open Gateway Commitments are designed to prevent.

A. SHIPPERS WHO NEGOTIATE NON-LINEAR TERMS WITH RAILROADS ARE NOT HARMED BY THE MERGER

20. A large fraction of interline rail shipments are governed by sophisticated contracts, which shippers have *negotiated* with the railroads, and which often include terms conditioned on price, volume, and perhaps other factors. Such negotiations can occur in cases where interline prices are obtained via Rule 11 or where prices are obtained via through rates. I will use the term "negotiated non-linear contracts" with shippers to refer to such

situations.[21, 22] As I show below, the merger raises *no competitive risks for such shipments*, but instead, if anything creates benefits—in the form of downward pricing pressure relative to the situation with no merger—for such shipments.

1. Negotiated Non-linear Contracts make up a large percentage of interline rail shipments.

21. A significant fraction of rail shipments moves pursuant to negotiated non-linear contracts. Figure 1 summarizes the various pricing arrangements used by UP, NS and their customers for their interline traffic. The vast majority of the parties' interline traffic in 2024, approximately {{ }} percent for UP and {{ }} percent for NS, involves either long-term contracts, private quotes, or other non-tariff arrangements. Under these pricing mechanisms, railroads and shippers engage in negotiations, and all three pricing arrangements are likely to reflect at least some form of non-linear terms. The only set of traffic that is unlikely to entail any private negotiations or non-linear terms consists of shipments moving under tariff rates—which accounts for only {{ }} percent of interline traffic for UP and NS combined.[23]

---

21 Pricing is non-linear when the price terms are conditioned on volume in some way, e.g., when price reflects an understanding about expected volumes, or when there are volume discounts (i.e., when prices decline with volume), or in cases where there are volume commitments (i.e., price is available for achieving a specific volume). As one specific example, a contract that specifies both a price and a quantity (p, q)—carrying q amount of traffic for p dollars—is a non-linear contract since it specifies both p and q, rather than setting a linear price at which the shipper can ship as much or as little as it wants.

22 I focus here on environments where railroads have good information about their interline partners' costs and discuss cases where that is not true in a later section.

23 "Tariff" traffic consists of movements identified by UP and NS as moving under tariff price authorities and is inclusive of public quotes. While "tariff" traffic as defined here could potentially involve non-linear terms such as rebates, it is the subset of traffic that is least likely to reflect negotiations with non-linear terms.

Figure 1
UP and NS Interline Traffic by Pricing Document Type {{

}}

Source: UP and NS Waybill Data 2019-2024
Notes:
1) "All UP/NS Interline" does not equal the sum of UP and NS panels due to the avoidance of double counting UP and NS interline movements.
2) The document type for 1 percent of NS interline traffic could not be identified.

22. To be clear, I am not claiming that every contract, private quote, or other non-tariff arrangement reflects negotiation between shippers and railroads over non-linear pricing terms. In some of these cases, contractual terms may be quite simple—approximating linear pricing—and in other cases, railroads may largely establish contract terms with limited negotiation. That said, my experience in the industry, the complexity of the contracts, and the fact that even private quotes often take the form of a given quantity at a given price—which is a form of non-linear pricing since it specifies both price and quantity, rather than a per-unit price at which any amount can be shipped—all indicate

that a very large percentage of these cases reflect negotiated non-linear contracts.[24] And in all such cases, economics teaches that there are not foreclosure concerns, but rather the merger will either benefit shippers or leave them unharmed, as I explain next.

2. Where shippers negotiate non-linear contracts, they will not be harmed—but rather are likely to benefit—from the merger

23. It is well established in economics that non-linear contracts between a seller and a buyer—meaning cases in which the price in the contract is conditioned on volume in some way—increase output and enhance efficiency. And, as a matter of economics, when the seller and the buyer negotiate, much of what they do is to divide these efficiency gains between them, meaning each party benefits from setting these efficient pricing terms.

24. In settings where a shipper bargains over non-linear contracts with two complementary rail networks, the same benefits arise. And a merger between the firms selling the complements does not interfere with the generation of these benefits—meaning it does not give rise to foreclosure harms. Rather, a merger often increases benefits. *Put simply, a merger between complementary railroads in settings where individual shippers negotiate sophisticated (non-linear) contracts is either benign or efficiency-enhancing and shipper-welfare enhancing*.

25. The economics behind this conclusion is straightforward. Consider a situation in which a transcontinental route is served by one railroad in the West (UP) and two railroads in the East (NS and CSX). Prior to the merger, the shipper will play the Eastern railroads against each other to get the best rate. The railroads will compete until price falls to the cost of the higher-cost railroad, and then the lower cost railroad will price just under that cost and win the business because the higher cost railroad cannot profitably match that

---

24 See, for example, United States Government Accountability Office, "Freight Rail Pricing: Contracts Provide Shippers and Railroads Flexibility, but High Rates Concern Some Shippers," Report to Congress, December 2016, available at https://www.gao.gov/assets/gao-17-166.pdf, site accessed November 24, 2025, p. 9 ("Contracts may include additional negotiable terms to the railroad's standard terms such as volume commitments and service standards."), p. 14 ("In 2014 about 76 percent of regulated freight was shipped by contract.").

price. The winning lower-cost railroad will earn a margin roughly equal to the difference between the two railroad's costs. That margin is known in economics as a "Ricardian rent." It is the profit that a firm earns because it has a cost advantage, and it is equal to the size of that cost advantage. Critically, the presence of that Ricardian rent creates a wedge between what is paid to the railroads and what it actually costs to move the goods, and this creates an inefficiency and takes value away from shippers.

26. Prior to the merger, the shipper will also negotiate with Union Pacific in the West. And they will strike the best deal they can given the presence of Ricardian rents in the East. But the inefficiency created by those Ricardian rents reduces the "pie" to be negotiated over and leaves the shipper (and Union Pacific) worse off.

27. Now consider the post-merger situation. Suppose first that CSX is the lower cost Eastern railroad. It still makes sense for the shipper to work with CSX and pay it a price just below NS's cost—that option is cheaper than the merged carrier shipping the goods itself and bearing NS's cost, which is higher than a price just below NS's cost. Therefore, the merger does not alter the factors that determine price; there are still Ricardian rents equal to the difference between the Eastern railroads' costs paid to CSX, and the shipper still negotiates (now with the merged UP) in the presence of those Ricardian rents. The merger has no harm (or benefit) in that case.

28. Suppose instead that NS is the lower cost carrier in the East. Now NS will carry the freight in the East, and the cost is NS's actual lower cost rather than NS's premerger price, which embeds a markup. Hence, the Ricardian rents are eliminated; the merged carrier correctly internalizes the actual cost of carrying the goods in the East. And the merged railroad and the shipper strike a deal in the absence of those Ricardian rents, leaving more value to go around, and thus leaving the parties to the transaction (the shipper and the railroads) better off.

29. Finally, suppose that CSX is the lower cost Eastern railroad pre-merger but due to the efficiencies unlocked by the merger—in particular, the lower cost of interchange when crossing the Mississippi—UP/NS becomes the lower cost option for the Eastern leg post-merger. The merged railroad can win the business with a transfer price for the Eastern

segment that is lower than CSX's price, which once more eliminates a Ricardian rent and internalizes the cost in the East. As a result, there is again a welfare-enhancing outcome where both shippers and railroads are better off.

30. The details showing that the above intuition holds in a formal model are in Appendix A. But the basic point is simple: Either the merger changes nothing or, in the situation where the merged RR has the cheaper competitive leg, the merger creates a better deal for everyone, because it gets rid of the inefficiencies created by Ricardian rents.

B. SHIPPERS THAT ACCEPT RATES UNDER RULE 11 ARE NOT HARMED BY THE MERGER

31. Not all rail contracts involve highly negotiated, sophisticated contracts. Some shippers may accept offers from railroads with little negotiation. In what follows, I consider the two possibilities for such cases: Rule 11 pricing and through rate pricing. Together with the discussion above, this fully covers all situations—those that are negotiated non-linear contracts, and those that are not negotiated non-linear contracts, with the latter divided into Rule 11 and through rates. And below I will further divide through rates into those that are obtained from the sole-served railroad or those that are obtained from one of the railroads on the competitive leg (explaining why only the latter—a small subset of a small subset of traffic—even possibly gives rise to foreclosure concerns, and why even that possibility is rejected empirically in this case).

1. Rule 11 pricing is common and growing

32. Among these other (non-negotiated) cases, Rule 11 is likely to be the most common. As shown in Figure 2, Rule 11 rates are the most common interline arrangement and their use has increased. In 2024, Rule 11 accounted for approximately {{ }} percent of the interline traffic for UP and NS.

33. Given the popularity of Rule 11 rates, it is especially telling that: (i) shipments using Rule 11 (without negotiated non-linear pricing) benefit from the merger (due to the "Cournot Complements effect, which generates downward pricing pressure when complementary railroads merge, as explained below) and (ii) the only theories of harm in the economic

literature for such cases (in which buyers receive prices separately from each provider of a complementary product) do not apply here. I explain these points in more detail next.

Figure 2
UP and NS Interline Traffic by Pricing Arrangement {{

}}

Source: UP and NS Waybill Data 2019-2024
Notes:
1) "All UP/NS Interline" does not equal the sum of UP and NS panels due to the avoidance of double counting UP and NS interline movements.

2. The merger will generate benefits, not harms, for shippers using Rule 11 pricing

34. Under Rule 11, the competitive setting is a variant of what economists refer to as "Cournot Complements" pricing, named for the economist who first analyzed the situation nearly 200 years ago.[25] In this situation there are one or more sellers of each of two or more products that are perfect complements, meaning each component is a necessary component that together constitute a single product. Here the components are the eastern and western legs of transcontinental rail shipments. Pricing incentives and the effects of mergers in Cournot Complements settings—which is what the Rule 11 institution creates—have been widely studied in the economic literature. A general

[25] See Cournot, A. (1838), *Researches into the Mathematical Principles of the Theory of Wealth,* New York: Macmillan; Economides, N. and S. C. Salop (1992), "Competition and Integration Among Complements, and Network Market Structure," *The Journal of Industrial Economics*, 40(1), 105–123; Vives, X. (1999), *Oligopoly Pricing: Old Ideas and New Tools,* MIT Press, pp. 176–177.

conclusion is that mergers in this setting either reduce prices or leave them unchanged, except in certain edge cases that do not apply to the merger at hand.

35. When shippers receive price quotes under Rule 11 but treat the offers as take-it-or-leave-it and do not negotiate with the railroads—the situation at issue in this section, since I dealt with the negotiated case above—they face what are known as Cournot Complements externalities. These externalities typically cause independent railroads to price higher than they would as a merged firm. The logic is as follows. When two complementary producers A and B set prices independently (pre-merger), an increase in the price by one of them raises the "combined price" paid by the customer (the sum of the two prices), which typically reduces the quantity demanded and leads to lower sales of *both* complements. The issue is that neither railroad considers the effect of its price on the profits of the *other* railroad, and thus they each set prices higher than would be optimal to maximize joint profits. This is essentially another version of the reason that separate firms selling complements have lower investment incentives than the combined firm: In both cases, each firm can take a costly action (cut price, invest more) to increase profits, but because they do not consider the profits of the *combined* firm, but rather consider only their own profits, they do not take as much of the costly action as would be jointly optimal. A merger solves both problems, leading to downward pricing pressure (relative to the situation with no merger) and increased investment. Indeed, this is the reason vertical/complementary mergers are rarely found to be anticompetitive.

36. A recent article in the economics literature identifies two edge cases where a complements merger can theoretically harm consumers, but neither edge case applies to this merger.[26] Both edge cases assume that the merged firm engages in "pure bundling" of the merged complements, which in the context of this case would mean the merged firm would refuse to provide a Rule 11 rate to a competing railroad. However, that assumption does not fit the facts of the railroad industry, as shippers have the ability to break the pure bundling strategy. In particular, by rule, the merged carrier must provide a

---

26 See Kadner-Graziano, A. S. (2023), "Mergers of Complements: On the Absence of Consumer Benefits," *International Journal of Industrial Organization*, 89, Article 102935.

Rule 11 rate if the shipper requesting the rate has arranged service from the competing railroad for the other leg.[27] And critically, an unintegrated railroad has an incentive to provide a Rule 11 rate for a leg that it has a chance of winning—meaning it has an incentive to provide a Rule 11 rate for any leg where it is competitively relevant. This means that in cases where pure bundling could matter, the shipper can prevent it by first getting a Rule 11 rate from an unintegrated railroad and then requesting one from the merged firm. Thus, the pure bundling edge cases do not apply.

37. Even if one were to assume (counterfactually) that pure bundling were feasible, the theories of harm developed in the paper are ill-suited to the railroad industry. The first of them involves using pure bundling to deter entry. For such a theory to be relevant, one would have to believe that entry by railroads onto routes they do not otherwise serve is an important competitive consideration in the railroad industry, and thus build that reality into competitive analysis of railroad transactions, railroad rates, etc. That is not a commonly held view in this industry, as entry is not generally viewed as an important competitive consideration, and thus entry deterrence is an unlikely theory of harm. Further, even if it were relevant, whether pure bundling could even be used in this way is speculative and the welfare effects are ambiguous.[28] The other theory of harm requires that BNSF and CSX (the non-merging railroads) legs are systematically less compatible with one another (in providing interline service) than are other combinations. I know of no evidence that this is true, and, given that eastern and western

---

27 Surface Transportation Board, Docket No. EP 705, "Competition in the Railroad Industry," January 11, 2011, p. 4 ("Finally, for either type of movement—same-source movements for which a shipper has successfully obtained an alternative routing, or different-source movements that the bottleneck carrier cannot handle in single-line service—the Board held that it could not force the bottleneck carrier to quote a separately challengeable rate for the bottleneck segment unless the requesting shipper had already entered into a rail contract for the non-bottleneck segment at the time that the bottleneck rate was requested.").

28 Whinston (1990) makes the following observation about the use of pure bundling as an entry deterrence strategy: "Even in the simple models considered here [which are like the model in Kadner-Graziano], which ignore a number of other possible motivations for the practice [pure bundling], the impact of this exclusion on welfare is uncertain.“ See Whinston, M. D. (1990), "Tying, Foreclosure, and Exclusion," *The American Economic Review*, 80(4), 837–859.

railroads all interchange at common gateways, it is unlikely to hold, meaning this theory is also ill-suited to the railroad industry.

38. In sum then, for shippers who do not negotiate non-linear contracts, but rather receive prices via Rule 11, the merger will generate Cournot Complement benefits, with no offsetting harms, and thus will not lead to foreclosure harms, but rather will benefit shippers.

C. SHIPPERS WHO ACCEPT THROUGH RATES ARE NOT HARMED BY THE MERGER

39. Finally, for completeness, I turn to the smallest case: shippers who do not negotiate non-linear contracts and do not get prices via Rule 11, but rather who receive (non-negotiated) through rates. As seen above, given the prevalence of negotiated contracts and Rule 11 pricing—neither of which gives rise to foreclosure concerns—this is a small category. It is also one in which foreclosure concerns cannot be ruled out as a matter of theory (at least when the shipper receives the through rate from a railroad that faces competition), but where I show that empirical tests reject standard foreclosure theories This leaves only edge cases, which depend on restrictions on firm behavior and other assumptions that do not apply to the railroad industry, and which are addressed not by blocking the merger but rather via Open Gateway Conditions that can "clean up" any edge cases that may slip through.

1. Theoretical possibility of foreclosure for non-negotiated through rates where price is received from a railroad on the competitive end

40. As discussed above, some shippers accept through rates offered by railroads without negotiating. This occurs when rates are quoted to a shipper by a railroad on one leg of an interline route, where the contracting railroad arranges and pays for service by a complementary railroad on another leg. Under this pricing mechanism, the adjoining railroads are in a vertical arrangement where the customer-facing railroad sells the entire route to the shipper.

41. As a pure matter of economic theory, shippers who accept offers of through rates from railroads—without negotiating non-linear contractual terms—*could* face traditional foreclosure concerns. For these theories to hold, it would have to be the case that the

carrier that solely serves one segment of the route can earn greater profits by merging with a competitive carrier and foreclosing the remaining unintegrated carrier(s) on another segment. A long-standing response to these concerns has been that the sole-serving carrier can charge the monopoly rate and earn the monopoly profit *prior to a merger*. If so, then the sole-serving carrier is already earning all the profits possible and cannot increase them by foreclosing an unintegrated carrier, meaning there should be no concern about foreclosure due to the merger. *Hence, any economic theory of foreclosure has to explain why the sole-serving carrier was not earning monopoly profits pre-merger, how the merger will alter that situation, and thus why it would have an incentive to foreclose the independent railroad post-merger.*

42. In general, theories of foreclosure—that is, explanations for why the sole-serving carrier was not earning the monopoly profit pre-merger—do not apply to situations where the shipper gets a price directly from the sole-served carrier. In those cases, the sole-serving carrier gets an input price from the "upstream" railroads (those not facing the shipper directly) and, in turn, sets the final price to the shipper. In that situation, nothing stops the sole-serving carrier from setting the monopoly price (conditional on that input price). Notably it might set a higher than monopoly price if the input price is above the marginal cost of providing that service, but it should not provide a lower than monopoly price (again, absent shipper negotiation over non-linear pricing terms, which are covered elsewhere in this statement).

43. Thus, potential theories of foreclosure come down to a single, narrow case—prices that are not part of negotiated non-linear contracts, are not Rule 11, and are not through rates set by the sole-served carrier but rather are through rates received from one of the railroads on the competitive end. On its own this says that the scope for potential foreclosure is quite narrow, as this describes a narrow sliver of all shipments. And critically, the possibility of foreclosure in this narrow case is just that, a possibility, and one with specific empirical predictions that can be tested. I do so, below, and show that they do not hold.

2. **Empirical tests reject the standard models of foreclosure in this case**

44. Building on the logic discussed above, the case for foreclosure on non-negotiated through rates received from a railroad on the competitive end (outside of edge cases, relying on unreasonable restrictions on firm behavior, discussed in Appendix A) would be as follows, in simple terms. Something about having to work through two downstream railroads (meaning two competing railroads who compete to win the shipper's business with a through rate) prevents the upstream, sole-served railroad from being able to charge the full monopoly price. Note that this is just a theoretical possibility that does not have to be true: It may be the case that the sole-serving railroad is able to charge the full monopoly price even in this setting. And whether it can or not depends on highly detailed assumptions about things like whether pricing offers are publicly observable or not and what form they take. But if it is true that the sole-serving railroad cannot charge the monopoly price in this case, two things should be observed:

- Shippers should strongly prefer to get through rates from railroads on the competitive end, rather than railroads on the sole-served end, because if they get through rates from the sole-served end they will pay at least the monopoly price, while—if the foreclosure theory holds—if they get through rates from the competitive end, they will pay less; and
- Observed prices when through rates come from the competitive end should be lower than when the rates come from railroads on the sole-served end.

Hence, testing whether those two conditions hold—do shippers flock to getting through rates from the competitive end and are through rates lower when they come from the competitive end—provides a test of whether these theories of foreclosure hold.

45. In the next section (Section III.D), I show that neither condition holds and thus the theory of foreclosure is rejected, even in the one narrow case where it was possible.

46. This analysis shows that the economic theories of anti-competitive foreclosure that make up the bulk of the economic literature do not apply to the railroad industry. Some parties may suggest alternative theories that predict foreclosure. However, these theories will be some combination of: (i) inconsistent with generally accepted economic results; (ii)

inconsistent with the clear empirical evidence in Section III.D; or (iii) based on restrictions on railroad behavior that are inconsistent with the facts of the industry and other unsupportable assumptions. I discuss some of these theories in greater detail in Appendix A. I will respond to specific theories if they are raised by other economists, but even now I can say that they will not provide a basis to block such a beneficial transaction, and, to the extent they raise any concern at all, that is what the Open Gateway Conditions exist to address.

D. EMPIRICAL TESTS DEMONSTRATE THAT FORECLOSURE THEORIES DO NOT APPLY EVEN IN THE NARROW CASES WHERE THEY ARE THEORETICALLY POSSIBLE

47. In this section, I implement the empirical tests described above to test whether standard (non-edge) foreclosure theories hold even in the one narrow case where they might: non-negotiated through rates received from railroads on the competitive end. I show that they do not.

48. In particular, I implement the following tests:

- Where shippers obtain through rates, do they primarily obtain them from a railroad on the competitive end? **Answer: No**
- Are through rates obtained from the competitive end lower than other rates? **Answer: No**.

1. Shippers do not favor obtaining through rates from downstream competitive carriers

49. To implement the first test—assessing whether, when shippers obtain through rates, they primarily obtain them from the competitive end—I rely on data on through rates observed in the UP and NS 2019-2024 waybill data limited to routes with a sole-serving carrier on one end and competition on the other end. I have to make two key implementation decisions: how to define competition (discussed below) and which through rates to study. For the latter, the issue is that this theory of foreclosure only applies to through rates that are not set pursuant to negotiation over non-linear contractual terms. But there is no perfect way to define such through rates in the data, so I consider three approaches:

- Look at all through rates;
- Look at through rates other than contracts (meaning private quotes, other non-tariff rates, and tariffs), in this way eliminating the through rates most likely to reflect negotiations over non-linear price terms (contracts);
- Look only at tariff rates (thus eliminating price quotes and other non-tariff rates, which may also reflect negotiation over non-linear price terms)

I show that all three approaches yield the same conclusion.

50. My analysis considers two alternative definitions of competition: "Competition Version 1," which uses industry location data[29] *and* observed traffic,[30] and "Competition Version 2," which uses only industry location data. Of the two, Competition Version 2 is more likely to label a route-segment as sole served. I show that both approaches yield the same conclusion.

51. In Figure 3, I show the breakdown of UP and NS through rate traffic with a sole-served segment and a competitive segment. Using "Competition Version 1" I find that nearly {{ }} percent of the through rate traffic under consideration is contracted with a carrier on the competitive segment. Similar findings emerge under my alternative competition definition (see lower panel). *Hence, shippers do not flock to getting through rates from a railroad on the competitive end; rather, it is either almost {{ }}. This is not consistent with a theory of foreclosure, as that would involve lower rates when they are received from the competitive end, meaning shippers should strongly prefer that setup.*

---

[29] Access for a given Class I railroad at a particular station is determined using the centralized station master ("CSM") and Serving Carrier/Reciprocal Switch ("SCRS") files such that a particular railroad station, defined as the combination of: SPLC-SCAC-FSAC, is considered to be open to competition from another Class I carrier if the other Class I carrier has open access to one or more customers in common with the railroad/station in question.

[30] In particular, if a Class I railroad is observed originating, terminating, or interchanging more than 1% of carloads for a given group of commodities at a particular station (SPLC-6) in the STB confidential Carload Waybill Sample from 2019-2023, that railroad is determined to be competitive at that origin or destination for shipments of that commodity group.

Figure 3
Pricing Arrangements on Routes with a Sole-Served and a Competitive Segment
2019 – 2024 {{

}}

Source: UP and NS Waybill Data 2019-2024, AAR Centralized Station Master (CSM), Serving Carrier Reciprocal Switching Data (SCRS).
Notes:
1) "UP/NS Total" does not equal the sum of UP and NS panels due to the avoidance of double counting UP and NS interline movements.
2) I determine who the shipper deals with is determined based on the issuer of the shipment's Price Authority.

52. In Figure 4, I examine this split over time. Again, the chart demonstrates that shippers do not favor dealing with the carriers on the competitive end when obtaining through rates. Instead, the percentage bounces around {{ }}, exactly as one would expect if there was no preference between the two, and the opposite of what one would expect if the theory of foreclosure held.

Figure 4
Through Rates By Who Shipper Deals With
UP/NS, All Traffic, By Year {{

}}

Source: UP and NS Waybill Data 2019-2024, AAR Centralized Station Master (CSM), Serving Carrier Reciprocal Switching Data (SCRS).
Notes:
1) I determine who the shipper deals with based on the issuer of the shipment's Price Authority.

53. As noted above, I conduct a similar analysis using the subset of through rate traffic moving under: (1) everything other than contracts (i.e., private quotes, other non-tariff rates, and tariffs) and (2) tariffs only. Each of these represents a way to zoom in on traffic less likely to reflect negotiations over non-linear pricing terms.

54. As shown in Figure 5, when looking at everything other than contracts, there is no evidence that shippers prefer to obtain rates from a railroad on the competitive end. In fact, in almost every year, more of the non-contract prices are obtained from the *sole-served* end, exactly the opposite of what the foreclosure theory would predict. The fact that shippers using non-contract rates do not seek out rates from the competitive end—as they would under the standard theory of foreclosure where those rates should be lower than rates obtained from the sole-served end—is strong evidence against a theory of foreclosure. Said differently, the standard theory of foreclosure requires that something is holding rates down when they are obtained from the competitive end, meaning shippers should strongly prefer that setup, but that pattern does not hold.

Figure 5
Through Rates By Who Shipper Deals With
Non-Contracted Traffic, By Year {{

}}

Source: UP and NS Waybill Data 2019-2024, AAR Centralized Station Master (CSM), Serving Carrier Reciprocal Switching Data (SCRS).
Notes:
1) I determine who the shipper deals with based on the issuer of the shipment's Price Authority.

55. Finally, Figure 6 looks at tariffs only. This is the most restricted set of traffic, but also the one least likely to be subject to negotiations over non-linear pricing terms. Again, I find that obtaining through rates from the competitive end is actually less common than obtaining them from the sole-served railroad, occurring only {{ }} percent of the time. Once again, this refutes the standard theory of foreclosure in which the pattern should go the other way.

Figure 6
Through Rates By Who Shipper Deals With
Tariff Traffic, By Year {{

}}

Source: UP and NS Waybill Data 2019-2024, AAR Centralized Station Master (CSM), Serving Carrier Reciprocal Switching Data (SCRS).
Notes:
1) I determine who the shipper deals with is determined based on the issuer of the shipment's Price Authority.

2. Rates are not lower when dealing with the competitive carriers relative to dealing with the sole-serving carrier

56. Next, I turn to the second part of the test: Are through rates lower when they are negotiated on the competitive end? Again, I consider my two definitions for the presence of competition, as well as alternative sets of through rates in an attempt to focus on rates that are not set by negotiation over non-linear contractual terms. As in the prior section these alternative sets are: (1) all traffic; (2) non-contract traffic; (3) tariff traffic only.

57. To implement this test, I run a multivariate regression analysis, comparing through rates obtained from the competitive end with through rates obtained from the sole-served end, after controlling for many other factors that affect rates.[31] Regression analysis is a standard tool used by economists to measure economic relationships between a response variable (also known as a "dependent variable") and a variable of interest, while holding

31 Data are aggregated to the following unit of observation: railroad, route, commodity, shipper, year-month, car type, car owner, pricing document type, and unit train flag.

constant key confounders (also known as "control variables"). I rely on aggregated UP/NS waybill data from 2019-2024.

58. The measure of price in the regression is the natural logarithm of the rail rate, defined as the revenue per carload. In addition to the variables of interest (which indicates whether the rate comes from the competitive or sole-served side), I include control variables to account for various factors that may also impact pricing on a particular rail shipment, including controls for commodity, car owner, car type, whether it is a unit train, type of pricing arrangement (contract, private quote, etc.), average net weight per car, and the year/month of the observation. I also include what are known as "fixed effects" for each route—a set of control variables that fully account for all differences *across routes*. In this way, the test is implemented by comparing rates obtained from the competitive end and rates obtained from the sole-served end, holding constant the origin and destination—meaning only within-route variation is used to measure the effect, not across-route variation.

59. Figure 7 shows results based on the two methodologies used to define competitive and sole-served segments in prior figures ("Competition Version 1" using industry location data *and* observed traffic and "Competition Version 2" using only industry location data).

Figure 7
Test for Presence of Foreclosure Incentives in Through Rates

Independent Variable	Dependent Variable: Ln(Rate per carload) Combined UP/NS Data — Competition Version 1	Competition Version 2
Through Rate: Shipper Deals with Competitive End [Base]	-	-
Through Rate: Shipper Deals with Sole-Serving Carrier	-0.0396	-0.0367
Std. Err.	[0.0365]	[0.0321]
P-value	*0.277*	*0.254*
Observations	346,454	326,397

Source: UP and NS Waybills 2019-2024, STB Confidential Carload Waybill Sample 2019-2023 (CCWS), AAR Centralized Station Master (CSM), Serving Carrier Reciprocal Switching Data (SCRS).
Notes:
1) Explanatory variables include fixed effects for: route, STCC3, car owner, AAR car initial, unit train dummy, type of pricing arrangement (contract, private quote, etc.), year-month, reporting railroad dummies; weight and weight^2.
2) ** P-value<0.05; * p-value<.1. Clustered standard errors in brackets (clustering at the route level).
3) "Competition Version 1" uses industry location data and observed traffic. "Competition Version 2" uses only industry location data.

60. The second row measures the difference between through rates when the shipper obtains through rates from the sole-serving carrier vs. through rates when the shipper obtains rates from the competitive end. If shippers receive lower rates when dealing with the competitive carriers this estimate would be positive and statistically significant. However, as shown in the second row of Figure 7, the estimate is actually small, negative (approximately negative 4 percent), and statistically indistinguishable from zero.

61. The second column displays the results from the same test applied using the alternative competition definition ("Competition Version 2"). Again, the estimate is negative—not positive as it would be expected under an operative foreclosure hypothesis—and statistically insignificant.

62. As a further test, I conduct the same regression analysis applied to non-contract traffic, meaning private quotes, other non-tariff rates, and tariffs. By eliminating contract traffic, the analysis eliminates the subset of traffic, which is most likely to reflect negotiations with non-linear terms. These analyses, presented in Figure 8, also find that through rates obtained from the competitive end are not lower. Under both "Competition Version 1"

and "Competition Version 2" the estimates are negative and not positive, as it would be expected under an operative foreclosure hypothesis

Figure 8
Test for Presence of Foreclosure Incentives in Through Rates
Non-Contract Traffic

	Dependent Variable: Ln(Rate per carload)	
	Combined UP/NS Data	
Independent Variable	**Competition Version 1**	**Competition Version 2**
Through Rate: Shipper Deals with Competitive End [Base]	-	-
Through Rate: Shipper Deals with Sole-Serving Carrier	-0.0622	-0.0589*
Std. Err.	[0.0396]	[0.0342]
P-value	*0.116*	*0.086*
Observations	259,115	244,223

Source: UP and NS Waybills 2019-2024, STB Confidential Carload Waybill Sample 2019-2023 (CCWS), AAR Centralized Station Master (CSM), Serving Carrier Reciprocal Switching Data (SCRS).
Notes:
1) Explanatory variables include fixed effects for: route, STCC3, car owner, AAR car initial, unit train dummy, type of pricing arrangement, year-month, reporting railroad dummies; weight and weight^2.
2) ** P-value<0.05; * p-value<.1. Clustered standard errors in brackets (clustering at the route level).
3) "Competition Version 1" uses industry location data and observed traffic. "Competition Version 2" uses only industry location data.

63. Finally, I conduct the same regression analysis applied to tariff traffic. This is a small subset of the overall interline traffic, but I study it despite the data limitations because it is least likely to be subject to negotiations over non-linear pricing terms. This analysis, presented in Figure 9, again finds no difference in rates depending on the carrier from which shippers obtain through rates.

Figure 9
Test for Presence of Foreclosure Incentives in Through Rates
Tariff Traffic

	Dependent Variable: Ln(Rate per carload) Combined UP/NS Data	
Independent Variable	**Competition Version 1**	**Competition Version 2**
Through Rate: Shipper Deals with Competitive End [Base]	-	-
Through Rate: Shipper Deals with Sole-Serving Carrier	-0.0138	-0.0195
Std. Err.	[0.0138]	[0.0132]
P-value	*0.318*	*0.138*
Observations	22,116	17,770

Source: UP and NS Waybills 2019-2024, STB Confidential Carload Waybill Sample 2019-2023 (CCWS), AAR Centralized Station Master (CSM), Serving Carrier Reciprocal Switching Data (SCRS).
Notes:
1) Explanatory variables include fixed effects for: route, STCC3, car owner, AAR car initial, unit train dummy, year-month, reporting railroad dummies; weight and weight^2.
2) ** P-value<0.05; * p-value<.1. Clustered standard errors in brackets (clustering at the route level).
3) "Competition Version 1" uses industry location data and observed traffic. "Competition Version 2" uses only industry location data.

64. To sum up the evidence presented in this section, my analyses demonstrate that there is no statistical evidence that shippers negotiate lower rates when they get through rates from the competitive end of a movement. If anything, rates are a bit lower when shippers get them from the sole-served end, although the difference tends to not be statistically significant. Once again, then, the empirical evidence does not support the theory of foreclosure, even in the narrow cases where it might apply.

E. ASYMMETRIC INFORMATION ON COSTS AND OTHER EDGE CASES DO NOT CREATE INCENTIVES FOR ANTICOMPETITIVE FORECLOSURE

65. The analysis above rules out the most prominent theories of foreclosure. In this section, I turn to some other theories of foreclosure that could potentially be raised. First, recent economic literature has raised the counterintuitive possibility that the improved information resulting from a merger could enable a form of foreclosure, through which railroads harm shippers by extracting more value from them. However, even the published literature on this topic finds that more information is efficient, meaning that it increases total output and total welfare. In the case of the railroad industry, this would

mean the industry was more effectively doing its job of moving traffic and that the ultimate consumers of the railroad industry—the downstream buyers who consume the products that are shipped—are better off. And I show that the counterintuitive finding in the literature that more information can harm shippers depends on the unreasonably restrictive assumption that shipper demand does not decline at all with higher prices, and that once this assumption is relaxed, the result is reversed, with more information increasing consumer welfare.

66. I then turn briefly to some other "edge cases"—economic theories where foreclosure may be possible, but which depend on unreasonable restrictions on firm behavior or other assumptions not well suited to the railroad industry. I explain why these theories provide no basis to oppose the merger, but at most point to the value of Open Gateway Commitments to resolve any stray cases. I provide more detail on edge cases in Appendix A.

1. Concerns regarding mergers when the sole-serving railroad has incomplete information

67. A recent model developed by Moresi *et al.* ("Moresi") raises the possibility that foreclosure harms from vertical mergers may occur in settings where downstream competitors have private information.[32] For example, an upstream (non-customer-facing) railroad may have incomplete information about a downstream railroad's costs or the shipper's demand. The downstream, customer-facing railroad, of course, knows its costs and is likely to have better information about the shipper's demand than the upstream firm because it interacts directly with the shipper. A vertical merger of such a downstream railroad with such an upstream monopolist would transfer the downstream railroad's information upstream. The concern raised in the Moresi model is that transferring information to the monopoly railroad through merger would allow the

---

32 Moresi, S., D. Reitman, S. C. Salop, and Y. Sarafidis (2021), "Vertical Mergers in a Model of Upstream Monopoly and Incomplete Information," *Review of Industrial Organization*, 59(2), 297–336.

merged railroad to price more aggressively and thus more effectively extract shipper surplus.

68. This concern is misplaced. First, even in the Moresi model, both output and total welfare rise. Notably, in the context of the railroad industry, the fact that output increases means that the railroad industry is more effectively doing its job of moving goods, and that downstream consumers (those who buy from shippers) are better off, as more goods are bought and sold. Second, the finding in the Moresi model that the merger lowers consumer surplus is driven by an unrealistic and overly restrictive assumption: that consumers (shippers) have perfectly inelastic demand, meaning that changes in price, in either direction, have no effect on demand. When this assumption is replaced by the more realistic assumption that shippers have downward sloping demand, the merger increases shipper welfare and continues to raise output and total welfare. I develop each these points in more detail in the following paragraphs.

69. The Moresi model has two elements: a vertical merger between an upstream monopolist and one of two downstream oligopolists, and the information transfer that the merger brings about. Given the inherent benefits of vertical mergers, described above, and the fact that information transfer frequently enhances efficiency, it would be surprising if adding an element of information transfer to a vertical merger resulted in a transaction that was harmful to consumer welfare. However, under the highly restrictive and stylized assumption that consumers (shippers) have perfectly inelastic demand with a known reservation price, the Moresi model finds that the merger harms consumer welfare because the improved information enables the merged firm to extract more value from consumers (shippers).

70. In fact, this prediction of the Moresi model is an artifact of the inelastic demand assumption. This assumption is unreasonable in the railroad industry for one or both of the following reasons: (i) shippers are likely to want to ship more in response to a lower price (standard downward sloping demand); and (ii) shippers likely have private information about their valuations for any given shipment, which means that a shipper's expected purchases likely increase as price falls (downward sloping expected demand). The first of these likely holds because shippers sell their goods in downstream markets,

and if shipping costs go up, they are likely to have to pass some of these variable costs on to their consumers, reducing demand for their products, and thus reducing the amount shipped. The second of these holds because even if shippers *do* in fact have a fixed reservation price (or willingness to pay), railroads surely do not know it, and so as railroads raise prices, the probability of going over that reservation price rises, reducing the expected amount sold.

71. Hence, the Moresi model only works under the truly extreme assumption that shippers have a fixed willingness to pay *and* railroads know what it is with certainty. Note how strong the second part of this assumption is in the context of the Moresi model: the sole-serving railroad is assumed to lack information about the other railroad's costs, yet to have perfect information about shippers' willingness to pay. In practice, the sole-serving carrier's uncertainty about shippers' willingness to pay is likely to be *greater than* its uncertainty about the downstream railroad's costs. Railroads are likely to have a reasonable understanding of the cost of rail service between two points. However, there is no reason to assume that a railroad that does not interact directly with a shipper has particularly good information about that shipper's willingness to pay for transportation or the shipper's customers' sensitivity to higher delivered prices. Strikingly, however, to generate its results, the Moresi paper assumes *perfect* information about shippers' willingness to pay, while information about other firms' cost to ship is limited. Such an assumption is not reasonable, yet it is required to generate the result that greater information harms shipper welfare.

72. In the Moresi model, under these extreme assumptions, the merger reduces shipper surplus (in fact, it leads to complete extraction of shipper surplus). However, this finding is an artifact of Moresi's assumptions that: (i) shippers have perfectly inelastic demand and (ii) the sole-serving carrier knows the shipper's reservation price (i.e., the highest price the shipper is willing to pay). In Appendix B, I show that a straightforward extension of the model to allow downward sloping demand for shippers leaves the output and welfare results unchanged—the merger increases output and total welfare—but reverses the shipper welfare result. More specifically, I find that for the case of linear demand and uniformly distributed costs, a merger increases shipper surplus in addition to

increasing output and total welfare. The increase in shipper welfare is the result of the railroad making more sales at lower prices and the fact that it cannot fully extract the shipper's surplus as it can in Moresi. In addition, both the shipper and the railroad benefit from the increase in output that results from the elimination of inefficiently high prices resulting from poor information. These results mirror the standard efficiency effects of vertical mergers in the case of complete information, described above.

73. Put simply, as long as railroads face lower demand as they raise prices—the standard economic assumption—the Moresi result is reversed and greater information increases consumer surplus. For this reason, the information transfer (between UP and NS) engendered by the merger is not a source of competitive concern, but rather a benefit.

2. Edge Cases

74. This section has presented strong, general results rejecting foreclosure as a significant concern in the railroad industry. Those results consider carefully the modern literature on cases where foreclosure may occur, but reject those cases as inapplicable—as a matter of theory, marketplace realities, and empirical evidence—to the railroad industry. As I have explained, that is not to say that other economists could not present alternative theories of foreclosure and claim they apply to this industry and this transaction. Here, I can confidently say any such theories would describe, at best, "edge cases," based on unreasonably restrictive assumptions about firm behavior or other assumptions ill-suited to the railroad industry. I briefly discuss these edge cases here and explain why they do not apply to this merger. See Appendix A for more detail.

75. As one example, in complete information settings with an upstream monopolist selling to downstream *differentiated* oligopolists using linear contracts (per-unit "wholesale" prices), a vertical merger can raise prices if downstream firms are highly asymmetric, specifically, if consumer substitution from competitor A to B in response to a reduction in B's price is sufficiently different from the consumer's substitution from B to A in response to a reduction in A's price. However, such theories are ill-suited to the present case for multiple reasons. First, the restriction to linear pricing does not describe the vast majority of railroad transactions, in which terms are more complicated than that. Rather

than involving a single price at which any amount of traffic can be shipped, they include volume commitments, different prices for different volumes, specific agreements on how much to ship, and so on. And second, the specific type of asymmetry such theories require in order to work does not arise when contracts are customer-specific and customers themselves sell products to final consumers, which is the case with shippers in the railroad industry (see Appendix A).[33]

76. As an example that moves beyond linear pricing, in complete information settings with an upstream sole sourcing supplier selling through observable non-linear contracts, and with differentiated downstream oligopolists, the pre-merger price equals the price set by a fully integrated railroad.[34] If a merger occurred in this setting and there was no Rule 11 option, there would be a theoretical possibility that prices to shippers could rise if (i) downstream firms were sufficiently asymmetric, and (ii) the merging firm could not adjust its contract to ensure the fully integrated outcome continues to arise post-merger. However, given that this model assumes that railroads are already engaged in sophisticated non-linear contracting to ensure the fully integrated outcome pre-merger, there is no reason to believe they could not write a contract replicating that outcome post-merger, and in that case, the merger would not change anything. Hence, this is another case where claims of merger harm would be based on unreasonable restrictions on firm behavior in the post-merger case, with those restrictions, not the merger itself, generating the harms.

77. I discuss such edge cases further in Appendix A.

---

33 The customers in rail freight markets are firms that sell the products they ship to customers, and rail services from different carriers are inputs into their production and sales process. Under the typical assumption that a shipper's profits from manufacturing and selling its product is a continuous function of the prices of different rail inputs, the cross derivatives of the demand for two rail inputs are equal. See Varian, H. R. (1992), *Microeconomic Analysis*, 3rd Edition, W.W. Norton & Company, p. 60.

34 Mathewson, G. F. and R. A. Winter (1984), "An Economic Theory of Vertical Restraints," *The RAND Journal of Economics*, 15(1), 27–38, p. 34.

F. **OPEN GATEWAY COMMITMENTS**

78. As discussed, the proposed merger does not raise any significant concerns with respect to vertical foreclosure. While I will address any theories of foreclosure raised in opposition to the proposed merger in subsequent reports, they will almost surely be edge cases, not well-suited to this industry. Nevertheless, to the extent there remains any concern that some of these edge cases may "slip through" and apply to isolated, atypical transactions, those are precisely the situations open gateway commitments are designed to address.

79. UP/NS is making a series of commitments to maintain open gateways on commercially reasonable terms. These commitments mirror those imposed in the CP-KCS merger and include:[35]

- Keeping all existing gateways open in perpetuity on commercially reasonable terms (including both rates and service), for both existing and new traffic;
- Offering connecting carriers commercially reasonable rate divisions and negotiating in good faith regarding disagreements;
- Ensuring no new regulatory bottlenecks that could limit STB rate review;
- Providing (upon request) written justification of price increases in excess of inflation; and
- Submitting monthly reports on interchange volumes at gateways during the oversight period.

80. These open gateway commitments provide further support for the conclusion that the merger will not create any material vertical harm. These commitments demonstrate UP/NS' intention to work with interline partners to maintain efficient competitive alternatives and provide monitoring mechanisms and enforceable obligations with respect to UP/NS's treatment of shippers and interline partners.

---

35 See Joint Verified Statement of Kenny Rocker and Claude E. "Ed" Elkins (hereinafter "Rocker-Elkins V.S.), ¶¶ 158-168.

IV. DUE TO ITS COMPLEMENTARY NATURE, THE UP/NS MERGER WILL GENERATE SIGNIFICANT PRO-COMPETITIVE BENEFITS FOR SHIPPERS

81. As an end-to-end combination, the proposed merger will bring complementary rail networks under the control of a single firm and thus generate significant benefits for shippers that cannot be achieved in any other way. These results follow due to the economics of externalities: Because of the enormous amount of interline traffic, pricing, operational, and investment decisions made by one railroad have large effects on the complementary network. When operating separately, railroads make decisions based on their individual profits rather than the profits for the combined network. They do not take the effects of their decisions on their interline partner into account. Quite simply, then, they consider the wrong profits from the point of view of the combined network, which is the relevant network when it comes to serving the needs of shippers. As a result, prices are set higher than would be optimal when the effects on both networks are considered; too few investments are made relative to what would be optimal for the combined network; and operational decisions are made without regard to the effect on the complementary network. Shippers suffer from each of these outcomes. The merger corrects all of them, and Nobel prize-winning economics proves that no other solution can do so.

82. As discussed below, vertical integration gives optimal incentives to the merged railroad to maximize the value of the combined network. Moreover, the benefits cover all aspects of the operation of the combined network, including pricing that eliminates double marginalization, more efficient scheduling and operations, and greater and better coordinated investment.

A. BENEFITS OF VERTICAL MERGERS

1. Independent railroads operating complementary networks cannot coordinate their operations and investments as efficiently as a single combined railroad

83. Collaborations and cooperation notwithstanding, independent railroads cannot operate complementary railroad networks together as efficiently as a merged railroad can. When operating independently, each railroad maximizes its own profit. Therefore, to provide

efficient incentives to engage in costly activities, each railroad would need to receive all of the marginal profit resulting from its efforts to increase the profitability of the railroads' joint movements. However, it is not possible for each railroad to receive ***all*** of the marginal joint profit— there are two railroads and only one joint profit to share between them. Thus, optimal incentive payments add up to more than the joint profit that they share.[36] In such a situation, each railroad will maximize its own individual profits at the expense of optimal outcome that maximizes joint profits across the complementary networks. This is often referred to as double moral hazard.

84. Notably, there may be certain decisions in the course of operating separate railroads that rest with UP, while others rest with NS. It may be tempting to say that the incentive problem could be solved by giving all of the marginal profit to the relevant railroad in each case. But such a solution is clearly impossible; the relevant railroad varies from decision to decision, multiple times each day, and thus no division of profits between the railroads can possibly create the right incentives for each of them properly to consider effects on overall rail service. Only a merger that brings the railroads under common control can fully align incentives to maximize joint profits and solve this problem.

85. Nor can the problem be solved with sufficiently rich contracts. In practice, it is impossible to write a complete contingent contract that specifies how the two railroads must manage their interline business on a day-to-day basis. Such a contract would require dictating decisions or rules in every state of the world: every service choice, every investment decision, every price, and so on, accounting for every possible outcome of everything that is uncertain. They would have to say how each railroad should operate under any scheduling circumstance, what investment decisions should be made under all operational and economic conditions, how prices should be set under all demand scenarios, and so on. While economists may be able to talk of such "complete contingent

---

36 Holmstrom B. (1982), "Moral Hazard in Teams," *The Bell Journal of Economics*, 13(2), 324–340.

contracts," they have no relation to industry reality. Once again, only a merger—with its full alignment of incentives—can solve this problem.

86. This intuitive result—that, in the presence of double moral hazard, where each firm takes actions that are not fully observable to the other but which jointly determine the profits of both firms, only a merger can generate optimal outcomes—was developed into a formal proof by Bengt Holmstrom, the winner of the 2016 Nobel Prize for Economics. He showed that as long as each firm must engage in costly noncontractible activities, there is no profit-sharing rule, transfer price schedule, or contract that implements the fully efficient incentives across the two firms' complementary networks. *Only a merger can generate the benefits described in this section.*

87. The solution enabled by a merger is both simple and elegant. The merged railroad receives the full marginal profit from its management efforts across the combined network, so the resulting incentives are optimal for maximizing the network's value. Bringing the two railroads under common ownership and control is the only solution that corrects the railroads' suboptimal incentives. Thus, there is no question that the merger's benefits are, in fact, the result of the merger itself. They cannot be obtained by other means.

2. Double-moral hazard affects all aspects of decision-making regarding joint movements

88. The theory of incentives described above is powerful because it is quite general. The suboptimal incentives of independent railroads operating complementary networks leads to well-recognized inefficiencies, including pricing inefficiencies (referred to by economists as 'double marginalization'), suboptimal operational and scheduling decisions (*i.e.*, failing to consider the benefits to the complementary network), and insufficient investment.

89. One specific example of an inefficiency created by separate networks is double marginalization. Double marginalization occurs because each railroad raises its price to maximize its own profits without regard for the negative impact of its price on the sales of its partner on joint movements. Double marginalization illustrates the problem that

neither railroad has efficient pricing incentives because neither has the optimal *marginal profit incentive*. Each considers only its own marginal profit, rather than the margin of the combined profit on the movement. For example, a carrier negotiating a rate using Rule 11 sets that rate to maximize its own profit. However, an increase in one carrier's rate lowers demand for the service of its interline partner, lowering its partner's profits on the movement. Each carrier sets its price above the optimal level because it does not account for the effect of its price on the full joint profit of the movement. Elimination of double marginalization from the merger puts downward pressure on prices relative to prices that would exist absent the merger. The same problem of inefficient incentives arises in the context of through rates and investment as well.

90. Suboptimal incentives arising from double moral hazard also affect how railroads coordinate operations over long and short time frames. For example, two railroads' schedules could be optimized to work together, which means neither railroad would have an optimal schedule from its own perspective. However, such optimization is difficult to effect when each railroad seeks to maximize its own profits. The two railroads coordinating schedules will invariably view differently the tradeoffs associated with coordinating schedules.

91. Schedules can also be affected in the very short run, such as when a train is running late and may miss an interconnection, raising the question whether to hold the connecting train. The optimal response to a late train may depend on factors such as whether its shipments are time-sensitive, the degree of congestion on the network, and the potential for creating congestion through the response to the late train. Of course, the response that optimizes joint profits will impose different costs and yield different benefits for the independent railroads, making optimal coordination impossible absent a merger.

92. Investment incentives are also suboptimal because an investment that increases demand on one network will increase demand on the partner railroad's complementary network as well. However, the railroad considering the investment will make its investment decision based solely on the impact on its own profitability. One example, which I discuss in more detail in Section IV.B.5, is the scheduled improvements to the UP mainlines. The merged UP/NS plans to invest in double-tracking much of the mainline, improvements

made profitable by the anticipated post-merger increase in traffic. The proposed merger will make a larger number of investments like this one profitable, leading to a redirection and likely increase in investment in the network.

B. THE UP/NS MERGER WILL ENHANCE COMPETITION AND GENERATE SIGNIFICANT PRO-COMPETITIVE BENEFITS

93. The pro-competitive benefits of the merger include (1) costs savings and the elimination of double marginalization, which will put downward pressure on prices relative to a no-merger world, (2) improved scheduling and operations, providing more efficient service to shippers; and (3) greater investment in the rail network. Perhaps the most obvious benefit of this transaction is the improved, single-line, transcontinental service that UP/NS will offer. For shippers, eliminating the need for an interchange is akin to the difference between connecting air travel service and a nonstop option. The introduction of direct, single-line service eliminates the cost, scheduling uncertainty, coordination, and added transit time associated with interchanging traffic, and is a clear benefit to shippers and railroads.

1. **Cost Savings**

94. I understand that the parties expect the merger will generate substantial cost reductions. When fully implemented (i.e., following the merger when UP and NS are fully integrated and the costs and benefits are annual and recurring[37]), these are expected to total nearly one billion dollars ($965 million).[38] These savings arise from the elimination of redundancies, the adoption of best practices, and the more efficient utilization of resources made possible by bringing both organizations under common control.

95. The anticipated savings come from numerous specific changes in operations designed to optimize the use of existing capital and labor and take advantage of operational changes to provide more efficient transportation services. Examples from the operating plan, as explained by UP/NS, include the following, all of which are consistent with the economic

---

[37] Verified Statement of Grant Janke (hereinafter Janke V.S.), ¶ 10.

[38] Janke V.S., Table 4. Amounts are expressed in 2023 dollars.

teachings, described above, on the efficiencies that can be unlocked when firms operating complementary networks have the ability and incentive to coordinate their activities.

- More efficient use of locomotives and rolling stock. The improved operation of the integrated network is expected to reduce the number of locomotives and amount of rolling stock required to meet service needs following the merger. "The Optimized operating plan improves railcar utilization through more single-line service, decreased handlings and yard work, reduced dwell time, and optimized movements including increased train speeds."[39] In addition, more efficient railcar distribution will result in fewer empty car miles, improved cycle times, and higher service levels.[40]

- Consolidation, rationalization, and more efficient use of yards, railcars, and locomotive maintenance facilities. By consolidating and re-optimizing across the combined network UP/NS can achieve required levels of operations with fewer resources and lower costs.[41]

- Detailed changes in operations and systems with respect to maintenance-of-way, repair management, track maintenance, crew management, etc. These entail specific changes involving adoption of best practices and applying better systems across the broader UP/NS network[42].

96. In addition to changes in the operating plan and operating improvements, there are reductions in annual administrative costs ($198 million annually) and management costs ($260 million annually) when fully implemented.[43]

97. Merger-related cost savings and efficiency improvements that reduce the marginal cost of rail service or permit the provision of higher quality service at reduced costs improve the

---

39 See Gehringer-Orr V.S., ¶ 394.

40 Gehringer-Orr V.S., ¶ 396.

41 Gehringer-Orr V.S., §4.3. See also, Gehringer-Orr V.S., ¶¶ 180, 396-397.

42 Gehringer-Orr V.S.,§10.

43 Janke V.S., Tables 1 and 3.

competitive position of UP/NS. Reduced costs should be expected to be passed through to consumers in some form, even in industries that are imperfectly competitive.[44] The pass through of efficiencies could take the form of price reductions or the provision of higher-quality service without increasing price. Thus, merger-related efficiencies may permit UP/NS to offer rail transportation at lower rates than would otherwise have been possible or provide higher quality service than would otherwise have been available. Merger-related cost reductions are unambiguously procompetitive.

2. Elimination of Double Marginalization

98. Technically speaking, double marginalization refers to the presence of successive markups in vertical settings, where each of the upstream and downstream firms charges a markup over marginal cost. More generally, double markups result from an externality. When setting its rates, the downstream railroad does not consider the impact of its pricing decisions on the upstream railroad's profits, and vice versa.[45] As a result, under double marginalization prices rise above the price that a vertically integrated firm would charge absent the merger. This is precisely analogous to the Cournot Complements issue, described above, applied to a vertical setting, independent firms selling complements set prices too high because they do not internalize the benefits lower prices convey on one another.

99. Importantly, while the elimination of double marginalization puts downward pressure on rates relative to the state of the world absent the merger, it does not imply that post-merger rates will necessarily be lower than pre-merger levels. Vertical mergers improve pricing incentives and frequently reduce costs, creating downward pressure on rates relative to the state of the world that would exist absent the merger. However, rates regularly go up with inflation, which could offset the elimination of double

---

44 See, *e.g.*, Miller, N. H., M. Osborne, and G. Sheu (2017), "Pass-Through in a Concentrated Industry: Empirical Evidence and Regulatory Implications," *RAND Journal of Economics*, 48(1), 69–93.

45 See, e.g., Davis, P., and E. Garcés (2009), *Quantitative Techniques for Competition and Antitrust Analysis*, Princeton University Press, pp. 505–507.

marginalization, for example. Alternatively, the merged railroad could choose to increase quality without raising prices, which is a reduction in the quality-adjusted prices. As described above, these are all versions of the same phenomenon: once combined profits are considered, more costly actions—whether they be lower prices or investments to increase quality—will be undertaken than would be absent the merger. What one can safely say is that the merger puts downward pressure on prices relative to the case with no merger; this pressure may take the form of prices lower than they otherwise would have been, higher quality, or some combination of those, depending on which turns out to be optimal.

3. Empirical demonstration of lower costs and/or elimination of double marginalization

100. To confirm empirically what is known as a matter of economics—that rates will face downward pressure as the result of costs savings and the elimination of double marginalization—I conducted a multivariate regression analysis to test whether prices on comparable routes are lower for single-line service, which the merger is expected to make more broadly available, relative to rates observed on interline traffic. To illustrate in simple terms, the regression compares, for example, UP's single-line rate on a 1,000-mile shipment of plastic pellets to the total interline rate on a 1,000-mile shipment of plastic pellets that originates with UP and is delivered by another Class I carrier. As with my regressions testing for foreclosure, above, I include controls for other factors that affect pricing, including: commodity, car owner, car type, unit trains, type of pricing arrangement (contract, private quote, etc.), the year-month of the shipments, the median rail distance between the origin and destination, and the average net weight per car.[46] I also include control variables for local conditions at both the origin and destination of the move: the number of Class I railroads, GDP per capita, personal income, and population. These explanatory variables ensure that the measured price differences are the result of interlining and not due to differences in shipment characteristics or costs.

---

46 To allow for flexible, non-linear effects, distance and weight are included as both linear and squared terms.

101. The regression sample is based on UP and NS's combined waybill data. It is limited to single-line movements and interline movements originating and terminating within the United States, where UP or NS's interline partner is another Class I railroad. In the case of Rule 11 traffic, the dataset is further limited to rates for UP-NS interline traffic from 2019 to 2024, for which it has been possible to link up the individual Rule 11 waybills and construct a combined rate that covers both the Eastern and Western portions of the move.

Figure 10
Test for the Presence of Double Marginalization in Interline Rates

	Dependent Variable: Ln(Rate per car-mile) Combined UP/NS Data					
	Interline Universe:					
	All Simple Interline Traffic		East<->West Traffic		UP<->NS Traffic	
	Estimate	Effect (%)	Estimate	Effect (%)	Estimate	Effect (%)
Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Single-line Rates [Base]	-		-		-	
Through Rates	0.2102**	23%	0.1776**	19%	0.1690**	18%
Std. Err	[0.0165]		[0.0228]		[0.0269]	
P-value	*0.000*		*0.000*		*0.000*	
Rule 11 Rates	0.2147**	24%	0.1894**	21%	0.2139**	24%
Std. Err	[0.0225]		[0.0268]		[0.0262]	
P-value	*0.000*		*0.000*		*0.000*	
Observations	3,141,073		2,996,960		2,763,565	

Source: UP and NS Waybills 2019-2024, STB Confidential Carload Waybill Sample 2019-2023 (CCWS), AAR Centralized Station Master (CSM), Serving Carrier Reciprocal Switching Data (SCRS), PC Miler.
Notes:
1) Fixed Effects: STCC3, car owner, AAR car initial, type of pricing arrangement (contract, private quote, etc.), unit train dummy year-month, reporting railroad dummies. Control variables include distance and distance^2, weight and weight^2, local conditions (at both origin and destination): number of Class Is, (log) GDP per capita, (log) personal income, and (log) population.
2) ** P-value<0.05; * p-value<.1. Clustered standard errors in brackets (clustering at the route level).
3) Simple interline moves defined as traffic involving two line-haul carriers on routes with no single-line service by UP or NS.
4) Rule 11 rates are limited to rates for UP-NS interline traffic, for which it has been possible to link up the individual Rule 11 waybills and construct a combined rate that covers both the Eastern and Western portions of the move.
5) Competition variables based on "Competition Version 1".
6) The effect in % terms is computed as: $\exp(\beta) - 1$.

102. The results in Figure 10 demonstrate that interline moves are priced substantially higher than comparable single-line moves, consistent with the combination of lower costs and the absence of double marginalization on such movements. The first two columns report the results from estimating the regression on a sample that includes single-line moves, as

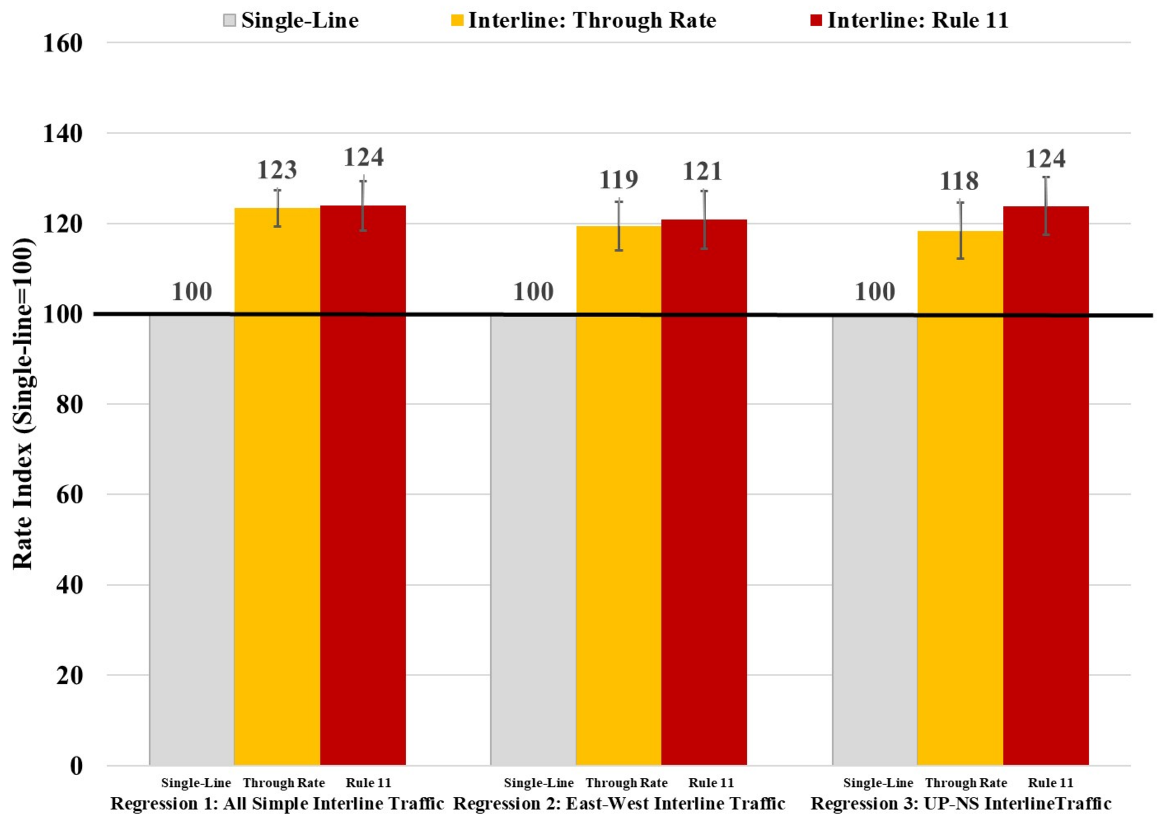
well as all "simple interline" traffic, defined as moves involving two line-haul carriers on routes that do not have single-line service by UP or NS. Column (2) shows that, for comparable shipments, through rates are approximately 23 percent higher than single-line rates and Rule 11 rates are approximately 24 percent higher than single-line rates.

103. The finding that interline rates are higher than single-line rates persists across multiple variations of this analysis, demonstrating that this result is robust (meaning not sensitive to small changes in the data or the regression specification). As the first alternative, I conduct the same analysis as above but limit the interline shipments in the data to those crossing the Mississippi River. These are routes that originate, for example, in the West on UP or BNSF and are completed by NS or CSX in the East, and vice versa. This limitation focuses the regression on the types of routes that will transition from being interline routes to single-line routes following the merger. Columns (3) and (4) of Figure 10 present the results from this test. I find a significant interline premium. Through rates are approximately 19 percent higher than comparable single-line rates, and Rule 11 rates are approximately 21 percent higher than comparable single-line rates.

104. For the second alternative regression, I conduct the same analysis limiting the traffic to only UP-NS interline moves. The results of this analysis are shown in columns (5) and (6) in Figure 10. This analysis once again finds a statistically significant and substantial interline premium: approximately 18 percent for through rates and approximately 24 percent for Rule 11 traffic.

105. In Figure 11, below, I present a graphical summary of the regression estimates reported in in Figure 10.

Figure 11
Rate Differentials between Single-Line and Interline Service



Source: UP and NS Waybills 2019-2024, STB Confidential Carload Waybill Sample 2019-2023 (CCWS), AAR Centralized Station Master (CSM), Serving Carrier Reciprocal Switching Data (SCRS), PC Miler.
Notes:
1) Based on regression analysis reported in Figure 10.
2) Whiskers indicate 95% confidence interval.

4. Schedule and Operations

106. Merger-related improvements to service and operations will allow UP/NS to offer higher-quality rail transportation than would otherwise have been available. Such improvements are pro-competitive and benefit shippers and the public interest.

107. Shippers will benefit from improved routing and coordination between the formerly separate railroads, yielding higher quality service. In particular, shippers will benefit from: (i) the expansion of single-line service, which will reduce transit times and eliminate costly interchanges; (ii) improved routings that will allow traffic to avoid

congested gateways, reducing delays; and (iii) more seamless interactions to schedule and track shipments.[47]

108. The STB has recognized the benefits of such scheduling and operational improvements from integration, citing service and operational improvements as important benefits of prior rail mergers. For example, in its CPKCS Decision, the Board noted[48]:

> [T]he record indicates that the Transaction should result in qualitative benefits to the shipping public, including more single-line service, new and improved routes, more gateway choices, more reliable service, and reduced terminal delay.

109. In fact, these benefits are borne out in data that show that railroads win a higher percentage of traffic than trucks when single-line service is available versus when it is not available.[49] One benefit of single-line service is the reduction in transit time that results from the elimination of interchange handlings between railroads.[50] The benefits of improved routings and more efficient operations are also explained in detail in the Operating Plan filed with this application.[51] In particular, the parties highlight opportunities to offer faster and more reliable service by eliminating interchanges and implementing new blocking plans.[52] For example, the operating plan notes transit times on routes between Southern California and the Northeast are anticipated to fall by 17 to 19 hours, and transit times between Southern California and the Southeast are anticipated to be cut by 70 to 95 hours.[53]

---

47 Union Pacific and Norfolk Southern "Delivering Benefits to All Stakeholders: For Service," available at https://www.up-nstranscontinental.com/benefits/benefits-for-service. See also Gehringer-Orr V.S., ¶ 27 and § 4; and Rocker-Elkins V.S., ¶¶ 12-13 and Figure 4.

48 CPKCS Decision, p. 24.

49 Rocker-Elkins V.S., Figure 2 and Figure 3; Verified Statement of David T. Hunt and Matthew Schabas (hereinafter "Hunt-Schabas V.S."), Exhibit 3-1 and Exhibit 3-2.

50 Hunt-Schabas V.S., Section 3.4.

51 Gehringer-Orr V.S., §4.

52 Gehringer-Orr V.S., ¶ 179.

53 Gehringer-Orr V.S., ¶¶185, 189.

5. **Investment Incentives**

110. As explained in Section IV.A, above, independent railroads make sub-optimal investment decisions. Vertical integration corrects these incentives and benefits shippers in the form of greater investment. The economics behind this is simple; separate railroads face the full cost of an investment, but only earn the profit on their part of the complementary network, and thus too few investments will pass the internal financial "hurdle rates" require to be undertaken.

111. A simple example may help to illustrate. If a railroad could take an action that generated $100 of incremental profit for the joint movements across the railroad's networks at a cost of $60, the action should be undertaken. However, if the railroad keeps only 50% of the profits on joint movements, the railroad will not take the efficient action because it would keep only $50 of the benefit, which is less than the $60 cost of taking the action. The same problem exists in more complex form in reality: Business cases for investments may fail to pass muster when only one firm's profits are included, but once the full profits of the merged firm are considered, this outcome will be reversed. As discussed, the solution to this incentive problem is to combine the two complementary rail networks so that the single, integrated railroad receives the full marginal profit from its management efforts across the combined network.

112. Examples of the investments that will be affected are particularly easy to see in this case. Railroads operate as integrated networks such that increases in utilization of one part of the network (e.g., east-west flows through the middle of the country) can require investments at distant locations to maintain efficient and fluid flows of traffic throughout the system. Today, however, when UP, for example, makes an investment in the west, it fails to consider the benefits to NS in terms of traffic carried in the east. Post-merger, this failure to consider all benefits from investments will be corrected and thus investment incentives will expand.

113. The application provides examples of planned future investments that will facilitate efficient routings and increased rail traffic that is expected to be attracted from other railroads and from trucks. UP/NS plans to increase the line capacity on two UP

mainlines, the Sunset Route that connects Southern California to El Paso and the Golden State Route between El Paso and Kansas City.[54] UP/NS plans to increase capacity on two portions of the NS network, the corridor between Kansas City, Missouri, and Butler, Indiana, and the corridor between New Orleans, Louisiana, and Atlanta, Georgia.[55] These investments involve additional double-tracking and extending sidings to support the additional transcontinental traffic that the transaction is expected to generate.

114. To support the additional traffic and integrated operating plan Applicants will also make further investments totaling $443.5 million in terminals and yards.[56] This includes seven intermodal terminals, two manifest yards, and two automotive facilities.[57] UP/NS anticipates capital investments of over $2.1 billion in the first three years following the merger to enable the growth anticipated by the merger and to realize merger synergies and integrate technology.[58]

115. As discussed below, the transaction is expected to divert millions of truckloads from the highways to the UP/NS rail system. The public benefits of moving trucks-to-rail are clear, but the UP/NS system requires additional investments to support the increased volume of intermodal movements. Applicants plan on substantial investments in additional intermodal capacity at numerous locations across the country. On the current UP system, investments in expansion of intermodal facilities are planned at Houston, Texas, Laredo, Texas, West Colton, California (i.e., California Inland Empire), and Council Bluffs, Iowa.[59] On the NS system, UP/NS plans to invest in expansion projects at Croxton, New Jersey, Sharonville, Pennsylvania, and Toledo, Ohio.[60] Absent the ability to attract additional intermodal volumes from trucks—and the increased

---

54 Verified Statement of John W. Turner (hereinafter "Turner V.S."), §4.B.1.

55 Turner V.S. §4.B.1.

56 Turner V.S. §4.B.2.

57 Turner V.S. §4.B.2.

58 Janke V.S., Tables 5 and 6.

59 Turner V.S. §4.B.2.

60 Turner V.S. §4.B.2.

investment incentives described above—as a result of the merger, these investments would not occur.

C. EVIDENCE OF THE MERGER'S BENEFITS: MODAL SHARES AND DIVERSIONS

116. As independent railroads, UP and NS carry interline traffic between points in the West and points in the East. Following the proposed merger, that interline service will become single-line service. Some shippers will switch from their current interline option to single-line service on UP/NS, indicating that, as the result of service improvements and investments in the combined UP/NS rail network, the merged carrier offers superior service at lower quality-adjusted prices.

117. Hence, a direct demonstration of the benefits generated by the merger comes from the fact that the merged carrier's single-line service is expected to attract business from its competitors. This follows from the law of demand—a railroad offering lower prices and/or better service, which together mean lower quality-adjusted prices, will make sales at the expense of its competitors. Evidence of customer switching—which I analyze below using modal shares and diversions—is the clearest way to demonstrate the benefits of single-line service that the merger unlocks.[61]

1. **Modal Shares**

118. The benefits of single-line service—as demonstrated by shippers' preference for such service—can be assessed by analyzing routes with both single-line and interline options. The Application contains an analysis of rail's modal share compared to truck for county-to-county routes of merchandise traffic where rail can provide single-line service and where it cannot. The figure shows that rail's modal share is often approximately three times higher (e.g., increases from 15% to 51% for lengths of haul between 1,000 to 1,499 miles) for routes where single-line service is available compared to routes where only

---

61 When shippers switch to the merged firm's service, that is direct evidence that the merged firm's service offering has a lower quality adjusted price. This means that when merger-related improvements in quality are considered, the merged firm's offering is more attractive to customers than other offerings even if the price has not decreased.

interline service is available.[62] For long-distance intermodal traffic (i.e., greater than 1,500 miles), when single line service is available, rail obtains approximately 30 percentage points more of the total traffic than it does when only interline service is available.[63] Such an enormous increase in rail share provides strong evidence of the benefits of single-line service and thus of the benefits from the merger.

119. A similar analysis finds that for inter-watershed lanes (i.e., those lanes with either an origin or destination within the watershed region near the gateways of Chicago, IL; St. Louis, MO; Memphis, TN; and New Orleans, LA) single-line service is chosen by shippers over interline service by a wide margin.[64] The analysis also shows that, for all lengths of haul, single-line rail service captures at least 82 percent of rail traffic, and frequently greater than 90 percent.

120. It is important to recognize that options to move rail traffic via single-line service from the west to the east of the U.S. or vice versa today are limited.[65] This simple fact demonstrates the fundamental improvement in industry performance that the proposed merger unlocks, an improvement that comes with no material risk of foreclosure, as demonstrated above.

121. Each of these analyses demonstrates that shippers prefer single-line service to interline service and will benefit not only from the expansion of single-line options, but from a new and valuable transcontinental single-line service that is not currently available to shippers.

---

62 Hunt-Schabas V.S., Exhibit 3-1.

63 Hunt-Schabas V.S., Exhibit 3-2.

64 Hunt-Schabas V.S., Exhibit 4-11.

65 Examples of exceptions include BNSF service to Birmingham, Alabama, and NS service to Kansas City, Missouri. See BNSF and NS Rail Network Maps, available at https://www.bnsf.com/ship-with-bnsf/maps-and-shipping-locations/index.page and https://www.norfolksouthern.com/en/ship-by-rail/our-rail-network.

2. **Diversions**

122. The extent to which shippers will switch to UP/NS single-line service provides a direct indication of the value they place on UP/NS's post-merger single-line service relative to UP and NS's premerger interline service. The *projected diversion* of traffic to UP/NS's single-line service can be used to estimate the value that all shippers (including current UP/NS shippers) place on the improved service. Specifically, with an estimate of price elasticity of demand, one can estimate the percentage change in price that would have generated the same predicted diversions as the merger. Said more simply, one can ask, "what price reduction would have been required to generate a traffic diversion of the same size as that predicted from the merger?" Intuitively, that price reduction provides a monetary equivalent to the value of the merger benefits.[66]

123. The economic literature has demonstrated that, under straightforward assumptions, that equivalence is more than intuitive. In fact, this equivalent price reduction can provide a precise measure of the consumer welfare gains from the merger. That is, this equivalent price change provides a measure of the increase in the value of UP/NS's higher-quality single-line service relative to their premerger interline services.[67]

124. Applicants' largest category of diversions numerically is the diversion of truckload movements to intermodal containers moving by rail; hence it is natural to use this diversion to estimate the increase in quality from the merger. While I focus on this particular category of diversion, the implication for the quality improvements from the merger apply more generally: The ability to divert intermodal traffic from truck to rail provides a way to quantify the quality improvements that all shippers can benefit from.

125. I rely on the cross-price elasticity of demand between truck and rail options to quantify the benefit. The cross-price elasticity of demand quantifies the percentage change in truck traffic on a route from a 1% change in the price of rail service on the route. Truck

---

66 The hypothetical price change does not indicate whether diversion resulted from lower prices, better service, or both from UP/NS.

67 See Willig, R. D. (1978), "Incremental Consumer's Surplus and Hedonic Price Adjustment," *Journal of Economic Theory,* 17(2), 227–253.

traffic increases or decreases depending on whether the rail price goes up or down. Given an estimated cross-price elasticity and quantity of diversions, the shipper benefit resulting from the new UP/NS single-line option can be estimated. Applicants estimate diversions of approximately 1.17 million intermodal containers from truck out of a possible 3.1 million containers.[68] This represents a change in the quantity of truck traffic (i.e., diversion share) of 38 percent. I conservatively use a value of 4, reflecting values in the economic literature, for the truck-rail cross-price elasticity.[69] This cross-price elasticity implies that a 1% price *decrease* in the price of rail intermodal would cause a *decrease* in truck traffic of 4%, which would be diverted to the now less-costly (or equivalently in this case, higher-quality) rail service. A cross-price elasticity of 4 reflects a quite high degree of elasticity between truck and rail. Using this cross-price elasticity and the truck diversion share of 38 percent indicates that the *value* provided by the new UP/NS option is estimated to be equivalent to a 9.4% percent reduction in price.[70] Based on this estimate, it is clear that the projected traffic diversions from the merger imply large benefits to both current and new UP/NS shippers, equivalent in value to substantial reductions in price.

126. Applicants also estimate non-intermodal (i.e., merchandise and auto) Truck-to-Rail diversions of approximately 804,000 trucks or 188,000 equivalent railcars annually.[71] In aggregate it is estimated that {{ }} percent of divertible trucks tons will be diverted to UP/NS on routes where diversion to rail occurs.[72] While I do not have cross-price

---

68 Hunt-Schabas V.S., Section 5.4. The number of potentially divertible containers is the "addressable market" for truck to rail intermodal diversion, see Hunt-Schabas V.S., Sections 5.1 to 5.2.

69 See, *e.g.*, Austin, D. (2018), "Pricing Overland Freight Transport to Account for External Costs," *Journal of Transport Economics and Policy,* 52(1), 45–67, Table 5. McCullough, G. J. and I. Hadash (2019), "Price Effects in Truck Competitive Railroad Markets," in *U.S. Freight Rail Economics and Policy: Are We on the Right Track*, J. T. Macher and J. W. Mayo (Eds.), Routledge, 114–126, at Table 5.5 shows truck-rail elasticities generally lower than for rail-truck elasticities.

70 $(1 / 4) * (1.166 / 3.095) = 0.094$

71 Hunt-Schabas V.S., Section 4.1.

72 See my backup materials.

elasticities from the literature to calculate a precise implied value for these diversions, the estimated Truck-to-Rail diversions for non-intermodal traffic are large and provide further evidence of the significant benefits to both current and new UP/NS shippers from the proposed transaction.[73]

127. Applicants also estimate rail-to-rail diversions of 442,000 cars or units across merchandise, intermodal, bulk, and automotive traffic.[74] The majority of Applicants estimated rail to rail diversions come from BNSF and CSX. Diversions from CSX represent approximately 4 percent of units handled by CSX in 2023, and for BNSF diversions represent approximately 3 percent of units handled by BNSF in 2023.[75] In aggregate for rail-to-rail diversions, Applicants estimate diversions of {{ }} percent (of divertible carloads or units) for merchandise traffic, {{ }} percent for bulk traffic, {{ }} percent for automotive traffic, and {{ }} percent for intermodal traffic.[76] While I do not have precise cross-price elasticities from the literature to calculate an implied value of these diversions, these estimated diversions are large and further make clear that the levels of diversion projected from the merger imply large benefits to current and new UP/NS shippers.[77]

128. The benefits demonstrated by the level of diversions accrue to more than just the traffic that is diverted. The diversions demonstrate the anticipated value to shippers from the improved quality—and thus the improved option in the marketplace—that the merged carrier will provide. But this improved service will also be available to existing UP-NS interline shippers on these routes. In addition, to the extent the improvements generated

---

73 In general, the cross-price truck-rail elasticities for these other (non-auto) types of commodities that would be diverted from truck into railcars tend to be lower than for intermodal traffic. The implication is that for the same share of truck traffic of this type diverted, the equivalent price percentage drop is greater.

74 Hunt-Schabas V.S., Exhibit 6-1.

75 Hunt-Schabas V.S., Section 6.1.

76 See my backup materials.

77 See, e.g., McCullough, G. J. and I. Hadash (2019), "Price Effects in Truck Competitive Railroad Markets," in *U.S. Freight Rail Economics and Policy: Are We on the Right Track*, J. T. Macher and J. W. Mayo (Eds.), Routledge, 114–126, at Table 5.5.

by the merger induce a response from competing railroads and other transportation modes in terms of lower prices or improved service, such competitive responses generate additional benefits induced by the merger, making my quantification of direct benefits from the UP/NS quality improvements conservative.

129. In addition to the private benefits obtained by shippers from higher quality intermodal service to be provided by the Applicants, Truck-to-Rail diversions generate substantial external public benefits beyond that reflected in the improved service quality shippers receive.[78] Per ton-mile moved, compared to freight rail transportation, trucks generate more pollution, are more dangerous in terms of injuries and deaths, and create congestion on highways and roads.[79] Moreover, trucks utilize publicly funded transportation networks whereas the rail network is privately-owned and operated and receives limited government funding. Diversions from truck to rail generated by the merger create additional unpriced benefits to society that are not captured in the price-equivalent service improvements received by shippers.

D. IMPLICATIONS FOR POTENTIAL FUTURE MERGERS

130. The STB requests parties include an analysis of whether and how potential future mergers of Class I railroads (proposed in response to this proposed transaction), could affect the structure of the industry and the public interest. I understand the Applicants address this requirement in their Application.

---

78 See Verified Statement of Mathew Graham for a discussion of certain external benefits of diversions of truck to rail arising from the merger.

79 Austin, D. (2019), "Accounting for External Costs in Freight Transport: Eight Policy Options," in *U.S. Freight Rail Economics and Policy: Are We on the Right Track*, J. T. Macher and J. W. Mayo (Eds.), Routledge, 81–113 at Table 4.1. The estimated differential external costs for truck and rail transportation range from 2.32 to 5.04 cents per ton-mile, in 2014 dollars, based on minimum and maximum estimates by mode. Applicants estimate a net reduction of 50 billion truck freight ton-miles due to merger-induced truck-to-rail diversions, see Hunt-Schabas V.S. Exhibit B-58. Using a simple assumption of 3 cents per ton mile in differential external costs between truck and rail and an equivalent offsetting increase in rail freight ton-miles, the predicted truck diversions reduce unpriced external social costs by $1.5 billion per year.

131. From an economic perspective, and as I have discussed, the merger of UP and NS will generate significant vertical benefits for shippers. These vertical benefits—including the expansion of single-line service, more efficient service and operations, and increased investment—are unlikely to be undermined by any subsequent mergers. Instead, a future U.S. transcontinental merger would also tend to be predominantly vertical with similar effects. To the extent such a merger generated efficiency improvements it would put more competitive pressure on UP/NS.

132. That said, two points are worth emphasizing:

- Even if no subsequent merger occurs, the analysis of this merger stands on its own. It generates substantial pro-competitive benefits without a realistic risk of foreclosure and thus it is pro-competitive and beneficial to shippers on its own terms.
- Any proposed future merger must be evaluated on its own merits and would have to be evaluated based on the specific elements of that application, including detailed analysis of how that proposal impacts shippers and the overall rail network. That analysis may indicate that specific conditions should be placed on that future merger that are distinct from those placed on the present transaction due to distinct characteristics of that merger. In addition, that analysis may reveal circumstances that require adjustments to components of (or conditions placed on) this transaction in order to protect shippers and the overall public interest. Such decisions can be made if and when a future transaction is proposed and its details are known.

V. UP/NS'S COMMITTED GATEWAY PRICING IS DESIGNED TO ENHANCE COMPETITION

133. For the reasons I discuss above, the proposed transaction will generate significant benefits for customers and the broader public and enhance competition. Hence, the merger is pro-competitive and shipper-welfare enhancing in its own right.

134. To further enhance these competitive effects, UP and NS have also included in their application a proposal to establish Committed Gateway Pricing designed to enhance competition further, by providing competitive options to certain shippers and routes that would otherwise not directly benefit from the vertical integration of UP and NS.

135. Committed Gateway Pricing accomplishes this by using UP/NS rates—rates that reflect the benefits of improved pricing incentives and cost reductions generated by the merger—to determine the rates that may be used *by CSX and BNSF* to set through rates for eligible traffic. Moreover, because CGP also incorporates rates established on routes with existing intra-modal competition between UP/NS and CSX and BNSF, CGP extends the benefits of that competition to routes that are otherwise sole-served and do not benefit from such competition.

A. THE COMMITTED GATEWAY PRICING METHOD

136. CGP is a market-based mechanism that allows BNSF and CSX to offer the benefits of existing competition, as well as improved pricing incentives and cost reductions flowing from the merger, to certain shippers and shipments that otherwise would not benefit from either. The CGP method is explained in detail elsewhere in this application, but broadly consists of three steps:[80]

- Identify relevant traffic by commodity and distance, designed to reflect commodity groupings subject to similar market forces and costs structures; [81]

[80] See Verified Statement of Katherine N. Novak (hereinafter "Novak V.S."), including Appendix A, for the description of CGP.

[81] The comparable traffic groups consist of 23 market categories based on commodity classification and four distance categories, resulting in 92 groupings based on commodity and distance. Certain traffic, such as intermodal, finished vehicles, and unit trains, are not covered by CGP.

- Identify UP/NS rates for traffic in the relevant commodity and distance categories and set the Committed Gateway Price to the 70th percentile of the UP/NS rate (in dollars per car-mile);[82]and
- Provide to BNSF and CSX, separately, Committed Gateway Price for each commodity and distance group.[83]

137. The Committed Gateway Price is the guaranteed rate at which UP/NS will provide service on the UP/NS segment of eligible interline moves. For purposes of CGP, eligible traffic is defined as manifest traffic to or from facilities solely served by UP/NS (or a short line interchanging traffic solely with UP/NS) that interchanges across one of the east-west gateways—Chicago, St. Louis, Memphis, or New Orleans—and is solely-served by BNSF or CSX (or a short line interchanging traffic solely with BNSF or CSX) at the other end. Because CSX or BNSF can use the Committed Gateway Price to quote a through rate that undercuts a high division or Rule 11 rate offered by UP/NS, the Committed Gateway Price effectively caps the rates that UP/NS can charge for these movements. However, nothing prevents the shipper from utilizing existing options including negotiating for a potentially lower rate Rule 11 rate from UP/NS and/or a lower total rate for the full movement.

---

82 The identified groupings are populated with rates based on UP/NS traffic movements for a twelve-month period. For each commodity-distance grouping the rate and distance associated with a corresponding UP/NS shipment is collected, and the rate per car-mile is calculated. If there are 100 or more shipments in a grouping during the period, then the rate calculation will be determined based on shipments in that grouping. If fewer than 100 shipments are within a grouping, then aggregated data for the distance range will be used to determine the car-mile rate. Requiring a minimum number of shipments reduces the likelihood that outliers or non-representative observations affect the calculated rates. For purposes of determining shipments, a combination of waybill date and equipment identifier is used, which means that in most cases 100 carloads, not in unit trains, will be sufficient to populate a cell in the table. Twelve cells, eight for CSX and four for BNSF would potentially fall under the 100-shipment threshold, using 2024 UP and NS waybill data, and would have their CGP rates derived from the aggregated distance groupings without commodity specific information.

83 To account for the fixed costs associated with originating or terminating a rail movement, a minimum price based on 250 miles is applied to the car-mile rates for a commodity grouping to otherwise adjust for very short moves. See Novak V.S., § I.B.2.

B. Committed Gateway Pricing Extends Benefits To Routes That Otherwise Would Not Directly Obtain Merger Benefits

138. The proposed merger brings benefits to shippers by connecting two complementary networks to create a seamless, single-line, rail service connecting the east and west coasts. As described above, the combined UP/NS will provide improved single-line service and will introduce efficiencies throughout the network, benefiting shippers on many east-west routes. While the benefits of the proposed merger extend to the entire US rail industry, only routes served by UP on one end and NS on the other benefit directly.

139. In contrast, routes served by UP on one end but only CSX on the other, or NS on one end but only BNSF on the other, do not benefit as directly from the vertical integration of UP and NS. By providing BNSF and CSX access to the Committed Gateway Price—for routes that are sole-served by them on one end and UP/NS on the other—the CGP provides the benefit of existing rail competition and benefits from the merger to shippers on routes that would not otherwise see such benefits.

140. The CGP proposal also directly addresses concerns that vertical mergers may limit source and geographic competition. CGP's potential of lower rates—and at least a cap—on the UP/NS portion of interline moves will enhance geographic and source competition for other routes moving the same or similar commodities. The ability of, for example, an industrial chemicals producer sole-served by UP/NS to reach a CSX sole-served consumer, using a Committed Gateway Price that is below the rate that UP/NS otherwise have charged, provides an enhanced competitive option in both the production and consumption of the industrial chemical.

C. Experience From The I-5 Corridor Shows Similar Rate Agreements Enhance Competition

141. An existing analogous agreement—the I-5 Agreement between BNSF and UP regarding movements and rates between the Pacific Northwest and the U.S. Southwest—demonstrates the competition-enhancing effects of market-based gateway rates. The I-5 Agreement, provides UP the ability to market transportation services directly to BNSF-served shippers for transportation across the Portland gateway without the direct

involvement of BNSF.[84] In this way it is very similar to CGP and served as an inspiration for parts of the CGP proposal, although CGP has been modified to improve the proposal, based on lessons learned from the I-5 Agreement.

142. The I-5 Agreement arose in conjunction with the UP-SP merger and was imposed by the Board as a condition of its approval of that merger. It was not intended, however, to remedy specific competitive harms arising from the transaction. Rather, UP agreed to sell a rail line to BNSF that created single-line BNSF service between western Canada and southern California. This created a single-line competitor to UP along much of the I-5 corridor. The I-5 Agreement then provided UP access to BNSF-served locations in the Pacific Northwest with market-determined rates determined under the agreement. The agreement represents a pro-competitive component of a larger agreement that permanently rationalized ownership and operation of rail lines between California and Washington state.

143. The I-5 Agreement and the CGP proposal share a number of fundamental elements. Both define the range of shippers, locations, and movements to which the guaranteed rates may be applied. Both are limited to movements across a defined gateway or gateways. Each utilizes information on market rates derived from corresponding traffic from the incumbent carrier—BNSF for the I-5 Agreement and UP/NS for the CGP. These rates are then used by the non-incumbent carrier(s) to establish a guaranteed rate for interline service. They also both provide for non-discriminatory service level commitments, means for auditing, rules and schedules for data collection, processing and establishing of rates, and mechanisms for managing periods of limited or missing data.

144. Critically for the present transaction, UP's experience with the I-5 Agreement demonstrates that carefully designed market-based gateway rates can successfully enhance competition, and that this occurs in ways beyond simply sharing rates. The I-5

84 The "I-5 Agreement," also known as BNSF Proportional Rate Agreement, was analyzed by the STB in its approval of the UP-SP merger. See *Union Pacific Corporation, et al.—Control and Merger—Southern Pacific Rail Corporation, et al.,* STB Docket No. FD 32760, Decision No. 44, August 6, 1996 (hereinafter "UPSP Decision"). The agreement also provides UP with access to connections for certain locations in western Canada.

Agreement also generated significant non-price benefits and resulted in a more competitive overall product. UP was able to respond to new opportunities at BNSF-served locations without being dependent on BNSF to establish a rate to UP destinations. And UP was able to offer shippers the higher-quality customer experience that comes with working with a single railroad.

145. Shippers have made extensive use of this competition under the I-5 Agreement. Figure 12 shows that since 2009 UP has moved over {{ }} carloads under the I-5 Agreement, accounting for nearly {{ }} billion in revenue to UP.[85] The volume of traffic moving under the I-5 agreement has generally grown over this period, with carload volume in 2024 more than {{ }} of 2010 volume.

Figure 12
UP I-5 Agreement Traffic: 2009 – 2024 {{

}}

Source: UP I-5 History Data
Notes:
1) UP Net Revenue removes the revenue paid to BNSF.

85 2009 is the earliest date for which I have data.

146. UP has used the I-5 Agreement to compete successfully against BNSF for all major commodities moving over the I-5 corridor. Southbound traffic predominates over this corridor, and, as shown in Figure 13, UP has achieved higher volumes than BNSF for {{ }} of the top ten commodities over this corridor. Given the product mix, forest products (largely STCC2 24 and 26) moving southbound from the Pacific Northwest have accounted for a {{ }} of I-5 traffic and UP has achieved {{ }}.[86]

86 See my backup materials. This traffic reflects movement over the I-5 corridor but includes UP movements not utilizing the I-5 Agreement proportional rate.

Figure 13
BNSF and UP Carloads Over the I-5 Corridor
2023 Top Ten Southbound 2-digit STCCs {{

}}

Source: STB Confidential Carload Waybill Sample
Note: CCWS traffic is limited to Southbound shipments covered under BNSF and UP's 1997 I-5 Agreement. Southbound traffic is defined as BNSF or UP traffic originating in an I-5 Northern region and terminating in the I-5 Southern Region. Based on CCWS and subject to variance arising from sampling. Given limitations of the CCWS, this traffic also includes UP movements not using the I-5 Agreement proportional rate but moving between the areas covered by the Agreement,

147. The I-5 Agreement enhanced geographic competition through improved competitive options to otherwise sole-served shippers; the CGP proposal will do the same.[87] UP obtains access to BNSF-served shippers located in the Pacific Northwest through gateway prices provided under the I-5 Agreement; CGP provides CSX the ability to market directly to sole-served UP shippers, and BNSF the ability to market directly to

[87] The I-5 Agreement was not limited to BNSF sole-served locations, but in the region served by BNSF there was little if any additional competitive rail options serving these locations.

sole-served NS shippers, for shipments over the east-west gateways. As explained by the STB, looking at wood products producers in the Pacific Northwest:[88]

> When Oregon lumber moves south to California, competition from the north has been limited because access to California required interline arrangement with [UP-predecessor] SP. The BNSF PRA [the I-5 Agreement] opens that access, thereby intensifying source competition. From the standpoint of destination competition, an Oregon shipper has the choice of directing lumber either to eastern markets or to California depending on product market conditions and transportation options. These forms of geographic competition were highly effective pre-merger, and with the BNSF PRA, will improve post-merger.

148. In the UPSP merger, the primary objection to the I-5 Agreement was from shippers that were not eligible to participate and were concerned about the enhanced competitiveness the I-5 Agreement provided to shippers covered by it.[89] But this concern is a feature not a bug; it demonstrates the extra competition spurred by the Agreement. CGP provides similar "intensified" source and geographic competition arising from CSX (and BNSF) access to UP (and NS) shippers across the east-west gateways.

D. Analysis of the Committed Gateway Pricing Proposal

1. Lessons learned from the I-5 Agreement

149. Although the I-5 Agreement has been successful on its own terms, all programs can be improved. UP's multiple decades of experience with the I-5 Agreement have provided lessons for improving the operation of CGP. These improvements are designed to provide a more stable, useful, and effective mechanism through which CSX and BNSF can utilize the available rates to market to shippers on routes between a UP sole-served location and a CSX sole-served location, or between an NS sole-served location and a BNSF sole-served location.

150. One significant improvement in the CGP proposal is how 'cells'—the category that determines the traffic from which the Committed Gateway Price is calculated and the

---

88 UPSP Decision, p. 403.

89 UPSP Decision, pp. 401 and 467-468.

traffic to which it is applied—are defined. In the I-5 Agreement, cells were entries in a multidimensional matrix, determined based on the 3-digit STCC of the freight, direction (i.e., north- or south-bound), five northern regions, car type, car ownership, and train size. This resulted in thousands of possible cells, most of which remained empty, but still with thousands of different possible rates depending on the traffic characteristics. This enormous number of cells, most of which were either empty or populated by very little data, has created significant logistical challenges in implementing the I-5 rates. CGP, in contrast, is categorized by twenty-three freight groupings and four distance ranges, resulting in fewer than 100 possible rate categories for each interline railroad, a much more manageable setup generating significant benefits, described next.

151. The reduced number of rate cells makes the CGP cells more likely to be populated, stable, and representative of market rates. By aggregating UP/NS price data into fewer cells based on only two criteria—commodity group and distance—the resulting rates are based on much more data, which means they can more reliably reflect current market conditions. The CGP proposal also provides a mechanism by which all cells will always have a rate available for use by BNSF and CSX in serving shippers. In contrast, under the I-5 Agreement, if no movement is made by BNSF in a cell category, no rate exists to be used by UP for the potential benefit of shippers. When no actual rates exist for a given cell, cells are updated using an alternative mechanism that is not based on actual movements, meaning cells populated in this way are not based on relevant market conditions.

152. CGP incorporates several additional improvements over the I-5 Agreement. First, the Committed Gateway Prices are updated annually, while the I-5 Agreement's prices are updated quarterly. This annual cycle provides greater stability in pricing for other railroads to market to shippers based on the available gateway rates, without the rates quoted to shippers varying wildly. Additionally, CGP includes other elements that make it more practical and reduce potential negative consequences of market-based gateway pricing.

- The movements used to determine the Committed Gateway Prices are distinct from the movements to which the price is applied. This avoids potential unsustainable feedback in rate making (whereby the use of rates under CGP in one year affects the rates available under CGP in future years, potentially leading to instability in the distribution of rates).
- The Committed Gateway Price is based on the 70th percentile (weighted by carloads) of the distribution of rates, rather than the average. As discussed below, using a percentile to establish the Committed Gateway Price rather than an average reduces the incentive of the incumbent railroad (i.e., BNSF for the I-5 Agreement, and UP/NS here) to compete less aggressively for certain traffic and better retains the incentive to pass on the benefits of the merger to shippers. The 70th percentile provides a reasonable balance between the enhancement of competition provided by the availability of CGP and the incentives discussed below.
- Rates are based on car-miles, rather than ton-miles. This is more consistent with current rate making, avoids disputes over car weights, and mitigates the influence of outliers (i.e., lightly-loaded cars) in establishing rates.

153. UP/NS proposes that CGP terminate at the end of the oversight period. Market conditions change over time, therefore, CGP should be reviewed to ensure it continues to operate as intended. UP/NS indicates that if the anticipated public benefits of the merger fail to materialize in a timely manner, the Board could extend the availability of CGP.[90]

2. **Mitigation of adverse incentives**

154. I find that CGP is welfare enhancing for shippers and the economy. However, using the incumbent carrier's rate (UP/NS in this application) as an input for establishing the gateway rates can potentially create an incentive for the incumbent carrier to compete less aggressively and transact at rates higher than would otherwise occur absent the

---

90 Novak V.S., § I.B.6.

gateway rate mechanism. In this case, the impact of this adverse incentive is limited for several important reasons and, as I show below, the benefit of CGP to shippers outweighs any negative effect of incentives to compete less aggressively for some traffic. So, bottom line, even considering this potential effect on pricing incentives in the markets where prices are set, CGP increases shipper welfare by extending competitive benefits to routes that would not otherwise benefit as directly from the merger.

155. **First**, the adverse incentive is only even potentially relevant with respect to traffic that is used to calculate Committed Gateway Prices, a subset of overall traffic. And critically, as I show below, because the proposal uses a percentile rather than an average to establish the Committed Gateway Prices, the adverse incentive applies to only a small portion of even that traffic.

156. **Second**, the Committed Gateway Prices are calculated using the largest practical group of shipments and is applied narrowly, which means that the potential benefits of competing less aggressively will be small (because they will only apply to the set of traffic where CGP is applied) relative to the loss of profits from doing so (which will apply to the large set of traffic on which the Committed Gateway Prices are computed). Specifically, the Committed Gateway Price (for CSX) is calculated using traffic moving on *all routes* served by UP in the west and interconnecting with NS or CSX in the east. Only traffic between sole-served UP and sole-served CSX locations is excluded. The resulting Committed Gateway Price is available to CSX only to and from its sole-served customers in the east and only on routes that are sole-served by UP in the west. (Corresponding rates available to BNSF are established using traffic between NS locations in the east and UP and BNSF locations in the west.) Using the largest practical traffic group to calculate the Committed Gateway Price also makes it more difficult for the incumbent carrier to manipulate rates effectively, because changing the rate of any particular shipment will have limited to no effect on the Committed Gateway Price.

157. Based on recent UP and NS traffic data, the Committed Gateway Prices available to CSX will be calculated based on nearly {{ }} annual carloads comprised of UP-CSX and UP-NS interline shipments and will be available to only approximately {{ }}

annual UP-CSX sole-served interline shipments.[91] On the BNSF side, the Committed Gateway Prices will be calculated based on nearly {{ }} annual carloads comprised of NS-BNSF and NS-UP interline shipments and will be eligible to only roughly {{ }} annual NS-BNSF sole-served interline shipments. CGP is designed to apply across a broad range of commodities, but shippers of chemical, plastic, agriculture, and food product commodities would have approximately {{ }}}} annual shipments eligible for CGP.

158. **Third**, the Committed Gateway Price is determined using a percentile rather than an average. If the Committed Gateway Price were established using an average of rates, the incumbent carrier would have the small incentive to price less aggressively on all traffic that goes into the determination of the average gateway rate available to other railroads. However, using the 70th percentile as the basis for CGP means the incentive to price less aggressively is concentrated only on transactions around those that form the 70^{th} percentile of the rate distribution. For most transactions below this level, there is no direct effect of any change in rate on CGP. Instead, the ability to influence the Committed Gateway Price arises only from a change in volume shipped under those rates which then alters which transaction establishes the 70^{th} percentile rate. As shown below, this incentive is small.

159. **Fourth and critically**, the use of the 70^{th} percentile in CGP and UP/NS' incentive to raise the Committed Gateway Price would also create a countervailing incentive for UP/NS to lower the rates for traffic associated with the highest rates on routes that determine the Committed Gateway Price. Similar to the incentive below the 70^{th} percentile, one way to increase the 70^{th} percentile rate is to increase the volume of traffic that would otherwise be transacted at rates above the 70^{th} percentile, thus increasing the price at which the 70^{th} percentile falls (since more traffic in the top of the distribution means a higher price is required such that only 30 percent of traffic moves at prices higher than that level). This can be achieved via *decreasing* the rates that are above the

---

91 My estimations of carloads within the input and eligible segments of CGP are based on defining sole-served stations based on a combination of CSM and SCRS information.

70th percentile rate and encouraging additional volume from these shippers. Therefore, in addition to lowering the rates potentially offered to shippers for whom CGP applies, CGP may also benefit shippers who face the highest rates on routes from which the Committed Gateway Price is determined.

160. As shown below, the net effect of CGP is to enhance competition and improve the welfare of shippers. Any small incentive for UP/NS to compete less aggressively on some routes is more than offset by the benefits sole-served shippers receive from CGP in capping the rates UP/NS may charge on its portion of the interline shipments to which CGP applies.

E. Welfare Effects of the Committed Gateway Pricing Proposal

1. Period in which UP/NS cannot influence CGP Rates

161. In the initial period during which CGP is implemented, rates will be based on historical rates that were transacted prior to the merger and before CGP is implemented. Any adverse incentives for UP/NS to compete less aggressively on routes that determine the Committed Gateway Prices will not be reflected in those rates. During any time when CGP rates are based on rates that UP/NS cannot influence, the effect of CGP will be purely welfare enhancing, benefiting shippers on routes where CGP applies by providing lower rates to interline partners that can be shared with shippers.

162. To estimate the potential savings that CGP will offer during its first year of implementation, I calculate the hypothetical Committed Gateway Prices that will be available to CSX and BNSF separately for each of the commodity and distance groups in the CGP proposal based on UP and NS rates distribution in 2024. I then calculate the amount of traffic on eligible UP-CSX and NS-BNSF interline routes that had rates on UP or NS in 2024 that are above the calculated Committed Gateway Prices—the volume of traffic that could benefit from CGP—and the amount of potential savings that these shippers could receive from CGP. This estimated eligible volume of traffic and potential savings are reported in Figure 14, below. In total, I estimate that a potential savings of up

to $43.6 million from CGP in the first year could be available to shippers.[92] Note that this estimate represents a lower bound on the total benefits that CGP will offer in the first year, as this calculation does not take into account the output expansion effect of the lower rates offered by CGP; rather it is pure rate reduction on existing traffic with no output expansion.[93]

Figure 14
Estimated Potential Benefits from CGP in the First Year of Application

Commodity Group	Carloads Used for Calculation of CGP	Carloads Eligible for the CGP	Carloads Potentially Benefiting from the CGP	Estimated Potential Benefit from the CGP
Industrial Chemicals	98,342	15,153	2,311	$7,203,947
Refrigerated	12,524	4,603	2,362	$6,808,708
Sand	42,189	6,695	5,009	$5,203,622
Specialized Markets	23,580	10,627	2,348	$4,679,411
Food & Beverage I	10,381	7,323	2,404	$3,452,518
Grain Products I	36,727	5,300	2,359	$3,373,678
Plastics	91,282	21,792	2,664	$2,469,871
Metals & Ores II	16,227	1,782	358	$2,015,230
Fertilizer & Sulfur	24,385	4,757	1,219	$1,224,455
Grain Products II	26,660	6,356	1,325	$957,480
Petroleum	20,346	2,025	827	$948,390
Petcoke	1,845	1,430	705	$835,736
Forest Products I	27,316	8,503	1,508	$740,952
Coal & Renewables	536	46	44	$736,267
Grain	25,387	5,603	915	$733,385
Food & Beverage II	19,692	8,272	726	$672,809
Metals & Ores I	35,980	4,705	362	$457,171
Forest Products II	12,773	4,243	448	$371,379
OTE	8,868	1,683	265	$234,804
Construction	11,207	2,866	141	$217,441
LPG	16,306	1,285	116	$150,446
Not Assigned	86	305	217	$69,730
Soda Ash	21,542	5,027	63	$14,282
Auto Parts	8,002	357	0	$0
Total	**592,183**	**130,738**	**28,696**	**$43,571,710**

Sources: UP and NS Waybill Data 2024, AAR Centralized Station Master (CSM), Serving Carrier Reciprocal Switching Data (SCRS), UP Short Line Access Information

---

92 The actual savings available to shippers will depend on the responses of BNSF and CSX in through rates offered to shippers as a result of the lower rates provided to them under CGP by UP/NS.

93 With regards to the inclusion of sole-served short lines, the calculation of potential benefits uses information provided by UP as well as information from the CSM and SCRS to determine which short lines are served by a single Class I railroad. Shipments from sole-served short lines represent an approximately 11,000 of the input carloads, approximately 8,500 of the eligible carloads, and approximately $2.5 million in potential benefit in the first year shown above.

2. **Simulation model of CGP effects going forward**

163. To evaluate the welfare effects of the CGP proposal on shipper welfare going forward, I have developed a simulation model in which railroads set rates to maximize their profits given shippers' choices of routes and contracting arrangements. The model is calibrated to observed data on rates and volume of traffic from interline shipments that will be used as inputs to calculate the Committed Gateway Prices, as well as from interline shipments eligible to use CGP, along with information on UP's and NS's average margins.[94] I use the model to simulate the profit maximizing rates that UP/NS and the interline partners will set under different post-merger scenarios. I evaluate the welfare effects of CGP on shippers by comparing the rates that UP/NS has the incentive to set with and without CGP. The mathematical and computation detail of this simulation model is provided in Appendix C.

164. For interline shipments that are used as *inputs* to calculate the Committed Gateway Prices, CGP has multiple effects that go in different directions, all captured by my model. As explained above, the CGP proposal creates an incentive to compete less aggressively on some of the shipments used in the generation of the Committed Gateway Prices. Most of this incentive is focused around the 70th percentile rate, with *much smaller* incentive to compete less aggressively for rates below the 70th percentile.[95] Notably, however, above the 70th percentile—that is, for the highest rates in these input markets—the incentive is reversed, and the pricing pressure from CGP is downward. UP/NS has an incentive to reduce rates on higher-priced shipments, thereby inducing additional volumes above the CGP percentile threshold. These two opposing incentives are illustrated in Figure 15, below, using as an example the model simulation results for the commodity group "Forest Products I" and the distance band "1,500 Miles or Greater," focusing on the Committed Gateway Price that would be available to CSX. For this CGP cell, my

---

94 Due to data limitation, I am not able to accurately determine BNSF's and CSX's rates for shipments that involve short lines. For this reason, I excluded short line shipments for the purpose of this simulation.

95 To the extent higher rates below the 70th percentile reduce output, it will tend to shift upward the 70th percentile price.

simulation model estimates that UP/NS will compete less aggressively on the set of shipments that faces rates below {{ }} per car-mile due to CGP, raising the 70th percentile rate from {{ }} per car-mile to {{ }} per car-mile. However, as also shown in the figure, UP/NS will also be pricing more aggressively and lowering rates for about {{ }} percent of traffic, and importantly, this will be for the traffic that faces the highest rates for this set of shipments.

Figure 15
Simulation Results: UP/NS's Optimal Rates for Shipments from which the Committed Gateway Price is Calculated {{

}}

165. Most importantly, for interline shipments that are eligible to utilize CGP, the CGP proposal provides unambiguous shipper-welfare benefits. CGP provides the interchange railroad an option to utilize the lower Committed Gateway Price rather than the rate UP/NS would otherwise provide on its portion of the move. The interchange railroad, with the ability to use CGP, has the incentive to price more aggressively and pass some

or all of that reduction in the UP/NS rate due to CGP onto the shipper.[96] This provides direct benefits to the shipper, and with a lower through rate, the incentive expands the volume of shipments on that route. Figure 16 demonstrates this benefit for shipments that are eligible to utilize CGP, for the CGP cell that is used as an example in Figure 15 above. For this set of shipments, the Committed Gateway Price of {{ }} per car-mile represents the {{ }} percentile rate, which means that {{ }} percent of the traffic would face a lower rate as a result of CGP.

96 Although the degree to which reductions in UP/NS rate will be passed through from the interchange railroad to shippers generally depends on various supply and demand factors, when faced with a marginal cost reduction, a profit maximizing firm typically has an incentive to pass some or all of the savings it receives onto customers in the form of lower prices, just as it has the incentive to raise prices when marginal cost increases. In certain cases, firms may also lower prices by an amount that exceeds the marginal cost savings (i.e., a pass-through rate that exceeds 100 percent). See, e.g., Miller, N. H., M. Osborne, and G. Sheu (2017), "Pass-Through in a Concentrated Industry: Empirical Evidence and Regulatory Implications," *The RAND Journal of Economics*, 48(1), 69–93.

Figure 16
Simulation Results: UP/NS's Optimal Rates for Shipments to which CGP is Applicable {{

}}

166. As shown in the above example, except for the volume of traffic concentrated around the 70th percentile rates for interline shipments included in the calculation of the Committed Gateway Price, UP/NS's incentive to compete less aggressively tends to result in rate increases that are much smaller in magnitude compared to the direct benefits that shippers are likely to receive on interline shipments to which CGP is applicable. This suggests that CGP will be beneficial overall. To confirm that intuition, I implement the simulation model that I described above (and in more detail in Appendix C), calibrated to actual data from 2024, to measure the benefits. For the particular example shown in Figure 15 and Figure 16 above, I find that the direct benefits of CGP dominate any potential upward price pressure in the input markets, resulting in an increase in overall shippers' consumer surplus by about $592 thousand a year.

167. Due to data limitations, I am only able to perform this simulation for 27 CGP cells where I have sufficient data to estimate shippers' demand and margins of railroads reliably.[97] *Strikingly—and consistent with the simulation results in the example discussed above—I find that the direct benefits of CGP outweigh any potential welfare reductions in all of these 27 CGP cells, resulting a total net increase in shippers' consumer surplus of about $10.3 million a year across these cells*.

168. To put into perspective the magnitude of this welfare effect estimate of $10.3 million a year, I multiply this estimate by the ratio of the volume of traffic in the data to the volume of traffic included in my simulation. I calculate this ratio using two different approaches to obtain a range of potential welfare effects of CGP on all affected shipments. First, I calculate this ratio for all interline shipments from which CGP is calculated and all interline shipments to which CGP applies. Using this approach, I obtain a net increase in shippers' consumer surplus of $61.8 million a year. Second, I calculate the above ratio using only interline shipments to which CGP applies, which produces a more conservative lower bound estimate of $39.4 million a year.[98]

169. The welfare effect estimated by my simulation model is almost surely an underestimate of welfare benefits of CGP to shippers, however. Although my simulation model accounts for the response of existing shippers on existing routes to changes in rates as a result of CGP, the model does not account for new interline traffic that CSX or BNSF may be able to attract as a result of CGP. The availability of CGP provides CSX and BNSF the opportunity to market directly to UP/NS sole-served shippers and enables them to provide rates to UP/NS sole-served shippers without the concurrence of UP/NS. For example, CSX can approach a UP sole-served shipper directly with a through rate using

---

97 One main data limitation I face is that I do not observe the rates set by CSX and BNSF in UP-CSX and NS-BNSF interline shipments, when the shippers have chosen to use Rule 11 to negotiate rates separately with the two railroads.

98 Because the number of carloads that is missing from the model is higher for the set of shipments that is used to calculate CGP (increasing this set of shipments would lower UP/NS's incentive to raise rates), calculating the above ratio using only data from shipments to which CGP applies produces a conservative lower bound on the estimate of the total welfare effects of CGP.

UP/NS's Committed Gateway Price for delivery to a CSX sole-served location. Thus, CSX can unilaterally compete against UP/NS for a sole-served UP shipper for movement to a CSX destination, in potential geographic competition against a UP/NS alternative, in a manner that was not previously available and is not accounted for in the simulation.

170. The ability of CSX and BNSF to market to shippers using CGP absent any required concurrence from UP/NS can open multiple alternative origins or destinations that may not have otherwise been economically feasible to serve if rates and concurrences from UP/NS were required. Indeed, as seen with the experience of the I-5 Agreement, the ability to market directly to shippers—rather than having to rely on joint negotiation or concurrences—opened up new markets and permitted substantial volumes of traffic to compete with the pre-existing markets and locations. Shippers taking advantage of these new market opportunities provided by CGP represent an unambiguous welfare enhancement to shippers and the economy.

VERIFICATION

I, Mark A. Israel, declare under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this statement.

Executed this 17th day of December, 2025.

/s/ Mark A. Israel
Mark A. Israel

Appendix A

This Appendix explains in more detail, including reference to the economics literature, the basis for my conclusions about the lack of realistic foreclosure concerns from the transaction.

Framework

There are five main ways in which railroad transport service between the eastern and western U.S. is sold:

1. 1*1 routes: both routes are sole served.
2. 2*1 routes: there is customer-facing monopoly on one leg and duopoly on the other.
3. 1*2 routes: there is customer-facing duopoly on one leg and monopoly on the other leg.
4. 2*2 routes: there is duopoly on both legs.
5. Rule 11: the shipper gets quotes for both legs; potentially applies to any of 1-4.

In addition, arrangements vary depending on whether shippers negotiate contractual terms with railroads or whether they are price takers, whether pricing terms are linear or nonlinear, and whether railroads have private cost information. I discuss the scope for harm in cases, 2, 3, and 5, which are the situations where STB has expressed some concern about possible foreclosure.[1]

Throughout the discussion I use the terminology "fully integrated price," "fully integrated outcome," and "fully integrated wholesale prices" as follows:

> *Fully integrated price*: For routes that are sole served on at least one end, the fully integrated price is the full price (a through rate or the sum of the prices of each leg) the shipper would pay if all sellers were vertically integrated.
>
> *Fully integrated outcome*: The equilibrium values of all the relevant variables associated with the outcome that generates the fully integrated prices.
>
> *Fully integrated wholesale prices*: The wholesale prices (*i.e.*, the prices customer facing railroads pay for the other leg) that induce the fully integrated outcome.

Negotiated Nonlinear Contracts with Shippers

As observed in Section III.A, shippers who negotiate nonlinear contracts with railroads in settings with complete information are not harmed and may benefit from the merger. This section provides additional analytical support for that finding.

Consider the following illustration. Suppose a shipper has a demand for shipments from San Francisco to New York and will ship more the lower the price. Suppose the western leg is

---

[1] Notably, routes on which each segment is sole served (case 1 above) have no foreclosure risk, and shippers would benefit from the proposed merger on the route from the elimination of successive monopoly.

sole served by UP at unit cost c_U, and the eastern leg can be served by CSX at unit cost c_X or by NS at unit cost c_N. Suppose the shipper negotiates the quantity it would like to ship along with a price that divides the surplus with each railroad.

To analyze this problem, the first step is to recognize that the shipper will play CSX and NS against one another to determine the price for the eastern leg. For my first illustration assume that $c_N < c_X$, i.e., NS can supply the eastern leg at lower cost than CSX. In this case, NS will win the competition to serve the eastern leg at a per-unit price approximately equal to $p_E = c_X$.

The second step is to recognize that given an eastern leg price $p_E = c_X$, UP and the shipper will negotiate a western leg price and quantity that maximizes and divides their joint surplus. The quantity that maximizes their joint surplus is the quantity the shipper would purchase if it paid a price equal to UP's cost.[2] Call this quantity Q, and denote the gross shipper surplus at quantity Q by V. The shipper pays NS $C_X = p_E Q = c_X Q$, and UP incurs cost $C_U = c_U Q$. Therefore, the net surplus divided by the shipper and UP after taking out UP's cost and the eastern leg price is $V - C_X - C_U$. This is the surplus that UP and the shipper divide. Under the standard bargaining solution used in the economic literature, the Nash bargaining solution, UP and shipper will split the surplus equally. The total payment that splits the surplus equally is $P = \frac{V - C_X - C_U}{2}$. If the total cost of the eastern and western legs, $C_X + C_U$, is less than the shipper's valuation V, the shipment will be made, and the shipper's consumer surplus will be $V - C_X - P = \frac{V + C_U - C_X}{2}$.

Now consider what happens if UP and NS merge. The shipper and UP both recognize that NS can supply the eastern leg at lower cost than CSX and that the jointly optimal strategy still has UP and NS supplying the legs. However, whereas prior to the merger the quantity chosen reflected a price for the eastern leg that exceeded NS's cost (because competition between NS and CSX allowed NS to win buy just undercutting CSX's higher cost), after the merger the jointly optimal quantity will reflect NS's lower cost. Thus, the jointly optimal quantity will rise, as will the surplus available for UP and the shipper to divide.[3] For this reason, the merging firms and shipper all experience benefits from the merger.

---

[2] Conditional on the eastern leg price, negotiations over a nonlinear contract by UP and the shipper lead to a variant of first-degree price discrimination where the shipper shares part of the increase in joint surplus from that strategy. The solution to the first degree price discrimination problem is widely understood: "It is well known that a perfectly discriminating monopolist produces a Pareto efficient amount of output," which means that the output choice maximizes joint surplus (quoting Varian, H. R. (1989), "Price Discrimination," *Handbook of industrial organization*, Vol 1, 597–654). The main nuance surrounding this strategy in the railroad context is that shippers with bargaining power share in the benefits of the strategy.

[3] Formally, let the $D(c_U + c)$ be the quantity sold when the marginal price for the UP leg is c_U and the marginal price of the eastern leg is c. The joint surplus of UP and the shipper is then.

Next, consider the case where CSX has the lower cost and wins the competition for the eastern leg. The same logic as above implies that the shipper's pre-merger surplus will now be $\frac{V+C_U-C_N}{2}$, which is the same as before but replacing C_X with C_N because CSX's price reflects its ability to win the eastern leg with a price that just undercuts NS's cost. Post-merger, the merged firm recognizes that the most efficient strategy is to continue using CSX for the eastern leg—since paying CSX will be cheaper than the cost of carrying the goods itself—and in this case, the bargaining situation between the merged firm and the shipper is the same both pre- and post-merger; the surplus that the merged firm and shipper maximize and divide does not change. This means that the outcome for the merged firm and the shipper do not change with the merger. In particular, the merger has no impact on the shipper.

This stylized example illustrates a more general point: In a setting with perfect complements (here two rail networks) where the end customer negotiates nonlinear contracts with suppliers of complementary inputs, a merger benefits shippers in some cases (i.e., in the example, cases where NS has lower costs for the eastern leg than CSX) and has no effect on shippers in other cases (i.e., where NS has higher costs for the eastern leg than CSX).

Non-Negotiated Linear Prices with Shippers

On 2*1 routes, the merger raises no significant risk of competitive harm. If each duopolist writes an efficient contract with the customer facing monopoly, the fully integrated outcome arises with or without the merger.[4] If firms face contracting frictions, there is double marginalization prior to the merger that leads to a price higher than the fully integrated price. The merger then eliminates double marginalization between the merging firms and lowers final product prices in standard cases. Notably the non-standard case in which the elimination of double marginalization can actually raise the final price is unlikely to apply to the railroad

---

$$JS(c_U + c) = \int_{c_U+c}^{\infty} D(t)dt.$$

The effect of a small reduction in c on JS is

$$-JS'(c_U + c) = D(c_U + c) > 0.$$

Thus, a reduction in the cost of the eastern leg increases the joint surplus that UP and the shipper split, and under Nash bargaining, they both benefit.

[4] The generalization of the result that nonlinear contracts induce the fully integrated outcome under bilateral monopoly to the case of two (or more) differentiated upstream sellers and a downstream monopolist appears in O'Brien, D. P. and G. Shaffer (1997), "Nonlinear Supply Contracts, Exclusive Dealing, and Equilibrium Market Foreclosure," *Journal of Economics & Management Strategy*, *6*(4), 755–785. See also Bernheim, B. D. and M. D. Whinston (1998), "Exclusive Dealing," *Journal of Political Economy*, 106(1), 64–103. Because the efficient pre-merger contract involves a marginal transfer price equal to marginal cost, a vertical merger does not change incentives when nonlinear contracts are feasible.

industry, as in the benchmark case of linear demand, it never occurs when Slutsky symmetry holds, as it does when customers are firms (e.g., shippers) and contracts are customer specific.[5]

On 1*2 routes, the primary risk arises when bilateral contracting externalities exist that hold price below the fully integrated level.[6] As a matter of theory, this can occur under two types of circumstances: (i) when contracts are bilateral and private information[7], and/or (ii) when downstream firms have sufficient bargaining power.[8] However, the frequent choices by shippers

---

[5] An "edge" case where the elimination of double marginalization can raise the final price is "Edgeworth Tax Paradox," which is an oddity in which a reduction in the marginal cost of one of a multiproduct downstream monopolist's products leads to increases in the final prices of all products. (See Edgeworth, F. (1925), "The Pure Theory of Monopoly," in *Papers Relating to Political Economy*, Vol 1, New York: Burt Franklin; and Salinger, M. A. (1991), "Vertical Mergers in Multi-Product Industries and Edgeworth's Paradox of Taxation," *The Journal of Industrial Economics*, 39(5), 545–556. In the benchmark case of linear demand, this paradox never occurs when Slutsky symmetry holds, as it does when customers are firms (e.g., shippers) and contracts are customer specific.

[6] Bilateral contracting externalities arise when the contract between one pair of complements affects the profits of third parties. See Segal, I. (1999), "Contracting with Externalities," *The Quarterly Journal of Economics*, 114(2), 337–388. In this report, I highlight cases where bilateral contracting externalities lead to marginal transfer prices such that final prices are below the fully integrated level, as those are the cases in the literature on bilateral contracting where harm vertical mergers can occur.

[7] In a series of papers in the early 90s, researchers showed that if downstream firms have private information about their contract offers and each downstream firm believes that offers to rivals do not change when the supplier makes an unexpected (off-equilibrium path) offer, the equilibrium marginal transfer price equals marginal cost. See Hart, O. and J. Tirole (1990), "Vertical Integration and Market Foreclosure," *Brookings Papers on Economic Activity. Microeconomics*, 205–286 (downstream Cournot competition); O'Brien, D. P. and G. Shaffer (1992), "Vertical Control With Bilateral Contracts," *The RAND Journal of Economics*, 23(3), 299–308 (downstream Bertrand competition); and McAfee, R. P. and M. Schwartz (1994), "Opportunism in Multilateral Vertical Contracting: Nondiscrimination, Exclusivity, and Uniformity," *The American Economic Review*, 84(1), 210–230 (examines the role of alternative off-equilibrium path beliefs and discusses how commitments to contract uniformity can solve the problem.). For a survey that covers these papers, see Rey, P. and J. Tirole (2007), "A Primer on Foreclosure," *Handbook of Industrial Organization*, Vol 3, 2145–2220. When the pre-merger marginal transfer price is marginal cost, a vertical merger raises downstream prices. As noted in the text, the fact that shippers choose the 2*1 arrangement much more frequently than the 1*2 arrangement rejects the presences of these effects.

[8] When firms bargain over linear prices, two circumstances can lead to wholesale prices below the fully integrated wholesale prices. First, when the wholesale price is negotiated before downstream prices are set, the equilibrium wholesale prices are below the fully integrated level if downstream competition is sufficiently intense. See O'Brien, D. P. (2014), "The Welfare Effects of Third-Degree Price Discrimination in Intermediate Good Markets: The Case of Bargaining," *The RAND Journal of Economics*, *45*(1), 92–115, and Daniel O'Brien (1989), *The Uniform Settlements Policy in International Telecommunications: A Non-Cooperative Bargaining Model of Intermediate Product Third Degree Price Discrimination*, (Doctoral Dissertation), Northwestern University. O'Brien showed that under linear demand and downstream Cournot competition, price exceeds the fully integrated level if there are two or fewer downstream firms. For downstream Bertrand competition, see Panhans, M. (2024), "Vertical Integration in a Sequential Model of a Supply Chain with Bargaining," Bureau of Economics Working Paper No. 349, Federal Trade Commission and Moresi, S. (2020), "Vertical Mergers and Bargaining Models: Simultaneous Versus Sequential Pricing," Working Paper available at SSRN 3541099. Second, when wholesale prices are negotiated at the same time as downstream prices are set, if downstream firms have sufficiently higher bargaining power as measured by their Nash bargaining weights, the pre-merger wholesale prices will be less than the fully integrated wholesale prices. See Sheu, G. and C. Taragin (2021), "Simulating Mergers in a Vertical Supply Chain with Bargaining," *The RAND Journal of Economics*, *52*(3), 596–632. See also Moresi (2020). As noted in the text, the fact that shippers choose the 2*1 arrangement much more frequently than the 1*2 arrangement rejects the presence of bilateral contracting externalities that hold price below the fully integrated level.

to seek through rates from the customer facing monopolist indicates the absence of bilateral contracting externalities that hold price below the fully integrated level. The reason is that through rates obtained from customer facing monopolists cannot be lower than the fully integrated rate except in edge cases (discussed in the following paragraph). If shippers could get a lower price by seeking a through rate from customer facing duopolists, they would do so, but they typically do not do so, which rejects the assumption that bilateral contracting externalities hold price below the fully integrated level. In this case, this theory of harm is inapplicable. Further, the direct empirical evidence finds that prices in 1*2 situations are *not* lower than in 2*1 situations, further rejecting this theory of harm.

As a matter of theory, there can be edge cases in the 1*2 setting where a vertical merger can have anticompetitive effects in the absence of bilateral contracting externalities that hold pre-merger prices below the fully integrated level. Under linear contracting, this can happen when the demand for duopoly products is asymmetric and has asymmetric cross derivatives.[9] However, this situation does not apply to the railroad industry because the cross derivatives are equal when customers are firms and contracts are firm specific as they typically are in railroads.

In both the 1*2 and 2*1 structures, Rule 11 allows the customer to obtain bids for each leg directly from railroads rather than a rate from railroad(s) serving only the upstream or downstream leg. In settings with nonlinear contracting between the shipper and the railroads, the effect of a merger under Rule 11 is to leave price unchanged or lower it, as discussed above.

In Rule 11 settings with no shipper bargaining and linear pricing, Rule 11 creates a Cournot complements setting where independent firms tend to price too high.[10] The high price caused by independent pricing in the Cournot complements setting is analogous to double marginalization that arises in vertical contracting.[11] The merger, which leads to joint pricing of the complements, mitigates or eliminates this Cournot complements concern and thus creates direct benefits.

An edge case in the Cournot complements setting in which a complements merger can have foreclosure effects can arise if the merged firm can engage in pure bundling of the merging

---

[9] See Lu, S., S. Moresi, and S. Salop (2007), "A Note on Vertical Mergers with an Upstream Monopolist: Foreclosure and Consumer Welfare Effects," Working Paper.

[10] See Cournot, A. (1838), *Researches into the Mathematical Principles of the Theory of Wealth,* New York: Macmillan; Economides, N. and S. C. Salop (1992), "Competition and Integration Among Complements, and Network Market Structure," *The Journal of Industrial Economics*, 40(1), 105–123; Vives, X. (1999), *Oligopoly Pricing: Old Ideas and New Tools,* MIT Press, pp. 176–177.

[11] Vertical contracting via linear prices is formally equivalent to a Cournot complements pricing game with sequential rather than simultaneous timing. For a formal proof, see O'Brien, D. P. (2008), "The Antitrust Treatment of Vertical Restraints: Beyond the Possibility Theorems," in *The Pros and Cons of Vertical Restraints*, Konkurrensverket, Swedish Competition Authority, Stockholm, p. 50, footnote 19.

complements following the merger.[12] Pure bundling means selling the complements only as a package, which in the interline rail service context would mean refusing to offer Rule 11 rates (i.e., UPNS would refuse to quote UP and NS legs separately). However, it is unlikely that UP and NS could pursue such a strategy given regulation in the railroad industry. A shipper can compel a Rule 11 (unbundled) offer whenever it has an offer in hand for the other interline leg. Because unintegrated railroads have incentives to provide such offers if they have a chance of being selected, a shipper is likely to be able to compel a Rule 11 offer from UPNS in cases where unbundling matters, which is when unintegrated carriers have a chance of winning the competition for one of the legs. In this case, the pure bundling edge case would not apply.

Even if one were to assume (counterfactually) that pure bundling were feasible, the theories of harm developed in this paper are ill-suited to the railroad industry. The first of them involves using pure bundling to deter entry. For such a theory to be relevant, one would have to believe that entry by railroads onto routes they do not otherwise serve is an important competitive consideration in the railroad industry, and thus build that reality into competitive analysis of railroad transactions, railroad rates, etc. That is not a commonly held view in this industry, as entry is not generally viewed as an important competitive consideration, and thus entry deterrence is an unlikely theory of harm. Further, even if it were relevant, whether pure bundling could even be used in this way is speculative and the welfare effects are ambiguous.[13] The other theory of harm requires that BNSF and CSX (the non-merging railroads) legs are systematically less compatible with one another (in providing interline service) than are other combinations. I know of no evidence that this is true, and, given that eastern and western railroads all interchange at common gateways, it is unlikely to hold, meaning this theory is also ill-suited to the railroad industry.

[12] See Kadner-Graziano, A. S. (2023), “Mergers of Complements: On the Absence of Consumer Benefits,” *International Journal of Industrial Organization*, 89, Article 102935.

[13] Whinston (1990) makes the following observation about the use of pure bundling as an entry deterrence strategy: “Even in the simple models considered here [which are like the model in Kadner-Graziano], which ignore a number of other possible motivations for the practice [pure bundling], the impact of this exclusion on welfare is uncertain.“ See Whinston, M. D. (1990), "Tying, Foreclosure, and Exclusion,” *The American Economic Review*, 80(4), 837–859.

Appendix B

Introduction

This appendix presents an analysis of the effects of the merger when there are no bilateral contracting externalities that hold price below the fully integrated level (defined in Appendix A) and duopoly-side railroads have private cost information. In this setting, a vertical merger has two types of effects: (i) standard incentives effects involving the elimination of double marginalization and potential incentives to raise rivals' costs, and (ii) effects due to the information transfer that occurs when the merged railroad gains knowledge of what was previously private information on one of the legs. Importantly, these effects interact.

Established results in the economics of vertical mergers show that in the absence of bilateral contracting externalities that hold price below the fully integrated level, vertical mergers tend to be pro-competitive. A challenge to that conclusion is presented in a paper by Moresi, Reitman, Salop, and Sarafidis (2021) (hereinafter "MRSS") on the effects of a vertical merger (in a setting where bilateral contracting externalities do not hold price below the fully integrated level) when downstream railroads have private cost information.[1] They find that when the shipper is a single customer (or a set of identical customers) with perfectly inelastic demand and known reservation price, a vertical merger reduces expected shipper surplus (although it increases output and total surplus). This appendix shows that that unambiguous conclusion from their model is an artifact of the inelastic demand assumption. In a benchmark case with linear demand and uniformly distributed downstream costs, we find that a vertical merger reduces expected price and increases expected output, total surplus, and shipper surplus.

Background and Motivation

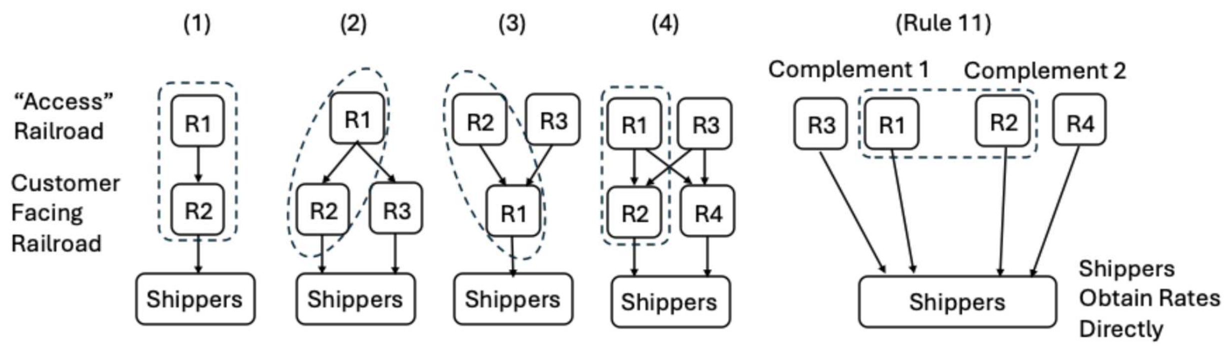
There are five main pricing institutions discussed in the economic literature on vertical and conglomerate complements mergers, shown in Figure 1: four "through-rate" institutions (borrowing that term from the railroad context), and the "Rule 11" institution (also borrowing that term the railroad context). Although Figure 1 could apply to any industry with vertical or conglomerate complements relationships, I will describe it in the context of railroad transportation service and this merger. R1 and R2 are the merging railroads, and R3 and R4 are their rivals. R1 and R3 operate in one part of the country (e.g., the west), and R2 and R4 operate in the other part (e.g., the east). Two railroads from different parts of the country are

[1] Moresi, S., D. Reitman, S. C. Salop, and Y. Sarafidis (2021), "Vertical Mergers in a Model of Upstream Monopoly and Incomplete Information," *Review of Industrial Organization*, 59, 363–380.

complements because transport legs across the west and across the east are required inputs into rail transport between the west and the east.

The through-rate institutions (1) – (4) in Figure 1 are interpreted as follows. The "Customer Facing Railroad" is the one that offers a through rate to the customer for shipping between east and west (in either direction). The "Access Railroad" supplies the leg of the route not supplied by the customer facing railroad. For example, in institution (2), railroad R1 supplies access to its leg to duopoly railroads R2 and R3, who compete to supply the leg in the other part of the country in quoting through rates to shippers. The four through rate institutions correspond to the two-stage game framework with upstream/downstream railroads (with the customer facing railroads being downstream) used in the economic literature to analyze vertical mergers.

Figure 1: Railroad Through-Rate Pricing Institutions



Key:
- R1 and R2 are merging parties (merger indicated by dashed line)
- R3 and R4 are other railroads
- Institutions (1) – (4) are "through-rate" institutions, analogous to standard vertical settings
- The Rule 11 institution is analogous to standard conglomerate complements settings

The Rule 11 institution is interpreted as follows. The shipper seeks bids from suppliers on each leg directly rather than obtaining a through rate quote from railroads operating on either leg. This institution corresponds to the conglomerate complements framework used in the economic literature to examine conglomerate complements mergers. The shipper effectively assembles a product—rail transport between the east and the west—by purchasing the required components and putting them together, much like a datacenter server producer combines hardware and software components in producing servers.

In through rate institutions (1) – (3), a vertical merger very often eliminates double marginalization (a benefit) or is benign (the "one-monopoly rent" idea), and in through rate institution (4), competition at both levels constrains pricing both pre- and post-merger, working against harmful effects.[2] Analogous arguments apply to the Rule 11 institutions where the shipper obtains quotes for each leg directly.[3] In settings with complete information and without contracting externalities holding prices below the fully integrated level, a single vertical merger tends to be pro-competitive in all five pricing institutions.[4]

When firms have private cost information, however, a vertical merger has more complex effects. MRSS showed that a vertical merger in institution (2) can reduce shipper surplus when the duopoly side railroads have private cost information, even when bilateral contracting externalities are absent (which is true in MRSS). However, a strong and unrealistic assumption in that model is that the shipper has perfectly inelastic demand with a willingness to pay that is known by all sellers. In the remainder of this Appendix, I show that modifying that assumption to allow downward sloping demand, using a linear demand curve (a common benchmark case) and uniformly distributed costs (also a common benchmark), leads to a different conclusion: a vertical merger reduces the expected price and raises shipper welfare in institution (2), and in fact, in all 5 institutions.

Model and Notation

I focus my analysis on through rate institutions (2) and (3) and the Rule 11 institution, as the merger does not raise significant concerns under through rate institutions (1) (where EDM is the only price effect) and (4) (where competition on both legs constrains prices). I consider different assumptions about the timing of information revelation post-merger, as discussed below. I model the effects of a vertical merger in each case under the same set of assumptions about costs, demand, and private cost information. Notation for each case is the following:

Duopoly side marginal costs: $c_i \sim U[0,1]$ $(i = 1, 2)$
Distribution of c_i: $F(c_i) = c_i, c \in [0,1]; f(c_i) = 1$
Maximum of two draws: $c = \max\{c_1, c_2\}$
Distribution of c: $G(c) = c^2$, $c \in [0,1]$; $g(c) = 2c$
Duopoly side price: p^D
Duopoly side profit: π_i^D

Sole-serving side cost: 0
Sole-serving side price: p^M
Sole-serving side profit: π^M

Full price: $p^F = p^M + p^D$
Shipper Demand: $D(p^F) = 1 - p^F$

[2] See the main body of the report and Appendix A for a discussion of edge cases in which vertical mergers can have harmful effects and why they do not apply to this merger.

[3] *Id*.
[4] *Id*.

Throughout this appendix, I assume that the merger is between railroad 1 on the duopoly side and the sole-serving railroad. I examine the following six cases.

Case 1: Rule 11, the sole-serving railroad makes a take-it-or-leave-it ("TIOLI") offer at the same time as the duopoly side second price auction takes place.

- *Pre-merger*, the sole-serving railroad does not observe the private costs of the duopolists or the outcome of the duopoly side auction before making the TIOLI offer.
- *Post-merger*, the sole-serving railroad observes the private cost of the integrated duopolist, but not the outcome of the duopoly side auction, before making the TIOLI offer on the access leg of the route.

Case 2: Rule 11, the duopoly side second price auction takes place first, and then the sole-serving railroad makes a TIOLI offer.

- *Pre-merger*, the sole-serving railroad does not observe the private costs of the duopolists or the outcome of the duopoly side auction before making the TIOLI offer.
- *Post-merger*, the sole-serving railroad observes the private cost of the integrated duopolist and the outcome of the duopoly side auction before making the TIOLI offer.

Case 3: Rule 11, the sole-serving railroad makes a TIOLI offer first, and then the duopoly side second price auction takes place.

- *Pre-merger*, the sole-serving railroad does not observe the private costs of the duopolists or the outcome of the duopoly side auction before making the TIOLI offer.
- *Post-merger*, the sole-serving railroad observes the private cost of the integrated duopolist, but not the outcome of the duopoly side auction, before making the TIOLI offer.

Case 4: 2*1 Routes, the duopoly side second price auction takes place first, and then the sole-serving railroad makes a TIOLI offer. The sole-serving railroad sets the full price.

- *Pre-merger*, the sole-serving railroad observes the outcome of the duopoly side auction, but not the private costs of the duopolists, before making the TIOLI offer.
- *Post-merger*, the sole-serving railroad observes the private cost of the integrated duopolist and the outcome of the duopoly side auction before making TIOLI offer.

Case 5: 1*2 Routes, the sole-serving railroad makes a TIOLI offer first, and then the duopoly side second-price auction takes place. The winner of the duopoly side auction sets the full price equal to the sum of the sole-serving railroad's TIOLI offer and the auction price.

- *Pre-merger*, the sole-serving railroad does not observe the private costs of the duopolists or the outcome of the duopoly side auction before making the TIOLI offer.

- *Post-merger*, the sole-serving railroad observes the private cost of the integrated duopolist, but not the outcome of the duopoly side auction, before making the TIOLI offer.

Case 6: 1-Up/2-Down. This case is the same as case 5, but the shipper has inelastic demand $D(p^F) = 1\{p^F \leq 1\}$ (*i.e.*, the MRSS case).

Summary of Results

In this section, I summarize my main results and the intuition that drives them.

Table 2 summarizes the pre- and post-merger prices, quantities, profits, shipper- and total surplus values, and the change in these values caused by the merger. Observe first that the merger reduces the expected full price and increases expected output, shipper surplus, and total surplus in every case except Case 6, where the merger reduces shipper surplus. Case 6 assumes that the shipper has perfectly inelastic demand with a known reservation price, as in MRSS. A conclusion from Table 2 is that the unambiguous finding that a vertical merger reduces shipper surplus in Case 6 is an artifact of the assumption that the customer has perfectly inelastic demand with known reservation price.

To understand the relevance of the inelastic demand assumption, I first discuss the results in Cases 5 and 6, which differ only in the demand assumption—downward sloping demand in case 5, and perfectly inelastic in case 6.

Prior to the merger, in both cases downstream competition yields an expected downstream mark-up over the wholesale price equal to the maximum of the competing railroads' marginal costs. Each downstream railroad's profit is zero if it loses the auction, so it maximizes its expected profit conditional on winning. The dominant strategy under the second price auction rule for each railroad is to bid marginal cost, which for each railroad is the wholesale price plus its production marginal cost. Under the second price auction rule, this leads to a mark-up over the wholesale price equal to second lowest downstream production marginal cost. The full price is random (because the second lowest cost is random), and when positive sales occur, the full price is less than the shipper's reservation price in Case 6 and less than its the shipper's choke price in Case 5. Therefore, shipper surplus is positive in each case.

Figure 2: Summary of Results

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
	Rule 11: Simultaneous Timing	Rule 11: Duopoly Auction → sole-serving RR TIOLI Offer	Rule 11: sole-serving RRTIOLI Offer → Duopoly Auction	2*1 Routes: Duopoly Auction → sole-serving RR TIOLI Offer	1*2 Routes: sole-serving RR TIOLI Offer → Duopoly Auction	1*2 Routes: sole-serving RR TIOLI Offer → Duopoly Auction (Inelastic Demand)
Pre-Merger						
$E[p^D]$	0.6667	0.6667	0.6667	0.6667	0.6094	0.3975
$E[p^M]$	0.2500	0.2500	0.2500	0.1667	0.2500	0.5574
$E[p^F]$	0.9167	0.9167	0.9167	0.8333	0.8594	0.9748
$E[\pi_1^D]$	0.0132	0.0132	0.0132	0.0208	0.0132	0.0642
$E[\pi_2^D]$	0.0132	0.0132	0.0132	0.0208	0.0132	0.0642
$E[\pi^M]$	0.0352	0.0352	0.0352	0.0417	0.0352	0.3849
$E[\pi^{Joint}]$	0.0483	0.0483	0.0483	0.0625	0.0483	0.4491
$E[D(p^F)]$	0.1406	0.1406	0.1406	0.1667	0.1406	0.6667
$E[CS]$	0.0264	0.0264	0.0264	0.0208	0.0264	0.0252
$E[TS]$	0.0879	0.0879	0.0879	0.1042	0.0879	0.5384
Post-Merger						
$E[p^D]$	0.5394	0.5266	0.5394	0.5266	0.5000	0.2500
$E[p^M]$	0.2605	0.1837	0.2605	0.1837	0.2605	0.7500
$E[p^F]$	0.7999	0.7104	0.7999	0.7104	0.7605	1.0000
$E[\pi_1^D]$	0.0160	0.0557	0.0160	0.0557	0.0160	-0.1667
$E[\pi_2^D]$	0.0141	0.0096	0.0141	0.0096	0.0141	0.0417
$E[\pi^M]$	0.0514	0.0468	0.0514	0.0468	0.0514	0.7500
$E[\pi^{Joint}]$	0.0674	0.1025	0.0674	0.1025	0.0674	0.5833
$E[D(p^F)]$	0.2395	0.2896	0.2395	0.2896	0.2395	1.0000
$E[CS]$	0.0533	0.0513	0.0533	0.0513	0.0533	0.0000
$E[TS]$	0.1348	0.1633	0.1348	0.1633	0.1348	0.6250
Delta						
$E[p^D]$	-0.1273	-0.1401	-0.1273	-0.1401	-0.1094	-0.1475
$E[p^M]$	0.0105	-0.0663	0.0105	0.0170	0.0105	0.1926
$E[p^F]$	-0.1168	-0.2063	-0.1168	-0.1229	-0.0989	0.0252
$E[\pi_1^D]$	0.0028	0.0425	0.0028	0.0349	0.0028	-0.2309
$E[\pi_2^D]$	0.0009	-0.0036	0.0009	-0.0112	0.0009	-0.0225
$E[\pi^M]$	0.0162	0.0116	0.0162	0.0051	0.0162	0.3651
$E[\pi^{Joint}]$	0.0191	0.0542	0.0191	0.0400	0.0191	0.1342
$E[D(p^F)]$	0.0989	0.1490	0.0989	0.1229	0.0989	0.3333
$E[CS]$	0.0269	0.0249	0.0269	0.0305	0.0269	-0.0252
$E[TS]$	0.0469	0.0754	0.0469	0.0591	0.0469	0.0866

After the merger, it remains a dominant strategy for the unintegrated rival to bid cost in each case, but this is not true for the vertically integrated downstream railroad, *i.e.*, the standard second price auction result (bid cost) no longer holds. Post-merger, the merged railroad's expected profit depends not only on its profit conditional on winning the downstream auction, but also on its profit conditional on losing because in that event its profit comes from selling the input to the downstream rival. Conditional on winning, the merged railroad's profit is unaffected by its bid to the downstream rival (under the second price auction rule), but conditional on losing, its profit is what it extracts from the rival in selling the access leg. In this case, the demand assumptions matter a lot—in particular, the extreme assumption that the shipper has perfectly inelastic demand (meaning a reservation price that is known by the railroad) drives the result that the merger harms shipper welfare.

When the shipper has inelastic demand (Case 6), the merged railroad's profit upon losing equals its wholesale margin times a fixed quantity of inelastic demand. The profit that the merged railroad can capture from the rival without making the rival's participation unprofitable is higher the more surplus the rival captures from the shipper. Under the second price auction rule, the merged railroad maximizes this downstream surplus capture (and thus its profit) by bidding a price equal to the shipper's reservation price. This strategy implies that the unintegrated rival wins the auction with a bid just slightly below the shipper's reservation price, effectively leaving the buyer with no surplus in the event the rival wins. That is, by raising its bid to the sole-served price (the shipper's reservation price), the merged railroad ensures that if the rival wins the auction, it captures the entire shipper surplus given the second-price auction setup. Note as well that when the merged railroad wins the auction with that bid, it also collects the entire shipper surplus because the rival will have bid price that is weakly higher price.[5] Either way, the shipper earns zero surplus after the merger, and it is profit-maximizing for the merged railroad to bid in a way that ensures this. Thus, a vertical merger in Case 6 with inelastic demand reduces expected shipper surplus from a positive level pre-merger to zero post-merger.

This result is an artifact of the inelastic demand assumption, as I now explain. When the shipper has downward sloping demand, the merged railroad recognizes that conditional on losing the auction, it earns more if the rival sells more. Starting from the pre-merger wholesale price, the merged railroad has an incentive to shade its bid downward so that conditional on losing, the price charged by the rival is lower and the merged railroad sells more. This effect, which tends to lower the merged railroad's price to the downstream rival does not exist in the inelastic-demand case. In the linear demand/uniformly distributed cost case that we examine, the merged firm does raise the wholesale price post-merger, but the desire to sell more in the event it loses the auction combined with the elimination of double marginalization together dominate the higher wholesale price in determining ultimate effect on the shipper. This result mirrors the prediction of the effects of vertical mergers in full information settings with one upstream firm,

[5] Implicitly, the shipper's reservation price is a reserve price in the second price auction.

two downstream railroads, linear demand and Slutsky symmetry: a vertical merger in that setting is always procompetitive. My analysis shows that the presence of private cost information for the downstream railroads does not overturn this standard result.

Derivations

Case 1: Rule 11, the sole-serving railroad makes a TIOLI offer at the same time as the duopoly side second price auction takes place.

Pre-Merger

The price on the duopoly side is determined in a standard second price auction, in which both railroads bid their true costs, the lowest bid wins, and the duopoly side price is equal to the highest of the two costs:

$$p^{D,Pre} = c,$$

and its expectation is

$$E[p^{D,Pre}] = \int_0^1 cg(c)dc = \int_0^1 2c^2dc = \frac{2}{3} \quad \text{(or 0.6667).}$$

The sole-serving railroad sets its price p to maximize its expected profit, which is given by

$$\begin{aligned} E[\pi^{M,Pre}(p)] &= \int_0^{1-p} p(1-p-c)\, g(c)dc \\ &= -\frac{1}{3}p^4 + p^3 - p^2 + \frac{1}{3}p. \end{aligned}$$

Note that demand, and therefore the sole-serving railroad's profit, is 0 if $p + c > 1$ (i.e., $c > 1 - p$). The first order condition with respect to p is

$$\frac{\partial E[\pi^{M,Pre}(p)]}{\partial p} = -\frac{4}{3}p^3 + 3p^2 - 2p + \frac{1}{3} = 0.$$

The roots to this equation are 1 and $\frac{1}{4}$. Therefore, the profit maximizing price is

$$p^{M,Pre} = \frac{1}{4} \quad \text{(or 0.25),}$$

and the sole-serving railroad's expected profit is

$$E[\pi^{M,Pre}(p^{M,Pre})] = \frac{9}{256} \quad \text{(or 0.0352).}$$

The duopolists' expected profits are given by:

$$E\left[\pi_1^{D,Pre}\right] = E\left[\pi_2^{D,Pre}\right]$$

$$= \int_0^{1-p^{M,Pre}} \left(\int_{c_1}^{1-p^{M,Pre}} (c_2 - c_1)\left(1 - \frac{1}{4} - c_2\right) f(c_2)\,dc_2 \right) f(c_1)\,dc_1$$
$$= \int_0^{\frac{3}{4}} \left(-\frac{1}{6}c_1^3 + \frac{3}{8}c_1^2 - \frac{9}{32}c_1 + \frac{9}{128}\right) dc_1$$
$$= \frac{27}{2048} \quad \text{(or 0.0132),}$$

and the expected joint profit of the sole-serving railroad and the integrating duopolist is

$$E\left[\pi^{Joint,Pre}\right] = E\left[\pi^{M,Pre}\right] + E\left[\pi_1^{D,Pre}\right]$$
$$= \frac{9}{256} + \frac{27}{2048} = \frac{99}{2048} \quad \text{(or 0.0483).}$$

The expected full price is

$$E[p^{F,Pre}] = p^{M,Pre} + E[p^{D,Pre}] = \frac{1}{4} + \frac{2}{3} = \frac{11}{12} \quad \text{(or 0.9167),}$$

and expected output is

$$E[D(p^{F,Pre})] = \int_0^{1-\frac{1}{4}} \left(1 - \frac{1}{4} - c\right) g(c)\,dc$$
$$= \int_0^{\frac{3}{4}} \left(\frac{3}{4} - c\right) 2c\,dc$$
$$= \frac{9}{64} \quad \text{(or 0.1406).}$$

Expected shipper surplus is

$$E[CS^{Pre}] = \int_0^{1-p^{M,Pre}} \left(\frac{1}{2}\right)(1 - c - p^{M,Pre})^2 g(c)\,dc$$
$$= \frac{1}{2}\int_0^{\frac{3}{4}} \left(\frac{3}{4} - c\right)^2 2c\,dc$$
$$= \int_0^{3/4} \left(c^3 - \frac{3}{2}c^2 + \frac{9}{16}c\right) dc$$
$$= \frac{9}{32}\left(\frac{3}{4}\right)^2 - \frac{1}{2}\left(\frac{3}{4}\right)^3 + \frac{1}{4}\left(\frac{3}{4}\right)^4$$
$$= \frac{27}{1024} \quad \text{(or 0.0264),}$$

and expected total surplus is

$$
\begin{aligned}
E[TS^{Pre}] &= E[CS^{Pre}] + E\left[\pi_1^{D,Pre}\right] + E\left[\pi_2^{D,Pre}\right] + E[\pi^{M,Pre}] \\
&= \frac{27}{1024} + \frac{27}{2048} + \frac{27}{2048} + \frac{9}{256} \\
&= \frac{45}{512} \qquad \text{(or 0.0879).}
\end{aligned}
$$

Post-Merger

On the duopoly side, it is still the dominant strategy for the unintegrated railroad to bid its true cost, c_2. The integrated duopolist, however, internalizing the profit of the vertically integrated railroad, will optimally bid $b \leq c_1$.

The monopolist learns the realization of the integrated duopolist, c_1, prior to making the TIOLI offer. However, it does not observe the outcome of the duopoly side auction. Therefore, the merged railroad chooses the sole-served side price p and the duopoly side bids b to maximize the expected joint profit of the merged railroad, conditional on c_1.

Let p be the price of the sole-serving railroad. If the integrated duopolist bids $b \leq c_2$, then it wins the auction, and the joint profit of the merged railroad is

$$\pi_{Win}^{Post}(p) = (p + c_2 - c_1)(1 - p - c_2)$$

provided that $c_2 \leq 1 - p$ (otherwise the profit is 0). Note that this does not depend on b. If the integrated duopolist bids $b > c_2$, then it loses the auction, and the joint profit of the merged railroad is

$$\pi_{Lose}^{Post}(p, b) = p(1 - p - b)$$

as long as $b \leq 1 - p$. If $b > 1 - p$, the joint profit is guaranteed to be 0 and therefore the integrated duopolist would never bid above $1 - p$.

The expected joint profit of the merged railroad, conditional on c_1, is given by

$$
\begin{aligned}
&E\left[\pi^{Joint,Post}(p, b) \mid c_1\right] \\
&= \Pr[c_2 < b]\, \pi_{Lose}^{Post}(p, b) + \Pr[b \leq c_2 \leq 1 - p]\, E[\, \pi_{Win}^{Post}(p) \mid c_1, b \leq c_2 \leq 1 - p] \\
&= bp(1 - p - b) + (1 - p - b) \int_b^{1-p} (p + c_2 - c_1)(1 - p - c_2) \frac{1}{(1 - p - b)} dc_2 \\
&= bp(1 - p - b) + \int_b^{1-p} (p + c_2 - c_1)(1 - p - c_2)\, dc_2
\end{aligned}
$$

$$= bp(1 - p - b) + \frac{1}{6}(b + p - 1)^2(2b - 3c_1 + 2p + 1).$$

The FOCs for the profit-maximizing values of b and p are

$$\frac{\partial E\left[\pi^{Joint,Post}(p, b) \mid c_1\right]}{\partial b} = b^2 - (1 + c_1)b + (1 - p)c_1 = 0$$

and

$$\frac{\partial E\left[\pi^{Joint,Post}(p, b) \mid c_1\right]}{\partial p} = p^2 - (1 + c_1)p + (1 - b)c_1 = 0,$$

and the solutions to this system of equations are

$$(p, b) = (0,1), (1,0), \text{and} \left(c_1 + \frac{1}{2} \pm \frac{\sqrt{4c_1^2 + 1}}{2}, c_1 + \frac{1}{2} \pm \frac{\sqrt{4c_1^2 + 1}}{2}\right).$$

Note that $(p, b) = (0,1)$ and $(p, b) = (1,0)$ guarantee a profit of 0 and, therefore, cannot be the optimal solution. Similarly,

$$\frac{1}{2} + \frac{\sqrt{4c_1^2 + 1}}{2} \geq 1,$$

which means that $c_1 + \frac{1}{2} + \frac{1}{2}\sqrt{4c_1^2 + 1}$ cannot be the optimal solution. Finally, note that $c_1 + \frac{1}{2} - \frac{1}{2}\sqrt{4c_1^2 + 1}$ is increasing in c_1 and it is equal to $\frac{3}{2} - \frac{\sqrt{5}}{2} = 0.3820$ when $c_1 = 1$, which means that

$$(p^{M,Post}, b^{D,Post}) = \left(c_1 + \frac{1}{2} - \frac{\sqrt{4c_1^2 + 1}}{2}, c_1 + \frac{1}{2} - \frac{\sqrt{4c_1^2 + 1}}{2}\right)$$

satisfies $b^{D,Post} \leq 1 - p^{M,Post}$ and is the optimal solution. The expected joint profit of the merged railroad is therefore

$$E\left[\pi^{Joint,Post}(p^{M,Post}, b^{D,Post})\right]$$
$$= \int_0^1 E[\pi^{Post}(p^{M,Post}, b^{D,Post}) \mid c_1] f(c_1) dc_1$$
$$= \int_0^1 \Big(b^{D,Post} p^{M,Post}(1 - p^{M,Post} - b^{D,Post})$$
$$+ \frac{1}{6}(b^{D,Post} + p^{M,Post} - 1)^2(2b^{D,Post} - 3c_1 + 2p^{M,Post} + 1)\Big) dc_1$$
$$= \int_0^1 \left(2c_1^2 \frac{\sqrt{4c_1^2 + 1}}{3} - \frac{1}{2}c_1 - \frac{4}{3}c_1^3 + \frac{\sqrt{4c_1^2 + 1}}{6}\right) dc_1$$

$$= \frac{\log(\sqrt{5}+2)}{32} + \frac{13\sqrt{5}}{48} - \frac{7}{12} \quad \text{(or 0.0674).}$$

The expected profit of the merged railroad on the duopoly side is

$$E[\pi_1^{D,Post}] = \int_0^1 \left(\int_{b^{D,Post}}^{1-p^{M,Post}} (c_2 - c_1)\,(1 - p^{M,Post} - c_2) f(c_2)\, dc_2 \right) f(c_1) dc_1$$

$$= \int_0^1 \left(-\frac{4}{3} c_1^3 + \left(\frac{2\sqrt{4c_1^2+1}}{3} + 2 \right) c_1^2 - \left(\sqrt{4c_1^2+1} \right) c_1 - \frac{\sqrt{4c_1^2+1}}{12} + \frac{1}{4} \right) dc_1$$

$$= \frac{2}{3} - \frac{13\sqrt{5}}{48} - \frac{\log(\sqrt{5}+2)}{32} \quad \text{(or 0.0160).}$$

The expected profit of the merged railroad on the sole-served side is

$$E[\pi^{M,Post}] = E[\pi^{Joint,Post}] - E[\pi_1^{D,Post}]$$

$$= \frac{\log(\sqrt{5}+2)}{16} + \frac{13\sqrt{5}}{24} - \frac{5}{4} \quad \text{(or 0.0514),}$$

and the expected profit of the unintegrated duopolist is

$$E[\pi_2^{D,Post}]$$

$$= \int_0^{\frac{3}{2}-\frac{\sqrt{5}}{2}} \left(\int_{c_1: b^{D,Post}=c_2}^{1} (b^{D,Post} - c_2)\,(1 - p^{M,Post} - b^{D,Post}) f(c_1)\, dc_1 \right) f(c_2) dc_2$$

$$= 0.0141.$$

The expected sole-served side price is

$$E[p^{M,Post}] = \int_0^1 \left(c_1 + \frac{1}{2} - \frac{\sqrt{4c_1^2+1}}{2} \right) f(c_1) dc_1$$

$$= 1 - \frac{\sqrt{5}}{4} - \frac{\log(\sqrt{5}+2)}{8} \quad \text{(or 0.2605),}$$

and the expected duopoly side price is

$$E[p^{D,Post}] = \int_0^1 (\Pr[c_2 \le b^{D,Post}]\, b^{D,Post} + \Pr[c_2 > b^{D,Post}]\; E[c_2 \mid c_2 > b^{D,Post}])\, f(c_1) dc_1$$

$$= \int_0^1 \left((b^{D,Post})^2 + \int_{b^{D,Post}}^1 c_2 f(c_2) dc_2 \right) f(c_1) dc_1$$

$$= \int_0^1 \left((b^{D,Post})^2 + \frac{1}{2} - \frac{1}{2}(b^{D,Post})^2 \right) dc_1$$

$$= \frac{11}{8} - \frac{\sqrt{5}}{3} - \frac{\log(\sqrt{5}+2)}{16} \quad \text{(or 0.5394).}$$

The expected full price is therefore

$$E[p^{F,Post}] = E[p^{M,Post}] + E[p^{D,Post}] = \frac{19}{8} - \frac{7\sqrt{5}}{12} - \frac{3\log(\sqrt{5}+2)}{16} \quad \text{(or 0.7999),}$$

and the expected output is

$$E[D(p^{F,Post})]$$
$$= \int_0^1 (\Pr[c_2 < b^{D,Post}]\,(1 - p^{M,Post} - b^{D,Post}) + \Pr[b^{D,Post} \leq c_2 \leq 1 - p^{M,Post}]\,E[\,(1 - p^{M,Post} - c_2\,)|\,c_1, b^{D,Post} \leq c_2 \leq 1 - p^{M,Post}])\,f(c_1)\,dc_1$$
$$= \int_0^1 \left(b^{D,Post}(1 - p^{M,Post} - b^{D,Post}) + \int_{b^{D,Post}}^{1-p^{M,Post}} (1 - p^{M,Post} - c_2)\,dc_2 \right) dc_1$$
$$= \frac{\log(\sqrt{5}+2)}{8} + \frac{\sqrt{5}}{4} - \frac{1}{2} \quad \text{(or 0.2395).}$$

Expected shipper surplus is

$$E[CS^{Post}]$$
$$= \frac{1}{2}\int_0^1 (\Pr[c_2 < b^{D,Post}]\,(1 - p^{M,Post} - b^{D,Post})^2 + \Pr[b^{D,Post} \leq c_2 \leq 1 - p^{M,Post}]\,E[(1 - p^{M,Post} - c_2\,)^2|\,c_1, b^{D,Post} \leq c_2 \leq 1 - p^{M,Post}])\,f(c_1)\,dc_1$$
$$= \frac{1}{2}\int_0^1 \left(b^{D,Post}(1 - p^{M,Post} - b^{D,Post})^2 + \int_{b^{D,Post}}^{1-p^{M,Post}} (1 - p^{M,Post} - c_2)^2\,dc_2 \right) dc_1$$
$$= \frac{23}{12} - \frac{5\sqrt{5}}{6} \quad \text{(or 0.0533),}$$

and expected total surplus is

$$E[TS^{Post}] = E[CS^{Post}] + E[\pi_1^{D,Post}] + E[\pi_2^{D,Post}] + E[\pi^{M,Post}]$$
$$= 0.1348.$$

Case 2: Rule 11. The duopoly side second price auction takes place first, and then the sole-serving railroad makes a TIOLI offer.

Pre-Merger

The per-merger outcome on the duopoly side is the same as the outcome in Case 1, with prices given by

$$p^{D,Pre} = c$$
$$E[p^{D,Pre}] = \frac{2}{3} \quad \text{(or 0.6667)},$$

and the duopolists' expected profits are

$$E\left[\pi_1^{D,Pre}\right] = E\left[\pi_2^{D,Pre}\right] = \frac{27}{2048} \quad \text{(or 0.0483)}.$$

The pre-merger outcome on the sole-served side is also the same as the outcome in Case 1. The sole-serving railroad does not observe the outcome of the duopoly side auction, and it sets price to maximize its expected profit. The profit maximizing price is

$$p^{M,Pre} = \frac{1}{4} \quad \text{(or 0.25)}.$$

The sole-serving railroad's expected profit is

$$E[\pi^{M,Pre}(p^{M,Pre})] = \frac{9}{256} \quad \text{(or 0.0352)},$$

and the expected joint profit of the sole-serving railroad and the integrating duopolist is

$$E\left[\pi^{Joint,Pre}\right] = \frac{99}{2048} \quad \text{(or 0.0483)}.$$

The expected full price is

$$E[p^{F,Pre}] = \frac{11}{12} \quad \text{(or 0.9167)},$$

and the expected output is

$$E[D(p^{F,Pre})] = \frac{9}{64} \quad \text{(or 0.1406)}.$$

Expected shipper surplus is

$$E[CS^{Pre}] = \frac{27}{1024} \quad \text{(or 0.0264)},$$

and expected total surplus is

$$E[TS^{Pre}] = \frac{45}{512} \qquad \text{(or 0.0879)}.$$

Post-Merger

On the duopoly side, it is still the dominant strategy for the unintegrated railroad to bid its true cost, c_2. The integrated duopolist, however, internalizing the profit of the merged railroad, will optimally bid $b \leq c_1$.

The sole-serving railroad learns the realization of the integrated duopolist, c_1, and the outcome of the duopoly side auction prior to making its TIOLI offer. Therefore, the sole-serving railroad chooses the sole-served side price p to maximize the joint profit of the merged railroad, conditional on c_1 and the outcome of the duopoly side auction.

Let p be the price on the sole-served side. If the integrated duopolist bids $b \leq c_2$, then it wins the auction, and the joint profit of the merged railroad is

$$\pi_{Win}^{Post}(p) = (p + c_2 - c_1)(1 - p - c_2)$$

provided that $c_2 \leq 1 - p$ (otherwise the profit is 0). Note that this does not depend on b.

The profit maximizing FOC with respect to p is

$$\frac{\partial \pi_{Win}^{Post}(p)}{\partial p} = 1 - 2p + c_1 - 2c_2 = 0,$$

and the profit maximizing sole-served side price is

$$p_{Win}^{M,Post} = \frac{1 + c_1 - 2c_2}{2}.$$

The full price, conditional on the integrated duopolist winning the auction, is

$$p_{Win}^{F,Post} = \frac{1 + c_1 - 2c_2}{2} + c_2 = \frac{1 + c_1}{2}$$

which does not depend on c_2. Therefore, the joint profit of the merged railroad, conditional on the integrated duopolist winning the duopoly side auction, is

$$\pi_{Win}^{Post}\left(p_{Win}^{M,Post}\right) = \left(\frac{1 + c_1 - 2c_2}{2} + c_2 - c_1\right)\left(1 - \frac{1 + c_1 - 2c_2}{2} - c_2\right) = \left(\frac{1 - c_1}{2}\right)^2.$$

If the integrated duopolist bids $b > c_2$, then it loses the auction, and the joint profit of the merged railroad is

$$\pi_{Lose}^{Post}(p, b) = p(1 - p - b)$$

as long as $b \leq 1 - p$. If $b > 1 - p$, the joint profit is guaranteed to be 0 and, therefore, the integrated duopolist would never bid above $1 - p$. The profit maximizing FOC with respect to p is

$$\frac{\partial \pi_{Lose}^{Post}(p, b)}{\partial p} = 1 - 2p - b = 0,$$

and the profit maximizing sole-servied side price, conditional on the integrated duopolist losing the duopoly side auction, is

$$p_{Lose}^{M,Post} = \frac{1 - b}{2}.$$

The full price, conditional on the integrated duopolist losing the auction, is

$$p_{Lose}^{F,Post} = \frac{1 - b}{2} + b = \frac{1 + b}{2}.$$

The joint profit of the merged railroad, conditional on the integrated duopolist losing the duopoly side auction and the bid b, is

$$\pi_{Lose}^{Post}\left(p_{Lose}^{M,Post}, b\right) = \left(\frac{1 - b}{2}\right)\left(1 - \frac{1 - b}{2} - b\right) = \left(\frac{1 - b}{2}\right)^2.$$

Now consider the optimal bid for the integrated duopolist in the duopoly second price auction. Conditional c_1, the expected joint profit of the merged railroad is

$$\begin{aligned}
&E\left[\pi^{Joint,Post}\left(p_{Win}^{M,Post}, p_{Lose}^{M,Post}, b\right) \mid c_1\right] \\
&= \Pr(c_2 > b)\, \pi_{Win}^{Post}\left(p_{Win}^{M,Post}\right) + \Pr(c_2 \leq b)\, \pi_{Lose}^{Post}\left(p_{Lose}^{M,Post}, b\right) \\
&= (1 - b)\left(\frac{1 - c_1}{2}\right)^2 + b\left(\frac{1 - b}{2}\right)^2 \\
&= \frac{1}{4}b^3 - \frac{1}{2}b^2 + \left(\frac{1}{4} - \left(\frac{1 - c_1}{2}\right)^2\right)b + \left(\frac{1 - c_1}{2}\right)^2,
\end{aligned}$$

and the profit maximizing FOC with respect to b is

$$\frac{\partial E\left[\pi^{Joint,Post}\left(p_{Win}^{M,Post}, p_{Lose}^{M,Post}, b\right) \mid c_1\right]}{\partial b} = \frac{3}{4}b^2 - b + \frac{1}{4} - \left(\frac{1 - c_1}{2}\right)^2 = 0.$$

The roots to this equation are

$$b = \frac{2}{3} \pm \frac{\sqrt{4 - 6c_1 + 3c_1^2}}{3}.$$

Note that $\sqrt{4 - 6c + 3c^2}$ is decreasing in c_1 in the interval $[0,1]$ and it is equal to 1 when $c_1 = 1$, which means the $\frac{2}{3} + \frac{1}{3}\sqrt{4 - 6c_1 + 3c_1^2}$ cannot be the optimal bid. Therefore, the optimal bid for the integrated duopolist is

$$b^{D,Post} = \frac{2}{3} - \frac{\sqrt{4 - 6c_1 + 3c_1^2}}{3}.$$

The expected joint profit of the merged railroad is therefore

$$\begin{aligned}
&E\left[\pi^{Joint,Post}\left(p_{Win}^{M,Post}, p_{Lose}^{M,Post}, b^{D,Post}\right)\right] \\
&= \int_0^1 E\left[\pi^{Joint,Post}\left(p_{Win}^{M,Post}, p_{Lose}^{M,Post}, b^{D,Post}\right) \mid c_1\right] f(c_1) dc_1 \\
&= \int_0^1 \left(\frac{1}{4}(b^{D,Post})^3 - \frac{1}{2}(b^{D,Post})^2 + \left(\frac{1}{4} - \left(\frac{1-c_1}{2}\right)^2\right) b^{D,Post} + \left(\frac{1-c_1}{2}\right)^2\right) dc_1 \\
&= \frac{\sqrt{3}\log\left(\sqrt{3}+2\right)}{432} + \frac{7}{72} \qquad \text{(or 0.1025).}
\end{aligned}$$

The expected profit of the merged railroad on the duopoly side is

$$\begin{aligned}
E\left[\pi_1^{D,Post}\right] &= \int_0^1 \left(\int_{b^{D,Post}}^1 (c_2 - c_1)\left(1 - p_{Win}^{M,Post} - c_2\right) f(c_2) dc_2\right) f(c_1) dc_1 \\
&= \int_0^1 \left(\int_{b^{D,Post}}^1 (c_2 - c_1)\left(\frac{1-c_1}{2}\right) dc_2\right) dc_1 \\
&= \frac{79}{1296} - \frac{\sqrt{3}\log\left(\sqrt{3}+2\right)}{432} \qquad \text{(or 0.0557).}
\end{aligned}$$

The expected profit of the merged railroad on the sole-served side is

$$\begin{aligned}
E\left[\pi^{M,Post}\right] &= E\left[\pi^{Joint,Post}\right] - E\left[\pi_1^{D,Post}\right] \\
&= \frac{\sqrt{3}\log\left(\sqrt{3}+2\right)}{216} + \frac{47}{1296} \qquad \text{(or 0.0468).}
\end{aligned}$$

and the expected profit of the unintegrated duopolist is

$$\begin{aligned}
&E\left[\pi_2^{D,Post}\right] \\
&= \int_0^{\frac{1}{3}} \left(\int_{c_1 : b^{D,Post} = c_2}^1 \left(b^{D,Post} - c_2\right)\left(1 - p_{Lose}^{M,Post} - b^{D,Post}\right) f(c_1) dc_1\right) f(c_2) dc_2
\end{aligned}$$

$$= \int_0^{\frac{1}{3}} \left(\int_{c_1 : b^{D,Post} = c_2}^{1} (b^{D,Post} - c_2) \left(1 - \frac{1 + b^{D,Post}}{2}\right) dc_1 \right) dc_2.$$
$$= 0.0096.$$

The expected sole-served side price is

$$E[p^{M,Post}] = \int_0^1 \left(\Pr[c_2 \leq b^{D,Post}] p_{Lose}^{M,Post} + \Pr[c_2 > b^{D,Post}]\, E\left[p_{Win}^{M,Post} | c_2 > b^{D,Post}\right]\right) f(c_1) dc_1$$
$$= \int_0^1 \left(b^{D,Post} \left(\frac{1 - b^{D,Post}}{2} \right) + \int_{b^{D,Post}}^{1} \left(\frac{1 + c_1 - 2c_2}{2} \right) dc_2 \right) f(c_1) dc_1$$
$$= \frac{1}{2} \int_0^1 \left(b^{D,Post}(1 - b^{D,Post}) + (b^{D,Post} - c_1)(b^{D,Post} - 1) \right) f(c_1) dc_1$$
$$= \frac{\sqrt{3} \log\left(\sqrt{3} + 2\right)}{36} + \frac{13}{108} \quad \text{(or 0.1837),}$$

and the expected duopoly side price is

$$E[p^{D,Post}] = \int_0^1 (\Pr[c_2 \leq b^{D,Post}]\, b^{D,Post} + \Pr[c_2 > b^{D,Post}]\;\; E[c_2 \mid c_2 > b^{D,Post}])\, f(c_1) dc_1$$
$$= \int_0^1 \left((b^{D,Post})^2 + \int_{b^{D,Post}}^{1} c_2 f(c_2) dc_2 \right) f(c_1) dc_1$$
$$= \int_0^1 \left((b^{D,Post})^2 + \frac{1}{2} - \frac{1}{2} (b^{D,Post})^2 \right) dc_1$$
$$= \frac{11}{18} - \frac{\sqrt{3} \log\left(\sqrt{3} + 2\right)}{27} \quad \text{(or 0.5266).}$$

The expected full price is therefore

$$E[p^{F,Post}] = E[p^{M,Post}] + E[p^{D,Post}] = \frac{79}{108} - \frac{\sqrt{3} \log\left(\sqrt{3} + 2\right)}{108} \quad \text{(or 0.7104).}$$

Expected output is

$$E[D(p^{F,Post})]$$

$$= \int_0^1 \left(\Pr[c_2 < b^{D,Post}]\left(1 - p_{Lose}^{F,Post}\right) + \Pr[b^{D,Post} \leq c_2]\left(1 - p_{Win}^{F,Post}\right)\right) f(c_1)\, dc_1$$

$$= \int_0^1 \left(b^{D,Post}\left(1 - \frac{1 + b^{D,Post}}{2}\right) + (1 - b^{D,Post})\left(1 - \frac{1 + c_1}{2}\right)\right) dc_1$$

$$= \frac{29}{108} + \frac{\sqrt{3}\log(\sqrt{3} + 2)}{108} \quad \text{(or 0.2896).}$$

Expected shipper surplus is

$$E[CS^{Post}]$$

$$= \frac{1}{2}\int_0^1 \left(\Pr[c_2 < b^{D,Post}]\left(1 - p_{Lose}^{F,Post}\right)^2 + \Pr[b^{D,Post} \leq c_2]\left(1 - p_{Win}^{F,Post}\right)^2\right) f(c_1)\, dc_1$$

$$= \frac{1}{2}\int_0^1 \left(b^{D,Post}\left(1 - \frac{1 + b^{D,Post}}{2}\right)^2 + (1 - b^{D,Post})\left(1 - \frac{1 + c_1}{2}\right)^2\right) dc_1$$

$$= \frac{7}{144} + \frac{\sqrt{3}\log(\sqrt{3} + 2)}{864} \quad \text{(or 0.0513),}$$

and expected total surplus is

$$E[TS^{Post}] = E[CS^{Post}] + E\left[\pi_1^{D,Post}\right] + E\left[\pi_2^{D,Post}\right] + E[\pi^{M,Post}]$$
$$= 0.1633.$$

Case 3: Rule 11, the sole-served side makes a TIOLI offer first, and then the duopoly side second price auction takes place.

Pre-Merger

The per-merger outcome on the duopoly side is the same as the outcome in Case 1, with prices given by

$$p^{D,Pre} = c$$
$$E[p^{D,Pre}] = \frac{2}{3} \quad \text{(or 0.6667)},$$

and the duopolists' expected profits are

$$E\left[\pi_1^{D,Pre}\right] = E\left[\pi_2^{D,Pre}\right] = \frac{27}{2048} \quad \text{(or 0.0132)}.$$

The pre-merger outcome on the sole-served side is also the same as the outcome in Case 1. The sole-serving railroad does not observe the outcome of the duopoly side auction, and it sets price to maximize its expected profit. The profit maximizing price is

$$p^{M,Pre} = \frac{1}{4} \quad \text{(or 0.25)}.$$

The sole-serving railroad's expected profit is

$$E[\pi^{M,Pre}(p^{M,Pre})] = \frac{9}{256} \quad \text{(or 0.0352)},$$

and the expected joint profit of the sole-serving railroad and the integrating duopolist is

$$E\left[\pi^{Joint,Pre}\right] = \frac{99}{2048} \quad \text{(or 0.0483)}.$$

The expected full price is

$$E[p^{F,Pre}] = \frac{11}{12} \quad \text{(or 0.9167)},$$

and expected output is

$$E[D(p^{F,Pre})] = \frac{9}{64} \quad \text{(or 0.1406)}.$$

Expected shipper surplus is

$$E[CS^{Pre}] = \frac{27}{1024} \quad \text{(or 0.0264)},$$

and expected total surplus is

$$E[TS^{Pre}] = \frac{45}{512} \quad \text{(or 0.0879).}$$

Post-Merger

The post-merger outcomes on both the duopoly side and the sole-served side are the same as the outcomes in Case 1.

On the duopoly side, it is still the dominant strategy for the unintegrated duopolist to bid its true cost. The integrated duopolist, on the other hand, would optimally bid

$$b^{D,Post} = c_1 + \frac{1}{2} - \frac{\sqrt{4c_1^2 + 1}}{2}.$$

The expected price on the duopoly side is

$$E[p^{D,Post}] = \frac{11}{8} - \frac{\sqrt{5}}{3} - \frac{\log(\sqrt{5} + 2)}{16} \quad \text{(or 0.5394).}$$

On the sole-served side, the optimal TIOLI offer is

$$p^{M,Post} = c_1 + \frac{1}{2} - \frac{\sqrt{4c_1^2 + 1}}{2},$$

and its expected value is

$$E[p^{M,Post}] = 1 - \frac{\sqrt{5}}{4} - \frac{\log(\sqrt{5} + 2)}{8} \quad \text{(or 0.2605).}$$

The expected profit of the merged railroad on the duopoly side is

$$E\left[\pi_1^{D,Post}\right] = \frac{2}{3} - \frac{13\sqrt{5}}{48} - \frac{\log(\sqrt{5} + 2)}{32} \quad \text{(or 0.0160),}$$

and the expected profit of the unintegrated duopolist is

$$E\left[\pi_2^{D,Post}\right] = 0.0141.$$

The expected profit of the merged railroad on the sole-served side is

$$E[\pi^{M,Post}] = \frac{\log(\sqrt{5} + 2)}{16} + \frac{13\sqrt{5}}{24} - \frac{5}{4} \quad \text{(or 0.0514),}$$

and the expected joint profit of the merged railroad is therefore

$$E\left[\pi^{Joint,Post}\right] = E\left[\pi_1^{D,Post}\right] + E[\pi^{M,Post}] = \frac{\log(\sqrt{5} + 2)}{32} + \frac{13\sqrt{5}}{48} - \frac{7}{12} \quad \text{(or 0.0674).}$$

The expected full price is

$$E[p^{F,Post}] = E[p^{M,Post}] + E[p^{D,Post}] = \frac{19}{8} - \frac{7\sqrt{5}}{12} - \frac{3\log(\sqrt{5}+2)}{16} \quad \text{(or 0.7999)}$$

and expected output is

$$E[D(p^{F,Post})] = \frac{\log(\sqrt{5}+2)}{8} + \frac{\sqrt{5}}{4} - \frac{1}{2} \quad \text{(or 0.2395).}$$

Expected shipper surplus is

$$E[CS^{Post}] = \frac{23}{12} - \frac{5\sqrt{5}}{6} \quad \text{(or 0.0533),}$$

and expected total surplus is

$$\begin{aligned} E[TS^{Post}] &= E[CS^{Post}] + E\left[\pi_1^{D,Post}\right] + E\left[\pi_2^{D,Post}\right] + E[\pi^{M,Post}] \\ &= 0.1348. \end{aligned}$$

Case 4: 2*1 Routes, the duopoly side second price auction takes place first, and then the sole-served side makes a TIOLI offer. The sole-serving railroad sets the full price.

Pre-Merger

On the duopoly side, it is the dominant strategy for the duopolists to bid their costs, as it is in Case 1. The prices on the duopoly side auction are given by

$$p^{D,Pre} = c$$
$$E[p^{D,Pre}] = \frac{2}{3} \quad \text{(or 0.6667)}.$$

On the sole-served side, the sole-serving railroad observes the outcome of the auction before making the TIOLI offer. It then sets the full price equal to the sum of the winning price in the duopoly side auction, $p^{D,Pre} = c$, and its TIOILI offer. That is, the sole-serving railroad chooses the sole-served side price p to maximize its profit, which is given by

$$\pi^{M,Pre}(p) = p(1 - p - c) = -p^2 + p - cp.$$

The first order condition with respect to p is

$$\frac{\partial \pi^{M,Pre}(p)}{\partial p} = -2p + 1 - c = 0.$$

Therefore, the profit-maximizing sole-served side price is

$$p^{M,Pre} = \frac{1-c}{2},$$

and its expectation is

$$E[p^{M,Pre}] = \int_0^1 \frac{1-c}{2} g(c)dc = \int_0^1 (1-c)c\,dc = \frac{1}{6} \quad \text{(or 0.1667)}.$$

The expected profit of the sole-serving railroad is

$$\begin{aligned} E[\pi^{M,Pre}(p^{F,Pre})] &= \int_0^1 \left(-\left(\frac{1-c}{2}\right)^2 + \frac{1-c}{2} - c\frac{1-c}{2} \right) g(c)dc \\ &= \int_0^1 \left(\frac{1}{2}c^3 - c^2 + \frac{1}{2}c \right) dc \\ &= \frac{1}{24} \quad \text{(or 0.0417)}. \end{aligned}$$

The duopolists' expected profits are given by

$$\begin{aligned} E\left[\pi_1^{D,Pre}\right] &= E\left[\pi_2^{D,Pre}\right] \\ &= \int_0^1 \left(\int_{c_1}^1 (c_2 - c_1)\left(1 - \frac{1-c_2}{2} - c_2\right) f(c_2)dc_2 \right) f(c_1)dc_1 \end{aligned}$$

$$= \int_0^1 \left(-\frac{1}{12}c_1^3 + \frac{1}{4}c_1^2 - \frac{1}{4}c_1 + \frac{1}{12}\right) dc_1$$

$$= \frac{1}{48} \quad \text{(or 0.0208)},$$

and the expected joint profit of the sole-serving railroad and the integrating duopolist is

$$E\left[\pi^{Joint,Pre}\right] = \frac{1}{24} + \frac{1}{48} = \frac{1}{16} \quad \text{(or 0.0625).}$$

The expected full price is

$$E[p^{F,Pre}] = E[p^{M,Pre}] + E[p^{D,Pre}] = \frac{1}{6} + \frac{2}{3} = \frac{5}{6} \quad \text{(or 0.8333)},$$

and expected output is

$$E[D(p^{F,Pre})] = \int_0^1 \left(1 - \frac{1-c}{2} - c\right) g(c) dc$$

$$= \int_0^1 \left(\frac{1-c}{2}\right) 2c\, dc$$

$$= \frac{1}{6} \quad \text{(or 0.1667).}$$

Expected shipper surplus is

$$E[CS^{Pre}] = \int_0^1 \left(\frac{1}{2}\right)\left(1 - \frac{1-c}{2} - c\right)^2 g(c)\, dc$$

$$= \int_0^1 \left(\frac{1-c}{2}\right)^2 c\, dc$$

$$= \int_0^1 \left(\frac{1}{4}c^3 - \frac{1}{2}c^2 + \frac{1}{4}c\right) dc$$

$$= \frac{1}{48} \quad \text{(or 0.0208)},$$

and expected total surplus is

$$E[TS^{Pre}] = E[CS^{Pre}] + E\left[\pi_1^{D,Pre}\right] + E\left[\pi_2^{D,Pre}\right] + E[\pi^{M,Pre}]$$

$$= \frac{1}{48} + \frac{1}{48} + \frac{1}{48} + \frac{1}{24}$$

$$= \frac{5}{48} \quad \text{(or 0.1042).}$$

Post-Merger

The post-merger outcomes on both the duopoly side and the sole-served side are the same as the outcomes in Case 2.

On the duopoly side, it is still the dominant strategy for the unintegrated duopolist to bid its true cost. The integrated duopolist, on the other hand, would optimally bid

$$b^{D,Post} = \frac{2}{3} - \frac{\sqrt{4 - 6c_1 + 3c_1^2}}{3}.$$

The expected price on the duopoly side is

$$E[p^{D,Post}] = \frac{11}{18} - \frac{\sqrt{3}\log(\sqrt{3}+2)}{27} \quad \text{(or 0.5266).}$$

On the sole-served side, the sole-serving railroad learns the outcome of the duopoly side auction prior to making the TIOLI offer. The optimal TIOLI offer conditional on winning the auction is

$$p_{Win}^{M,Post} = \frac{1 + c_1 - 2c_2}{2},$$

and the optimal TIOLI offer conditional on losing the auction is

$$p_{Lose}^{M,Post} = \frac{1 - b}{2},$$

and its expected sole-served side price is

$$E[p^{M,Post}] = \frac{\sqrt{3}\log(\sqrt{3}+2)}{36} + \frac{13}{108} \quad \text{(or 0.1837).}$$

The expected profit of the merged railroad on the duopoly side is

$$E[\pi_1^{D,Post}] = \frac{79}{1296} - \frac{\sqrt{3}\log(\sqrt{3}+2)}{432} \quad \text{(or 0.0557),}$$

and the expected profit of the unintegrated duopolist is

$$E[\pi_2^{D,Post}] = 0.0096.$$

The expected profit of the merged railroad on the sole-served side is

$$E[\pi^{M,Post}] = \frac{\sqrt{3}\log(\sqrt{3}+2)}{216} + \frac{47}{1296} \quad \text{(or 0.0468),}$$

and the expected joint profit of the merged railroad is therefore

$$E[\pi^{Joint,Post}] = E[\pi_1^{D,Post}] + E[\pi^{M,Post}] = \frac{\sqrt{3}\log(\sqrt{3}+2)}{432} + \frac{7}{72} \quad \text{(or 0.1025).}$$

The expected full price is

$$E[p^{F,Post}] = E[p^{M,Post}] + E[p^{D,Post}] = \frac{79}{108} - \frac{\sqrt{3}\log\left(\sqrt{3}+2\right)}{108} \quad \text{(or 0.7104),}$$

and expected output is

$$E[D(p^{F,Post})] = \frac{29}{108} + \frac{\sqrt{3}\log\left(\sqrt{3}+2\right)}{108} \quad \text{(or 0.2896).}$$

Expected shipper surplus is

$$E[CS^{Post}] = \frac{7}{144} + \frac{\sqrt{3}\log\left(\sqrt{3}+2\right)}{864} \quad \text{(or 0.0513),}$$

and expected total surplus is

$$\begin{aligned} E[TS^{Post}] &= E[CS^{Post}] + E\left[\pi_1^{D,Post}\right] + E\left[\pi_2^{D,Post}\right] + E[\pi^{M,Post}] \\ &= 0.1633. \end{aligned}$$

Case 5: 1*2 Routes, the sole-served side makes a TIOLI offer first, and then the duopoly side second price auction takes place. The winner of the duopoly side auction sets the full price equal to the sum of the sole-served railroad's TIOLI offer and the auction price.

Pre-Merger

Suppose the sole-served side TIOLI price is p^M and both railroads on the duopoly side observe this prior to bidding in the duopoly side second price auction. The winner of the auction will combine the products on the sole-served side and the duopoly side and sell it to the shipper at price $p^F = p^M + p^D$, where p^F is determined in the second price auction and p^D is simply the difference between p^F and p^M.

Given p^M, the full cost of duopolist i is $c_i + p^M$. Suppose duopolist i bid b_i in the duopoly side auction and suppose that the buyer has a reserve price of 1 in the second price auction. Then, the bidder with the lowest bid wins the auction and the winning price is

$$p^F = \min\{\max\{b_1, b_2\}, 1\}.$$

If duopolist i loses the auction, its profit is zero. If duopolist i wins the auction, i.e., $b_i < b_j$ where $j \neq i$, its profit is

$$(p^F - p^M - c_i)(1 - p^F) = \left(\min\{b_j, 1\} - p^M - c_i\right)\left(1 - \min\{b_j, 1\}\right).$$

Pre-merger, duopolist i's bid b_i does not affect its profit conditional on winning or losing. So, following the standard second price auction logic, it is the dominant strategy for both duopolists to bid their true cost, $c_i + p^M$, and the equilibrium full price pre-merger is

$$p^{F,Pre}(p^M) = \min\{c + p^M, 1\}$$

where $c = \max\{c_1, c_2\}$.

Because the price is capped at 1, duopolist i will not participate in the auction if $c_i > 1 - p^M$, which happens with probability $1 - F(1 - p^M)$. If $c > 1 - p^M$, then there will be no sale, and the probability of this event is

$$\Pr[\text{No Sale}] = 1 - \left(F(1 - p^M)\right)^2 = p^M(2 - p^M).$$

Given $p^{F,Pre}$ and p^M, the expected output is

$$E\left[D\left(p^{F,Pre}(p^M)\right)\right]$$
$$= \int_0^{1-p^M}\left(\int_0^{1-p^M}\left(1 - p^{F,Pre}(p^M)\right)f(c_2)dc_2 + \int_{1-p^M}^{1}(1-1)f(c_2)dc_2\right)f(c_1)dc_1$$
$$+ \int_{1-p^M}^{1}\left(\int_0^{1-p^M}(1-1)f(c_2)dc_2 + \int_{1-p^{M,Pre}}^{1}(0)f(c_2)dc_2\right)f(c_1)dc_1$$

$$= -\int_0^{1-p^M} \left(\int_0^{1-p^M} \max\{c_1, c_2\} f(c_2) dc_2 \right) f(c_1) dc_1 + (1-p^M)\big(F(1-p^M)\big)^2$$

$$= -\int_0^{1-p^M} \left(c_1 F(c_1) + \int_{c_1}^{1-p^M} c_2 f(c_2) dc_2 \right) f(c_1) dc_1 + (1-p^M)\big(F(1-p^M)\big)^2$$

$$= \frac{1}{3}(1-p^M)^3.$$

On the sole-served side, the sole-serving railroad chooses price p^M to maximize its expected profit, which is given by

$$\begin{aligned} E[\pi^{M,Pre}(p^M)] &= p^M E\left[D\left(p^{F,Pre}(p^M)\right)\right] \\ &= \frac{1}{3} p^M (1-p^M)^3 \\ &= -\frac{1}{3}(p^M)^4 + (p^M)^3 - (p^M)^2 + \frac{1}{3}(p^M). \end{aligned}$$

The optimal pre-merger sole-served side price, $p^{M,Pre}$, is the solution to the following profit maximizing FOC

$$\frac{\partial E[\pi^{M,Pre}(p^M)]}{\partial p^M} = -\frac{4}{3}(p^M)^3 + 3(p^M)^2 - 2p^M + \frac{1}{3} = 0.$$

The roots to this equation are 1 and $\frac{1}{4}$. Therefore, the profit maximizing price is

$$p^{M,Pre} = \frac{1}{4} \quad \text{(or 0.2500)},$$

and the sole-serving railroad's expected profit is

$$E[\pi^{M,Pre}(p^{M,Pre})] = \frac{9}{256} \quad \text{(or 0.0352)}.$$

The expected full price is

$$\begin{aligned} E[p^{F,Pre}] &= \int_0^{1-p^{M,Pre}} (c + p^{M,Pre}) g(c)\, dc + \int_{1-p^{M,Pre}}^1 g(c)\, dc \\ &= \int_0^{\frac{3}{4}} \left(c + \frac{1}{4}\right) 2c\, dc + \int_{\frac{3}{4}}^1 2c\, dc \\ &= \frac{55}{64} \quad \text{(or 0.8594)}, \end{aligned}$$

and the expected duopoly side price is

$$E[p^{D,Pre}] = E[p^{F,Pre}] - E[p^{M,Pre}] = \frac{55}{64} - \frac{1}{4} = \frac{39}{64} \quad \text{(or 0.6094)}.$$

The duopolists' expected profits are given by

$$
\begin{aligned}
E\left[\pi_1^{D,Pre}\right] &= E\left[\pi_2^{D,Pre}\right] \\
&= \int_0^{1-p^{M,Pre}} \left(\int_{c_1}^{1-p^{M,Pre}} (c_2 - c_1)(1 - p^{M,Pre} - c_2)\, f(c_2)\, dc_2 \right) f(c_1) dc_1 \\
&= \int_0^{\frac{3}{4}} \left(-\frac{1}{6} c_1^3 + \frac{3}{8} c_1^2 - \frac{9}{32} c_1 + \frac{9}{128} \right) dc_1 \\
&= \frac{27}{2048} \quad \text{(or 0.0132)},
\end{aligned}
$$

and the expected joint profit of the sole-served and the integrating duopolist is

$$
\begin{aligned}
E\left[\pi^{Joint,Pre}\right] &= E\left[\pi^{M,Pre}\right] + E\left[\pi_1^{D,Pre}\right] \\
&= \frac{9}{256} + \frac{27}{2048} = \frac{99}{2048} \quad \text{(or 0.0483)}.
\end{aligned}
$$

Expected output is

$$
\begin{aligned}
E[D(p^{F,Pre})] &= \frac{1}{3}(1 - p^{M,Pre})^3 \\
&= \frac{9}{64} \quad \text{(or 0.1406)}.
\end{aligned}
$$

Expected shipper surplus is

$$
\begin{aligned}
E[CS^{Pre}] &= \int_0^{1-p^{M,Pre}} \left(\frac{1}{2}\right) (1 - c - p^{M,Pre})^2 g(c)\, dc \\
&= \frac{1}{2} \int_0^{\frac{3}{4}} \left(\frac{3}{4} - c\right)^2 2c dc \\
&= \int_0^{3/4} \left(c^3 - \frac{3}{2}c^2 + \frac{9}{16}c\right) dc \\
&= \frac{9}{32}\left(\frac{3}{4}\right)^2 - \frac{1}{2}\left(\frac{3}{4}\right)^3 + \frac{1}{4}\left(\frac{3}{4}\right)^4 \\
&= \frac{27}{1024} \quad \text{(or 0.0264)},
\end{aligned}
$$

and expected total surplus is

$$
\begin{aligned}
E[TS^{Pre}] &= E[CS^{Pre}] + E\left[\pi_1^{D,Pre}\right] + E\left[\pi_2^{D,Pre}\right] + E[\pi^{M,Pre}] \\
&= \frac{27}{1024} + \frac{27}{2048} + \frac{27}{2048} + \frac{9}{256} \\
&= \frac{45}{512} \quad \text{(or 0.0879)}.
\end{aligned}
$$

Post-Merger

Let p^M be the price on the sole-served side and let b_1 be the bid submitted by the integrated duopolist. First, note that it is still the dominant strategy for the unintegrated duopolist to bid its true cost, $c_2 + p^M$. Second, it is never optimal for the integrated duopolist to bid $b_1 > 1$ as that would guarantee that it loses the auction, and so we can assume $b_1 \leq 1$. Finally, since the profit on the sole-served side is now part of the merged railroad's joint profit, the true cost of the integrated duopolist is c_1 and not $c_1 + p^M$. This means that the integrated duopolist will always participate in the duopoly side auction.

The sole-served railroad learns the realization of the integrated duopolist, c_1, prior to making the TIOLI offer p^M. However, it does not observe the outcome of the duopoly side auction. Therefore, the merged firm chooses the sole-served side price p^M and the duopoly side bid b_1 to maximize the expected joint profit of the merged railroad, conditional on c_1.

If $c_2 \leq 1 - p^M$, then the unintegrated duopolist would participate in the auction. The joint profit of the merged railroad when the integrated duopolist wins the auction is

$$\begin{aligned}\pi_{Win}^{Post}(p^M) &= (\min\{c_2 + p^M, 1\} - c_1)(1 - \min\{c_2 + p^M, 1\}) \\ &= (p^M + c_2 - c_1)(1 - p^M - c_2).\end{aligned}$$

If the integrated duopolist loses the auction, then the joint profit of the merged railroad is

$$\pi_{Lose}^{Post}(p^M, b_1) = p^M(1 - b_1).$$

If $c_2 > 1 - p^M$, then the unintegrated duopolist does not participate in the auction and the integrated duopolist always wins and $p^F = 1$. In this case, the joint profit of the merged railroad is

$$\pi_{Win}^{Post}(p^M) = (1 - c_1)(1 - 1) = 0.$$

The expected joint profit of the merged railroad, conditional on c_1, is given by

$$\begin{aligned}&E\left[\pi^{Joint,Post}(p^M, b_1) \mid c_1\right] \\ &= \Pr[c_2 < b_1 - p^M]\, \pi_{Lose}^{Post}(p^M, b_1) \\ &\qquad + \Pr[b_1 - p^M \leq c_2 \leq 1 - p^M]\, E[\, \pi_{Win}^{Post}(p^M) \mid c_1, b_1 - p^M \leq c_2 \leq 1 - p^M] \\ &= (b_1 - p^M)p^M(1 - b_1) + \int_{b_1 - p^M}^{1 - p^M} (p^M + c_2 - c_1)(1 - p^M - c_2)\, dc_2 \\ &= (b_1 - p^M)p^M(1 - b_1) + \frac{1}{6}(b_1 - 1)^2(2b_1 - 3c_1 + 1)\end{aligned}$$

and the profit maximizing FOCs with respect to p^M and b_1 are

$$\frac{\partial E\left[\pi^{Joint,Post}(p^M, b_1) \mid c_1\right]}{\partial p^M} = p^M(2b_1 - 2) - b_1^2 + b_1 = 0,$$

and

$$\frac{\partial E\left[\pi^{Joint,Post}(p^M, b_1) \mid c_1\right]}{\partial b_1} = b_1^2 - (1 + 2p^M + c_1)b_1 + (p^M)^2 + p^M + c_1 = 0.$$

The solutions to this system of equations are

$$(p^M, b_1) = (1,1), (0,1), \text{and} \left(c_1 + \frac{1}{2} - \frac{\sqrt{4c_1^2 + 1}}{2}, 2\left(c_1 + \frac{1}{2} - \frac{\sqrt{4c_1^2 + 1}}{2}\right)\right).$$

Note that $(p, b) = (1,1)$ and $(p, b) = (0,1)$ guarantee a profit of 0 and therefore cannot be the optimal solution. Also, note that $c_1 + \frac{1}{2} - \frac{1}{2}\sqrt{4c_1^2 + 1}$ is increasing in c_1 and it is equal to $\frac{3}{2} - \frac{\sqrt{5}}{2} = 0.3820$ when $c_1 = 1$.

The optimal solution to the merged railroad's joint profit maximization problem is therefore

$$p^{M,Post} = c_1 + \frac{1}{2} - \frac{\sqrt{4c_1^2 + 1}}{2} \quad \text{and} \quad b^{D,Post} = 2\left(c_1 + \frac{1}{2} - \frac{\sqrt{4c_1^2 + 1}}{2}\right),$$

and the expected joint profit of the merged railroad is

$$\begin{aligned} E\left[\pi^{Joint,Post}(p^{M,Post}, b^{D,Post})\right] &= \int_0^1 E\left[\pi^{Joint,Post}(p^{M,Post}, b^{D,Post}) \mid c_1\right] f(c_1) dc_1 \\ &= \int_0^1 \left(2c_1^2 \frac{\sqrt{4c_1^2 + 1}}{3} - \frac{1}{2}c_1 - \frac{4}{3}c_1^3 + \frac{\sqrt{4c_1^2 + 1}}{6}\right) dc_1 \\ &= \frac{\log(\sqrt{5} + 2)}{32} + \frac{13\sqrt{5}}{48} - \frac{7}{12} \qquad \text{(or 0.0674).} \end{aligned}$$

The expected profit of the merged railroad on the duopoly side is

$$\begin{aligned} E\left[\pi_1^{D,Post}\right] &= \int_0^1 \left(\int_{b^{D,Post} - p^{M,Post}}^{1 - p^{M,Post}} (c_2 - c_1)(1 - p^{M,Post} - c_2) f(c_2) dc_2\right) f(c_1) dc_1 \\ &= \int_0^1 \left(-\frac{4}{3}c_1^3 + \left(\frac{2\sqrt{4c_1^2 + 1}}{3} + 2\right)c_1^2 - \left(\sqrt{4c_1^2 + 1}\right)c_1 - \frac{\sqrt{4c_1^2 + 1}}{12} + \frac{1}{4}\right) dc_1 \\ &= \frac{2}{3} - \frac{13\sqrt{5}}{48} - \frac{\log(\sqrt{5} + 2)}{32} \qquad \text{(or 0.0160).} \end{aligned}$$

The expected profit of the merged railroad on the sole-served side is

$$E[\pi^{M,Post}] = E\left[\pi^{Joint,Post}\right] - E\left[\pi_1^{D,Post}\right]$$
$$= \frac{\log\left(\sqrt{5}+2\right)}{16} + \frac{13\sqrt{5}}{24} - \frac{5}{4} \quad \text{(or 0.0514),}$$

and the expected profit of the unintegrated duopolist is

$$E\left[\pi_2^{D,Post}\right]$$
$$= \int_0^1 \left(\int_0^{b^{D,Post}-p^{M,Post}} (b^{D,Post} - c_2 - p^{M,Post})\,(1 - b^{D,Post}) f(c_2\,) dc_2 \right) f(c_1) dc_1$$
$$= \int_0^1 \left(-\frac{1}{8}\left(2c_1 - \sqrt{4c_1^2+1}\right)\left(2c_1 + 1 - \sqrt{4c_1^2+1}\right)^2 \right) f(c_1) dc_1$$
$$= \frac{\log\left(\sqrt{5}+2\right)}{32} + \frac{53\sqrt{5}}{48} - \frac{5}{2} \quad \text{(or 0.0141).}$$

The expected sole-served side price is

$$E[p^{M,Post}] = \int_0^1 \left(c_1 + \frac{1}{2} - \frac{\sqrt{4c_1^2+1}}{2} \right) f(c_1) dc_1$$
$$= 1 - \frac{\sqrt{5}}{4} - \frac{\log\left(\sqrt{5}+2\right)}{8} \quad \text{(or 0.2605),}$$

and the expected full price is

$$E[p^{F,Post}] = \int_0^1 \left(\int_0^{b^{D,Post}-p^{M,Post}} b^{D,Post} f(c_2\,) dc_2 + \int_{b^{D,Post}-p^{M,Post}}^{1-p^{M,Post}} (c_2 + p^{M,Post})\, f(c_2\,) dc_2 \right.$$
$$\left. + \int_{1-p^{M,Post}}^{1} f(c_2\,)\, dc_2 \right) f(c_1) dc_1$$
$$= \int_0^1 \left(c_1 + 1 - \frac{\sqrt{4c_1^2+1}}{2} \right) f(c_1) dc_1$$
$$= \frac{3}{2} - \frac{\sqrt{5}}{4} - \frac{\log\left(\sqrt{5}+2\right)}{8} \quad \text{(or 0.7605).}$$

The expected duopoly side price is therefore

$$E[p^{D,Post}] = E[p^{F,Post}] - E[p^{M,Post}] = \frac{1}{2} \quad \text{(or 0.5000),}$$

and expected output is

$$E[D(p^{F,Post})] = \int_0^1 \left(\int_0^{b^{D,Post}-p^{M,Post}} (1 - b^{D,Post})\, f(c_2)dc_2 \right.$$
$$\left. + \int_{b^{D,Post}-p^{M,Post}}^{1-p^{M,Post}} (1 - c_2 - p^{M,Post})\, f(c_2)dc_2 \right) f(c_1)dc_1$$
$$= \int_0^1 \left(\frac{\sqrt{4c_1^2 + 1}}{2} - c_1 \right) f(c_1)dc_1$$
$$= \frac{\log(\sqrt{5} + 2)}{8} + \frac{\sqrt{5}}{4} - \frac{1}{2} \quad \text{(or 0.2395).}$$

Expected shipper surplus is

$$E[CS^{Post}] = \frac{1}{2}\int_0^1 \left(\int_0^{b^{D,Post}-p^{M,Post}} (1 - b^{D,Post})^2\, f(c_2)dc_2 \right.$$
$$\left. + \int_{b^{D,Post}-p^{M,Post}}^{1-p^{M,Post}} (1 - c_2 - p^{M,Post})^2\, f(c_2)dc_2 \right) f(c_1)dc_1$$
$$= \frac{23}{12} - \frac{5\sqrt{5}}{6} \quad \text{(or 0.0533),}$$

and expected total surplus is

$$E[TS^{Post}] = E[CS^{Post}] + E\left[\pi_1^{D,Post}\right] + E\left[\pi_2^{D,Post}\right] + E[\pi^{M,Post}]$$
$$= \frac{\log(\sqrt{5} + 2)}{16} + \frac{13\sqrt{5}}{24} - \frac{7}{6} \quad \text{(or 0.1348).}$$

Case 6: 1*2 Routes, the sole-served side makes a TIOLI offer first, and then the duopoly side second price auction takes place. The winner of the duopoly side auction sets the full price equal to the sum of the sole-serving railroad's TIOLI offer and the auction price. The shipper has perfectly inelastic demand.

Pre-Merger

Suppose the sole-served side TIOLI price is p^M and both railroads on the duopoly side observe this prior to bidding in the duopoly side second price auction. The winner of the auction will combine the products on the monopoly side and the duopoly side and sell it to the shipper at price $p^F = p^M + p^D$, where p^F is determined in the second price auction and p^D is simply the difference between p^F and p^M.

Given p^M, the full cost of duopolist i is $c_i + p^M$. Suppose duopolist i bid b_i in the duopoly side auction and suppose that the buyer has a reserve price of 1 in the second price auction. Then, the bidder with the lowest bid wins the auction and the winning price is

$$p^F = \min\{\max\{b_1, b_2\}, 1\}.$$

If duopolist i loses the auction, its profit is zero. If duopolist i wins the auction, i.e., $b_i < b_j$ where $j \neq i$, its profit is

$$(p^F - p^M - c_i) = \left(\min\{b_j, 1\} - p^M - c_i\right).$$

Pre-merger, duopolist i's bid, b_i, does not affect its profit conditional on winning or losing. So, following the standard second price auction logic, it is the dominant strategy for both duopolists to bid their true cost, $c_i + p^M$, and the equilibrium full price pre-merger is

$$p^{F,Pre}(p^M) = \min\{c + p^M, 1\}$$

where $c = \max\{c_1, c_2\}$.

Because the price is capped at 1, duopolist i will not participate in the auction if $c_i > 1 - p^M$, which happens with probability $1 - F(1 - p^M)$. If $\min\{c_1, c_2\} > 1 - p^M$, then there will be no sale and the probability of this event is

$$\Pr[\text{No Sale}] = \left(1 - F(1 - p^M)\right)^2 = (p^M)^2.$$

Given $p^{F,Pre}$ and p^M, the expected output is

$$E\left[D\left(p^{F,Pre}(p^M)\right)\right] = 1 - \Pr[\text{No Sale}] = 1 - (p^M)^2.$$

On the sole-served side, the sole-serving railroad chooses price p^M to maximize its expected profit, which is given by

$$E[\pi^{M,Pre}(p^M)] = p^M(1 - (p^M)^2)$$

$$= -(p^M)^3 + p^M.$$

The optimal pre-merger sole-served side price, $p^{M,Pre}$, is the solution to the following profit maximizing FOC

$$\frac{\partial E[\pi^{M,Pre}(p^M)]}{\partial p^M} = -3(p^M)^2 + 1 = 0.$$

The roots to this equation are $-\frac{1}{\sqrt{3}}$ and $\frac{1}{\sqrt{3}}$. Therefore, the profit maximizing price is

$$p^{M,Pre} = \frac{1}{\sqrt{3}} \quad \text{(or 0.5574)},$$

and the sole-served railroad's expected profit is

$$E[\pi^{M,Pre}(p^{M,Pre})] = \frac{2\sqrt{3}}{9} \quad \text{(or 0.3849)}.$$

The expected full price is

$$\begin{aligned}
E[p^{F,Pre}] &= \int_0^{1-p^{M,Pre}} (c + p^{M,Pre}) g(c)\, dc + \int_{1-p^{M,Pre}}^1 g(c)\, dc \\
&= \int_0^{1-\frac{1}{\sqrt{3}}} \left(c + \frac{1}{\sqrt{3}}\right) 2c\, dc + \int_{1-\frac{1}{\sqrt{3}}}^1 2c\, dc \\
&= \frac{1}{3} + \frac{10\sqrt{3}}{27} \quad \text{(or 0.9748)},
\end{aligned}$$

and the expected duopoly side price is

$$E[p^{D,Pre}] = E[p^{F,Pre}] - E[p^{M,Pre}] = \frac{1}{3} + \frac{\sqrt{3}}{27} \quad \text{(or 0.3975)}.$$

The duopolists' expected profits are given by

$$\begin{aligned}
E\left[\pi_1^{D,Pre}\right] &= E\left[\pi_2^{D,Pre}\right] \\
&= \int_0^{1-p^{M,Pre}} \left(\int_{c_1}^{1-p^{M,Pre}} (c_2 - c_1) f(c_2) dc_2 \right. \\
&\qquad \left. + \int_{1-p^{M,Pre}}^1 (1 - p^{M,Pre} - c_1) f(c_2) dc_2 \right) f(c_1) dc_1 \\
&= \int_0^{1-\frac{1}{\sqrt{3}}} \left(\frac{1}{2} c_1^2 - c_1 + \frac{1}{3} \right) dc_1 \\
&= \frac{\sqrt{3}}{27} \quad \text{(or 0.0642)},
\end{aligned}$$

and the expected joint profit of the sole-served railroad and the integrating duopolist is

$$E\left[\pi^{Joint,Pre}\right] = E[\pi^{M,Pre}] + E\left[\pi_1^{D,Pre}\right]$$
$$= \frac{2\sqrt{3}}{9} + \frac{\sqrt{3}}{27} = \frac{7\sqrt{3}}{27} \quad \text{(or 0.4491).}$$

Expected output is

$$E[D(p^{F,Pre})] = 1 - (p^{M,Pre})^2$$
$$= \frac{2}{3} \quad \text{(or 0.6667).}$$

Expected shipper surplus is

$$E[CS^{Pre}] = \int_0^{1-p^{M,Pre}} (1 - c - p^{M,Pre})g(c)\,dc$$
$$= \int_0^{1-\frac{1}{\sqrt{3}}} \left(1 - c - \frac{1}{\sqrt{3}}\right) 2c\,dc$$
$$= \frac{2}{3} - \frac{10\sqrt{3}}{27} \quad \text{(or 0.0252),}$$

and expected total surplus is

$$E[TS^{Pre}] = E[CS^{Pre}] + E\left[\pi_1^{D,Pre}\right] + E\left[\pi_2^{D,Pre}\right] + E[\pi^{M,Pre}]$$
$$= \frac{2}{3} - \frac{10\sqrt{3}}{27} + \frac{\sqrt{3}}{27} + \frac{\sqrt{3}}{27} + \frac{2\sqrt{3}}{9}$$
$$= \frac{2}{3} - \frac{2\sqrt{3}}{27} \quad \text{(or 0.5384).}$$

Post-Merger

Let p^M be the price on the sole-served side and let b_1 be the bid submitted by the integrated duopolist. First, note that it is still the dominant strategy for the unintegrated duopolist to bid its true cost, $c_2 + p^M$. Second, it is never optimal for the integrated duopolist to bid $b_1 > 1$ as that would guarantee that it loses the auction, and so we can assume $b_1 \leq 1$. Finally, since the profit on the sole-served side is now part of the merged railroad's joint profit, the true cost of the integrated duopolist is c_1 and not $c_1 + p^M$. This means that the integrated duopolist will always participate in the duopoly side auction.

The sole-served railroad learns the realization of the integrated duopolist, c_1, prior to making the TIOLI offer p^M. However, it does not observe the outcome of the duopoly side auction. Therefore, the merged railroad chooses the sole-served side price p^M and the duopoly side bid b_1 to maximize the expected joint profit of the merged railroad, conditional on c_1.

Suppose $c_1 > 1 - p^M$:

If $c_2 \leq 1 - p^M$, then the unintegrated duopolist would participate in the auction. The joint profit of the merged railroad when the integrated duopolist wins the auction is

$$\pi_{Win}^{Post}(p^M) = \min\{c_2 + p^M, 1\} - c_1 = p^M + c_2 - c_1.$$

If the integrated duopolist loses the auction, then the joint profit of the merged railroad is

$$\pi_{Lose}^{Post}(p^M) = p^M > 1 - c_1.$$

Note that in this case

$$\pi_{Win}^{Post}(p^M) = p^M + c_2 - c_1 < p^M + (1 - p^M) - (1 - p^M) = p^M = \pi_{Lose}^{Post}(p^M)$$

which means that the integrated duopolist would be better off losing the auction.

If $c_2 > 1 - p^M$, then the unintegrated duopolist does not participate in the auction and the integrated duopolist always wins and $p^F = 1$. In this case, the joint profit of the merged railroad is

$$\pi_{Win}^{Post}(p^M) = 1 - c_1,$$

which does not depend on b_1.

Therefore, the optimal bid for the integrated duopolist when $c_1 > 1 - p^M$ is

$$b_1 = 1,$$

which guarantees that it would lose the auction if the unintegrated duopolist participates in the auction and win the auction if the unintegrated duopolist does not participate.

The expected joint profit of the merged railroad, conditional on $c_1 > 1 - p^M$, is then

$$\begin{aligned} &E\left[\pi^{Joint,Post}(p^M, b_1) \mid c_1 > 1 - p^M\right] \\ &= \Pr[c_2 \leq 1 - p^M]\, \pi_{Lose}^{Post}(p^M) + \Pr[c_2 > 1 - p^M]\, \pi_{Win}^{Post}(p^M) \\ &= (1 - p^M)p^M + p^M(1 - c_1), \end{aligned}$$

and the profit maximizing FOC with respect to p^M is

$$\frac{\partial E\left[\pi^{Joint,Post}(p^M, b_1) \mid c_1 > 1 - p^M\right]}{\partial p^M} = 2 - 2p^M - c_1 = 0,$$

which gives the optimal sole-served side price

$$p^M = 1 - \frac{1}{2}c_1.$$

Suppose now $c_1 \leq 1 - p^M$:

If $c_2 \leq 1 - p^M$, then the unintegrated duopolist participates in the auction. The joint profit of the merged railroad when the integrated duopolist wins the auction is

$$\pi_{Win}^{Post}(p^M) = p^M + c_2 - c_1 \leq p^M + (1 - p^M) - c_1 = 1 - c_1.$$

and the joint profit of the merged railroad when it loses the auction is

$$\pi_{Lose}^{Post}(p^M) = p^M \leq 1 - c_1.$$

If $c_2 > 1 - p^M$, then the unintegrated duopolist does not participate in the auction and the joint profit of the merged railroad is

$$\pi_{Win}^{Post}(p^M) = 1 - c_1.$$

This implies that the merged railroad profit is at most $1 - c_1$ when $c_1 \leq 1 - p^M$. However, as shown above, if the merged railroad chooses p^M such that $c_1 > 1 - p^M$, it earns a profit of $1 - c_1$ when the unintegrated duopolist does not participate in the auction and $p^M > 1 - c_1$ when it does. Therefore, the merged railroad would never choose p^M such that $c_1 \leq 1 - p^M$.

The optimal solution to the merged railroad's joint profit maximization problem is therefore

$$p^{M,Post} = 1 - \frac{1}{2}c_1 \quad \text{and} \quad b^{D,Post} = 1,$$

and the expected joint profit of the merged railroad is

$$\begin{aligned} E\left[\pi^{Joint,Post}(p^{M,Post}, b^{D,Post})\right] &= \int_0^1 E\left[\pi^{Joint,Post}(p^{M,Post}, b^{D,Post}) \mid c_1\right] f(c_1) dc_1 \\ &= \int_0^1 \left((1 - p^{M,Post})p^{M,Post} + p^{M,Post}(1 - c_1)\right) dc_1 \\ &= \int_0^1 \left(\frac{1}{4}c_1^2 - c_1 + 1\right) dc_1 \\ &= \frac{7}{12} \quad \text{(or 0.5833).} \end{aligned}$$

The expected profit of the merged railroad on the duopoly side is

$$\begin{aligned} E\left[\pi_1^{D,Post}\right] &= \int_0^1 \left(\int_{1-p^{M,Post}}^1 (1 - p^{M,Post} - c_1) f(c_2) dc_2\right) f(c_1) dc_1 \\ &= \int_0^1 \left(\frac{1}{4}c_1^2 - \frac{1}{2}c_1\right) dc_1 \\ &= -\frac{1}{6} \quad \text{(or} - 0.1667), \end{aligned}$$

the expected profit of the merged railroad on the sole-served side is

$$E[\pi^{M,Post}] = E[\pi^{Joint,Post}] - E[\pi_1^{D,Post}]$$
$$= \frac{7}{12} - \left(-\frac{1}{6}\right) = \frac{3}{4} \quad \text{(or 0.7500)},$$

and the expected profit of the unintegrated duopolist is

$$E[\pi_2^{D,Post}] = \int_0^1 \left(\int_0^{1-p^{M,Post}} (b^{D,Post} - p^{M,Post} - c_2) f(c_2)dc_2 \right) f(c_1)dc_1$$
$$= \int_0^1 \left(\int_0^{\frac{1}{2}c_1} \left(\frac{1}{2}c_1 - c_2\right) dc_2 \right) dc_1$$
$$= \int_0^1 \left(\frac{1}{8}c_1^2\right) dc_1$$
$$= \frac{1}{24} \quad \text{(or 0.0417)}.$$

The expected sole-served side price is

$$E[p^{M,Post}] = \int_0^1 \left(1 - \frac{1}{2}c_1\right) f(c_1)dc_1$$
$$= \frac{3}{4} \quad \text{(or 0.7500)},$$

and expected full price is

$$E[p^{F,Post}] = \int_0^1 (\Pr[c_2 \leq 1 - p^{M,Post}]\, b^{D,Post} + \Pr[c_2 > 1 - p^{M,Post}]\ 1)\, f(c_1)dc_1.$$
$$= 1$$

The expected duopoly side price is therefore

$$E[p^{D,Post}] = E[p^{F,Post}] - E[p^{M,Post}] = 1 - \frac{3}{4} = \frac{1}{4} \quad \text{(or 0.2500)},$$

and expected output is

$$E[D(p^{F,Post})] = 1.$$

Expected shipper surplus is

$$E[CS^{Post}] = 0,$$

and expected total surplus is

$$
\begin{aligned}
E[TS^{Post}] &= E[CS^{Post}] + E\left[\pi_1^{D,Post}\right] + E\left[\pi_2^{D,Post}\right] + E[\pi^{M,Post}] \\
&= \frac{5}{8} \quad \text{(or 0.6250).}
\end{aligned}
$$

APPENDIX C: COMMITTED GATEWAY PRICING SIMULATION MODEL

I. OVERVIEW

1. This appendix describes the model that I have developed to simulate the shipper-welfare effects of the parties' Committed Gateway Pricing ("CGP") proposal.[1] Throughout this appendix, I use the term "input set" to describe the set of routes where the shipments and their associated rates will be used as inputs in calculating the CGP tables. Similarly, I use the term "application set" to describe the set of routes that are eligible to utilize the CGP.

2. Broadly speaking, the parties' CGP proposal creates two CGP tables—one for CSX and one for BNSF.[2] Each table consists of 92 cells, based on 23 commodity categories and 4 distance bands.

3. The shipments in the input sets for each table are mutually exclusive of the shipments in the application sets. The input sets for the CSX CGP table includes all UP-NS and legacy UP-CSX interline shipments, except for legacy UP-CSX interline shipments on routes that are sole-served by UP on one end and sole-served by CSX on the other end. The rates derived from these input sets will be utilized to establish Committed Gateway Prices that CSX can apply to shipments on sole-served to sole-served UP-CSX interline routes across the gateways.[3]

4. Similarly, the input sets for the BNSF CGP table includes all UP-NS and legacy NS-BNSF interline shipments, except for legacy NS-BNSF interline shipments on routes that

---

1 See Verified Statement of Katherine R. Novak (hereinafter "Novak V.S."), including Appendix A, for the authoritative description of the CGP proposal.

2 The CGP will apply to shipments between customer facilities served solely by UP/NS or a short line interchanging traffic solely with UP/NS, on the one hand, and customer facilities served solely by BNSF or CSX or a short line interchanging traffic solely with BNSF or CSX, on the other hand. See Novak V.S., Appendix A.

3 Certain types of shipments are ineligible for the CGP proposal. These include shipments to or from facilities owned by rail carriers or their affiliates, shipments to and from storage-in transit facilities, finished vehicle shipments, intermodal shipments, unit train shipments, Toxic Inhalation Hazard and Poison Inhalation Hazard materials shipments, and Dimensional Loads. See Novak V.S., Appendix A.

are sole-served by NS and BNSF. The rates derived from these input sets will be utilized to establish the Committed Gateway Prices that BNSF can apply to shipments on the set of sole-served to sole-served interline routes.

5. To estimate the welfare effects of the parties' CGP proposal on shippers, I use a simulation model in which different railroads set rates to maximize their profits given a shipper's choices of shipment routes and railroads. I calibrate the parameters of the model using shipment data, railroads' margins, based on a set of optimality equations implied by the pre-merger equilibrium of the model.

6. Once the model parameters are calibrated, I first use the model to simulate a post-merger equilibrium without the CGP proposal, in which UP and NS set rates as a single entity to maximize their joint profit and eliminate any double marginalization that existed pre-merger. Then, I use the model to simulate the post-merger equilibrium of interest, in which the CGP proposal would create incentives for UP/NS to adjust rates *both* upward and downward in the input sets, but it would only create incentive to lower rates in the application sets. Compared to the post-merger equilibrium without the CGP proposal, the CGP proposal will generally result in higher rates on average in the input set but lower rates in the application set. I use the model to estimate changes in consumer surplus for each shipper going from the equilibrium without CGP to the equilibrium with CGP in both the input and application sets. The overall welfare effects of the CGP proposal can then be calculated by comparing the corresponding changes in shippers' consumer surplus in the input and application sets.

7. I perform the simulation separately for cells in the CSX CGP table and the BNSF CGP table. The welfare effects are simulated for a total of 27 CGP cells, for which I have sufficient data to calibrate the model and perform the simulation.

8. I find that the overall welfare effects of the CGP proposal on shippers is positive in each of these CGP cells. I then extrapolate these estimated welfare effects to the CGP cells for which I do not have sufficient information to perform the simulation, based on the relative carloads of these CGP cells, to obtain an estimated range of the total welfare effects of the CGP proposal.

II. TECHNICAL MODEL

A. PRE-MERGER EQUILIBRIUM

1. Input Set

9. Consider an input set with N^I shippers, whose shipments' origins and destinations are operated by two different railroads, railroads r and s, where $r \in \{UP, NS\}$, $s \in \{NS, CSX\}$ if $r = UP$, and $s \in \{UP, BNSF\}$ if $r = NS$. For each shipper $i = 1, \dots, N^I$, let $d_i^I = d_{i,r}^I + d_{i,s}^I$ denote the total mileage of shipper i's chosen shipment route, where $d_{i,j}^I$ is the mileage of the segment operated by railroad $j \in \{r, s\}$. In this model, each shipper's choice of route and contracting arrangement are treated as exogenously given and I focus on modeling the railroads' pricing incentives after these choices have been made.[4]

10. Shipper i has demand function $q_i^I(p_i^I)$, where p_i^I is the rate per car-mile faced by shipper i, and $q_i^I(p_i^I)$ is the number of carloads associated with shipper i's shipment given rate p_i^I. I assume that $q_i^I(p_i^I)$ is log-linear in the product of d_i^I and p_i^I:

$$q_i^I(p_i^I) = \exp(a_i^I - b_i^I d_i^I p_i^I)$$

where $a_i^I, b_i^I > 0$. Furthermore, I assume that railroad $j \in \{r, s\}$ has constant marginal cost, $c_{i,j}^I$, of serving shipper i.

11. For any shipment that has origin and destination operated by two different railroads, the rate per car-mile faced by shipper i, p_i^I, can be expressed as the mileage-weighted average of the rates set by railroads r and s. That is,

$$p_i^I = p_i^I(p_{i,r}^I, p_{i,s}^I) \equiv \frac{d_{i,r}^I}{d_i^I} p_{i,r}^I + \frac{d_{i,s}^I}{d_i^I} p_{i,s}^I,$$

where $p_{i,j}^I$ is the rate per car-mile for the segment of the shipment route operated by railroad $j \in \{r, s\}$.

---

[4] Routings under the CGP will follow existing routing protocols, so the routes can be treated as fixed for purposes of the model.

12. Pre-merger, given the demand parameters (a_i^I, b_i^I) and marginal costs $\left(c_{i,r}^I, c_{i,s}^I\right)$, which I assume are common knowledge, railroads r and s choose rates $p_{i,r}^I$ and $p_{i,s}^I$ to maximize their profit functions $\pi_{i,r}^I\left(p_{i,r}^I, p_{i,s}^I\right)$ and $\pi_{i,s}^I\left(p_{i,r}^I, p_{i,s}^I\right)$, respectively. The functional forms of railroads' profits generally depend on whether shipper i chooses to (i) negotiate with one of the two railroads to obtain a through rate for its shipment, or (ii) negotiate with both railroads separately and obtain two separate rates for the two segments of its shipment route using Rule 11. However, as I show below, under the assumption of log-linear demand and the assumption that all negotiations take the form of railroads making linear take-it-or-leave-it offers to the shipper i, the functional forms of railroad profits and their optimal rates do not vary between through rate and Rule 11 negotiations, which greatly simplifies the computation of the model.[5]

(a) Shipper negotiates a through rate with railroad r

13. First, I consider the case in which shipper i chooses to negotiate with railroad r to obtain a through rate for its entire shipment route. In this case, railroad r must obtain the rate $p_{i,s}^I$ per car-mile from railroad s for the segment of the shipment route that it operates. Given $p_{i,s}^I$, railroad r chooses $p_{i,r}^I$ to maximize its profit function, which is given by

$$\begin{aligned}\pi_{i,r}^I\left(p_{i,r}^I, p_{i,s}^I\right) &= q_i^I\left(p_i^I\left(p_{i,r}^I, p_{i,s}^I\right)\right) d_i^I\left(p_i^I\left(p_{i,r}^I, p_{i,s}^I\right) - \frac{d_{i,r}^I}{d_i^I} c_{i,r}^I - \frac{d_{i,s}^I}{d_i^I} p_{i,s}^I\right)\\ &= q_i^I\left(\frac{d_{i,r}^I}{d_i^I} p_{i,r}^I + \frac{d_{i,s}^I}{d_i^I} p_{i,s}^I\right) d_{i,r}^I\left(p_{i,r}^I - c_{i,r}^I\right).\end{aligned}$$

14. The first order condition for profit maximization is

$$\frac{\partial \pi_{i,r}^I\left(p_{i,r}^I, p_{i,s}^I\right)}{\partial p_{i,r}^I} = \frac{\partial q_i^I(p_i^I)}{\partial p_i^I} \frac{\partial p_i^I\left(p_{i,r}^I, p_{i,s}^I\right)}{\partial p_{i,r}^I} d_{i,r}^I\left(p_{i,r}^I - c_{i,r}^I\right) + q_i^I(p_i^I) d_{i,r}^I = 0$$

and railroad r's best response function, given $p_{i,s}^I$ and the log-linear demand assumption, is

[5] This is consistent with the results on Rule 11 and through rates I report in Section III.

$$p_{i,r}^I(p_{i,s}^I) = c_{i,r}^I + \frac{1}{b_i^I d_{i,r}^I}.$$

Note that this best response function does not depend on $p_{i,s}^I$, and therefore the optimal rate for railroad r is

$$p_{i,r}^{I*} = c_{i,r}^I + \frac{1}{b_i^I d_{i,r}^I}.$$

15. Given railroad r's best response function $p_{i,r}^I(p_{i,s}^I)$, railroad s chooses $p_{i,s}^I$ to maximize its profit function, which is

$$\pi_{i,s}^I(p_{i,r}^I(p_{i,s}^I), p_{i,s}^I) = q_i^I\left(p_i^I(p_{i,r}^I(p_{i,s}^I), p_{i,s}^I)\right) d_{i,s}^I(p_{i,s}^I - c_{i,s}^I).$$

The first order condition for profit maximization is

$$\frac{d\pi_{i,s}^I(p_{i,r}^I(p_{i,s}^I), p_{i,s}^I)}{dp_{i,s}^I} = \frac{\partial q_i^I(p_i^I)}{\partial p_i^I}\frac{d\left(p_i^I(p_{i,r}^I(p_{i,s}^I), p_{i,s}^I)\right)}{dp_{i,s}^I} d_{i,s}^I(p_{i,s}^I - c_{i,s}^I) + q_i^I(p_i^I) d_{i,s}^I$$
$$= 0$$

and the optimal rate for railroad s, $p_{i,s}^{I*}$, is

$$p_{i,s}^{I*} = c_{i,s}^I + \frac{1}{b_i^I d_{i,s}^I}.$$

(b) Shipper negotiates a through rate with railroad s

16. Next, I consider the case in which shipper i chooses to negotiate a through rate with railroad s, who must first obtain the rate of $p_{i,r}^I$ per car-mile from railroad r for the segment of the shipment route that it operates.

17. This case is symmetrical to the previous case, where railroad r determines the through rate. The profit functions of railroads r and s are

$$\pi_{i,r}^I\left(p_{i,r}^I, p_{i,s}^I(p_{i,r}^I)\right) = q_i^I\left(p_i^I\left(p_{i,r}^I, p_{i,s}^I(p_{i,r}^I)\right)\right) d_{i,r}^I(p_{i,r}^I - c_{i,r}^I)$$

and

$$\pi_{i,s}^I(p_{i,r}^I, p_{i,s}^I) = q_i^I\left(\frac{d_{i,r}^I}{d_i^I}p_{i,r}^I + \frac{d_{i,s}^I}{d_i^I}p_{i,s}^I\right) d_{i,s}^I(p_{i,s}^I - c_{i,s}^I),$$

respectively, where $p_{i,s}^{I}(p_{i,r}^{I})$ is railroad s's best response function given $p_{i,r}^{I}$.

18. Under the log-linear demand assumption, the profit maximizing rates are

$$p_{i,r}^{I*} = c_{i,r}^{I} + \frac{1}{b_i^I d_{i,r}^I} \quad \text{and} \quad p_{i,s}^{I*} = c_{i,s}^{I} + \frac{1}{b_i^I d_{i,s}^I}.$$

(c) Shipper uses Rule 11

19. Finally, I consider the case in which shipper i chooses to use Rule 11 to negotiate with both railroads r and s and obtain rates $p_{i,r}^{I}$ and $p_{i,s}^{I}$ for the two segments of its shipping routes separately. I assume these two negotiations take place simultaneously and the two railroads do not observe each other's decision before setting their own rates.

20. Given $p_{i,s}^{I}$, railroad r chooses $p_{i,r}^{I}$ to maximize its profit function

$$\pi_{i,r}^{I}(p_{i,r}^{I}, p_{i,s}^{I}) = q_i^I(p_i^I) d_{i,r}^I (p_{i,r}^{I} - c_{i,r}^{I}).$$

The first order condition for profit maximization is

$$\frac{\partial \pi_{i,r}^{I}(p_{i,r}^{I}, p_{i,s}^{I})}{\partial p_{i,r}^{I}} = \frac{\partial q_i^I(p_i^I)}{\partial p_i^I} \frac{\partial p_i^I}{\partial p_{i,r}^{I}} d_{i,r}^I (p_{i,r}^{I} - c_{i,r}^{I}) + q_i^I(p_i^I) d_{i,r}^I = 0$$

and railroad r's best response function, given $p_{i,s}^{I}$, is

$$p_{i,r}^{I}(p_{i,s}^{I}) = c_{i,r}^{I} + \frac{1}{b_i^I d_{i,r}^I}.$$

21. By symmetry, railroad s's best response function, given $p_{i,r}^{I}$, is

$$p_{i,s}^{I}(p_{i,r}^{I}) = c_{i,s}^{I} + \frac{1}{b_i^I d_{i,s}^I}.$$

Therefore, the optimal rates, $p_{i,r}^{I*}$ and $p_{i,s}^{I*}$, are

$$p_{i,r}^{I*} = c_{i,r}^{I} + \frac{1}{b_i^I d_{i,r}^I} \quad \text{and} \quad p_{i,s}^{I*} = c_{i,s}^{I} + \frac{1}{b_i^I d_{i,s}^I}.$$

2. **Application Set**

22. Let N^A be the number of shippers in the application set, whose shipments' origins and destinations are operated by two different railroads, railroads r and s, where $(r, s) \in$

$\{(UP, CSX), (NS, BNSF)\}$. For each shipper $i = 1, \ldots, N^A$, let $d_i^A = d_{i,r}^A + d_{i,s}^A$ denote the total mileage of shipper i's chosen shipment route, where $d_{i,j}^A$ is the mileage of the segment of the route operated by railroad $j \in \{r, s\}$.

23. I assume that shipper i in the application set has demand function $q_i^A(p_i^A)$, where p_i^A is the rate per car-mile faced by shipper i, and $q_i^A(p_i^A)$ is the number of carloads associated with shipper i's shipment given rate p_i^A. I assume that $q_i^A(p_i^A)$ is log-linear in my model and it is given by

$$q_i^A(p_i^A) = \exp(a_i^A - b_i^A d_i^A p_i^A)$$

where $a_i^A, b_i^A > 0$. Railroad $j \in \{r, s\}$ is assumed to have constant marginal cost, $c_{i,j}^A$, of serving shipper i.

24. Similar to the assumption I made regarding the input set, I assume that all negotiations between railroads and shippers take the form of linear take-it-or-leave-it offers, in which case railroads r and s choose per car-mile rates $p_{i,r}^A$ and $p_{i,s}^A$ to maximize their profits $\pi_{i,r}^A(p_{i,r}^A, p_{i,s}^A)$ and $\pi_{i,s}^A(p_{i,r}^A, p_{i,s}^A)$, which can be written as follow under the log-linear demand assumption:

$$\pi_{i,r}^A(p_{i,r}^A, p_{i,s}^A) = q_i^A\left(p_i^A(p_{i,r}^A, p_{i,s}^A)\right) d_{i,r}^A(p_{i,r}^A - c_{i,r}^A)$$

and

$$\pi_{i,s}^A(p_{i,r}^A, p_{i,s}^A) = q_i^A\left(p_i^A(p_{i,r}^A, p_{i,s}^A)\right) d_{i,s}^A(p_{i,s}^A - c_{i,s}^A),$$

respectively, where

$$p_i^A(p_{i,r}^A, p_{i,s}^A) \equiv \frac{d_{i,r}^A}{d_i^A} p_{i,r}^A + \frac{d_{i,s}^A}{d_i^A} p_{i,s}^A.$$

The optimal rates for railroad r and s, $p_{i,r}^{A*}$ and $p_{i,s}^{A*}$, are

$$p_{i,r}^{A*} = c_{i,r}^A + \frac{1}{b_i^A d_{i,r}^A} \quad \text{and} \quad p_{i,s}^{A*} = c_{i,s}^A + \frac{1}{b_i^A d_{i,s}^A}.$$

B. POST-MERGER EQUILIBRIUM WITHOUT CGP

1. **Input Set**

25. Post-merger, UP and NS will operate as a single entity and jointly set a through rate to maximize their combined profit on the set of routes that were previously operated by UP on the one end and NS on the other end (shippers will no longer be able to use Rule 11 on this set of routes after the merger). That is, for any shipper i who has chosen a shipment route that was operated by railroads r and s pre-merger, where $(r, s) \in \{(UP, NS), (NS, UP)\}$, the shipper now faces a rate p_i^I per car-mile that is chosen to maximize the joint profit function of UP/NS:

$$\pi_{i,UP/NS}^I(p_i^I) = q_i^I(p_i^I)d_i^I\left(p_i^I - \frac{d_{i,r}^I}{d_i^I}c_{i,r}^I - \frac{d_{i,s}^I}{d_i^I}c_{i,s}^I\right).$$

26. The first order condition for joint profit maximization is

$$\frac{\partial \pi_{i,UP/NS}^I(p_i^I)}{\partial p_i^I} = \frac{\partial q_i^I(p_i^I)}{\partial p_i^I}d_i^I\left(p_i^I - \frac{d_{i,r}^I}{d_i^I}c_{i,r}^I - \frac{d_{i,s}^I}{d_i^I}c_{i,s}^I\right) + q_i^I(p_i^I)d_i^I = 0$$

and the optimal rate, p_i^{I**}, is therefore

$$p_i^{I**} = \frac{d_{i,r}^I}{d_i^I}c_{i,r}^I + \frac{d_{i,s}^I}{d_i^I}c_{i,s}^I + \frac{1}{b_i^I d_i^I}$$

27. For the set of routes that are operated by UP or NS on one end and CSX or BNSF on the other end, the optimal rates will remain unchanged from the pre-merger equilibrium. That is

$$p_{i,r}^{I**} = p_{i,r}^{I*} \quad \text{and} \quad p_{i,s}^{I**} = p_{i,s}^{I*}$$

where $(r, s) \in \{(UP, CSX), (NS, BNSF)\}$.

2. **Application Set**

28. The application set, which does not include any UP-NS interline route, is not affected by the proposed merger without the CGP proposal. Therefore, the pre-merger optimal rates in the application set continue to be the optimal rates post-merger. That is,

$$p_{i,r}^{A**} = p_{i,r}^{A*} \quad \text{and} \quad p_{i,s}^{A**} = p_{i,s}^{A*}$$

where $(r, s) \in \{(UP, CSX), (NS, BNSF)\}$.

C. POST-MERGER EQUILIBRIUM WITH CGP

29. Let $r = UP/NS$ and let $p_r^I = (p_{1,r}^I, \dots, p_{N^I,r}^I)$ denote the vector of all UP/NS's rates in the input set. Define $p^{70}(p_r^I)$ as the 70th percentile UP/NS rates in the input set based on the number of carloads. That is, for any UP/NS input set rate vector, p_r^I, $p^{70}(p_r^I)$ is the smallest $\tilde{p}$ such that

$$\frac{\sum_{i=1}^{N^I} 1\{p_{i,r}^I \leq \tilde{p}\} q_i^I(p_i^I)}{\sum_{i=1}^{N^I} q_i^I(p_i^I)} \geq 0.70.$$

30. Under the CGP proposal, when railroad $s \in \{CSX, BNSF\}$ is setting the through rate in the application set, it will have the option to pay UP/NS at a rate of $p^{70}(p_r^I)$ per car-mile for the UP/NS's portion of the shipment associated with shipper i if $p_{i,r}^A > p^{70}(p_r^I)$.[6] Given $p_{i,r}^A$ and p_r^I, railroad s now chooses the through rate $p_{i,s}^A$ for shipper i's shipment to maximize the following profit function

[6] The CGP proposal also includes a minimum mileage threshold of 250 miles to account for the fixed costs associated rail transportation and prevents disproportionately low rates on short haul movements. Suppose the UP/NS's mileage for a particular shipment is 125 miles and the Committed Gateway Price is \$3 per car-mile for the CGP cell. In this case, the effective Committed Gateway Price for this shipment will be \$3 × 250 ÷ 125 = \$6 per car-mile. To implement this minimum mileage threshold calculation, UP/NS will calculate the effective Committed Gateway Price based on the lower of the two Committed Gateway Prices from the "0 to less than 500 miles" and "500 to less than 1,000 miles" distance bands. See Novak V.S., Appendix A.

For legibility reason, the mathematical notations I use to describe CGP here do not explicitly account for the minimum mileage threshold, but the threshold of 250 miles is implemented in my model. However, because I perform the simulations of my model separately for each CGP cell, I simplify this minimum mileage threshold calculation by using only the Committed Gateway Price from the "0 to less than 500 miles" distance band. The implication of this simplification is that my model will underestimate the welfare benefits in the application set for shipments with UP/NS's mileage below 250 miles.

$$\pi^A_{i,s}\left(p^A_{i,r}, p^A_{i,s}; p^I_r\right)$$

$$= \overbrace{1\left\{p^A_{i,r} \le p^{70}(p^I_r)\right\} q^A_i \left(\frac{d^A_{i,r}}{d^A_i} p^A_{i,r} + \frac{d^A_{i,s}}{d^A_i} p^A_{i,s}\right) d^A_{i,s}\left(p^A_{i,s} - c^A_{i,s}\right)}^{\text{UP/NS's rate does not exceed the CGP}}$$

$$+ \overbrace{1\left\{p^A_{i,r} > p^{70}(p^I_r)\right\} q^A_i \left(\frac{d^A_{i,r}}{d^A_i} p^{70}(p^I_r) + \frac{d^A_{i,s}}{d^A_i} p^A_{i,s}\right) d^A_{i,s}\left(p^A_{i,s} - c^A_{i,s}\right)}^{\text{UP/NS's rate exceeds the CGP}}$$

and railroad s's best response function, $\tilde{p}^A_{i,s}\left(p^A_{i,r}; p^I_r\right)$, is

$$\tilde{p}^A_{i,s}\left(p^A_{i,r}; p^I_r\right) = \begin{cases} p^A_{i,s}\left(p^A_{i,r}\right) & \text{if } p^A_{i,r} \le p^{70}(p^I_r) \\ p^A_{i,s}\left(p^{70}(p^I_r)\right) & \text{if } p^A_{i,r} > p^{70}(p^I_r) \end{cases}$$

where $p^A_{i,s}\left(p^A_{i,r}\right)$ is railroad s's best response function in the post-merger equilibrium without CGP.

31. Because the Committed Gateway Price, $p^{70}(p^I_r)$, depends on the full distribution of UP/NS's rates in the input set, to maximize profit, UP/NS must choose $p^I_r = \left(p^I_{1,r}, \dots, p^I_{N^I,r}\right)$ and $p^A_r = \left(p^A_{1,r}, \dots, p^A_{N^A,r}\right)$ jointly to maximize its combined profit in the input and application sets. However, given p^I_r, UP/NS's optimal rates in the application set, $p^{A***}_{i,r}$, is identical to its optimal rates without CGP, $p^{A**}_{i,r}$, as long as $p^{A**}_{i,r} \le p^{70}(p^I_r)$:

$$p^{A***}_{i,r}(p^I_r) = \begin{cases} p^{A**}_{i,r} & \text{if } p^{A**}_{i,r} \le p^{70}(p^I_r) \\ p^{70}(p^I_r) & \text{if } p^{A**}_{i,r} > p^{70}(p^I_r) \end{cases}.$$

Although the CGP applies only when a shipper is negotiating a through rate with railroad $s \in \{CSX, BNSF\}$, I assume that it will also constrain UP/NS's rate setting decision in the application set when UP/NS sets the through rate or when the shipper is using Rule 11. That is, I assume that UP/NS will also set its rate according to the strategy $p^{A***}_{i,r}(p^I_r)$ in those cases.

32. Therefore, UP/NS's optimal input set rate vector, p^{I***}_r, is the solution to the following profit maximization problem:

$$\max_{p_r^I} \pi_{UP/NS}^{I+A}\left(p_r^I, p_s^I(p_r^I), p_r^{A***}(p_r^I), \tilde{p}_s^A\left(p_r^{A***}(p_r^I); p_r^I\right)\right)$$

$$= \sum_{i=1}^{N^I} \overbrace{1\{s = UP/NS\}\, q_i^I\left(p_{i,r}^I\right) d_i^I \left(p_{i,r}^I - \frac{d_{i,r}^I}{d_i^I} c_{i,r}^I - \frac{d_{i,s}^I}{d_i^I} c_{i,s}^I\right)}^{\substack{\text{Shipment routes in the input set where} \\ \text{UP/NS operates on both ends}}}$$

$$+ \sum_{i=1}^{N^I} \overbrace{1\{s \neq UP/NS\}\, q_i^I\left(p_i^I\left(p_{i,r}^I, p_{i,s}^I\left(p_{i,r}^I\right)\right)\right) d_{i,r}^I\left(p_{i,r}^I - c_{i,r}^I\right)}^{\substack{\text{Shipment routes in the input set where} \\ \text{UP/NS only operates on one end}}}$$

$$+ \sum_{i=1}^{N^A} \overbrace{1\left\{p_{i,r}^{A**} \leq p^{70}(p_r^I)\right\} q_i^A\left(p_i^A\left(p_{i,r}^{A**}, \tilde{p}_{i,s}^A\left(p_{i,r}^{A**}; p_r^I\right)\right)\right) d_{i,r}^A\left(p_{i,r}^{A**} - c_{i,r}^A\right)}^{\substack{\text{Shipment routes in the application set where} \\ \text{UP/NS's rate does not exceed the CGP}}}$$

$$+ \sum_{i=1}^{N^A} \overbrace{1\left\{p_{i,r}^{A**} > p^{70}(p_r^I)\right\} q_i^A\left(p_i^A\left(p^{70}(p_r^I), \tilde{p}_{i,s}^A\left(p_{i,r}^{A**}; p_r^I\right)\right)\right) d_{i,r}^A\left(p^{70}(p_r^I) - c_{i,r}^A\right)}^{\substack{\text{Shipment routes in the application set where} \\ \text{UP/NS's rate exceeds the CGP}}}$$

where $s \in \{CSX, BNSF\}$, $p_{i,s}^I\left(p_{i,r}^I\right)$ is railroad s's best response function in the input set without CGP.[7] The solution to this profit maximization problem generally do not have any closed-form solution and therefore it must be solved numerically.

33. Note that UP/NS's total profit function $\pi_{UP/NS}^{I+A}\left(p_r^I, p_s^I(p_r^I), p_r^{A***}(p_r^I), \tilde{p}_s^A\left(p_r^{A***}(p_r^I); p_r^I\right)\right)$ is discontinuous in p_r^I because of the percentile function $p^{70}(p_r^I)$ is a discontinuous function. To reduce computational burden and improve numerical accuracy, to solve for UP/NS's profit maximizing input set rate vector, p_r^{I***}, I use the following algorithm to

---

7 For $s \in \{CSX, BNSF\}$, railroad s will have an incentive to deviate from its optimal strategy in the post-merger equilibrium without CGP in the input set, as the rate that it chooses can influence the distribution UP/NS's optimal input set rates, which may lower the Committed Gateway Price and increases railroad s's profit in the application set. However, this is a third-order incentive and therefore its effect is likely to be extremely small. For tractability and computational reason, I assume that railroad s will use the same optimal rate setting strategy in the input set with and without the CGP proposal.

reformulate this discontinuous unconstrained optimization problem into N^I continuous constrained optimization problem:[8]

1) Compute the post-merger equilibrium without CGP and obtain $p_r^{I**} = \left(p_{1,r}^{I**}, \dots, p_{N^I,r}^{I**}\right)$.

2) Sort the N^I shippers in the input set based on p_r^{I**} such that $p_{k,r}^{I**} \leq p_{k+1,r}^{I**}$ for all $k = 1, \dots, N^I - 1$.

3) For $k = 1, \dots, N^I$, numerically solve the following continuous constrained optimization problem:

$$\max_{p_r^I} \pi_{UP/NS}^{I+A}\left(p_r^I, p_s^I(p_r^I), p_r^{A***}(p_r^I), \tilde{p}_s^A(p_r^{A***}(p_r^I), p_r^I)\right)$$

subject to

   i. $CGP = p_{k,r}^I$;

   ii. $p_{l,r}^I \leq p_{l+1,r}^I$ for all $l = 1, \dots, N^I - 1$;

   iii. $\frac{\sum_{i=1}^{k} q_i^I(p_i^I)}{\sum_{i=1}^{N^I} q_i^I(p_i^I)} \geq 0.7$; and

   iv. $\frac{\sum_{i=1}^{k-1} q_i^I(p_i^I)}{\sum_{i=1}^{N^I} q_i^I(p_i^I)} < 0.7$.

4) Compare the N^I UP/NS's total profits obtained from the N^I constrained optimization problems in the step 3. Suppose the m-th constrained optimization problem yields the highest profit, then p_r^{I***} is the solution to the m-th constrained optimization problem.

---

8 I solve this constrained optimization problem using the non-linear optimization solver Artelys KNITRO (https://www.artelys.com/solvers/knitro/), which is an optimization solver commonly used and recommended in the economic literature. See, e.g., Dubé, J.-P., J. T. Fox, and C.-L. Su (2012), "Improving the Numerical Performance of Static and Dynamic Aggregate Discrete Choice Random Coefficients Demand Estimation," *Econometrica,* 80(5), 2231–2267, and Conlon, C., and J. Gortmaker (2020), "Best Practices for Differentiated Products Demand Estimation with PyBLP," *The RAND Journal of Economics*, 51(4), 1108–1161.

34. Given the optimal rates in the post-merger equilibrium with CGP, (p^{I***}, p^{A***}), the change in shipper i's consumer surplus in the input set due the CGP proposal can be calculated as

$$\Delta CS_i^I = 1\{p_i^{I**} > p_i^{I***}\} \int_{p_i^{I***}}^{p_i^{I**}} d_i^I q_i^I(p) dp - 1\{p_i^{I**} < p_i^{I***}\} \int_{p_i^{I**}}^{p_i^{I***}} d_i^I q_i^I(p) dp.$$

Similarly, the change in shipper i's consumer surplus in the application set due to the CGP proposal can similarly be calculated as

$$\Delta CS_i^A = 1\{p_i^{A**} > p_i^{A***}\} \int_{p_i^{A***}}^{p_i^{A**}} d_i^A q_i^A(p) dp - 1\{p_i^{A**} < p_i^{A***}\} \int_{p_i^{A**}}^{p_i^{A***}} d_i^A q_i^A(p) dp.$$

The overall change in shippers' consumer surplus across the two sets can then be calculated as

$$\sum_{i=1}^{N^I} \Delta CS_i^I + \sum_{i=1}^{N^A} \Delta CS_i^A.$$

III. MODEL CALIBRATION AND SIMULATION

35. I calibrate the parameters of the model, $\{a_i^I, b_i^I, c_{i,r}^I, c_{i,s}^I\}_{i=1}^{N^I}$ and $\{a_i^A, b_i^A, c_{i,r}^A, c_{i,s}^A\}_{i=1}^{N^A}$, using observed per car-mile shipment rates, $\{p_{i,r}^I, p_{i,s}^I\}_{i=1}^{N^I}$ and $\{p_{i,r}^A, p_{i,s}^A\}_{i=1}^{N^A}$, carloads, $\{q_i^I\}_{i=1}^{N^I}$ and $\{q_i^A\}_{i=1}^{N^A}$, mileage, $\{d_{i,r}^I, d_{i,s}^I\}_{i=1}^{N^I}$ and $\{d_{i,r}^A, d_{i,s}^A\}_{i=1}^{N^A}$, as well as UP's and NS's average margins, m_{UP} and m_{NS}. This calibration is preformed separately for each CGP cell.

36. I calculate shipment rates, carloads, and mileages separately for each shipper in each CGP cell using UP's and NS's 100 percent Waybill data from 2024. The Waybill data are limited to UP-CSX, NS-BNSF, and UP-NS interline shipments that are included in the input and application sets under the CGP proposal.[9] Within each CGP cell, a shipper

---

9 Due to data limitation, I am not able to accurately determine BNSF's and CSX's rates for shipments that involve short lines. This is because I impute BNSF's and CSX's rate for each through rate shipment as the difference between UP/NS's reported through rate revenue (i.e.,

in the model is defined as a unique combination of shipper, route (origin SPLC6 to destination SPLC6), contracting railroads, contracting arrangement (e.g., through rate or Rule 11), and time period. I use a time period of six months (from January to June and from July to December) to define shippers in the model. I do so because shippers typically have contracts that dictate their shipment rates over a period of a year, but contract end dates generally do not align with the calendar year, and they differ across shippers. Hence, assuming contract end dates are evenly distributed throughout a year, each observed contract will expire in 6 months on average. I calculate average rate per car-mile, average shipment mileage, and count of carloads separately for each shipper.

37. I calculate UP's and NS's average margins using the total revenue and total variable cost information from the Confidential Carload Waybill Sample for the year 2023, which is the most recent version available from the STB. I limit the sample to non-intermodal Rule 11 shipments, and I calculate average margins separately for each CGP cell, and separately for UP and NS.

38. Because I do not observe the railroads' marginal costs for each individual shipment, simplifying assumptions must be made to calibrate the model parameters. I assume that UP's marginal cost per car mile is the same for all shipments within each CGP cell, i.e., $c_{i,UP}^{I} = c_{UP}$ for all $i = 1, \dots, N^{I}$ and $c_{i,UP}^{A} = c_{UP}$ for all $i = 1, \dots, N^{A}$, and I calibrate c_{UP} using the following equations for all UP-NS and UP-CSX interline shipments:

$$\frac{\sum_{i=1}^{N^I} 1\{r = UP\} q_i^I d_{i,r}^I \left(p_{i,r}^I - c_{UP}\right) + \sum_{i=1}^{N^A} 1\{r = UP\} q_i^A d_{i,r}^A \left(p_{i,r}^A - c_{UP}\right)}{\sum_{i=1}^{N^I} 1\{r = UP\} q_i^I d_{i,r}^I p_{i,r}^I + \sum_{i=1}^{N^A} 1\{r = UP\} q_i^A d_{i,r}^A p_{i,r}^A} = m_{UP}.$$

---

including all rail portions of the shipment) and the reported revenue for the UP/NS's portion of the shipment. For a shipment involving a short line, this would incorrectly attribute the short line revenue to BNSF or CSX. For this reason, I excluded short line shipments for the purpose of this simulation.

For NS-BNSF interline shipments, I make the same assumption and use an analogous equation to calibrate c_{NS} from m_{NS}.[10]

39. The approach described in the previous paragraph allows me to calibrate the marginal cost per car-mile of one of the two railroads, either c_{UP} or c_{NS}, for each shipment included in the model. Once c_{UP} or c_{NS} is calibrated, I calibrate the demand parameters, (a_i^I, b_i^I) and (a_i^A, b_i^A), as well as the marginal cost of the other railroad, using (i) the demand equation, (ii) the profit maximizing first order condition of railroad r, and (iii) the profit maximizing first order condition of railroad s. Specifically, for the input set, I calibrate these parameters using the following equations:

$$b_i^I = \frac{1}{d_{i,r}^I (p_{i,r}^I - c_r)}$$

$$a_i^I = \log(q_i^I) + b_i^I d_i^I \left(\frac{d_{i,r}^I}{d_i^I} p_{i,r}^I + \frac{d_{i,s}^I}{d_i^I} p_{i,s}^I \right)$$

$$c_{i,s}^I = p_{i,s}^I - \frac{1}{b_i^I d_{i,s}^I}$$

where $r \in \{UP, NS\}$. Similarly, I calibrate these parameters for the application set using the following equations:

$$b_i^A = \frac{1}{d_{i,r}^A (p_{i,r}^A - c_r)}$$

$$a_i^A = \log(q_i^A) + b_i^A d_i^A \left(\frac{d_{i,r}^A}{d_i^A} p_{i,r}^A + \frac{d_{i,s}^A}{d_i^A} p_{i,s}^A \right)$$

$$c_{i,s}^A = p_{i,s}^A - \frac{1}{b_i^A d_{i,s}^A}.$$

---

10 If the calibrated marginal cost implies a markup of less than \$0.01 per car-mile for a particular shipment, due to an unusually low observed rate per car-mile, I recalibrate the marginal cost for that shipment such that the UP's (or NS's) margin of that shipment is equal to m_{UP} (or m_{NS}). This is done to prevent extremely large or negative calibrated b_i^I or b_i^A that can lead to numerical instability in the main optimization problem of the simulation. This occurs only for a very small number of shipments in the data.

40. Once I have calibrated these model parameters, I use the numerical algorithm described in the previous section to simulate the welfare effects of the CGP proposal on shippers separately for each cell in the CSX CGP table and the BNSF CGP table.

41. One main data limitation I face in calibrating the model calibration and performing the simulation is that I do not observe the rates set by CSX and BNSF for those UP-CSX and NS-BNSF interline shipments where the shippers have chosen to use Rule 11. For these shipments, the mileage information is typically also missing for the CSX and BNSF segments of the shipment routes. Because of this data limitation and other missing information, a large number of (predominantly Rule 11) shipments are excluded from the model, which results in many CGP cells for which I do not have shipment data in either the input set or the application set.

42. In implementing my model, I focus on the set of CGP cells for which I have sufficient data to calibrate the model to ensure the simulation results are representative. Using UP's and NS's 100 percent Waybill data, I am able to determine the total number of carloads shipped in each of the input and application sets, regardless of whether I have sufficient information to include these shipments in the model. I perform the model calibration and simulation on the set of CGP cells where at least 10 percent of the number of carloads in both the input and application sets (before the redistribution of carloads excluded from the model) have sufficient information to be included in the model. For each of these 27 CGP cells, I redistribute the number of carloads excluded from the model, due to missing information, among the set of included shipments.[11] This procedure is done to ensure that the relative and total sizes of the input and application sets in the model are as close to their true sizes in the data as possible, in order to accurately capture the incentives UP/NS to set rates across both sets.

43. Figure 1 shows the estimated welfare effects for each of these CGP cells. As shown in Figure 1, my simulation model finds that the overall welfare effects of the CGP proposal

[11] This redistribution of carloads is applied to shipments in which the identities of the railroads are identical. I do not redistribute excluded carloads associated with UP-CSX Rule 11 shipments to UP-NS shipments that are included in the model, for example. See my backup materials for detail.

is positive in each of these CGP cells. In total, I estimate a net increase in shippers' consumer surplus of $10.3 million a year from shipments included in these CGP cells.

Figure 1

Total Welfare Effects of the CGP Proposal on Shippers for Included CGP Cells

		Change in Shippers' Consumer Surplus ($ / Year)		
Commodity Group	**Distance Band**	**Input Set**	**Application Set**	**Overall**
BNSF CGP Table				
SPECIALIZED MARKETS	500 TO LESS THAN 1,000 MILES	-$1,109,047	$2,863,551	$1,754,504
METALS & ORES I	500 TO LESS THAN 1,000 MILES	-$372,549	$742,022	$369,473
FOOD & BEVERAGE II	500 TO LESS THAN 1,000 MILES	-$265,588	$474,078	$208,490
METALS & ORES I	0 TO LESS THAN 500 MILES	-$243,870	$415,751	$171,881
FOOD & BEVERAGE II	0 TO LESS THAN 500 MILES	-$64,798	$105,933	$41,134
FOREST PRODUCTS I	500 TO LESS THAN 1,000 MILES	-$289,011	$303,296	$14,285
SPECIALIZED MARKETS	0 TO LESS THAN 500 MILES	-$609,348	$623,324	$13,976
METALS & ORES II	1,000 TO LESS THAN 1,500 MILES	-$36,481	$50,223	$13,741
REFRIGERATED	500 TO LESS THAN 1,000 MILES	-$25,204	$30,627	$5,423
FOREST PRODUCTS I	0 TO LESS THAN 500 MILES	-$603	$820	$217
REFRIGERATED	0 TO LESS THAN 500 MILES	$0	$0	$0
Subtotal		-$3,016,500	$5,609,625	$2,593,125
CSX CGP Table				
REFRIGERATED	1,500 MILES OR GREATER	-$4,754,896	$10,641,083	$5,886,187
FOOD & BEVERAGE II	1,500 MILES OR GREATER	-$1,882,066	$2,676,877	$794,811
FOREST PRODUCTS I	1,500 MILES OR GREATER	-$738,333	$1,330,651	$592,317
METALS & ORES I	1,500 MILES OR GREATER	-$184,039	$287,093	$103,054
METALS & ORES I	1,000 TO LESS THAN 1,500 MILES	-$74,853	$159,735	$84,882
METALS & ORES I	0 TO LESS THAN 500 MILES	-$112,384	$196,709	$84,325
REFRIGERATED	1,000 TO LESS THAN 1,500 MILES	-$70,583	$142,882	$72,300
METALS & ORES II	1,500 MILES OR GREATER	-$118,810	$150,111	$31,301
METALS & ORES I	500 TO LESS THAN 1,000 MILES	-$123,862	$153,073	$29,211
SPECIALIZED MARKETS	0 TO LESS THAN 500 MILES	-$47,511	$64,013	$16,502
FOOD & BEVERAGE II	500 TO LESS THAN 1,000 MILES	-$1,530	$9,139	$7,609
FOOD & BEVERAGE I	0 TO LESS THAN 500 MILES	-$38,115	$44,685	$6,570
FOOD & BEVERAGE II	0 TO LESS THAN 500 MILES	-$2,454	$5,598	$3,144
FOREST PRODUCTS I	0 TO LESS THAN 500 MILES	-$29,056	$32,087	$3,031
FOREST PRODUCTS I	1,000 TO LESS THAN 1,500 MILES	-$1,308	$1,638	$330
FOREST PRODUCTS I	500 TO LESS THAN 1,000 MILES	-$121,987	$122,307	$320
Subtotal		-$8,301,786	$16,017,680	$7,715,893
Total		-$11,318,286	$21,627,305	$10,309,019

44. To extrapolate this total welfare effects estimate to all CGP cells, I multiply the estimated total change in shippers' consumer surplus among the set of CGP cells included in the model by the following ratio:

$$\frac{\text{Total Number of Carloads in the Data}}{\text{Total Number of Carloads Included in the Model}}.$$

This ratio is calculated separately for the CSX CGP table and the BNSF CGP table, and I use the sum of these two resulting numbers as my estimate of the CGP proposal's total welfare effects on shippers.

45. I first calculate the above ratio combining the number of carloads in both the input and application sets. As an alternative, I calculate the above ratio using only the number of carloads in the application sets. Because the number of carloads that is missing from the model is higher in the input set (a larger input set would lower UP/NS's incentive to raise rates), calculating the above ratio using only data from the application sets produces a conservative lower bound on the estimate of the total welfare effects. These two ratios together give me an estimated range, from $39.4 million a year to $61.8 million a year, of the total welfare effects of the CGP proposal on all shippers. These calculations are presented in Figure 2.

Figure 2

Total Welfare Effects of the CGP Proposal on Shippers

BNSF CGP Table	**Application Set**	**Input and Application Sets**
Number of Carloads in Data	46,805	308,430
Number of Carloads Included in Model	11,911	36,321
Ratio	3.93	8.49
CSX CGP Table	**Application Set**	**Input and Application Sets**
Number of Carloads in Data	75,409	394,793
Number of Carloads Included in Model	19,919	76,657
Ratio	3.79	5.15

Total Welfare Effects	
ΔCS for Included CGP Cells	**$ Million / Year**
BNSF CGP Table	$2.59
CSX CGP Table	$7.72
Total	$10.31
ΔCS for All CGP Cells	
Based on Total Carloads ($2.59 x 8.49 + $7.72 x 5.15)	$61.76
Based on Application Sets Carloads ($2.59 x 3.93 + $7.72 x 3.79)	$39.40

ATTACHMENT 1

Mark A. Israel — December 2025
Founding Partner, Econic Partners

655 New York Avenue, NW
Suite 800
Washington, DC 20001
(301) 938-5094 (mobile)

Email: misrael@econicpartners.com
Bio: https://econicpartners.com/people/mark-a-israel

AREAS OF EXPERTISE

- Industrial organization economics; Antitrust and Competition economics
- Applied econometrics
- Economic and econometric analysis of horizontal and vertical mergers
- Economic and econometric analysis of antitrust litigation topics, including: Class certification, damages, and liability issues in cases involving price fixing, exclusive dealing, monopolization, bundling, price discrimination, and exclusionary practices

INDUSTRIES OF EXPERTISE AND CASE HIGHLIGHTS

- Particular expertise in industries including: Wireline and wireless telecommunications; Digital advertising; Internet and other high technology markets; Media; Sports; Airlines; Railroads; Consumer Packaged Goods; Distribution services; Financial exchanges; Biotech; Healthcare; Hotels; Rental Cars; Insurance markets; Credit Cards; Energy markets; Retail
- Selected litigation highlights: CCB v. Rogers/Shaw; FTC v. Tempur Sealy/Mattress Firm; FTC v. Sysco/US Foods; DOJ and Private Google AdTech Litigation; DOJ v. Google Search Litigation; Various matters against Reynolds & Reynolds and CDK Global; 10X v. Vizgen; Various litigation matters involving Acthar; Rail Fuel Surcharge Litigation; NFL Sunday Ticket Antitrust Litigation; PGA Tour v. LIV Golf; Viamedia v. Comcast; Capacitors Price Fixing Jury Trial; Verizon-Tracfone Hearings; Sprint-T-Mobile Hearings; DOJ v. AT&T/Time Warner; Determination of Cable Royalty Funds
- Research published in leading scholarly and applied journals including *The American Economic Review*, *The Rand Journal of Economics*, *The International Journal of Industrial Organization, The Review of Industrial Organization, The Journal of Law and Economics, The Journal of Competition Law and Economics, Economics Letters,* and *The Review of Network Economics*
- Co-author of the chapter on Econometrics and Regression Analysis in the ABA Treatise, *Proving Economic Damages: Legal and Economic Issues,* 2017

ATTACHMENT 1

EDUCATION

- Ph.D., Economics, Stanford University, June 2001
- M.S., Economics, University of Wisconsin-Madison, August 1992
- B.A., Economics, Illinois Wesleyan University, Summa Cum Laude (4.0), May 1991

EMPLOYMENT HISTORY

Econic Partners

Founding Partner: April 2025 – Present

Compass Lexecon

President: December 2023 – March 2025

Head of North American Antitrust Practice: January 2016 – December 2023

Executive Vice President: April 2013 – December 2015

Senior Vice President: January 2009 – March 2013

Vice President: January 2008 – December 2008

Economist: January 2006 – December 2007

Kellogg School of Management, Northwestern University

Associate Professor of Management and Strategy: 2007 – 2008

Assistant Professor of Management and Strategy: 2000 – 2006

State Farm Insurance

Research Administrator: August 1992 – August 1995

RECENT PROFESSIONAL RECOGNITIONS

Global Competition Review, *Economist of the Year*, 2023

Who's Who Legal, *Global Elite Thought Leader in Competition*: 2022, 2023, 2024, 2025, 2026

Who's Who Legal, *Recommended Expert Witness in Arbitration*: 2024, 2026

ATTACHMENT 1

<u>LIVE TESTIMONIAL EXPERIENCE</u>

Testimony as Economic Expert on behalf of Rogers Communications Canada Inc., In the Matter of CPC-2-0-17 - Conditions of License for Mandatory Roaming and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Sharing Arrangements; and In the Matter of CPC-2-0-18 - Industry Canada's Arbitration Rules and Procedures Between *Rogers Communications Canada Inc. and Telus Communications Inc.*, Live Hearing Testimony: October 21, 2025.

Testimony as Economic Expert on behalf of Hattie Mitchell et al., In the Matter of *Arrieona Beal v. Hattie Mitchell et al. v. NL Industries, Inc. and John Does 1-50*, In the Circuit Court of Milwaukee County State of Wisconsin, Case No. 2021-CV-003276, Deposition: July 22, 2025.

Testimony as Economic Expert on behalf of Google, LLC, In the Matter of *United States of America et al. v. Google LLC*, In the United States District Court for the District of Columbia, CV No. 20-3010, Live Trial Testimony at Remedies Hearing: May 2, 2025.

Testimony as Economic Expert on behalf of Google, LLC, In the Matter of *United States of America et al. v. Google LLC* (Case No. 1:20-cv-03010-APM), and *State of Colorado et al. v. Google LLC* (Case No. 1-20-cv-03715-APM), In the United States District Court for the District of Columbia, Deposition: November 3, 2022; November 4, 2022; Live Trial Testimony: November 2, 2023; November 3, 2023; November 6, 2023; Deposition: April 8, 2025.

Testimony as Economic Expert on behalf of Google LLC, *In Re Google Digital Advertising Antitrust Litigation*, In the United States District Court for the Southern District of New York, Case No. 1:21-md-3010 (PKC), Deposition: March 31, 2025; April 1, 2025.

Testimony as Economic Expert on behalf of 10X Genomics, Inc., In the Matter of *10X Genomics, Inc. and Fellows of Harvard College v. Bruker Spatial Biology, Inc. et al.*, In the United States District Court for the District of Delaware, C.A. No. 22-261-MFK, Deposition: February 25, 2025.

Testimony as Economic Expert on behalf of Tempur Sealy International, Inc., In the Matter of *Federal Trade Commission v. Tempur Sealy International, Inc. and Mattress Firm Group Inc.*, In the United States District Court for the Southern District of Texas Houston Division, Case No. 4:241-CV-02508, Deposition: October 29, 2024; Live Trial Testimony: November 25, 2024.

Testimony as Economic Expert on behalf of 10X Genomics, Inc., In the Matter of *10X Genomics, Inc. and President and Fellows of Harvard College v. Vizgen, Inc.; Vizgen, Inc. v. 10X Genomics, Inc. and President and Fellows of Harvard College (Counterclaim)*, In the United States District Court for the District of Delaware, Civil Action No. 22-595-MFK, Deposition: October 23, 2024.

Testimony as Economic Expert on behalf of The Kroger Company and Albertsons Companies, Inc., In the Matter of the *State of Colorado ex rel. Philip J. Weiser, Attorney General v. The Kroger Co.; Albertsons Companies, Inc.; and C&S Wholesale Groceries, LLC*, In the District Court, City and County of Denver, Colorado, Case No. 24CV30459, Live Trial Testimony: October 17, 2024; October 18, 2024.

ATTACHMENT 1

Testimony as Economic Expert on behalf of The Kroger Company and Albertsons Companies, Inc., In the Matter of the *State of Washington v. The Kroger Company*, In the United States Superior Court of Washington for King County, Case No. 24-200977-9 SEA, Deposition: August 20, 2024; Live Trial Testimony: October 7, 2024.

Testimony as Economic Expert on behalf of Google LLC, In the Matter of *United States of America et al. v. Google, LLC*, In the United States District Court for the Eastern District of Virginia Alexandria Division, Case No. 1:23-cv-00108-LMB-JFA, Deposition: March 14, 2024; Live Trial Testimony: September 26, 2024.

Testimony as Economic Expert on behalf of The Kroger Company and Albertsons Companies, Inc., In the Matter of *FTC et al. v. Kroger and Albertsons*, In the United States District Court District of Oregon Portland Division, Case No. 3:24-cv-00347-AN, Deposition: July 22, 2024; Economic Expert Tutorial: July 26, 2024; Live Trial Testimony: September 11, 2024.

Testimony as Economic Expert on behalf of Johns Manville Corporation, In the Matter of *Chase Manufacturing, Inc. d/b/a Thermal Pipe Shields v. Johns Manville Corporation*, In the United States District Court for the District of Colorado, Civil Action No. 19-cv-00872-MEH, Live Trial Testimony: May 2, 2024.

Testimony as Economic Expert on behalf of AT&T, Application of Pacific Bell Telephone Company d/b/a AT&T California (U1001) To Relinquish Its Eligible Telecommunications Carrier Designation, Before the Public Utilities Commission of the State of California, A.23-03-002, Rebuttal Testimony: January 19, 2024; Live Testimony at Evidentiary Hearing: April 9, 2024.

Testimony as Economic Expert on behalf of Trinity, In the Matter of *Commonwealth of Virginia, Ex. rel. and Joshua Harman v. Trinity Industries, Inc. et al. and Trinity Highway Products, LLC*, In the Circuit Court for the City of Richmond, Case No. CL 13-698, Deposition: January 30, 2024.

Testimony as Economic Expert on behalf of Authenticom, Inc., *In Re Dealer Management Systems Antitrust Litigation*, United States District Court for the Northern District of Illinois Eastern Division, MDL 2817, Case No. 1:18-CV-864, Deposition: January 16, 2020; January 17, 2020; January 19, 2024.

Testimony as Economic Expert on behalf of AT&T, Application of Pacific Bell Telephone Company d/b/a AT&T California (U 1001 C) for Targeted Relief from Its Carrier of Last Resort Obligation and Certain Associated Tariff Obligations, Before the Public Utilities Commission of the State of California, A.23-03-003, Opening Testimony: December 19, 2023.

Testimony as Economic Expert on behalf of Express Scripts, Inc., In the Matter of *Series 17-03-615, a designated series of MSP Recovery Claims, Series LLC et al. v. Express Scripts, Inc. et al.*, In the United States District Court for the Northern District of Illinois Western Division, Case No. 3:20-cv-50056, Deposition: December 7, 2023.

Testimony as Economic Expert on behalf of IQVIA Holdings Inc. and Propel Media, Inc., In the Matter of *Federal Trade Commission v. IQVIA Holdings Inc. and Propel Media, Inc.*, In the United States District Court for the Southern District of New York, Case No. 1:23-cv-06188-ER, Deposition: November 9, 2023; Live Trial Testimony: November 30, 2023.

ATTACHMENT 1

Testimony of as Economic Expert on behalf of Light & Wonder, Inc., In the Matter of an Arbitration between *Mohawk Gaming Enterprises, LLC, d/b/a Akwesasne Mohawk Casino Resort, on Behalf of Itself and All Others Similarly Situated and Light & Wonder, Inc., a Nevada Company, Formerly a Delaware Corporation, and LNW Gaming Inc., a Nevada Corporation*, American Arbitration Association, Case No. 01-20-0015-6196, and *In Re Automatic Card Shufflers Litigation*, In the United States District Court Northern District of Illinois Eastern Division, Case No. 1:21-cv-1798, Deposition: November 13, 2023.

Testimony as Economic Expert on behalf of BNSF Railway Company et al., *In Re Rail Freight Fuel Surcharge Antitrust Litigation (No. II)*, In the United States District Court for the District of Columbia, MDL Docket No. 2925, Misc. No. 20-8 (BAH), Deposition: October 23, 2023; October 24, 2023.

Testimony as Economic Expert on behalf of Express Scripts Inc, In the Matter of *City of Rockford v. Mallinckrodt ARD, Inc. et al.* (Case No. 3:17-cv-50107), and *Series 17-03-615, a designated series of MSP Recovery Claims, Series LLC et al. v. Express Scripts Inc. et al.* (Case No. 3:20-cv-50056), In the United States District Court for the Northern District of Illinois Western Division, Deposition: November 18, 2022; August 4, 2023.

Testimony as Economic Expert on behalf of Verra Mobility Corp., In the Matter of *Pluspass, Inc. v. Verra Mobility Corp. et al.*, In the United States District Court Central District of California – Western Division, No. 2:20-cv-10078-FWS-SK, Deposition: May 24, 2023.

Testimony as Economic Expert on behalf of United Chemi-Con, In the Matter of *Avnet Incorporated v. Hitachi Chemical Company* (*In Re Capacitors Antitrust Litigation*, No. 17-mdl-2801-JD), United States District Court Northern District of California, No. 17-cv-7046-JD, Live Trial Testimony: May 18, 2023.

Testimony as Economic Expert on behalf of Rogers Communications Inc., In the Matter of the *Competition Act*, R.S.C. 1985, c. C-34 as amended; and In the Matter of the proposed acquisition by Rogers Communications Inc. of Shaw Communications Inc.; and In the Matter of an application by the Commissioner of Competition for one or more orders pursuant to section 92 of the *Competition Act*, Between the Commissioner of Competition and Rogers Communications Inc. and Shaw Communications Inc., the Competition Tribunal, CT-2022-002, Live Trial Testimony: November 30, 2022; December 1, 2022.

Testimony as Economic Expert on behalf of National Football League, *In Re National Football League Sunday Ticket Antitrust Litigation*, In the United States District Court Central District of California, Case No. ML 15-02668-PSG (JEMx), Deposition: November 23, 2022.

Testimony as Economic Expert on behalf of American Airlines, Inc., In the Matter of *United States of America et al. v. American Airlines Group Inc. and JetBlue Airways Corporation*, In the United States District Court for the District of Massachusetts, Civil Action No. 1:21-cv-11558-LTS, Deposition: August 22, 2022; Live Trial Testimony: October 17, 2022; October 24, 2022.

ATTACHMENT 1

Testimony as Economic Expert on behalf of Comcast Corporation, In the Matter of *Viamedia, Inc. v. Comcast Corporation and Comcast Spotlight, LP*, In the United States District Court Northern District of Illinois Eastern Division, Case No. 16-cv-5486, Deposition: January 5, 2018; October 21, 2022.

Testimony as Economic Expert on behalf of KOA Corporation and KOA Speer Electronics, Inc., In the Matter between *Sean Allott and Panasonic Corporation et al.,* In the Ontario Superior Court of Justice, Court File No. 1899-2015 CP, Deposition: August 16, 2022.

Testimony as Economic Expert on behalf of Arconic, Inc. et al., In the Matter of *Arconic, Corp., and Howmet Aerospace, Inc. v. Novelis, Inc., and Novelis, Corp.,* United States District Court for the Western District of Pennsylvania, Case No. 2:17-cv-014340-JFC, Deposition: April 29, 2022.

Testimony as Economic Expert on behalf of Norfolk Southern Railway Corporation, "Reciprocal Switching," In Front of the Surface Transportation Board, Docket No. EP 711 (Sub-No. 1), Live Testimony: March 16, 2022.

Live testimony in front of arbitration panel in confidential arbitration regarding wholesale roaming rate for wireless telecommunications: December 13, 2021; December 14, 2021.

Testimony as Economic Expert on behalf of Nippon Chemi-Con and United Chemi-Con, *In Re Capacitors Antitrust Litigation,* No. C 14-3264-JD, and *In Re Capacitors Antitrust Litigation (No. III)*, No. MD 17-2801 JD, United States District Court for the Northern District of California Division, No. C 14-3264-JD, Deposition: March 14, 2020; Live Jury Trial Testimony: December 8, 2021.

Testimony as Economic Expert on behalf of Norfolk Southern Railway Company, *In Re Rail Freight Fuel Surcharge Antitrust Litigation*, In the United States District Court for the District of Columbia, MDL No. 1869, Case No. 07-0489 (PLF/GMH), Deposition: November 18, 2021.

Testimony as Economic Expert on behalf of JPMorgan, Goldman Sachs and Glencore, *In Re Aluminum Warehousing Antitrust Litigation*, MDL 2481, In the United States District Court Southern District of New York, No. 16-CV-5955, Deposition: November 5, 2021.

Testimony as Economic Expert on behalf of Cox Automotive, Inc. et al., In the Matter between *Cox Automotive, Inc. et al. vs. The Reynolds and Reynolds Company*, American Arbitration Association, Case No. 01-19-0000-4548, Deposition: October 21, 2021.

Testimony as Economic Expert on behalf of the Joint Defense Group, In the Matter between *Cygnus Electronics Corporation and Sean Allott and Panasonic Corporation et al.*, In the Ontario Superior Court of Justice, Court File No. 3795-14 CP, Deposition: September 29, 2021.

Testimony as Economic Expert on behalf of American Express, In the Matter of *B & R Supermarket, Inc., d/b/a Milam's Market et al., Individually and on Behalf of All Others Similarly Situated v. Visa, Inc. et al.,* In the United States District Court Eastern District of New York, Case No. 117-cv-02738-MKB-VMS, Deposition: August 6, 2021.

ATTACHMENT 1

Testimony as Economic Expert on behalf of Bio-Rad Laboratories, Inc., In the Matter of *Bio-Rad Laboratories, Inc. and President and Fellow of Harvard College v. 10X Genomics, Inc., and 10X Genomics, Inc. v. Bio-Rad Labs, Inc. and President and Fellow of Harvard College as Counterclaimants,* In the United States District Court for the District of Massachusetts, Civil Action No. 1:19-cv-12533-wgy, Deposition: June 1, 2021.

Testimony as Economic Expert on behalf of Joint Applicants, In the Matter of *TracFone Wireless, Inc. (U4321C), América Móvil, S.A.B. de C.V. and Verizon Communications, Inc. for Approval of Transfer of Control over TracFone Wireless, Inc.*, Public Utilities Commission of the State of California, Application 20-11-001, Opening Testimony: March 12, 2021; Rebuttal Testimony: April 9, 2021; Live Trial Testimony: May 5, 2021; Supplemental Testimony: May 28, 2021.

Testimony as Economic Expert on behalf of United Airlines, *In Re Domestic Airline Travel Litigation*, United States District Court for the District of Columbia MDL 1404 (CKK), Deposition: October 20, 2020.

Testimony as Economic Expert on behalf of Peabody Energy Corporation and Arch Coal, Inc., In the Matter of *Federal Trade Commission v. Peabody Energy Corporation and Arch Coal, Inc.*, In the United States District Court for the Eastern District of Missouri, Civil Action No. 4-20-cv-000317-SEP, Deposition: June 29, 2020; Live Trial Testimony: July 24, 2020.

Testimony as Economic Expert on behalf of Trinity, In the Matter of *Jackson County, Missouri, Individually and on behalf of a class of others similarly situated, v. Trinity Industries, Inc., and Trinity Highway Products, LLC*, In the Circuit Court of Jackson County, Missouri at Independence, Case No. 1516-CV23684, Stage 1 Testimony: May 24, 2017; Stage 2 Deposition: November 14, 2019.

Testimony as Economic Expert on behalf of Joint Applicants, In the Proposed Merger of T-Mobile US, Inc. and Sprint Communications, Inc., Public Utilities Commission, State of California, San Francisco, California, Docket Nos. A.18-07-011 and A.18-07-012, Direct Rebuttal Testimony: January 29, 2019; Live Testimony: February 7, 2019; Direct Supplemental Testimony: November 7, 2019.

Testimony as Economic Expert on behalf of Turner Network Sales, Inc., In the Matter of *DISH Network L.L.C. v. Turner Network Sales, Inc.*, JAMS Arbitration No. 1100103066, Deposition: August 9, 2019; Live Trial Testimony: August 29, 2019.

Testimony of Economic Expert on behalf of Marriott Vacations Worldwide Corporation et al., In the Matter of *RCHFU, LLC et al. v. Marriott Vacations Worldwide Corporation et al.*, In the United States District Court for the Eastern District of Colorado, Civil Action No. 1:16-cv-01301-PAB-GPG, Deposition: July 12, 2019.

Testimony as Economic Expert on behalf of Oscar Insurance Company of Florida, In the Matter of *Oscar Insurance Company of Florida v. Blue Cross and Blue Shield of Florida, Inc., d/b/a/ Florida Blue; Health Options Inc., d/b/a/ Florida Blue HMO; and Florida Health Care Plan Inc., d/b/a/ Florida Health Care Plans*, In the United States District Court Middle District of Florida Orlando Division, Case No. 6:18-cv-01944, Live Preliminary Injunction Hearing Testimony: January 23, 2019.

ATTACHMENT 1

Testimony as Economic Expert on behalf of Wilh. Wilhelmsen Holding ASA, In the Matter of the *Federal Trade Commission v. Wilh. Wilhelmsen Holding ASA Wilhelmsen Maritime Services As Resolute Fund II, L.P. Drew Marine Intermediate II B.V. and Drew Marine Group, Inc.*, In the United States District Court for the District of Columbia, No. 1:18-cv-00414-TSC, Deposition: May 24, 2018; Live Trial Testimony: June 12, 2018; June 13, 2018.

Testimony as Economic Expert on behalf of Joint Sports Claimants, In the Matter of *Determination of Cable Royalty Funds*, United States Copyright Royalty Judges in the Library of Congress, Docket No. 14-CRB-0010-CD (2010-2013), Live Testimony: March 12, 2018.

Testimony as Economic Expert on behalf of Energy Solutions, Inc., In the Matter of the *United States of America v. Energy Solutions, Inc., Rockwell Holdco, Inc., Andrews County Holdings, Inc., and Waste Control Specialists, LLC*, In the United States District Court for the District of Delaware, Civil Action No. 16-cv-01056-SLR, Deposition: April 17, 2017; Live Trial Testimony: May 2, 2017; May 3, 2017.

Testimony as Economic Expert on behalf of Facebook, Inc., In the Matter of *Social Ranger, LLC v. Facebook, Inc.*, In the District Court of Delaware, C.A. No. 14-1525-LPS, Deposition: March 6, 2017.

Testimony as Economic Expert on behalf of Regal Entertainment Group, In the Matter of *iPic – Gold Class Entertainment, LLC et al., v. Regal Entertainment Group, AMC Entertainment Holdings, Inc. et al.*, In the District Court of Harris County, Texas, 234th Judicial District, No. 2015-68745, Deposition: January 12, 2016; February 15, 2017; Live Trial Testimony: January 21, 2016.

Testimony as Economic Expert on behalf of Anthem Inc., In the Matter of the *United States of America et al. v. Anthem Inc. and Cigna Corp.*, In the District Court of the District of Columbia, No. 16-cv-01493 (ABJ), Deposition: November 9, 2016; Phase 1 Live Trial Testimony: December 1, 2016; December 2, 2016; Phase 2 Live Trial Testimony: December 22, 2016.

Testimony of Dr. Mark A. Israel, In the Matter of *Distribution of Cable Royalty Funds*, Before the Copyright Royalty Judges, Washington, D.C., No. 14-CRB-0010-CD, September 15, 2017; Written Direct Testimony: December 22, 2016.

Testimony as Economic Expert on behalf of Defendants, In the Matter of *Darren Ewert v. Nippon Yusen Kabushiki Kaisha et al.*, Supreme Court of British Columbia, No. S-134895, Deposition: September 14, 2016.

Testimony in Commercial Arbitration on Issues Related to Mobile Wireless Competition, New York, NY, April 12, 2016.

Testimony as Economic Expert on behalf of Federal Trade Commission, In the Matter of *Federal Trade Commission et al. v. Sysco Corporation and USF Holding Corp.*, Civil Action No. 15-cv-00256 (APM), Deposition: April 28, 2015; Live Trial Testimony: May 7, 2015; May 8, 2015; May 14, 2015.

Appearance before California Public Utility Commission, Public Hearings on Comcast/Time Warner Merger, Los Angeles, April 2015.

ATTACHMENT 1

Appearances in Federal Communications Commission, Economists Panels:

- Comcast/Time Warner, January 2015
- AT&T/T-Mobile, July 2011
- Comcast/NBCUniversal, August 2010

EXPERT REPORTS, AFFIDAVITS, AND DECLARATIONS

Expert Report of Mark Israel, Ph.D., In the Matter of *Arrieona Beal v. Hattie Mitchell et al. v. NL Industries, Inc. and John Does 1-50*, In the Circuit Court of Milwaukee County State of Wisconsin, Case No. 2021-CV-003276, April 14, 2025.

Expert Reports of Mark A. Israel, In the Matters of *United States of America et al. v. Google LLC* (Case No. 1:20-cv-03010-APM), and *State of Colorado et al. v. Google LLC* (Case No. 1-20-cv-03715-APM), In the United States District Court for the District of Columbia, Initial Report: June 4, 2022; Rebuttal Report: August 5, 2022; Reply Report: September 23, 2022; March 14, 2025.

Expert Reports of Mark A. Israel, Ph.D., In the Matter of *Twin Bridges Waste and Recycling, LLC and Consolidated Waste Services, LLC v. County Waste and Recycling Service, Inc. et al.*, In the United States District Court Northern District of New York, Case No. 1:21-cv-0263, Initial Report: January 26, 2025; Amended Report: February 14, 2025.

Expert Report of Mark A. Israel, Ph.D., In the Matter of *10X Genomics, Inc. and President and Fellows of Harvard College v. Bruker Spatial Biology, Inc., Bruker Nano, Inc., and Bruker Corp.*, In the United States District Court for the District of Delaware, Case No. 22-261-MFK, December 20, 2024.

Expert Reports of Mark A. Israel, *In Re Google Digital Advertising Antitrust Litigation*, In the United States District Court for the Southern District of New York, Case No. 1:21-md-3010 (PKC), Initial Report: December 13, 2024; Supplemental Report: December 13, 2024.

Supplemental Pretrial Expert Reports of Mark A. Israel, Ph.D., In the Matter of *Loop, LLC, d/b/a AutoLoop v. CDK Global, LLC*, In the United States District Court for the Western District of Wisconsin, Case No. 3:24-cv-00571-JDP, Initial Report: November 8, 2024; Reply Report: November 27, 2024.

Declarations of Mark A. Israel on behalf of AT&T, Pacific Bell Telephone Company d/b/a AT&T, California's (U 1001 C) Opening Comments, Order Instituting Rulemaking Proceeding to Consider Changes to the Commission's Carrier of Last Resort Rules, Before the Public Utilities Commission of the State of California, Case No. R.24-06-012, September 30, 2024; Reply Comments: October 30, 2024.

Expert Report of Mark A. Israel, Ph.D., In the Matter of *Federal Trade Commission v. Tempur Sealy International, Inc. and Mattress Firm Group Inc.*, In the United States District Court for the Southern District of Texas Houston Division, Case No. 4:241-CV-02508, October 14, 2024.

ATTACHMENT 1

Expert Report of Mark A. Israel, Ph.D., In the Matter of *10X Genomics, Inc. and President and Fellows of Harvard College v. Vizgen, Inc.; Vizgen, Inc. v. 10X Genomics, Inc. and President and Fellows of Harvard College (Counterclaim)*, In the United States District Court for the District of Delaware, Civil Action No. 22-595-MFK, September 25, 2024.

Expert Report of Dr. Mark A. Israel, In the Matter of *State of Washington v. The Kroger Co. et al.*, In the State of Washington King County Superior Court, Case No. 24-2-00977-9 SEA, July 12, 2024.

Expert Report of Dr. Mark A. Israel, In the Matter of the *State of Colorado ex rel. Philip J. Weiser, Attorney General v. The Kroger Co.; Albertsons Companies, Inc.; and C&S Wholesale Groceries, LLC*, In the District Court, City and County of Denver, Colorado, Case No. 24CV30459, July 8, 2024.

Expert Report of Dr. Mark A. Israel, In the Matter of *The Kroger Company and Albertsons Companies, Inc.*, In the United States of America Federal Trade Commission Office of Administrative Law Judges, Docket No. 9428, July 5, 2024.

Expert Report of Dr. Mark A. Israel, In the Matter of *Federal Trade Commission et al. v. The Kroger Company and Albertsons Companies, Inc.*, In the United States District Court District of Oregon Portland Division, Case No. 3:24-cv-00347-AN, July 5, 2024.

Expert Reports of Mark A. Israel, Ph.D., *In Re Dealer Management Systems Antitrust Litigation*, United States District Court for the Northern District of Illinois Eastern Division, MDL 2817, No. 1:18-CV-864, Initial Report: August 26, 2019; Reply Report: December 19, 2019; Supplemental Report: November 21, 2023; Supplemental Reply Report: April 11, 2024; Supplemental Sur-Reply Expert Report: June 10, 2024.

Expert Reports of Mark Israel, In the Matter of *Chase Manufacturing, Inc. d/b/a Thermal Pipe Shields v. Johns Manville Corporation*, In the United States District Court for the District of Colorado, Civil Action No. 1:19-cv-00872-MEH, Initial Report: November 20, 2021; Updated Report: April 16, 2024.

Expert Report of Mark A. Israel, In the Matter of *United States of America et al. v. Google LLC*, In the United States District Court for the Eastern District of Virginia, Case No. 1:23-cv-00108 (LMB/JFA), January 23, 2024.

Declaration of Mark Israel, Bryan Keating, and Allan Shampine, In the Matter of *Safeguarding and Securing the Open Internet*, Before the Federal Communications Commission, WC Docket No. 23-320, December 14, 2023.

Expert Report(s) of Mark A. Israel, Ph.D., *In Re Rail Freight Fuel Surcharge Antitrust Litigation (No. II)*, In the United States District Court for the District of Columbia, MDL Docket No. 2925, Misc. No. 20-8 (BAH), Initial Report: August 15, 2023; Supplemental Report: December 13, 2023.

Reports of Dr. Mark A. Israel, In the Matter between *Topher's Beard Company and Olin Corporation et al.*, Canadian Federal Court Proposed Class Proceeding, Court File No.: T-1365-20, Initial Report: May 23, 2023; Sur-Reply Report: December 1, 2023.

ATTACHMENT 1

Expert Reports of Mark A. Israel, In the Matter of *Commonwealth of Virginia, Ex. rel. and Joshua M. Harman v. Trinity Industries, Inc., and Trinity Highway Products, LLC*, In the Court of Circuit Court for the City of Richmond, Case No. CL 13-698, Initial Report: October 12, 2023; Supplemental Report: November 15, 2023.

Expert Report of Mark A. Israel, In the Matter of *Series 17-03-615, a designated series of MSP Recovery Claims, Series LLC et al. v. Express Scripts, Inc. et al.*, In the United States District Court for the Northern District of Illinois Western Division, Case No. 3:20-cv-50056-IDJ-LAJ, November 13, 2023.

Submission of Mark A. Israel and Bryan G. M. Keating, "An Economic Analysis of TTC Wireless Access," In the Matter of *Conditions of License relating to the Provision of Services within the Toronto Transit Commission (TTC) Subway System* and In the Matter of *Arbitration Rules and Procedures for Provision of Service within the Toronto Transit Commission (TTC) Subway System*, Between Telus Communications Inc. and Bell Mobility Inc. and Rogers Communications Inc., November 10, 2023.

Verified Statement of Mark A. Israel, Ph.D., "Reciprocal Switching for Inadequate Rail Service," Surface Transportation Board, Docket No. EP 711 (Sub-No. 2), November 6, 2023.

Expert Report of Mark A. Israel, Ph.D., In the Matter of *Federal Trade Commission v. IQVIA Holdings Inc. and Propel Media, Inc.*, In the United States District Court for the Southern District of New York, Civil Action No. 1:23-cv-06188-ER, October 25, 2023.

Expert Report of Mark A. Israel, Ph.D., *In Re Automatic Card Shufflers Litigation*, In the United States District Court for the Northern District of Illinois Eastern Division, Case No. 1:21-CV-01798, August 20, 2023.

Expert Reports of Mark A. Israel, Ph.D., In the Matter of *City of Rockford, on behalf of itself and all others similarly situated v. Mallinckrodt ARD, Inc. formerly known as Questcor Pharmaceuticals, Inc. et al.*, In the United States District Court for the Northern District of Illinois Western Division, Case No. 3:17-cv-50107, Initial Report: October 17, 2022; Reply Report: July 10, 2023.

Expert Report of Mark A. Israel, Ph.D., In the Matter of *Pluspass, Inc. v. Verra Mobility Corp. et al.*, In the United States District Court Central District of California – Western Division, No. 2:20-cv-10078-FWS-SK, May 10, 2023.

Declarations of Mark A. Israel on behalf of AT&T, Application of Pacific Bell Telephone Company d/b/a AT&T California (U 1001 C) for Targeted Relief from Its Carrier of Last Resort Obligation and Certain Associated Tariff Obligations, Before the Public Utilities Commission of the State of California, A.23-03-003, Declaration: March 3, 2023; Reply Declaration: April 17, 2023; Amended Declaration: May 17, 2023.

Expert Report of Mark A. Israel, Ph.D., In the Matter of *TCS John Huxley America, Inc.; TCS John Huxley Europe Limited; TCS John Huxley Asia Limited; and Taiwan Fulgent Enterprise Co., Ltd. Vs. Scientific Games Corporation; Bally Technologies, Inc., d/b/a SHFL Entertainment or Shuffle Master; and Bally Gaming, Inc., d/b/a Bally Technologies, f/k/a Bally Gaming and Systems, f/k/aa SHFL Entertainment, Inc., f/k/a Shuffle Master, Inc.,* In the United States District Court for the Northern District of Illinois Eastern Division, Case No. 1:19-CV-01846, April 14, 2023.

ATTACHMENT 1

Expert Report of Mark A. Israel, Ph.D., In the Matter of *Home Depot U.S.A., Inc. v. Lafarge North America Inc.*, In the United States District Court Eastern District of Pennsylvania, Case No. 2:18-cv-05305-MMB, March 21, 2023.

Expert Report of Mark A. Israel, Ph.D., *In Re National Football League Sunday Ticket Antitrust Litigation*, In the United States District Court Central District of California, Case No. ML 15-02668-PSG (JEMx), November 4, 2022.

Expert Reports of Mark A. Israel, In the Matter of the *Competition Act*, R.S.C. 1985, c. C-34; and In the Matter of the proposed acquisition by Rogers Communications Inc. of Shaw Communications Inc.; and In the Matter of an application by the Commissioner of Competition for one or more orders pursuant to section 92 of the *Competition Act,* Between Commissioner of Competition and Rogers Communications Inc. and Shaw Communications Inc. and the Attorney General of Alberta and Videotron Ltd., the Competition Tribunal, CT-2022-002, Initial Report: September 23, 2022; Reply Report: October 20, 2022.

Reports of Dr. Mark A. Israel, In the Matter of *Viamedia, Inc. v. Comcast Corporation and Comcast Cable Communications Management, LLC*, In the United States District Court for the Northern District of Illinois Eastern Division, Case No. 16-cv-5486, Rebuttal Report: November 30, 2017; Errata Sheet for Rebuttal Report: January 4, 2018; Rebuttal Report: September 21, 2022.

Expert Declaration of Mark Israel, In the Matter of *Phil Mickelson et al. v. PGA Tour, Inc.*, In the United States District Court for the Northern District of California San Jose Division, Civil Action No. 5:22-cv-04486-BLF, August 7, 2022.

Expert Report of Mark A. Israel, Ph.D., In the Matter of *United States of America et al. v. American Airlines Group Inc. and JetBlue Airways Corporation*, In the United States District Court for the District of Massachusetts, Civil Action No. 1:21-cv-11558-LTS, July 11, 2022.

Expert Reports of Mark A. Israel, Ph.D., *In Re Rail Freight Fuel Surcharge Antitrust Litigation*, In the United States District Court for the District of Columbia, MDL No. 1869, Case No. 07-489, Initial Report: April 15, 2021; Surrebuttal Report: May 10, 2022.

Expert Reports of Mark A. Israel, Ph.D., In the Matter of *Arconic Inc. v. Novelis Inc., Novelis Corp.*, In the United States District Court for the Western District of Pennsylvania, No. 2:17-CV-01434, Initial Report: February 11, 2022; Reply Report: March 18, 2022.

Verified Statement of Mark A. Israel, Ph.D., "Reciprocal Switching," Surface Transportation Board, Docket No. EP 711 (Sub-No. 1), February 14, 2022.

Expert Report of Mark A. Israel, In the Matter between *Sean Allott and Panasonic Corporation et al.,* In the Ontario Superior Court of Justice, Court File No. 1899-2015 CP, January 17, 2022.

Expert Reports of Mark A. Israel, Ph.D., *In Re Aluminum Warehousing Antitrust Litigation*, In the United States District Court Southern District of New York, MDL No. 2481, Initial Report: September 17, 2021; Supplemental Declaration: January 14, 2022.

ATTACHMENT 1

Affidavits in confidential arbitration regarding wholesale roaming rate for wireless telecommunications, Initial Affidavit: August 23, 2021; Reply Affidavit: November 15, 2021.

Expert Report of Mark A. Israel, Ph.D., In the Matter of *Cox Automotive, Inc. et al. v. The Reynolds and Reynolds Company*, American Arbitration Association, Case No. 01-19-0000-4548, June 25, 2021.

Expert Report of Mark A. Israel, In the Matter of *Bio-Rad Laboratories, Inc. and President and Fellow of Harvard College v. 10X Genomics, Inc., and 10X Genomics, Inc. v. Bio-Rad Labs., Inc. and President and Fellow of Harvard College as Counterclaimants*, In the United States District Court for the District of Massachusetts, Civil Action No. 1:19-cv-12533-wgy, May 14, 2021.

Expert Report of Mark A. Israel, In the Matter of *B & R Supermarket, Inc., d/b/a Milam's Market, Grove Liquors LLC, Strouk Group LLC, d/b/a Monsieur Marcel, and Palero Food Corp. and Cagueyes Food Corp., d/b/a Fine Fare Supermarket v. Mastercard International Inc., Visa Inc., Visa U.S.A., Inc., Discover Financial Services, and American Express Company*, In the United States District Court for the Eastern District of New York, Case No. 17-CV-02738 (MKB) (JO), March 22, 2021.

Expert Report of Dr. Mark A. Israel, In the Matter of *Joshua M. Harman Qui Tam v. Trinity Industries, Inc. et al.,* In the Commonwealth of Massachusetts, Superior Court Department, Civil Action No. 2014-02364-D, February 26, 2021.

Verified Statement of Mark Israel, "Review of Commodity, Boxcar, and TOFC/COFC Exemptions," Surface Transportation Board, Docket No. EP 704 (Sub-No. 1), January 29, 2021.

Expert Report of Mark A. Israel, Ph.D., *In Re Comtech/Gilat Merger Litigation*, Court of Chancery of the State of Delaware, Consolidated C.A. No. 2020-0605-JRS, September 24, 2020.

Declaration of Mark Israel and Allan Shampine, In the Matter of *AMC Networks Inc. v. AT&T Inc.*, Before the Federal Communications Commission, MB Docket No. 20-254, File No. CSR-8993, August 20, 2020.

Expert Report of Mark A. Israel, In the Matter between *Ryan Kett and Mitsubishi Materials Corporation, Mitsubishi Cable Industries, Ltd., Mitsubishi Shindoh Co., Ltd., Mitsubishi Aluminum Co., Ltd., Tachibana Metal Mfg. Co., Ltd., and Diamet Corporation,* In the Supreme Court of British Columbia, Case No. VLC-S-S-1813758, July 15, 2020.

Expert Reports of Mark A. Israel, Ph.D., In the Matter of *Federal Trade Commission v. Peabody Energy Corporation and Arch Coal, Inc.*, In the United States District Court for the Eastern District of Missouri, Civil Action No. 4-20-cv-000317-SEP, Initial Report: May 26, 2020; Reply Report: June 19, 2020.

Expert Reports of Mark A. Israel, Ph.D., *In Re Domestic Airline Travel Antitrust Litigation*, United States District Court for the District of Columbia, MDL1404 (CKK), Initial Report: September 30, 2019; Rebuttal Report: November 14, 2019.

ATTACHMENT 1

Expert Reports of Mark A. Israel, In the Matter of *DISH Network L.L.C. v. Turner Network Sales, Inc.*, JAMS Arbitration No. 1100103066, Initial Report: July 23, 2019; Reply Report: August 2, 2019.

Submission of Mark A. Israel, Maya Meidan, and Robert J. Calzaretta, Jr., "The Atlantic Joint Business Generates Substantial Consumer Benefits," Competition and Markets Authority, United Kingdom, July 1, 2019.

Submission of Philip Haile and Mark Israel, "Alternative Approaches to Airport Slot Allocation: Objectives and Challenges," Department for Transport, United Kingdom, June 20, 2019.

Submission of Mark A. Israel, Maya Meidan, and Robert J. Calzaretta, Jr., "The Atlantic Joint Business Has Not Harmed Competition on Nonstop Overlap Routes, Including Focus Routes," Competition and Markets Authority, United Kingdom, June 14, 2019.

Expert Reports of Mark A. Israel, In the Matter of *RCHFU, LLC et al. v. Marriott Vacations Worldwide Corporation et al.,* In the United States District Court for the District of Colorado, Civil Action No. 16-01301-PAB-GPG, Initial Report: December 28, 2018; Supplemental Rebuttal Report, June 14, 2019.

Submission of Mark Israel, "The Fidelity/Stewart Merger Does Not Raise Competitive Concerns in the New York Title Insurance Industry," Revised Section 1506 Application Regarding the Proposed Acquisition of Stewart Title Insurance Company by Fidelity National Financial, Inc., New York State Department of Financial Services, April 12, 2019.

Second Report of Dr. Mark A. Israel, Between *UK Trucks Claim Limited and (1) – (5) Fiat Chrysler Automobiles NV and (1) – (4) MAN Truck & Bus AG & ORS*, In the Competition Appeal Tribunal, Case No. 1282/7/7/18, April 11, 2019.

Expert Report of Mark A. Israel, In the Matter between *Ryan Kett, Erik Oun and Jim Wong and Kobe Steel, Ltd., Shinko Metal Products Co., Ltd., Shinko Aluminum Wire Co., Ltd., Shinko Wire Stainless Company, Ltd., Kobelco & Materials Copper Tube Co., and Nippon Koshuha Steel Co., Ltd.*, In the Supreme Court of British Columbia, Case No. S-1710805, March 28, 2019.

Expert Report of Dr. Mark A. Israel, Between *Road Haulage Association and (1) – (10) MAN SE and Others and (1) Daimler AG, (2) Volvo Lastvagnar Aktiebolag*, In the Competition Appeal Tribunal, Case No. 1289/7/7/18, March 22, 2019.

Submission of Robert J. Calzaretta, Jr., Mark A. Israel, and Maya Meidan, "Assessing the Effects of ATI and JV Overlaps on Nonstop Fares: An Event Study Approach," submitted as part of a Supplement to Joint Motion to Amend Order 2010-7-8 for Approval of and Antitrust Immunity for Amended Joint Business Agreement, In the Application of American Airlines, Inc., British Airways PLC, OpenSkies SAS, Iberia Líneas Aéreas de España, S.A., Finnair OYJ, Aer Lingus Group DAC, Before the U.S. Department of Transportation, Washington, DC, Docket DOT-OST-2008-0252-, January 11, 2019.

ATTACHMENT 1

Declarations of Mark A. Israel, In the Matter of *Oscar Insurance Company of Florida v. Blue Cross and Blue Shield of Florida, Inc., d/b/a Florida Blue; Health Options Inc., d/b/a Florida Blue HMO; and Florida Health Care Plan Inc., d/b/a Florida Health Care Plans,* In the United States District Court Middle District of Florida Orlando Division, Case No. 6:18-cv-01944, Declaration: November 19, 2018; Supplemental Declaration: December 21, 2018.

Reply Declaration of Mark Israel, Michael Katz, and Bryan Keating, In the Matter of Applications of T-Mobile US, Inc. and Sprint Corporation, Consolidated Applications for Consent to Transfer Control of Licenses and Authorizations, Federal Communications Commission, WT Docket No. 18-197, September 17, 2018.

Expert Report of Gustavo Bamberger, Robert Calzaretta, and Mark Israel, In the Joint Application of Hawaiian Airlines, Inc. and Japan Airlines, Co., Ltd., Appendix 6 to "Joint Application for Approval of and Antitrust Immunity for Alliance Agreements," Department of Transportation, Case No. DOT-OST-2018-0084, June 13, 2018.

Expert Reports of Mark A. Israel, In the Matter between *Cygnus Electronics Corporation and Sean Allott and Panasonic Corporation et al.,* In the Ontario Superior Court of Justice, Court File No. 3795/14CP, Initial Report: November 17, 2017; Reply Report: February 23, 2018; Supplemental Report: May 22, 2018.

Expert Report of Mark A. Israel, In the Matter of the *Federal Trade Commission v. Wilh. Wilhelmsen Holding ASA Wilhelmsen Maritime Services As Resolute Fund II, L.P. Drew Marine Intermediate II B.V. and Drew Marine Group, Inc.*, In the United States District Court for the District of Columbia, No. 1:18-cv-00414-TSC, May 11, 2018.

Declaration of Mark A. Israel, In the Matter between *Robert Foster and Murray Davenport and Sears Canada Inc. et al.*, In the Ontario Superior Court of Justice, Court File No. 766-2010 CP, November 1, 2017.

Expert Report of Mark Israel and Bryan Keating, "Economic Analysis of Dr. Evans' Claims as They Relate to *Restoring Internet Freedom*," Federal Communications Commission, WC Docket No. 17-108, October 31, 2017.

Declaration of Mark A. Israel, Allan L. Shampine, and Thomas A. Stemwedel, In the Matter of *Restoring Internet Freedom*, Federal Communications Commission, WC Docket No. 17-108, July 17, 2017.

Expert Report of Dr. Mark A. Israel, In the Matter of *St. Clair County, Illinois, and Macon County, Illinois, Individually and on behalf of all other counties in the State of Illinois, v. Trinity Industries, Inc. and Trinity Highway Products, LLC*, In the United States District Court for the Southern District of Illinois, Civil Action No.: 3:14-cv-1320, April 25, 2017.

Expert Reports of Mark A. Israel, In the Matter of the *United States of America v. Energy Solutions, Inc., Rockwell Holdco, Inc., Andrews County Holdings, Inc., and Waste Control Specialists, LLC*, In the United States District Court for the District of Delaware, Civil Action No. 16-cv-01056-SLR, Initial Report: March 27, 2017; Rebuttal Report: April 10, 2017.

ATTACHMENT 1

Expert Report of Mark A. Israel, In the Matter of *Jackson County, Missouri, Individually and on behalf of a class of others similarly situated, v. Trinity Industries, Inc., and Trinity Highway Products, LLC*, In the Circuit Court of Jackson County, Missouri at Independence, Case No. 1516-CV23684, March 24, 2017.

Expert Report of Mark A. Israel, In the Matter of *Honeywell International Inc. v. iControl Networks, Inc. and Alarm.com Holdings, Inc.*, In the United States District Court for the District of New Jersey, No. 2:17-cv-01227, February 26, 2017.

Expert Report of Mark Israel, In the Matter of *Social Ranger, LLC v. Facebook, Inc.*, In the United States District Court for the District of Delaware, C.A. No. 14-1525-LPS, November 23, 2016.

Expert Report of Mark A. Israel, In the Matter between *Darren Ewert and DENSO Corporation et al.*, In the Supreme Court of British Columbia, Vancouver Registry, No. S-135610, November 15, 2016.

Expert Reports of Mark A. Israel, In the Matter of the *United States of America et al. v. Anthem Inc. and Cigna Corp.*, In the United States District Court, District of Columbia, No. 16-cv-01493 (ABJ), Initial Report: October 7, 2016; Supplemental and Rebuttal Report: October 28,2016.

Verified Statements of Mark Israel and Jonathan Orszag, "Review of Commodity, Boxcar, and TOFC/COFC Exemptions," Surface Transportation Board, Docket No. EP 704 (Sub-No. 1), Initial Verified Statement: July 26, 2016; Reply Verified Statement: August 26, 2016.

Declarations of Mark Israel, Daniel Rubinfeld, and Glenn Woroch, "Analysis of the Regressions and Other Data Relied Upon in the Business Data Services FNPRM And a Proposed Competitive Market Test," Federal Communications Commission, WC Docket Nos. 16-143, 15-247, 05-25, RM-10593, Second Declaration: June 28, 2016; Third Declaration: August 9, 2016.

Expert Declaration of Mark A. Israel, In the Matter of *Liberman Broadcasting, Inc. and LBI Media, Inc. v. Comcast Corporation and Comcast Cable Communications, LLC*, Federal Communications Commission, MB Docket No. 16-121, June 7, 2016.

Expert Report of Mark A. Israel, In the Matter of *La Crosse County, Individually, and on behalf of all others similarly situated v. Trinity Industries, INC. and Trinity Highway Products, LLC*, In the United States District Court, Western District of Wisconsin, Case No. 3:15-cv-00117-scl, May 27, 2016.

Expert Report of Mark A. Israel, In the Matter between *Darren Ewert and Nippon Yusen Kabushiki Kaisha et al.*, In the Supreme Court of British Columbia, Vancouver Registry, No. S-134895, May 20, 2016.

Declarations of Mark Israel, Daniel Rubinfeld, and Glenn Woroch, In the Matter of *Special Access Rates for Price Cap Local Exchange Carriers*, Federal Communications Commission, WC Docket No. 05-25, Declaration: February 19, 2016; Supplemental Declaration: March 24, 2016; Second Supplemental Declaration: April 20, 2016.

Declaration of Mark Israel, Daniel Rubinfeld, and Glenn Woroch, "Competitive Analysis of the FCC's Special Access Data Collection," Federal Communications Commission, WC Docket No. 05-25, January 26, 2016.

ATTACHMENT 1

Declaration of Dr. Mark Israel, In the Matter of *iPic – Gold Class Entertainment, LLC et al., v. Regal Entertainment Group, AMC Entertainment Holdings, Inc. et al.*, In the District Court of Harris County, Texas, 234th Judicial District, No. 2015-68745, January 18, 2016.

Declaration of Dennis Carlton, Mark Israel, Allan Shampine & Hal Sider, "Investigation of Certain Price Cap Local Exchange Carrier Business Data Services Tariff Pricing Plans," Federal Communications Commission, WC Docket No. 15-247, January 7, 2016.

Declaration of Mark A. Israel, Attached to "Response of AT&T Mobility LLC to Notice of Apparent Liability for Forfeiture," Federal Communications Commission, File No. EB-IHD-14-00017504, July 17, 2015.

Reports in the Matter of *Federal Trade Commission et al. v. Sysco Corporation and USF Holding Corp.*, In the United States District Court for the District of Columbia, Civil Action No. 1:15-cv-00256 (APM), Declaration: February 18, 2015; Report: April 14, 2015; Rebuttal Report: April 21, 2015.

Declaration of Mark A. Israel, Bryan G. M. Keating, and David Weiskopf, "Economic Analysis of the Effect of the Comcast-TWC Transaction on Voice and Broadband Services in California," December 3, 2014.

Expert Report of Mark A. Israel, "Economic Analysis of the Effect of the Comcast-TWC Transaction on Broadband: Reply to Commenters," Federal Communications Commission, MB Docket No. 14-57, September 22, 2014.

Supplemental Declaration of Mark Israel and Allan Shampine, In the Matter of *Amendment of the Commission's Rules Related to Retransmission Consent, Appendix A to "Reply Comments of the National Association of Broadcasters*," Federal Communications Commission, MB Docket No. 10-71, July 24, 2014.

Declaration of Mark Israel and Allan Shampine, In the Matter of *Amendment of the Commission's Rules Related to Retransmission Consent, Appendix B to "Comments of the National Association of Broadcasters*," Federal Communications Commission, MB Docket No. 10-71, June 26, 2014.

Expert Report of Mark A. Israel, "Implications of the Comcast/Time Warner Cable Transaction for Broadband Competition," Federal Communications Commission, MB Docket No. 14-57, April 8, 2014.

Declaration of Michael L. Katz, Philip A. Haile, Mark A. Israel, and Andres V. Lerner, "Sprint's Proposed Weighted Spectrum Screen Defies Economic Logic and Is Inconsistent with Established Facts," Federal Communications Commission, WT Docket No. 12-269, March 14, 2014.

Reply Declaration of Mark A. Israel, "Competitive Effects and Consumer Benefits from the Proposed Acquisition of Leap Wireless by AT&T: A Reply Declaration," Federal Communications Commission, WT Docket No. 13-193, October 23, 2013.

Declaration of Mark A. Israel, "An Economic Analysis of Competitive Effects and Consumer Benefits from the Proposed Acquisition of Leap Wireless by AT&T," Federal Communications Commission, WT Docket No. 13-193, August 1, 2013.

ATTACHMENT 1

Supplemental Reply Declaration of Michael L. Katz, Philip A. Haile, Mark A. Israel, and Andres V. Lerner, "Comments on Appropriate Spectrum Aggregation Policy with Application to the Upcoming 600 MHz Auction," Federal Communications Commission, WT Docket No. 12-269, June 13, 2013.

Reply Declaration of Michael L. Katz, Philip A. Haile, Mark A. Israel, and Andres V. Lerner, "Comment on the Submission of the U.S. Department of Justice Regarding Auction Participation Restrictions," Federal Communications Commission, WT Docket No. 12-269, June 13, 2013.

Reply Declaration of Michael L. Katz, Philip A. Haile, Mark A. Israel, and Andres V. Lerner, "Spectrum Aggregation Policy, Spectrum-Holdings-Based Bidding Credits, and Unlicensed Spectrum," Federal Communications Commission, GN Docket No. 12-268, March 12, 2013.

Declaration of Igal Hendel and Mark A. Israel, "Econometric Principles That Should Guide the Commission's Analysis of Competition for Special Access Service," Federal Communications Commission, WC Docket No. 05-25, February 11, 2013.

Declarations of Mark A. Israel and Michael L. Katz, "Economic Analysis of Public Policy Regarding Mobile Spectrum Holdings," Federal Communications Commission, WT Docket No. 12-269, Declaration: November 28, 2012; Reply Declaration: January 7, 2013.

Declaration of Mark Israel, "An Economic Assessment of the Prohibition on Exclusive Contracts for Satellite-Delivered, Cable-Affiliated Networks," Federal Communications Commission, MB Docket Nos. 12-68, 07-18, & 05-192, September 6, 2012.

Expert Report of Mark Israel, "Implications of the Verizon Wireless & SpectrumCo/Cox Commercial Agreements for Backhaul and Wi-Fi Services Competition," Federal Communications Commission, WT Docket No. 12-4, August 1, 2012.

Expert Report of Mark A. Israel, Michael L. Katz, and Allan L. Shampine, "Promoting Interoperability in the 700 MHz Commercial Spectrum," Federal Communications Commission, WT Docket No. 12-69, July 16, 2012.

Affidavits of Dr. Mark A. Israel in the Matter of *Bloomberg L.P. v. Comcast Cable Communications, LLC*, Federal Communications Commission, MB Docket No. 11-104, Declaration: June 21, 2012; Declaration: June 8, 2012; Supplemental Declaration: September 27, 2011; Declaration: July 27, 2011.

Expert Report of Robert Willig, Mark Israel, Bryan Keating, and Jonathan Orszag, "Response to Supplementary Comments of Hubert Horan," Docket DOT-OST-2009-1055, October 22, 2010.

Expert Report of Robert Willig, Mark Israel, Bryan Keating, and Jonathan Orszag, "Measuring Consumer Benefits from Antitrust Immunity for Delta Air Lines and Virgin Blue Carriers," Docket DOT-OST-2009-1055, October 13, 2010.

Expert Report of Mark Israel and Michael L. Katz, "Economic Analysis of the Proposed Comcast-NBCU-GE Transaction," Federal Communications Commission, MB Docket No. 10-56, July 20, 2010.

ATTACHMENT 1

Expert Report of Mark Israel and Michael L. Katz, "The Comcast/NBCU Transaction and Online Video Distribution," Federal Communications Commission, MB Docket No. 10-56, May 4, 2010.

Expert Report of Mark Israel and Michael L. Katz, "Application of the Commission Staff Model of Vertical Foreclosure to the Proposed Comcast-NBCU Transaction," Federal Communications Commission, MB Docket No. 10-56, February 26, 2010.

Expert Report of Robert Willig, Mark Israel, and Bryan Keating, "Competitive Effects of Airline Antitrust Immunity: Response of Robert Willig, Mark Israel, and Bryan Keating" in Docket DOT-OST-2008-0252, January 11, 2010.

Affidavit of Dr. Mark A. Israel on Class Certification in the Matter of Puerto Rican Cabotage Antitrust Litigation, in the United States District Court for the District of Puerto Rico, MDL Docket No. 3:08-md-1960 (DRD), December 10, 2009.

Expert Report of Robert Willig, Mark Israel, and Bryan Keating, "Competitive Effects of Airline Antitrust Immunity," Docket DOT-OST-2008-0252, September 8, 2009.

Expert Report and Supplemental Expert Report of Dennis W. Carlton and Mark Israel in the Matter of *Toys "R" Us-Delaware, Inc., and Geoffrey Inc. v. Chase Bank USA N.A.*, in American Arbitration Association New York, New York, Commercial Arbitrations No. 13-148-02432-08, Expert Report: February 27, 2009; Supplemental Expert Report: March 20, 2009.

Expert Reports of James Levinsohn and Mark Israel, In the Matter of *2006 NPM Adjustment Proceeding pursuant to Master Settlement Agreement*, October 6, 2008; January 16, 2009; March 10, 2009.

SELECTED EXPERT WORK IN REVIEW OF MERGERS/TRANSACTIONS

Successful acquisition of Lumen's mass market fiber business by AT&T, 2025. Served as lead economic expert for the merging parties. Made multiple submissions to the Department of Justice and contributed to white paper demonstrating benefits from the transaction due to complementarity between Lumen's fiber business and AT&T's wireless business, as well as lack of any basis to find harm due to de minimis overlap. Deal cleared with no second request.

Successful acquisition of General Mills' US Yogurt Business by Lactalis, 2025. Served as lead economic expert for General Mills. Made multiple presentations to the Department of Justice showing lack of material substitution between General Mills' yogurt products and Lactalis' yogurt products and explaining the deficiencies in the DOJ's economic modeling approach. Deal cleared with no conditions.

Successful acquisition of Viterra by Bunge Global, 2025. Served as lead economic expert for the merging parties in the United States and Canada. Performed extensive economic analysis and modeling to show lack of horizontal or vertical merger harms and significant efficiencies across a wide variety of agricultural products. Responded to modeling performed by a Canadian economic expert. Deal ultimately cleared with conditions.

ATTACHMENT 1

Successful acquisition of Ansys by Synopsys, 2025. Served as lead economic expert for the merging parties. Developed economic analysis demonstrating lack of concern over vertical foreclosure issues for presentation to competition agencies in the US, EU, and UK.

Successful acquisition of NWEA by Houghton Mifflin Harcourt, 2023. Served as lead economic expert for Veritas Capital, owner of Houghton Mifflin Harcourt. Provided analyses demonstrating no significant competitive overlaps, no significant vertical concerns, and substantial pro-competitive benefits via integration of curriculum materials and assessment tools. Deal cleared by DOJ without a second request.

Successful merger of NortonLifelock and Avast to form Gen Digital, 2022. Served as lead economic expert for the parties in the United States. Presented economic analyses demonstrating very low levels of customer overlap between the two consumer cybersecurity firms and thus lack of horizontal merger concerns. Deal cleared by DOJ.

Successful acquisition of Sanderson Farms by Joint Venture of Cargill and Continental Grain, 2022. Served as potential testifying expert on behalf of all three parties. Presented economic analyses demonstrating lack of horizontal concerns to the DOJ.

Successful merger of Sony's Cruncyhroll and AT&T's Funimation anime streaming platforms. 2021. Served as lead economic expert for AT&T. Made multiple presentations to DOJ, extremely limited consumer switching between them, as well as extensive competition with a broader marketplace including Netflix, Amazon, and others. DOJ closed the investigation allowing the merger to proceed with no conditions.

Successful acquisition of Innovative Industries, Inc. by Ex Libris. 2020. Served as lead economist in interactions with FTC. Demonstrated that the acquisition would not harm competition due to the *de minimis* extent of head-to-head competition between Ex Libris and Innovative and the recent decline of Innovative' s business. FTC closed investigation allowing acquisition to proceed with no conditions.

Successful acquisition of TD Ameritrade by Charles Schwab. 2020. Served as lead economist in interactions with DOJ. Presented analyses demonstrating broad market for investor dollars rather than narrow market for RIA Custodian Services. DOJ closed investigation allowing acquisition to proceed with no conditions.

Successful acquisition of Reinhart Foodservice by Performance Food Group Company. 2019. Served as lead economic expert on behalf of the parties in the FTC's investigation of the merger. Presented data analyses showing ample competition and lack of harm to competition in any geographic market. FTC closed the investigation with no conditions.

Successful acquisition of SGA's Food Group of companies by US Foods. 2019. Served as lead economic expert on behalf of the parties in the FTC's investigation of the merger. Presented detailed economics and econometric analyses showing ample competition and lack of harm to competition in any geographic market. FTC cleared the merger subject to divestitures in three geographic markets in the Fall of 2019.

ATTACHMENT 1

Successful acquisition of Time Warner by AT&T Inc. 2017-2019. Lead economist throughout the DOJ investigation. Then director of all economic work during trial, serving as the central connection point between all experts and counsel and directing development of all aspects of the economic case. Defendants ultimately prevailed in trial and the merger closed in June 2018.

Successful acquisition of Keystone Foods by Tyson Foods, Inc. 2018. Served as lead economic expert for U.S. jurisdiction. Presented economic analyses demonstrating that competition would remain strong post-merger. Ultimately, antitrust agencies in the U.S., China, Japan, and Korea cleared the transaction.

Successful acquisition of NEX Group PLC by CME Group Inc. 2018. Co-lead economic expert with Thomas Stemwedel. Presented several econometric analyses demonstrating that Treasury futures contracts and cash Treasury securities were economic complements rather than substitutes. Based heavily on these Compass Lexecon submissions, the DOJ and CMA closed their investigations without requiring any divestitures.

Successful acquisition of VCA Inc. by Mars, Inc. 2017. Co-lead economic expert with Mary Coleman. Made multiple presentations to FTC demonstrating ample competition in general, emergency, and specialty veterinary services, including econometric analyses showing lack of direct competitive impact of Mars and VCA on one another. Transaction was ultimately cleared subject to a small number of divestitures.

Successful acquisition of Mobileye by Intel. 2017. Served as lead economic expert for Intel. Assisted counsel in preparing FTC presentations and materials demonstrating lack of significant head-to-head competition and lack of valid vertical foreclosure theories. Investigation was closed without Second Request.

FTC litigation against DraftKings, Inc. and FanDuel Inc. (Civil Action No. 17-cv-1195 (KBJ)). 2017. Served as economic expert for FTC and prepared to serve as FTC's testifying expert against the merger, prior to the parties' abandonment of the deal. Developed economic and econometric evidence that the merging parties were closest substitutes and thus likely would have increased prices as a result of their proposed merger.

Successful merger of ASE Group and SPIL. 2017. Lead economic expert on behalf of ASE Group. Submitted reports and testified to the Taiwan Fair Trade Commission, which ultimately cleared the transaction, then made multiple presentations to U.S. FTC, which also cleared the transaction. Economic analyses focused on implications of profit margins for market definition and competitive effects, ultimately demonstrating that the transaction was unlikely to cause significant harm to competition.

Successful acquisition of Alarm.com of two business units (Connect and Piper) from iControl Networks. 2017. Led team that demonstrated substantial and growing competition in home security and connected home marketplace and thus lack of competitive harm from acquisition. Work focused on importance of downstream market definition as well as empirical evidence of impact of competition on Alarm.com pricing and profitability.

Successful acquisition of Samsung Electronics, Ltd.'s printer business by HP Inc. 2016. Led team in evaluating the competitive effects of the acquisition, including assessing shares and competitive effects in overlap areas. Notably, the transaction gained regulatory approval in the U.S. during the initial review period without issuing a Second Request.

ATTACHMENT 1

Successful acquisition of Sun Products Corp. by Henkel AG. 2016. Led team demonstrating lack of competitive impact despite overlaps in laundry detergent and related products.

Successful acquisition of Starwood Hotels & Resorts by Marriott International. 2016. Led team that performed detailed analysis of competitive conditions, extensive econometric analysis of pricing, and full review of Marriott's internal pricing models to demonstrate that Starwood and Marriott were not close competitors, combined ownership of the brands would not lead to upward pricing pressure, and competition would remain robust post-merger.

Successful acquisition of PR Newswire by GTCR. 2016. Lead economic expert for GTCR. Made presentations to DOJ showing lack of competitive harm from the transaction, based on detailed analysis of win/loss data, including calculations showing no possible upward pricing pressure (UPP) concerns regardless of the level of margins.

Successful acquisition of Schurz Communications' Broadcast Stations by Gray Television. 2015. Lead economic expert for Gray. Made presentations to DOJ demonstrating output expanding effects of proposed transaction in light of the scale economies in television production and advertising and the small size of the DMAs affected by the transaction.

Successful acquisition of the Communications Business of Danaher Corporation by NetScout Systems. 2015. Lead economic expert for NetScout. Made presentations to DOJ describing proper economic framework for analysis of competition and potential merger harms, and demonstrated that the presence of multiple viable competitors and numerous other credible threats to be used by powerful buyers in a dynamic industry made theories of anti-competitive harm from the merger implausible.

Successful acquisition of Windmill Distribution Co. by Manhattan Beer Distributors. 2015. Lead economic expert for Manhattan Beer Distributors. Submitted White Paper to DOJ demonstrating, based on margin data, that the merger would be highly unlikely to lead to anti-competitive effects. Transaction was granted early termination from the Hart Scott Rodino process by the DOJ.

Proposed acquisition of Time Warner Cable by Comcast Corporation. 2014-2015. Served as lead economic expert on broadband issues on behalf of Comcast Corporation. Submitted multiple Declarations and made multiple presentations to DOJ and FCC, explaining lack of horizontal, bargaining, or vertical/foreclosure concerns with regard to broadband competition as a result of the transaction.

Successful acquisition of Leap Wireless by AT&T. 2014. Lead economic expert for AT&T. Submitted multiple Declarations to FCC and made presentation to DOJ, demonstrating the transaction would generate substantial consumer benefits, while generating at most minimal upward pricing pressure in a properly defined mobile wireless services market and no issues related to spectrum concentration or other competitive concerns.

Successful merger of American Airline and US Airways. 2013. Lead consulting expert, managing Compass Lexecon team of over 25 economists supporting multiple experts. Made multiple presentations to DOJ, worked on expert reports in litigation, and assisted counsel with the analysis leading to settlement of litigation, permitting transaction to close.

ATTACHMENT 1

Successful merger of T-Mobile USA and MetroPCS. 2013. Lead economic expert for T-Mobile USA. Conducted economic analyses of competitive effects and consumer benefits from the transaction, as well as consumer benefits from reduced costs and increased network quality. Presented analyses to both DOJ and FCC.

FTC investigation of acquisition of Dollar Thrifty Automotive Group by Hertz. 2012. Served as a lead economic expert for FTC and prepared to serve as FTC's testifying expert against the merger, prior to case settlement. Conducted empirical analyses based on previous rental car mergers demonstrating likely price increases from the transaction.

Decision by Federal Communications Commission not to extend the ban on exclusive contracts for satellite-delivered, cable-affiliated networks. 2012. Lead economic expert for National Cable and Telecommunications Association. Submitted economic analysis demonstrating that the ban on exclusive distribution of satellite-delivered, cable affiliated networks is no longer warranted given increased marketplace competition. FCC made decision to allow the ban to sunset.

Successful sale of wireless spectrum by SpectrumCo and Cox ("Cable Companies") to Verizon Wireless and successful completion of related commercial agreements. 2012. On behalf of the Cable Companies, performed economic analyses demonstrating lack of competitive harm from the transaction on markets for backhaul and Wi-Fi services. Presented analyses to FCC.

Successful acquisition by LIN Media of broadcast television stations from NVTV. 2012. Lead economic expert for LIN Media. Prepared economic analysis demonstrating lack of competitive concern over potential issues related to SSA and JSA Arrangements.

Proposed acquisition of T-Mobile USA by AT&T. 2011. Served as one of the lead economists, initially for T-Mobile (along with Michael Katz) and ultimately for both parties (along with Michael Katz and Dennis Carlton). Made multiple presentations to DOJ and FCC. Appeared in FCC Workshop, ex parte meeting.

S*uccessful application for antitrust immunity by Delta and Virgin Blue*. 2010. Together with Robert Willig, Bryan Keating, and Jon Orszag, prepared economic analyses demonstrating substantial net consumer benefits from antitrust immunity. Submitted results in expert reports to Department of Transportation.

Successful joint venture between Comcast and NBC Universal (and ultimate full acquisition of NBC Universal by Comcast). 2010. Served as one of the lead economists (along with Michael Katz) on behalf of the merging parties. Wrote multiple reports submitted to FCC (with Michael Katz) demonstrating lack of significant competitive concerns from the transaction. Made multiple presentations to DOJ and FCC. Appeared in FCC Workshop of economists, ex parte meeting.

Successful application for antitrust immunity for oneworld alliance and associated joint venture of American Airlines, British Airways, and Iberia Airlines. 2009-2010. Together with Robert Willig and Bryan Keating, prepared economic analyses demonstrating substantial net consumer benefits associated with antitrust immunity for the joint venture. Submitted results in expert reports to Department of Transportation.

ATTACHMENT 1

Successful acquisition by PepsiCo of bottlers, PBG and PAS. 2009. Performed econometric and simulation analyses demonstrating pro-competitive effect of merger on PepsiCo's own brands, other brands distributed by PBG and PAS, and overall marketplace. Presented results to FTC (together with Dennis Carlton).

Successful merger of Delta Airlines and Northwest Airlines. 2008. In support of Dennis Carlton, developed empirical and theoretical analyses to demonstrate merger's pro-competitive nature. Work focused on (ultimately settled) private litigation opposing the merger.

Successful acquisition of Harcourt Education by Houghton Mifflin. 2007. Along with Daniel Rubinfeld and Frederick Flyer, developed econometric analyses demonstrating lack of competitive harm from proposed merger. Presented results to DOJ.

Successful acquisition of Chicago Board of Trade by Chicago Mercantile Exchange. 2007. Along with Robert Willig and Hal Sider, developed and presented multiple empirical analyses demonstrating lack of competitive harm from merger. Submitted multiple white papers and made multiple presentations to DOJ.

OTHER CONFIDENTIAL CONSULTING WORK IN THE FOLLOWING INDUSTRIES

Automobiles and Components

Consumer Durables

Consumer Services

Financial Services

Energy

Food, Beverage, and Tobacco

Healthcare Equipment and Services

Media

Pharmaceuticals, Biotechnology, and Life Sciences

Retail

Semiconductors and Semiconductor Equipment

Software and Related Services

Technology: Hardware and Equipment

Telecommunication Services

Transportation

Utilities

ATTACHMENT 1

PUBLICATIONS AND RESEARCH IN PROGRESS

"Vertical Mergers with Bilateral Contracting and Upstream and Downstream Investment," (with Daniel P. O'Brien), available at https://ssrn.com/abstract=3886048, Revised and Resubmitted to the *Journal of Economics & Management Strategy*, December 2025.

"Lessons from Foreclosure Parables: The Need to Tether Vertical Merger Analysis," (with Daniel P. O'Brien), available at https://ssrn.com/abstract=4726861; Submitted to *The Review of Industrial Organization,* December 2025.

"RPM and Vertical Integration with Upstream Competition and Noncontractible Efforts," (with Michele Bisceglia, Salvatore Piccolo, and Paolo Ramezzana), available at https://ssrn.com/abstract=4913199; forthcoming in *The Journal of Industrial Economics*, November 2025.

"The Challenges of Cartelization with Many Products and Ongoing Technological Advancements: LCD Crystal Displays Worldwide," (with Dennis W. Carlton, Ian MacSwain, and Allan Shampine), Chapter 10 in *Cartels Diagnosed: New Insights on Collusion*, Joseph E. Harrington, Jr. and Maarten Pieter Schinkel, eds., December 2024.

"Dynamic Lerner Condition and Horizontal Merger Assessment," (with Rodrigo Montes, Loren Poulsen, and Jason Wu), available at https://ssrn.com/abstract=4817343, May 2024.

"Evaluating a Theory of Harm in a Vertical Merger: AT&T/Time Warner," (with Dennis W. Carlton, Georgi V. Giozov, and Allan L. Shampine), Chapter 5 in *Antitrust Economics at a Time of Upheaval: Recent Competition Policy Cases on Two Continents*, John Kwoka, Jr., Tommaso M. Valletti, and Lawrence J. White, eds., August 2023.

"Cheap Exclusion in Markets with Multiple Complements," (with Erica Benton and Daniel P. O'Brien), Volume 89 in the *International Journal of Industrial Organization*, July 2023.

"A Retrospective Analysis of the AT&T/Time Warner Merger" (with Dennis W. Carlton, Georgi V. Giozov, and Allan L. Shampine), Volume 65, Number S2, in the *Journal of Law and Economics*, November 2022.

"New Merger Guidelines Should Keep the Consumer Welfare Standard" (with Jonathan Orszag and Jeremy Sandford), *CPI Antitrust Chronicle*, November 2022.

"International Broadband Price Comparisons Tell Us Little about Competition and Do Not Justify Broadband Regulation," working paper (with Michael Katz and Bryan Keating), commissioned by NCTA – The Internet & Television Association, May 11, 2021.

"Effects of the 2010 Horizontal Merger Guidelines on Merger Review: Based on Ten Years of Practical Experience," (with Dennis W. Carlton), Volume 58, Issue 2, in the *Review of Industrial Organization*, November 2020.

"An Evaluation of the Impact of the 2010 Horizontal Merger Guidelines," (with Dennis W. Carlton), available at https://ssrn.com/abstract=3547653, March 2020.

"Lessons from *AT&T/Time Warner,*" (with Dennis W. Carlton and Allan L. Shampine), *Competition Policy International*, July 2019.

ATTACHMENT 1

"Are You Pushing Too Hard? Lower Negotiated Input Prices as a Merger Efficiency," (with Thomas A. Stemwedel and Ka Hei Tse), Volume 82, Issue 2, Pages 623-642, in the *Antitrust Law Journal*, April 2019.

"Vertical Integration in Multichannel Television Markets: Revisiting Regional Sports Networks Using Updated Data," (with Georgi Giozov, Nauman Ilias, and Allan Shampine), Volume 4:1 in *The Criterion Journal on Innovation*, 2019.

"Are Legacy Airline Mergers Pro- or Anti-Competitive? Evidence from Recent U.S. Airline Mergers," (with Dennis Carlton, Ian MacSwain, and Eugene Orlov), Volume 62, Pages 58-95, in the *International Journal of Industrial Organization*, January 2018.

"Competitive Effects of International Airline Cooperation," (with Robert J. Calzaretta and Yair Eilat), Volume 13, Issue 3, Pages 501-548, in the *Journal of Competition Law & Economics*, September 2017.

"Econometrics and Regression Analysis," (with Chris Cavanagh, Paul Denis, and Bryan Keating), Chapter 6 in the *American Bar Association's Proving Antitrust Damages: Legal and Economic Issues, Third Edition*, 2017.

"Do Premiums Increase After Health Insurance Mergers? – A Reassessment of Guardado et al.'s Findings," (with Robert C. Bourke, Ben Wagner, and David A. Weiskopf), available at *https://ssrn.com/abstract=2933062*, March 2017.

"Complementarity without Superadditivity," (with Steven Berry, Philip Haile, and Michael Katz), Volume 151, Pages 28-30, in *Economics Letters*, December 2016.

"Antitrust in a Mobile World," (with Yonatan Even, Jonathan M. Jacobson, Scott Martin, and Dr. Helen Weeds), Chapter 17 in *International Antitrust Law & Policy: Fordham Competition Law 2015*, James Keyte, ed., 2016.

"Buyer Power in Merger Review," (with Dennis W. Carlton and Mary Coleman), Chapter 22 in *The Oxford Handbook of International Antitrust Economics*, Volume 1, Roger D. Blair and D. Daniel Sokol, eds., 2015.

"Airline Network Effects and Consumer Welfare," (with Bryan Keating, Dan Rubinfeld, and Robert Willig), *Review of Network Economics*, available at *https://ssrn.com/abstract=2473243*, November 2013.

"The Evolution of Internet Interconnection from Hierarchy to 'Mesh': Implications for Government Regulation," (with Stanley M. Besen), Volume 25 in *Information Economics and Policy*, July 2013.

"The Delta-Northwest Merger: Consumer Benefits from Airline Network Effects (2008)," (with Bryan Keating, Daniel L. Rubinfeld, and Robert D. Willig), *The Antitrust Revolution*, Sixth Edition, John E. Kwoka, Jr. and Lawrence J. White, eds., July 2013.

"Proper Treatment of Buyer Power in Merger Review," (with Dennis W. Carlton), *Review of Industrial Organization*, July 2011.

"Response to Gopal Das Varma's Market Definition, Upward Pricing Pressure, and the Role of the Courts: A Response to Carlton and Israel," (with Dennis W. Carlton), *The Antitrust Source*, December 2010.

"Will the New Guidelines Clarify or Obscure Antitrust Policy?" (with Dennis W. Carlton), *The Antitrust Source,* October 2010.

"Should Competition Policy Prohibit Price Discrimination?" (with Dennis W. Carlton), *Global Competition Review*, 2009.

"The Empirical Effects of Collegiate Athletics: An Update Based on 2004-2007 Data," (with Jonathan Orszag), Paper commissioned by National Collegiate Athletic Association, available *at* http://www.epi.soe.vt.edu/perspectives/policy_news/pdf/NCAASpending.pdf, February 2009.

"Services as Experience Goods: An Empirical Examination of Consumer Learning in Automobile Insurance," *The American Economic Review*, December 2005.

"Tenure Dependence in Consumer-Firm Relationships: An Empirical Analysis of Consumer Departures from Automobile Insurance Firms," *The Rand Journal of Economics*, Spring 2005.

"The Impact of Youth Characteristics and Experiences on Transitions Out of Poverty," (with Michael Seeborg), *Journal of Socio-Economics*, 1998.

"Racial Differences in Adult Labor Force Transition Trends," (with Michael Seeborg), *Journal of Economics*, 1991.

SELECTED PROFESSIONAL PRESENTATIONS

LexMundi 2024 Cross-Border Transactions Global Seminar, "U.S. Merger Control Fireside Chat," Speaker, February 2024.

American Bar Association Section of Antitrust Law, "Nuts & Bolts of Presenting Economic Evidence to the Agencies: Common Pitfalls and Best Practices, Panelist, October 2019.

Dechert LLP, 2019 Annual Antitrust Spring Seminar, Keynote Speaker, March 2019.

Concurrences Review and The George Washington University Law School, 6th Bill Kovacic Antitrust Salon: Where is Antitrust Policy Going?, "A Judge's Eye View on Antitrust: Mergers, Cartels, Remedies…," Panelist, September 2018.

Fordham Competition Law Institute, 45th Annual Conference on International Antitrust Law and Policy, "Merger Remedies," Panelist, September 2018.

Georgetown Center for Business and Public Policy, "Airline Competition Conference," Panelist, July 2017.

J.P. Morgan Special Situations Investor Forum, "The Antitrust Merger Review Process," Panelist, March 2017.

American Bar Association Section of Antitrust Law, "Economic Issues Raised In The Comcast – Time Warner Cable Merger," Panelist, February 2016.

Fordham Competition Law Institute, 42nd Annual Conference on International Antitrust Law and Policy, "Antitrust in a Mobile World," Panelist, October 2015.

ATTACHMENT 1

American Bar Association Section of Antitrust Law, "Merger Practice Workshop," Faculty Member, October 2015.

Searle Center Conference on Antitrust Economics and Competition Policy, Panel on Recent Transactions in the Telecom Industry, Panelist, September 2015.

National Bureau of Economic Research, Summer Institute 2015, Industrial Organization Meetings, "Panel Discussion of the Comcast-Time Warner Merger," Panelist, July 2015.

Federal Communications Bar Association, "How the Antitrust Agencies and the FCC are Likely to Analyze Vertical Mergers," Panelist, November 2014.

The Coca Cola Company Global Antitrust Forum, "Round Table Discussion on Use of Economics and Economists," Panel Chair, November 2014.

Compass Lexecon Competition Policy Forum, Lake Como Italy, "Consolidation of the Telecoms Industry in the EU and the U.S.," Panelist, October 2014.

The IATA Legal Symposium 2014, Aviation Law: Upfront and Center, "Merger Analysis – A sudden shift in approach by DOJ in the American Airlines and US Airways merger," Panelist, February 2014.

Georgetown Law 7th Annual Global Antitrust Enforcement Symposium, "Merger Enforcement and Policy," Panelist, September 2013.

American Bar Association Section of Antitrust Law, "Airline Mergers: First Class Results or Middle-Seat Misery?" Panelist, May 2013.

American Bar Association Section of Antitrust Law, "Go Low or Go Home! Monopsony a Problem?" Panelist, March 2012.

Federal Communications Bar Association Transactional Committee CLE Seminar, "The FCC's Approach to Analyzing Vertical Mergers," Panelist, October 2011.

The Technology Policy Institute Aspen Forum, "Watching the Future: The Economic Implications of Online Video," Panelist, August 2011.

American Bar Association Forum on Air & Space Law, 2011 Update Conference, "Antitrust Issues: What's on the Horizon for the Industry," Panelist, February 2011.

American Bar Association Section of Antitrust Law, "Antitrust in the Airline Industry," Panelist, September 2010.

ADVISORY, EDITORIAL, AND TRUSTEE BOARDS

Member of Steering Committee for Cambridge Forum on U.S. Antitrust Regulation

Illinois Wesleyan University, Board of Trustees, Trustee

Kenyon College, Board of Trustees, Trustee

BEFORE THE

SURFACE TRANSPORTATION BOARD

STB DOCKET NO. FD 36873

UNION PACIFIC CORPORATION AND UNION PACIFIC RAILROAD COMPANY

– CONTROL –

NORFOLK SOUTHERN CORPORATION AND NORFOLK SOUTHERN RAILWAY COMPANY

Verified Statement of David T. Hunt and Matthew Schabas

December 18, 2025

Contents

1. Qualifications

This verified statement was prepared by David T. Hunt and Matthew Schabas. Mr. Hunt is a Vice President and Mr. Schabas is a Principal with Oliver Wyman, a leading general management consulting firm with more than 60 offices in 31 countries. Oliver Wyman maintains one of the largest practices in the world dedicated to the transportation and logistics sectors. Oliver Wyman's transportation clients include national and regional governments on six continents, as well as many of the world's largest users of rail services, railroads, motor carriers, leasing companies, and industrial and consumer manufacturing firms.

Mr. Hunt: My office address is 1 University Square, Suite 100, Princeton, NJ 08540. I have been a consultant in the transportation sector for more than 40 years. I joined Oliver Wyman in 2008, specializing in strategic planning, regulatory issues, and operations for freight railroads and other freight transportation providers. Prior to joining Oliver Wyman, I was a consultant at Cambridge Systematics, Wilbur Smith Associates, and ALK Associates. While at ALK from 1983 through 2000, I provided services to clients in connection with all of the Class I railroad mergers that occurred during that period. I also was responsible for the annual calibration of and updates to ALK's Advanced Traffic Diversion Model that was used in ICC and STB merger proceedings. I hold a bachelor's degree in civil engineering from West Virginia University and a master's degree in civil engineering and operations research from Princeton University. My resume is included in Appendix D.

Mr. Schabas: My office address is 1166 Avenue of the Americas, New York City, New York 10036. I have been a consultant in the transportation sector for more than a decade, specializing in network design, business planning, commercial strategy, and freight operations.

I have led multiple projects for Class I railroads focused on railroad service design, traffic analysis, operational efficiency, and intermodal operations.

Prior to joining Oliver Wyman, I worked at Seabury Aviation Consulting, a boutique advisory firm, and as a researcher and teaching assistant in transportation policy while in graduate school. I hold a bachelor’s degree, master’s degree, and Master of Engineering from the University of Cambridge, United Kingdom, and a master’s in city planning from the University of California, Berkeley in the transportation program. My resume is included in Appendix D.

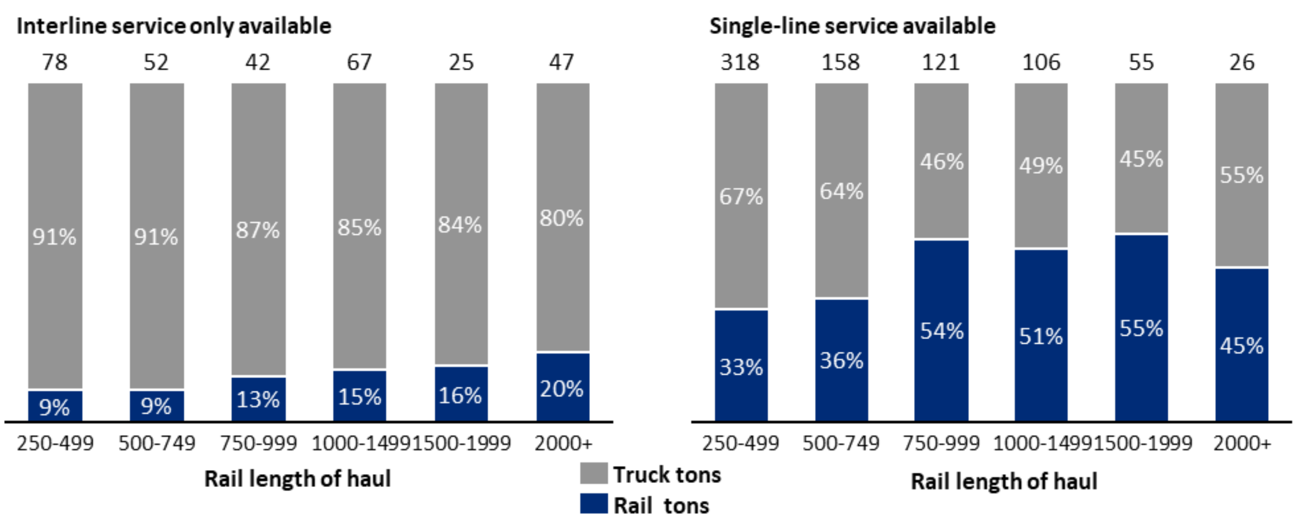
2. Summary of Key Findings

The purpose of this Verified Statement is to provide an analysis and estimate of potential rail-to-rail and truck-to-rail diversions that would occur as the result of a merger of Union Pacific Railroad Company ("UP") and Norfolk Southern Railway Company ("NS"). The companies have reviewed and verified the information used to develop the diversion estimates. Our key findings are:

1. Rail customers prefer single-line service. As shown in Exhibit 2-1, in truck-competitive merchandise/bulk markets, rail's market share is materially greater where single-line service is available than where service is limited to interline routings. The same holds true for intermodal markets. Customers strongly favor single-line service over interline service because of its lower costs, improved reliability, and faster transit times.

Exhibit 2-1: Rail vs. trucking in merchandise/bulk markets, where single-line service available or interline service only[1]

Millions of tons; % rail vs. truck



2. Shippers benefit from meaningfully lower pricing on single-line routes, which consistently show lower railroad revenue per ton-mile across distance bands (Exhibit 2-2). In the 1,000 to

[1] See workpaper "t2merch_watershed_summary_vF.ipynb."

1,500-mile range, for example, the price of interline service is 34% higher on average than for single-line service for general merchandise.

Exhibit 2-2: Rail revenue per ton-mile: single-line vs. interline service[2]

	General merchandise Service type 1			Intermodal Service type 2			Bulk Service type 3			Automotive Service type 4		
LOH (miles)	**0-500**	**500-1000**	**1000-1500**	**0-500**	**500-1000**	**1000-1500**	**0-500**	**500-1000**	**1000-1500**	**0-500**	**500-1000**	**1000-1500**
Single-line	0.090	0.061	0.048	0.128	0.082	0.079	0.076	0.037	0.023	0.468	0.237	0.196
Interline	0.113	0.077	0.065	0.127	0.096	0.108	0.082	0.047	0.027	0.785	0.232	0.205
Difference	**0.023**	**0.016**	**0.017**	**-0.000**	**0.015**	**0.029**	**0.007**	**0.009**	**0.004**	**0.318**	**-0.005**	**0.010**
Percent diff.	**25%**	**26%**	**34%**	**0%**	**18%**	**37%**	**9%**	**26%**	**19%**	**68%**	**2%**	**5%**

3. By offering the single-line rail service customers prefer, a merged UP-NS would attract an estimated 1.86 million rail carloads and intermodal units annually (Exhibit 2-3). 442,000 diversions are from other railroads, 67,000 are extensions of UP intermodal moves that dray over 250 miles, and 1.36 million are from traffic currently moving by truck. This growth opportunity represents an increase of 11% over combined UP-NS 2023 base year traffic.

Exhibit 2-3: Estimated total annual diversions from a UP-NS merger[3]
Thousands of carloads/intermodal units

	Merchandise	Intermodal	Bulk	Automotive	Total
A. Total rail-to-rail diversions	162	204	28	47	442
A1. Rail-to-rail extended haul diversions	*107*	*131*	*17*	*34*	*288*
A2. Rail-to-rail new traffic	*56*	*73*	*12*	*13*	*153*
B. Total truck-to-rail diversions	183	1,166	-	5	1,355
C. Long-haul drayage diversions	-	67	-	-	67
D. Total gross diversions	**346**	**1,438**	**28**	**52**	**1,864**
E. Rail-to-rail extended haul offsets	(71)	(131)	(34)	(26)	(262)
F. Long-haul drayage offsets	-	(67)	-	-	(67)
G. Net diversions	**275**	**1,239**	**(6)**	**26**	**1,535**

[2] Totals and subtotals on tables may not sum due to rounding. See workpaper "rev_per_tmile_by_service_type.sql."
[3] A1. Rail-to-rail extended haul diversions is the granular output of the model (many small O&Ds) for merchandise, bulk and automotive. E. Rail-to-rail extended haul offsets is calculated from the representative lanes to fully offset the car-miles (rather than number of waybills) in the compressed traffic dataset for merchandise, bulk and automotive (see Appendix C)

4. A combined UP-NS would launch new intermodal train services with truck-competitive transit times in several lanes and enable new rail services in other lanes via Chicago, IL (e.g., Los Angeles, CA – Boston, MA) that eliminate costly drayage interchanges. There are five key lanes that would experience a high share of intermodal growth as part of the projected 1.44 million intermodal unit shift to new UP–NS single-line service. They are:
   - Los Angeles, CA – New York, NY
   - Los Angeles, CA – Atlanta, GA and Charlotte, NC
   - Laredo, TX and Houston, TX – Atlanta, GA and New York, NY
   - San Francisco, CA and Oakland, CA – New York, NY
   - Los Angeles, CA – Cincinnati, OH, Columbus, OH, and Detroit, MI
5. Watershed markets stand to gain as merchandise and bulk freight shifts from truck to rail carload. The "watershed region" is defined as any county within 250 miles of four gateway cities: Chicago, St. Louis, Memphis, and New Orleans. Over 50% of the projected merchandise/bulk diversions from truck are attributable to creating integrated single-line service to, from, and within the watershed region.[4]
6. Multiple shipper segments would realize substantial benefits from improved single-line service. These include:
   - Chemical and petroleum manufacturers, especially those located in Texas and Louisiana and shipping to New Jersey, Ohio, Pennsylvania, and other eastern states;
   - Food product producers located in Iowa, Nebraska, Minnesota, and other western food-producing regions, shipping products east;

[4] Intra- (10%) and inter-watershed (47%) lanes. Watershed lane types defined in Appendix B.5.3.

- Retailers and shippers of consumer products with national supply chains, due to new truck-competitive intermodal services that bypass Chicago interchanges, and new lanes from South Texas to the Southeast and Northeast; and
- Finished vehicle manufacturers, especially from Michigan and Indiana, moving vehicles to California and Texas.

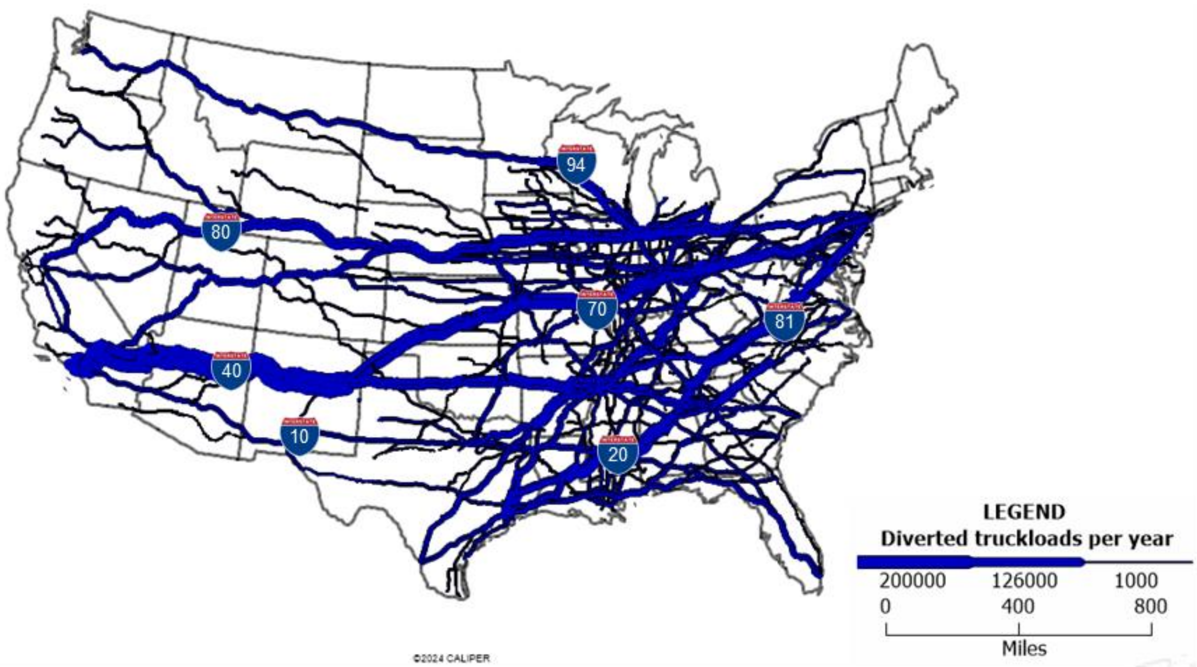
7. By moving large volumes of long-haul freight off highways and onto rail, the merger would improve roadway safety and reduce wear on public infrastructure. Our analysis projects a major reduction in long-haul truck traffic on key interstate highway corridors as freight converts to rail under the merger. As shown in Exhibit 2-4, an estimated 2.04 million equivalent truckloads, excluding new local drayage to serve intermodal diversions, are projected to convert from roadways to rail annually due to the merger. The truckloads diverted to rail equate to 3.1 billion truck-miles and are long-haul, with an average haul of more than 1,519 miles.

Exhibit 2-4: Estimated total truckloads and truck-miles removed from roadways[5]
Excludes local drayage mileage for intermodal diversions

Service type	Truckloads (thousands)	Truck-miles (thousands)	Avg. miles per unit
Intermodal	1,166	2,048,000	1,756
Long-haul drayage	67	18,300	273
Intermodal subtotal	*1,233*	*2,066,300*	*1,675*
Merchandise	797	1,014,900	1,273
Auto	7	13,600	1,890
Total	**2,038**	**3,094,900**	**1,519**

[5] See workpaper "Trucks diverted from highway vF.xlsx." The 2.04 million truckloads result in 1.35 million rail carloads and intermodal units. Trucks to intermodal units are one-to-one conversions, while trucks to rail carloads account for the ability of a railcar to haul more tons than a truck. Full conversion details explained in Appendix B.12.

Exhibit 2-5: Density map of estimated truckloads diverted from roads due to a UP-NS merger[6]
All highway lanes with at least 1,000 annual truckloads diverted in at least one direction



8. Finally, following full implementation of the merger, diverted traffic is estimated to generate $4.21 billion in new revenue annually for UP-NS, which represents an 11.6% increase over UP and NS combined 2023 operating revenue of $36.2 billion.[7] New intermodal service is projected to generate 52% of the estimated $4.21 billion in new business.[8] This freight revenue estimate is based on reported revenues per ton-mile from 2023, inclusive of fuel surcharge and adjusted for length-of-haul, for loads as reported in the Board's Confidential Carload Waybill Sample ("CCWS") Total Revenue field and adjusted using the Board's Freight Commodity Statistics report.[9] Revenue is calculated using the estimated diverted

---

[6] Based on county origin–destination pairs, using TransCAD's all-or-nothing assignment. Some links may appear spatially disjointed from the larger network when the minimum threshold is applied. See workpaper "Trucks diverted from highway vF.xlsx"; see Appendix B.11 for converting truckloads to carloads/intermodal units. Map created using TransCAD Transportation Planning Software and Oliver Wyman diversion analysis data.
[7] Analysis of Class I Railroads, 2023, Line 1, Total Operating Revenue, Association of American Railroads.
[8] Freight revenue estimate based on reported revenues from 2023, inclusive of fuel surcharge, as reported in the STB Confidential Carload Waybill Sample 2023, Total Revenue field; see workpaper "Revenue_Calculation_vF.xlsx."
[9] See Section 8. Revenue for more details. Sources: "Expanded Total Revenue" (field 102), Confidential Carload Waybill Sample, op. cit.; Freight Commodity Statistics 2023, Surface Transportation Board.

traffic loaded into the operating plan. We "compressed" the traffic so that the long tail of low-volume merchandise diversion lanes could be effectively modeled. The compression methodology took the largest lanes by STCC2 as representative traffic flows and grossed up the number of cars in a diversion lane to keep the total car-miles from merchandise diversions the same. This resulted in a small increase in diverted merchandise carloads of ~10,000 in the operating plan (see Appendix C.1 for full details).

3. Basis for Truck-To-Rail and Rail-to-Rail Diversion Models

Shippers selecting freight modes and carriers consider numerous factors in their decision-making. Shippers, however, consistently report three factors as particularly important: price, reliability, and transit time. The Organization for Economic Co-operation and Development ("OECD") confirmed this in a recent study:

> "A huge number of studies deal with the criteria that shippers or their intermediaries – like freight forwarders – take into account when choosing their transport mode. Independently of who has conducted the studies, costs, transit time, and reliability have been found to play the most important role in transport mode choice."[10]

Oliver Wyman's diversion models estimate how much traffic would shift to a single-line UP-NS system by focusing on the factors shippers value most: price, reliability, and transit time. **Section 3.1** shows that single-line service captures significantly more market share than interline service in both truck-versus-rail and rail-versus-rail markets, because single-line service better aligns with these preferences. **Sections 3.2 through 3.4** explain how single-line operations improve each factor relative to interline service. **Section 3.5** summarizes the two diversion models: the truck-to-rail model, which groups lanes by price and transit-time competitiveness and uses the number of junctions as a proxy for reliability, and the rail-to-rail logit model, which evaluates route choice based on rail miles, junction impedance, and the number of interchanges.

3.1. The Impact of Interchanges on Rail Market Share

Rail's competitiveness with trucking is materially stronger where single-line rail service is available rather than only interline service.[11] As shown in Exhibits 3-1 and 3-2, rail market share

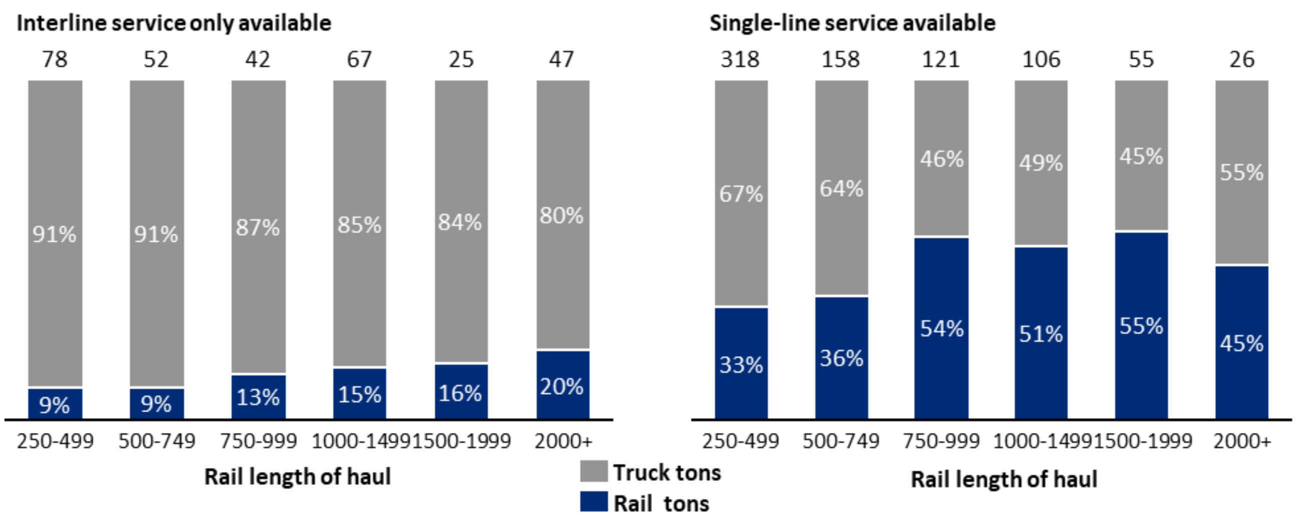
[10] "Mode Choice in Freight Transport," Research Report, International Transport Forum, OECD, 2022, pp. 13-14.
[11] A "market" is defined by an origin, destination, and commodity. The commodity may be general, such as merchandise/bulk or intermodal, or may be a specific STCC. Merchandise and bulk shipments are combined into one category, since it is unlikely that entire unit trains of bulk commodities (such as grain) would be diverted, especially from truck to rail.

is substantially higher at every length of haul where single-line service is available, both for merchandise/bulk and intermodal traffic, demonstrating the significant competitive advantage such service provides.

For example, for merchandise and bulk shipments, rail captures only 13% of tons in 750- to 999-mile markets if only interline service is available but 54% if single-line service is available. Similarly, in intermodal markets with a 1,500- to 1,999-mile length of haul, interline-only rail has a 43% share compared to truck, while single-line rail has a 75% market share.

Where interline is the only intermodal linehaul option, market share is 32 to 33 percentage points lower than if single-line service is available in the same length of haul bands. Particularly for intermodal services, additional transit time from executing a steel-wheel interchange and the unreliability this frequently introduces makes it more difficult, particularly at shorter lengths of haul, for intermodal to offer a competitive product to truck.

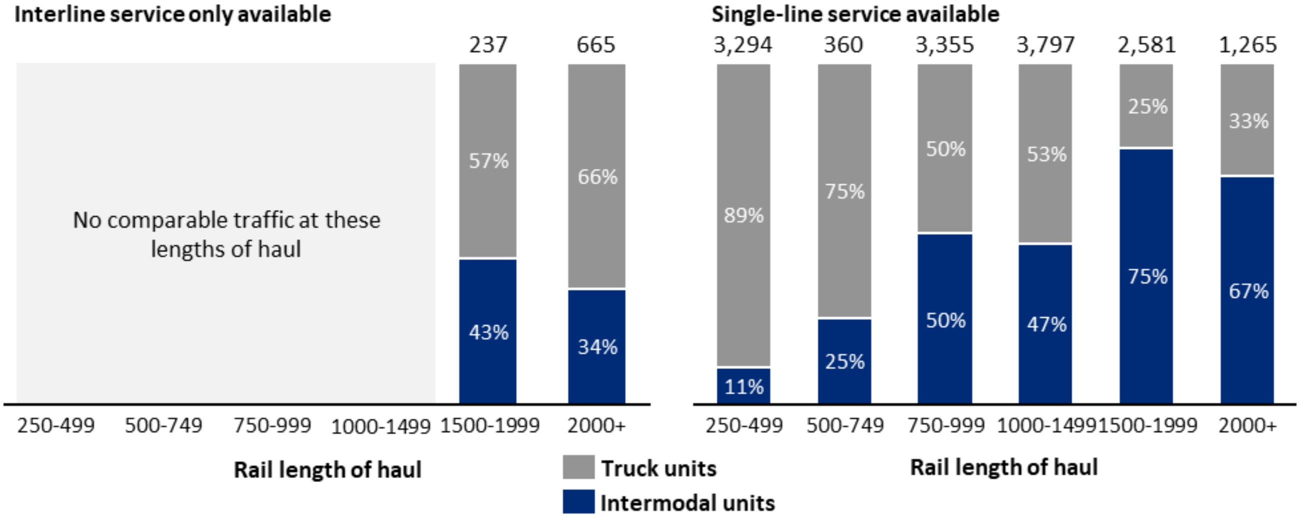
Exhibit 3-1: Rail competitiveness vs. trucks in merchandise/bulk markets, where single-line service available or interline only[12]
Millions of tons; % rail vs. truck



[12] Transearch, S&P Global Markets, 2023; Confidential Carload Waybill Sample, op. cit., includes "competitive" county-county lanes where both truck and rail compete, with additional exclusions applied (see Exhibit B-27); workpaper "t2merch_watershed_summary_vF.ipynb."

Exhibit 3-2: Rail competitiveness vs. trucks in intermodal markets, where single-line service available or interline only[13]

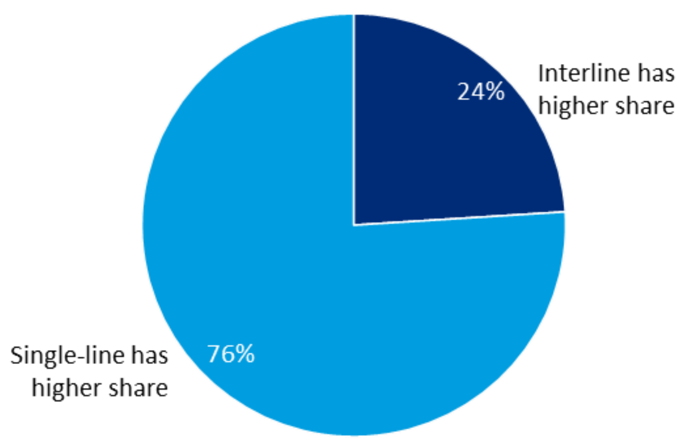
Thousands of truckloads/intermodal units; % rail vs. truck



Shippers' strong preference for single-line service also is revealed in markets where single-line and interline rail service compete directly, as single-line service has a higher share of traffic 76% of the time (Exhibit 3-3).

Exhibit 3-3: Rail single-line vs. interline service market share[14]

Number of markets with the same origin, destination, and commodity



[13] Transearch, op. cit.; Confidential Carload Waybill Sample, op. cit. includes "competitive" county-county lanes where both truck and rail compete and where current truck traffic is greater than 0; workpaper "Current state IM SLS vs Interline Market Share Comparison.xlsx."

[14] 2023 traffic base of record (see Appendix A.2); Confidential Carload Waybill Sample, op. cit. selected markets where the minimum JF = 0 and the average JF > 0. Market defined as origin SPLC, destination SPLC, and 7-digit STCC; see workpaper "rail_sl_vs_inl_mkt_share_vF.sql."

Finally, the difference in rail versus truck share is stark where markets that currently have single-line service are compared to markets where a merged UP-NS would introduce new single-line service. As shown in Exhibit 3-4, current single-line service lanes consistently have higher market shares compared to truck, by 5x to 20x, than where single-line service is yet to be introduced. Using tank trucks as an example, single-line rail service on average has a 64% share of tonnage versus trucks. In lanes where UP-NS would introduce new single-line service, the pre-merger rail share against tank trucks averages only 7% (9.1x less).

Exhibit 3-4: Pre-merger comparison of truck/rail share for (a) markets that currently have single-line rail service, and (b) markets where UP-NS would improve service[15]
Merchandise/bulk traffic; millions of tons

	(a) Truck/rail competitive with single-line rail service (pre-merger shares)			(b) Truck/rail competitive lanes where UP-NS would improve service (pre-merger shares)		
Alternative to rail truck type	**Truck tons**	**Rail tons**	**Rail share**	**Truck tons**	**Rail tons**	**Rail share**
Bulk	89.5	60.4	40%	14.4	0.4	2%
Dry van	230.6	122.3	35%	21.8	1.5	6%
Flatbed	63.5	26.3	29%	7.8	0.4	4%
Reefer	24.7	23.8	49%	5.5	0.6	10%
Tank	51.6	90.5	64%	12.2	0.9	7%

3.2. The Impact of Interchanges on Rail Price

A leading factor in why shippers choose single-line rail service rather than interline is that routes offering single-line service are consistently priced lower on a revenue per ton-mile basis, across all lengths of haul (Exhibit 3-5). For example, revenue per ton-mile for general merchandise traffic moving 1,000 to 1,500 miles is on average 34% higher for interline moves than for single-line service in the same distance band.

[15] Transearch, op. cit.; Confidential Carload Waybill Sample, op. cit.; workpaper "t2merch_lane_archetype_exhibits_vF.ipynb." Note Transearch also includes truck types for hauling livestock and wet cement, which were not considered since these are not commodities moved by railroads.

Exhibit 3-5: Rail revenue per ton-mile: single-line vs. interline service[16]

	General merchandise Service type 1			Intermodal Service type 2			Bulk Service type 3			Automotive Service type 4		
LOH (miles)	**0-500**	**500-1000**	**1000-1500**	**0-500**	**500-1000**	**1000-1500**	**0-500**	**500-1000**	**1000-1500**	**0-500**	**500-1000**	**1000-1500**
Single-line	0.090	0.061	0.048	0.128	0.082	0.079	0.076	0.037	0.023	0.468	0.237	0.196
Interline	0.113	0.077	0.065	0.127	0.096	0.108	0.082	0.047	0.027	0.785	0.232	0.205
Difference	**0.023**	**0.016**	**0.017**	**-0.000**	**0.015**	**0.029**	**0.007**	**0.009**	**0.004**	**0.318**	**-0.005**	**0.010**

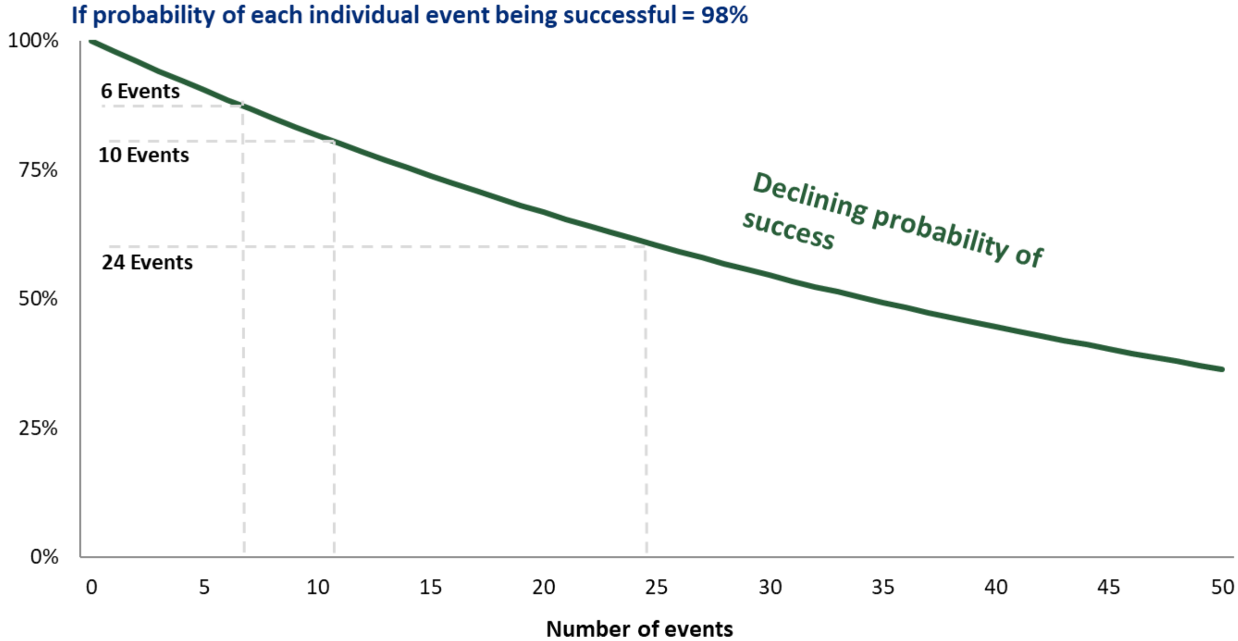
3.3. The Impact of Interchanges on Rail Reliability

Reliability is crucial for shippers, since uncertain and late delivery times can disrupt operations and create the need for additional inventory levels. For example, a chemicals manufacturer faced with delayed input shipments could incur a costly disruption to operations if it runs out of necessary feedstock for a process, while an automobile assembly plant might have to stop an assembly line if a critical part arrives late.

It is not possible to include a direct measure of reliability by market in the traffic diversion models, since this data does not exist on a lane-by-lane basis nationally. But the impact of reliability can be considered indirectly by looking at junction frequency (i.e., the number of rail interchanges) as a proxy. Simply put, the more interchanges, the greater the risk that a railroad will not be able to meet its service hand-off plan for a railcar. And even if the risk of failure for an individual event is small, the overall risk of failure increases as more events are added to a railcar move, as shown in Exhibit 3-6.[17] The result is that single-line service typically will be more reliable than interline service.

[16] Confidential Carload Waybill Sample, op. cit. Single-line defined as junction frequency=0 and rebill flag=0. Interline defined as junction frequency>0 and rebill flag=0; workpaper “rev_per_tmile_by_service_type.sql.”
[17] This adverse effect of interchanges on service reliability was established in the 1970s by the Massachusetts Institute of Technology, under funding from the US Department of Transportation Freight Car Utilization Program.

Exhibit 3-6: The probability of successfully executing a railcar trip plan decreases as the number of switch events increases[18]



3.4. The Impact of Interchanges on Rail Transit Time

Transit time is another important consideration for shippers in managing freight movements to support their supply chains. One reason is that more time spent in transit increases inventory costs and represents a lost opportunity for that shipment to be used or sold sooner.

Shippers do not expect railroads to be faster than truck but are more likely to switch from truck to rail if railroads can narrow the gap, while improving reliability and remaining below the cost of truck. And interchanges between railroads in interline service add significant transit time.

Using railroad performance data reported to the Board, the average system terminal dwell time of 22 hours (excluding cars on run-through trains) provides a good approximation for the

[18] Note: A 98% probability of performing each individual switching event according to plan is above levels normally experienced by the Class I railroads. The probability of meeting a trip plan is equal to the probability of performing each individual switching event according to plan, raised to the power of the number of switching events. Sources: Testimony of William J. Rennicke: Before the STB in the Matter of Ex Parte No. 711, Petition for Rulemaking to Adopt Revised Competitive Switching Rules, March 25, 2014, handout, p. 7; "Freight Car Utilization and Railroad Reliability: Conclusions and Recommendations," The Industry Task Force on Reliability Studies, October 1977, Final Report.

time a railcar or container spends at each interchange. Even at large gateways, most railcars must be handled twice (at the originating and terminating railroads' terminals) before continuing. A single railroad can perform the same move with just one handling, saving an intermediate handling and the time associated with it.

The issue of interchange time is most acute for intermodal, which is the most time-sensitive rail service product. Some interline lanes offered through Chicago, IL require containers to be drayed between railroad terminals, typically adding a day to transit time. Shippers so dislike extended transit times due to interchange that, for example, they will dray containers over 250 miles east from Chicago, IL and Memphis, TN instead of using interline rail service (see discussion in Section 5.5).

For example, if we consider the approximately 700-mile trip from Minneapolis, MN to Columbus, OH, a two-carrier rail move would take an estimated 130 hours to complete. A single-line move can reduce that by 17%, to 108 hours; still higher than but more competitive with the transit time for trucks (see Exhibit B-52 for assumptions).

3.5. Diversion Modeling of Price, Reliability, and Transit Time

Oliver Wyman's diversion models are designed to capture the core factors that drive shipper mode and route choice: price, reliability, and transit time.

The **truck-to-rail** diversion model predicts how a lane will respond to improved rail service by examining outcomes in comparable markets. This mirrors reference-class forecasting, which bases projections on the performance of similar real-world cases rather than on assumptions about a single lane. The model groups markets by distance and commodity type, and by transit-time and price differences relative to truck service. Where the UP–NS merger would create new single-line opportunities, the model matches those lanes to existing markets with similar service characteristics. These “lookalike” or “archetype” markets provide the observed shipper behavior used to forecast how the improved lane is likely to perform once mature.

For example, a 1,500-mile Houston-Cleveland tank-truck lane that would gain single-line service post-merger is matched to similar lanes where single-line rail service already exists. The rail share observed in those comparable markets is then used to predict the rail share for the improved lane. This approach naturally incorporates the key drivers of shipper choice – price, reliability, and transit time – because it relies on actual shipper behavior in markets where single-line rail competes directly with truck.

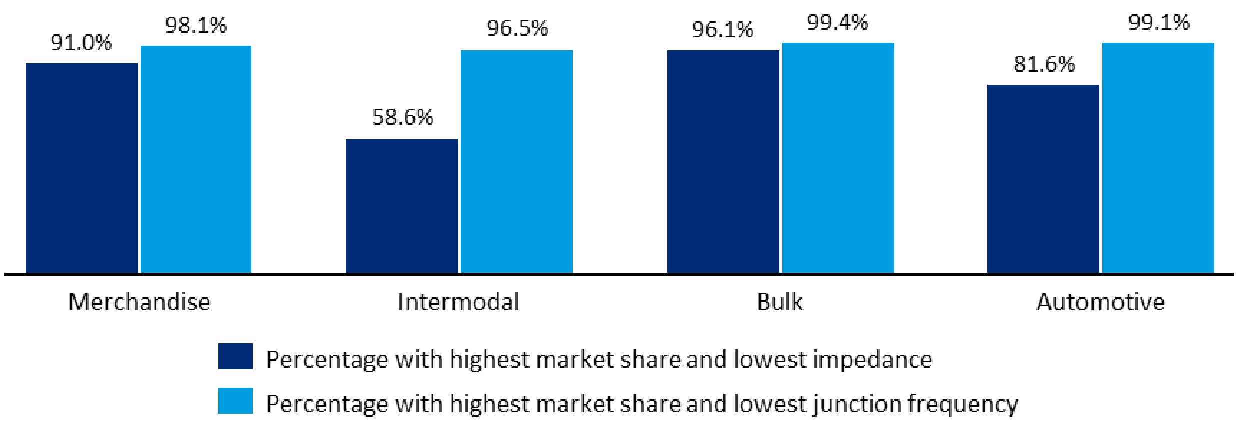
The rail-to-rail diversion model, by contrast, is a logit model of route choice. The model evaluates relative attractiveness of rail routes based on two key variables:

- Impedance, a quantitative measure that incorporates length-of-haul and expected interchange-related delay; and
- Junction frequency, the number of interchanges on a route.

These two measurable characteristics serve as practical proxies for the underlying factors that drive shipper preferences on price, reliability, and transit time. The route with higher impedance generally has longer transit time. Additional interchanges increase price, reduce reliability, and lengthen transit time, making a route less competitive. The logit model uses these two key variables to estimate the probability that shippers will select each available route. The model is calibrated using historical data to ensure that predicted choices reflect the way shippers have actually responded to cost, reliability, and transit time differences in real markets.

Importantly, actual traffic data confirms that impedance and junction frequency reliably predict shipper choices. Exhibit 3-7 shows that the highest share route in a market almost always has the lowest impedance and the fewest junctions. For merchandise traffic, the highest share route has the lowest impedance 91% of the time and the lowest junction frequency 98% of the time. Nearly all other service categories exceed 80%, with intermodal lower (59%) due to being modeled at a broader BEA-to-BEA level. Even so, the lowest-impedance intermodal route still has the highest share nearly 60% of the time.

Exhibit 3-7: Percentage of markets where the highest market share route has the lowest market impedance and/or junction frequency[19]



In sum, both models are appropriate for this forecasting exercise. The truck-to-rail model relies on close analogues in real markets to capture how improvements to single-line service will shift shipper mode choice from truck to rail. The rail-to-rail model uses a well-established logit framework to quantify how clearly defined and measurable route attributes – impedance and junctions – drive shipper routing choice among rail alternatives. Both approaches are grounded in real-world shipper behavior (revealed in routing and market shares) and align with the core economic drivers of freight transportation markets.

[19] See workpaper "HC Filtered CCWS Calibration.xlsx."

4. Truck-to-Carload Rail Traffic Diversions

4.1. Truck-to-Carload Rail Introduction

For the purposes of the analysis, all commodities were classified as either likely to ship by carload or intermodal when converted to rail.[20] This section focuses solely on carload commodities moving by truck (e.g., chemicals, grain, steel). The diversion of trucks carrying intermodal commodities (e.g., retail, furniture, machinery) is covered in Section 5.

A UP-NS merger would remove an estimated 804,000 truckload movements from roads by converting this traffic to rail carload movements. This would be expected to add, for a merged UP-NS, 183,000 new carloads of merchandise/bulk[21] traffic and 5,000 new multilevels transporting finished vehicles (Exhibit 4-1).[22]

Exhibit 4-1: Estimated truck-to-rail carload diversions to a merged UP-NS[23]

Category	Estimated trucks diverted	Equivalent carloads
Merchandise/bulk	797,000	183,000
Finished vehicles	7,000	5,000
Total	**804,000**	**188,000**

The primary roadways that could see a significant reduction in trucks as a result are between the Southeast, Midwest, and Northeast. Key corridors along these routes include I-81, connecting the Northeast and Southeast; I-20, running across the Southeast/Texas; and I-70, connecting the Northeast and the Midwest/watershed region (Exhibit 4-2).

[20] See workpaper "STCC4-CLvsIM.xlsx."
[21] "Merchandise/bulk" as used in this section includes all truck commodities that are not intermodal or finished vehicles and that could be potentially divertible to rail.
[22] Multilevel railcars are used to transport finished vehicles (STCC 3711).
[23] See workpapers "All_Results_vF.xlsx," "T2R Carload Diversions to UP-NS vF.sql," and "Trucks diverted from highway vF.xlsx." Reflects loads only, no empties.

Exhibit 4-2: Estimated truck-to-rail carload diversions for a merged UP-NS[24]
State-to-state lanes with more than 10,000 estimated annual diverted truckloads (bidirectional, no empties)

State	State	Estimated diverted truckloads (bi-directional)	Selected interstates likely to see reductions in trucks
Texas	Ohio	27,000	I-70, I-44, I-20
Texas	Alabama	23,000	I-20, I-10
Texas	Pennsylvania	21,000	I-80, I-70, I-44, I-20
Texas	Georgia	19,000	I-20
Texas	Tennessee	16,000	I-30, I-40
Texas	Indiana	15,000	I-70, I-44, I-20, I-55, I-40, I-30
Louisiana	Georgia	14,000	I-20, I-65
Iowa	Ohio	13,000	I-80, I-74, I-70
Texas	Michigan	12,000	I-94, I-74, I-55, I-57, I-44, I-20
Texas	New Jersey	12,000	I-20, I-30, I-40, I-70, I-78, I-80, I-81
Texas	New York	12,000	I-20, I-30, I-40, I-70, I-78, I-80, I-81
Texas	North Carolina	12,000	I-85, I-20, I-10
Louisiana	Ohio	12,000	I-10, I-20, I-55, I-40, I-65, I-71
Iowa	Indiana	12,000	I-80, I-65, I-74
Texas	Virginia	11,000	I-20, I-10, I-30, I-40, I-81, I-64

This traffic will benefit from new single-line services in the UP-NS Optimized Plan, which will be further enhanced in the UP-NS Growth Plan as the network onboards new traffic. Two planned new trains will be key enablers for converting this freight from trucks to the manifest carload rail service: The new North Platte-Conway manifest train, which bypasses the Chicago gateway, will provide single-line service and remove handlings in lanes from the Western USA and Iowa into the Midwest (Ohio, Indiana, etc.). The new North Little Rock-Conway manifest train pair via Sidney, IL will eliminate multiple handlings and out-of-route miles via the St. Louis gateway for traffic moving in lanes that run between Texas and the states of Indiana,

[24] See workpapers "All_Results_vF.xlsx" and "'T2R carload diversions state-to-state lanes vF.sql."

Michigan, northern Ohio, and the Northeast.[25] Both trains will reduce transit time for this freight and improved reliability as handlings at the gateway interchanges are removed.

Exhibit 4-3: Estimated truckloads removed from roadways by truck-to-carload rail diversions[26]
All highway lanes with at least 1,000 annual truckloads diverted in at least one direction

Below, **Section 4.1.1** provides a high-level overview of the traffic diversion modeling approach for finished vehicles and merchandise/bulk (see Appendix B for details). **Sections 4.2 and 4.3** then break down total carload diversions from trucks by merchandise/bulk and finished vehicles, respectively.

4.1.1. Overview of Truck-To-Carload Rail Diversion Modeling Assumptions

The following key assumptions were made in modeling truck-to-carload rail traffic diversions for finished vehicles and merchandise/bulk. See Appendix B for additional detail.

[25] STB Finance Docket No. 3687, Union Pacific Corporation et. al. – Control – Norfolk Southern Corporation et. al., Operating Plan Verified Statement, Figure 26.

[26] Based on county origin–destination pairs using TransCAD's all-or-nothing assignment. Some links may appear spatially disjointed from the larger network when the minimum threshold is applied. See workpaper "Trucks diverted from highway vF.xlsx"; see Appendix B.11 for converting truckloads to carloads/intermodal units. Map created using TransCAD Transportation Planning Software and Oliver Wyman diversion analysis data.

Exhibit 4-4: Key assumptions for truck-to-rail diversion modeling

Assumption	Description
Base year for traffic	• The base year for all traffic is 2023, with no forecast of future years
Traffic sources	• STB 2023 Confidential Carload Waybill Sample for rail traffic • Transearch, S&P Global Markets, 2023 freight flow database for truck traffic – Modes include truckload, private trucks, and trucks not elsewhere classified. Less-than-truckload excluded, since unlikely to divert to rail – For merchandise/bulk, five truck types considered: dry van, tank, bulk, reefer, and flatbed. Note we excluded STCC4 refrigerated commodities from Transearch that UP and NS recommended would not convert to rail (see Exhibit B-26). All others were allowed as potential diversions – For finished vehicles, only STCC 3711 was considered
Geography/ markets/traffic types	• All geography at a county-to-county level, the base level of Transearch • A "market" is based on an origin county, destination county, and traffic type • Traffic types are merchandise/bulk and finished vehicles, based on commodity[27] • Traffic O/Ds remained fixed. Source competition and geographic substitution were not modeled
Rail industry changes since 2023	• The base 2023 traffic does not include industry changes since 2023 from mergers/acquisitions involving CP-KCS, CSXT-Pan Am,[28] and CN-Iowa Northern, and other network changes involving BNSF-Montana Rail Link • These combinations were considered when determining if UP-NS would provide improved rail service in a market. No effort was made to estimate any truck diversions that might have occurred from prior mergers/acquisitions or other network changes
Permitted diversions	• Only permitted in markets where UP-NS service is expected to be better than current rail service (including recent mergers and acquisitions), where "better" is defined as shorter distance, lower price, and/or lower transit time

4.2. New Merchandise/Bulk Rail Carloads

4.2.1. Approach, Assumptions, and Market Definitions

We treated merchandise and bulk commodities the same way in the diversion model, since it is unlikely that any truck-to-rail carload diversions will be of sufficient point-to-point volume to result in the unit train service that railroads typically provide for bulk commodities. All diversions are thus treated, for revenue estimation and operations planning, as merchandise carloads that would move on the manifest train network.

[27] See workpaper "STCC4-CLvsIM.xlsx."

[28] Although Springfield Terminal Railways (SCAC = ST) became part of CSXT in its 2022 acquisition of Pan Am Railways, traffic records in 2023 continued to use ST.

A lookalike analysis was utilized to estimate the number of trucks transporting merchandise/bulk commodities that a UP-NS merger could divert from road to conventional railcar loads. As discussed briefly in Section 3, the theory behind using a lookalike analysis is that shippers' mode choice is based on price, transit time, and reliability, and shippers of a given commodity behave consistently on a national basis. Therefore, rail lanes with similar characteristics versus truck are expected to have a similar rail market share. If service characteristics change, then market share will change as well to match the most relevant existing lanes.

A lookalike analysis is appropriate for estimating diversions of merchandise/bulk trucks because it captures the key features of complex shipper behavior, without relying on false precision from estimating door-to-door transit times and prices for truck and rail. Lookalike analysis is a common methodology used in digital marketing to identify potential customers with similar characteristics to existing customer profiles. We applied this approach to compare freight markets with improved rail service post-merger to existing freight markets that have comparable levels of rail service already.

Exhibit 4-5: Comparison of truck vs. rail share for all merchandise/bulk markets, pre-merger and post-merger with improved service[29]

Millions of tons

	(a) All competitive single-line lanes: Pre-merger			(b) Lanes diverted: Pre-merger			(c) Lanes diverted: Post-merger		
Truck equipment type	**Truck tons**	**Rail tons**	**Rail share**	**Truck tons**	**Rail tons**	**Rail share**	**Truck tons**	**Rail tons**	**Rail share**
Bulk	89.5	60.4	40%	8.0	0.0	0%	5.3	2.7	34%
Dry van	230.6	122.3	35%	15.4	0.1	0%	9.6	5.9	38%
Flatbed	63.5	26.3	29%	3.9	0.0	1%	2.8	1.2	29%
Reefer	24.7	23.8	49%	3.8	0.0	0%	2.1	1.7	45%
Tank	51.6	90.5	64%	10.6	0.2	2%	4.5	6.3	59%

[29] Transearch, op. cit.; Confidential Carload Waybill Sample, op. cit.; workpaper "t2merch_lane_archetype_exhibits_vF.ipynb."

In Exhibit 4-5 above, we walk through how the lookalike analysis performs as expected. For all the competitive[30] lanes where single-line rail service exists today (a), rail competes strongly against truck, particularly in the tank truck market. Next, in those lanes that we estimate would divert due to a UP-NS merger (b), those lanes today severely underperform compared to truck (0%-2% market share).

After the UP-NS merger improves service in these lanes, primarily by turning interline service into single-line (c), the lookalike analysis compared them to groups of existing, similarly competitive single-line lanes. The result is that these improved lanes are predicted to divert trucks to reach a rail share much closer to existing single-line lanes. Tank truck diversions are a prime example: on average, rail has a 64% market share for single-line served lanes; the predicted market share on lanes improved by the merger is 59%, up from 2% currently.

We outline a specific example of how the model predicts rail market share below, using the largest tank truck-to-rail carload diversion from Nueces County, TX to Morgan County, AL, which the model predicts will divert 1,938 carloads of chemicals. The UP-NS merger would improve service by converting this lane to single-line service, thus decreasing rail transit time and price for shippers. This would cause the lane characteristics to change, resulting in a move from 0% rail market share now to an estimated 79% market share post-merger (Exhibit 4-6).

[30] "Competitive" defined as county-county lanes where truck and rail both offer service. See Appendix B.5.1 for what is included in this traffic.

Exhibit 4-6: Pre-merger vs. post-merger rail characteristics for a Nueces County, TX-Morgan County, AL chemicals lane[31]

	Pre-merger	Post-merger
Miles	1,064	976
Interchanges	1	0
Transit hours	180	146
Revenue per ton-mile	$0.069	$0.057
Rail market share	0%	79%

Exhibit 4-7 shows some of the largest lanes comprising the new group of similar lanes to which this lane would now belong. This group's rail market share is 79%, calculated from a weighted average of 3,859 lanes by total rail plus truck market. Complete details on the lookalike methodology can be found in Appendix B.5.2.C.

Exhibit 4-7: Top 10 lanes by total market size that make up the archetype to which the Nueces County, TX to Morgan County, AL chemicals lane would belong post-merger[32]

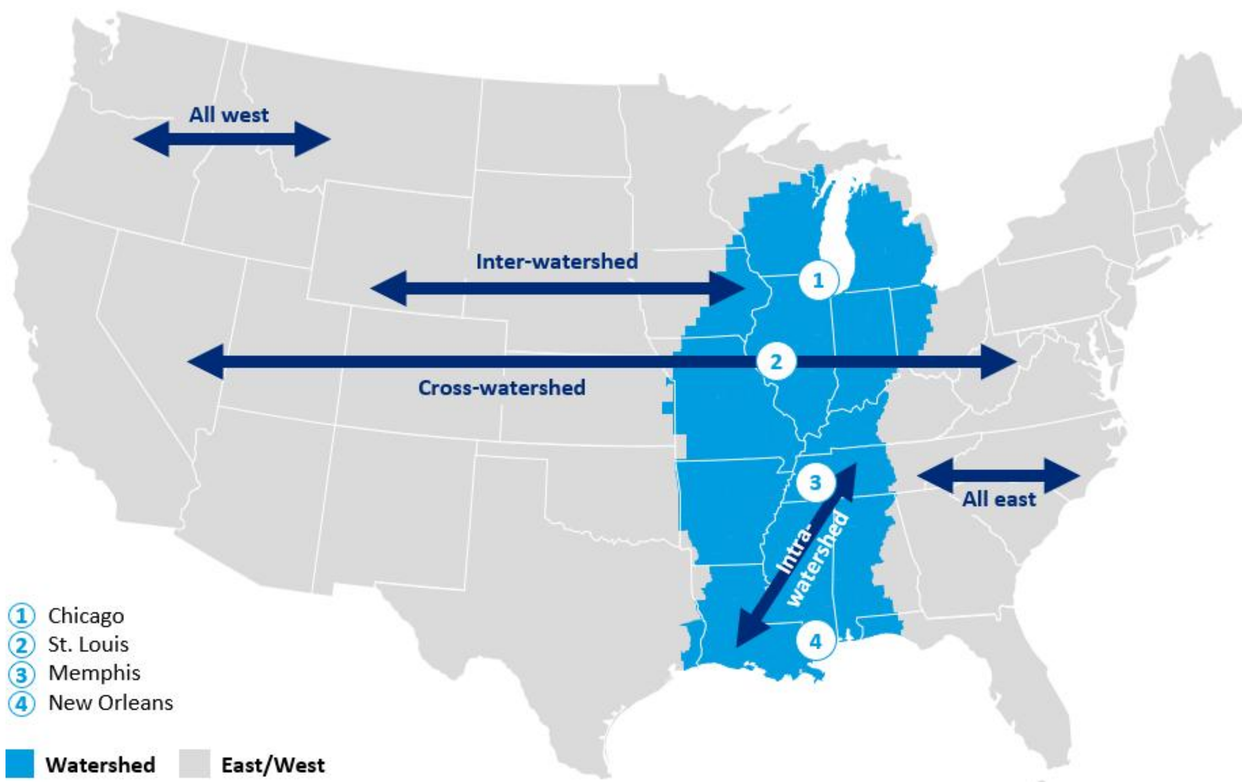
Origin county/region	Destination county/region	STCC2	Single-line or interline	Rail market Share	Total market (tons)
Sweetwater County, WY	Cowlitz County, WA	28	S	100%	715,506
Brazoria County, TX	Cook County, IL	28	S	84%	219,148
Quebec, Canada	Ramsey County, MN	28	S	100%	120,742
Calcasieu Parish, LA	Cook County, IL	28	S	72%	115,977
Platte County, NE	Harris County, TX	28	S	97%	109,336
Cook County, IL	Harris County, TX	28	S	98%	102,964
Cook County, IL	Charleston County, SC	28	S	99%	89,373
Yazoo County, MS	Ontario, Canada	28	S	98%	83,284
Madison County, IL	New Castle County, DE	28	S	99%	63,125
Madison County, IL	Duval County, FL	28	S	99%	60,543
All other				Average: 5%	1,717,215

[31] See workpaper "t2merch_lookalike_market_share_vF.xlsx." Transit hours methodology available in Appendix B.8. Revenue per ton-mile methodology available in Appendix B.6.
[32] See workpaper "t2merch_lookalike_market_share_vF.xlsx."

4.2.2. Carload Rail Merchandise/Bulk vs. Truck Performance in the Watershed Region

Much of the Class I interline traffic in the US involves traffic within or crossing the watershed region, the traditional dividing line between eastern and western US railroads (Exhibit 4-8). In 2023, the top five rail junctions by traffic volume were all key gateways in the watershed region: Chicago, IL; Meridian, MS; St. Louis, MO; Shreveport, LA; and Memphis, TN.[33]

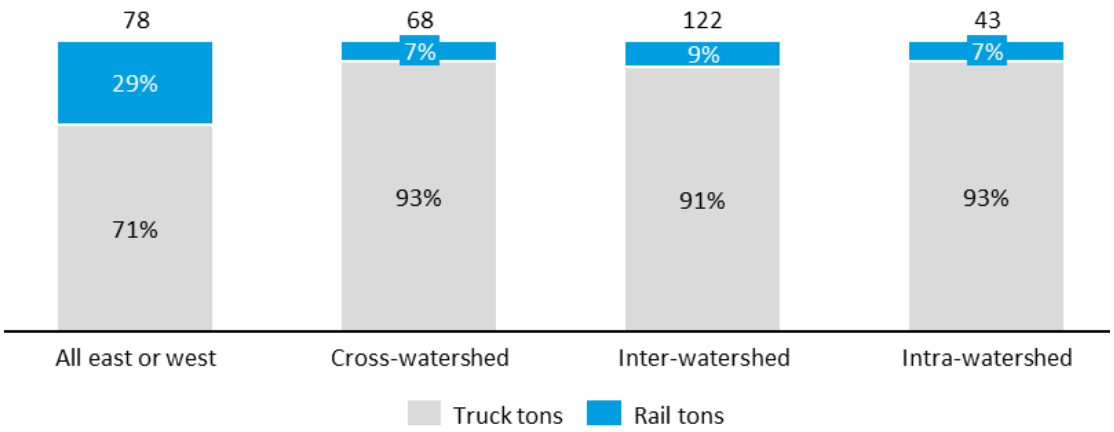
Exhibit 4-8: Watershed region and lane type definitions[34]



Rail historically underperforms against trucks for traffic within the watershed region or crossing the watershed, especially for carload merchandise/bulk traffic, as shown in Exhibit 4-9.

[33] See workpaper "Top_ClassI_rail_junctions_by_traffic_VF." Traffic data includes all Class I records from the CCWS where the junction frequency = 1 and rebill = 0 (rebilled records excluded since true origin/destination railroad unknown).
[34] The "watershed region" is defined as any county within 250 miles of four gateway cities: Chicago, St. Louis, Memphis, and New Orleans. See Appendix B.5.3 for more details on the watershed region definition.

Exhibit 4-9: Rail modal share for lanes with interline service, by lane type[35]
Millions of tons; percentage of rail vs. truck



As discussed in Section 3.1, freight movement involving a single railroad can compete against trucks more effectively for traffic than can a movement requiring two or more railroads (see Exhibit 3-1). Rail will have a lower share when only interline movements are available versus truck due to the associated costs and delays of interchanges, which make rail less attractive to shippers than trucking. Within the same length-of-haul range, the revenue per ton-mile shippers must pay to railroads is higher when multiple railroads are involved in the movement versus single-line service (see Exhibit 3-5). At a 500-1,000 mile length-of-haul, for example, single-line general merchandise rail service has an average revenue/ton-mile of $0.061, compared to $0.077 for interline moves.

For traffic that only moves in the western or eastern US (as defined in Exhibit 4-8 as "All east or west"), Exhibit 4-10 shows that trucks have a 67% share of tons for merchandise/bulk commodities in the 750- to 999-mile length of haul distance band, while rail has a 33% share. For traffic that crosses the watershed, where no single-line rail service is available, trucks have a 95% share versus 5% for rail at the same length of haul – a share drop of 28 percentage points –

[35] See workpaper "t2merch_watershed_summary_vF.ipynb."

driven by the higher all-in cost to shippers of interline compared to single-line rail service. Inter-watershed and intra-watershed show a similar trend: interline rail underperforms at all lengths of haul in these watershed markets compared to lanes all east or west.

Exhibit 4-10: Rail modal share for lanes with interline service, by lane type and length of haul in miles[36]

Millions of tons; percentage rail vs. truck

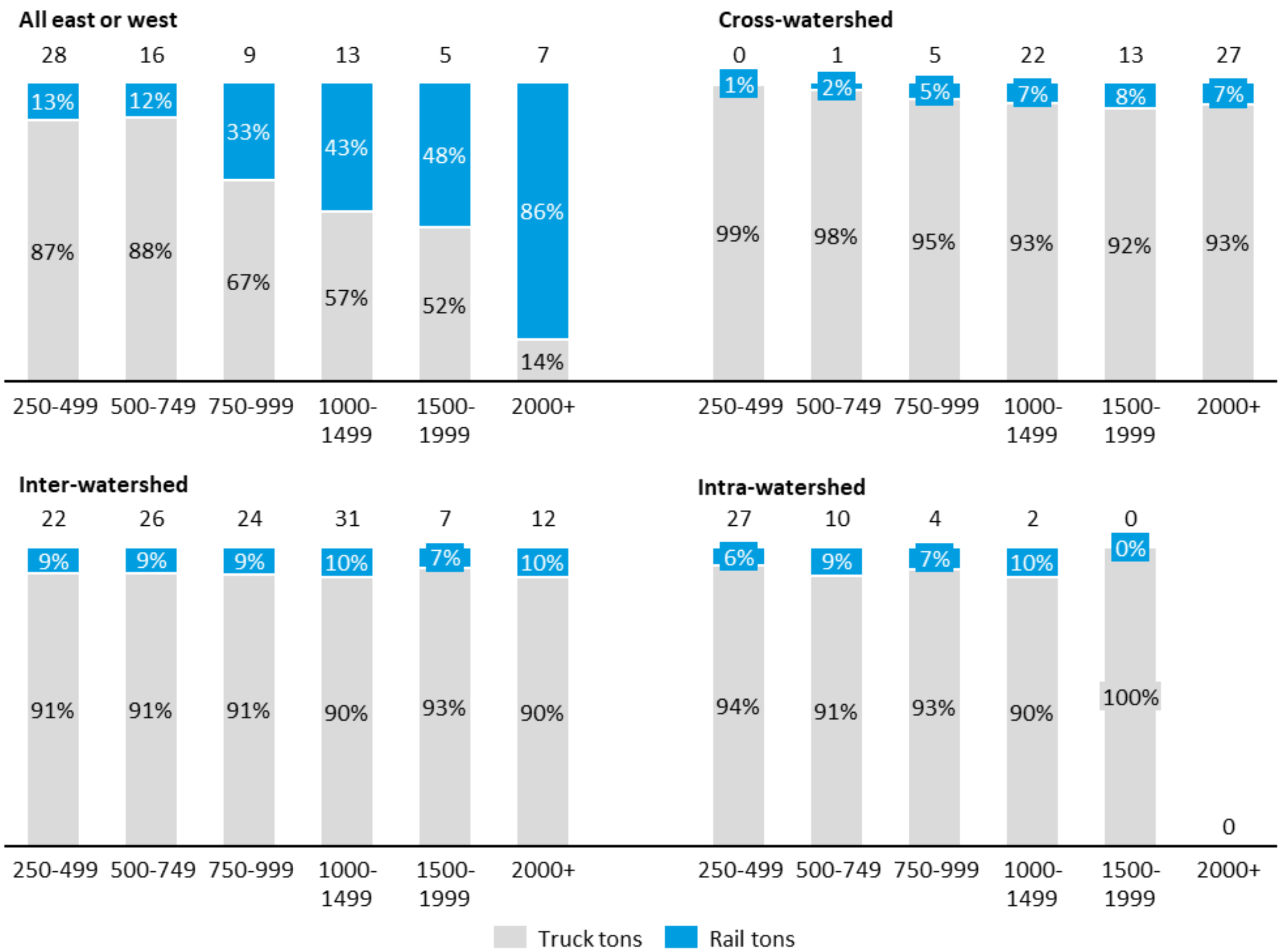
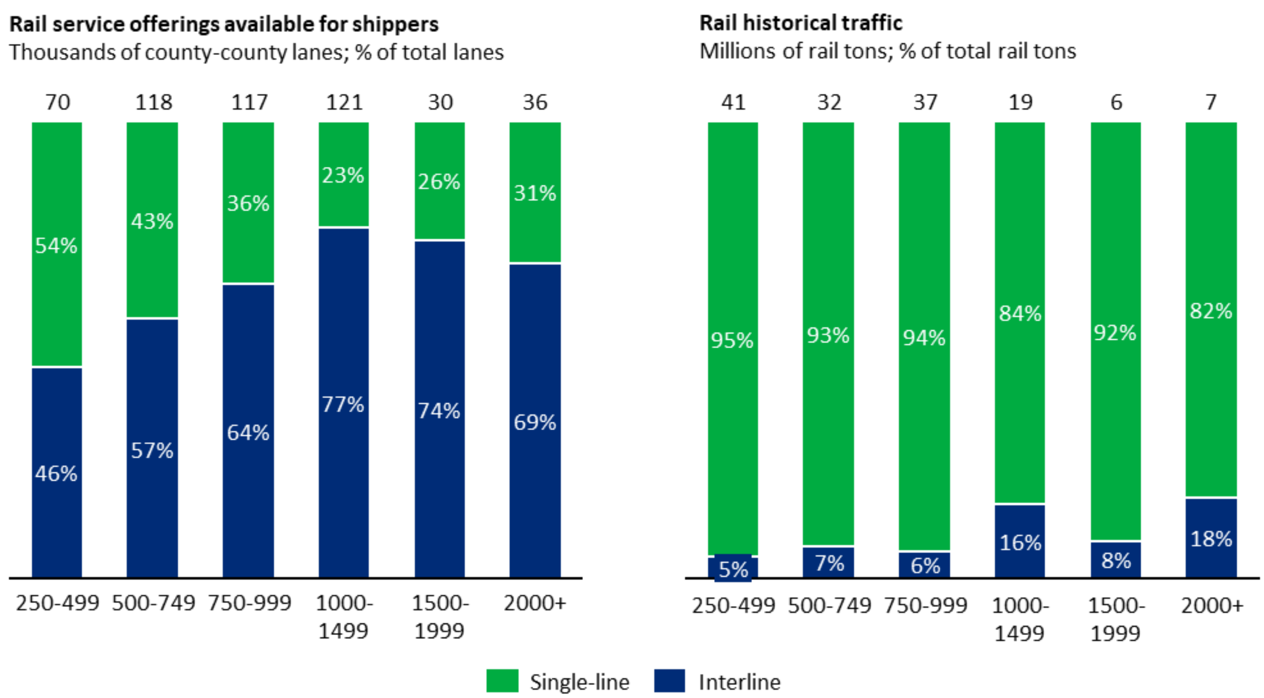


Exhibit 4-11 further demonstrates how single-line service outperforms interline service. In inter-watershed lanes, most of the available rail service currently is interline. Yet, the minority single-line lanes dominate the market in terms of share, accounting for more than 80% of rail

[36] See workpaper "t2merch_watershed_summary_vF.ipynb."

traffic in all length of haul bands. As a UP-NS merger introduces more single-line service, we would expect more traffic to divert to these new single-line lanes.

Exhibit 4-11: Inter-watershed lanes: current service offerings and historical traffic[37]

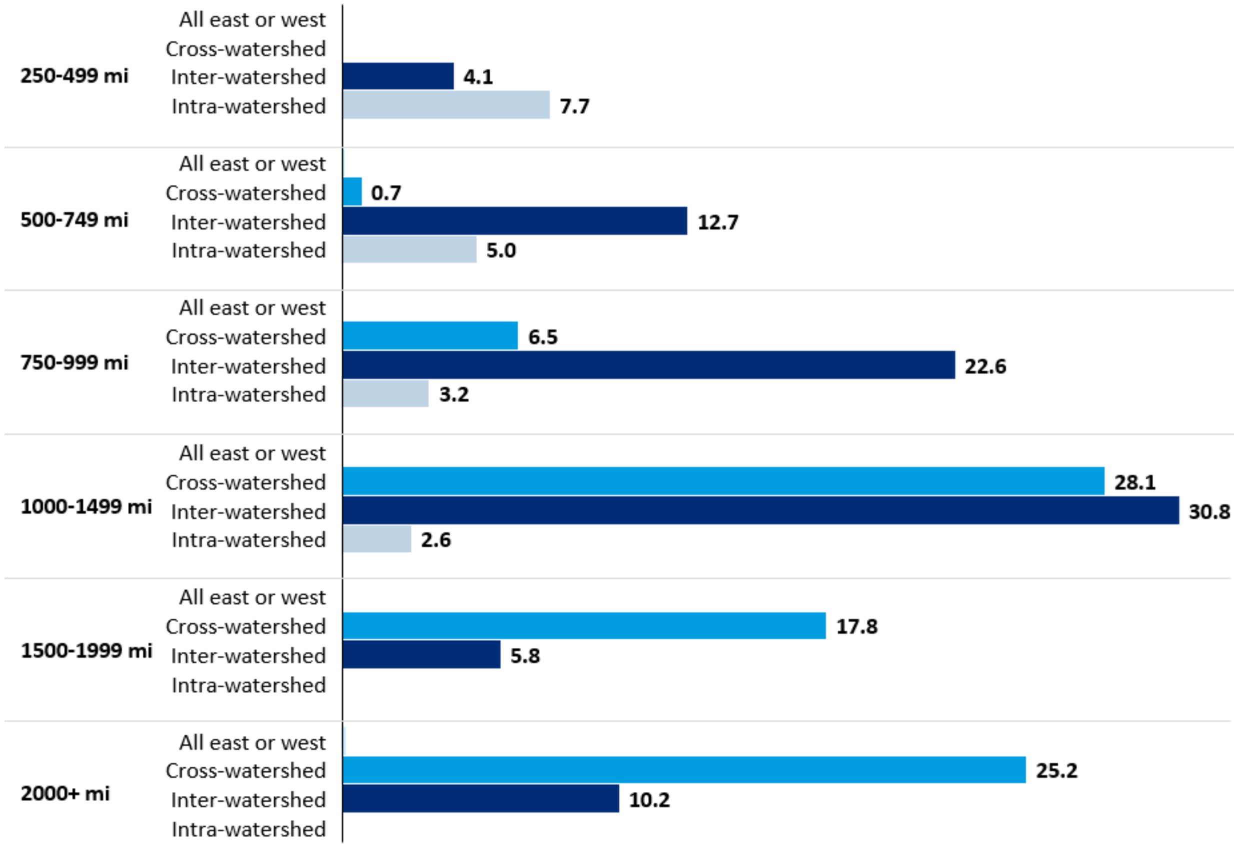


4.2.3. Estimated Traffic Diversions for Merchandise/Bulk to Conventional Rail Carload

We estimate that the UP-NS merger would divert approximately 797,000 merchandise and bulk truckloads from highways to conventional rail service, equivalent to about 183,000 rail carloads (Exhibit 4-12; see Appendix B.12 for conversion methodology). Most of these diversions are projected to occur in cross-watershed and inter-watershed lanes, reflecting improved single-line service between the western United States and the eastern portion of the watershed region.

[37] Ibid.

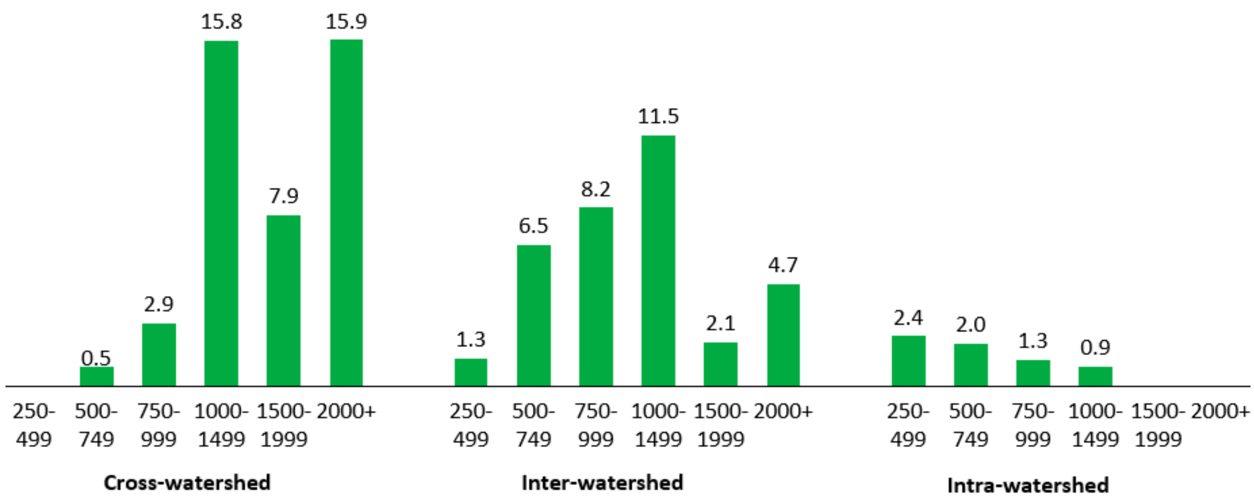
Exhibit 4-12: Estimated merchandise/bulk truck-to-rail carload diversions by lane type[38]
Thousands of rail carloads; total = 183,000 carloads



These diversions are driven by the merger's creation of single-line service in lanes solely served by interline rail movements today. As shown in Exhibit 4-13, we estimate that the merger would introduce 84,000 new single-line county-county lanes; 51% of these lanes would cross the watershed, while 41% would be inter-watershed lanes.

[38] Ibid.

Exhibit 4-13: New single-line lanes introduced by a UP-NS merger[39]
Thousands of county-county lanes; total = 84,000



The state-to-state lanes expected to generate the largest merchandise and bulk truck-to-rail diversions all cross the watershed, including Texas-Ohio, Texas-Pennsylvania, and Texas-Alabama. Texas, Louisiana, and Iowa are projected to be the leading origin states, with Texas and Louisiana primarily contributing chemicals, petroleum products, and food products; and Iowa, Arkansas, California, and Georgia contributing food products along with chemicals, nonmetallic ores, lumber, and petroleum.

Ohio, Pennsylvania, and Georgia are expected to be the principal destination states. The top ten destination states collectively account for 63% of projected truck-to-rail diversions. Chemicals, food products, and petroleum products represent the most frequently diverted commodities (Exhibit 4-14; see Appendix B.11 for detail).

The UP-NS Growth Plan incorporates new manifest train services to accommodate this traffic, including six new train pairs on legacy interline routes and 12 within the legacy networks. The six interline routes specifically support watershed traffic. Notably, a new North Little Rock,

[39] Ibid.

AR–Conway, PA train pair will enable efficient movement of Texas/Louisiana originations bypassing the major gateways over Sidney, IL to destinations in the Ohio Valley and Northeast, and empty returns. These services, developed by the railroads' service design teams, demonstrate how the UP-NS Growth Plan is designed to deliver the transit time improvements necessary to successfully convert freight from the highway.

Exhibit 4-14: Top 10 O/D pairs diverting truck-to-rail merchandise/bulk traffic[40]

<table>
<tr><th>Lane</th><th>Estimated diverted carloads</th><th>Top commodities diverted</th></tr>
<tr><td>TX-OH</td><td>5,000</td><td rowspan="2">• Chemicals or allied products
• Petroleum or coal products
• Food and kindred products</td></tr>
<tr><td>TX-PA</td><td>5,000</td></tr>
<tr><td>TX-AL</td><td>4,000</td><td>• Chemicals or allied products
• Petroleum or coal products
• Lumber or wood products, excluding furniture</td></tr>
<tr><td>TX-NY</td><td>3,000</td><td>• Petroleum or coal products
• Chemicals or allied products
• Food and kindred products</td></tr>
<tr><td>IA-OH</td><td>3,000</td><td>• Food and kindred products
• Chemicals or allied products
• Nonmetallic ores, minerals, excluding fuels</td></tr>
<tr><td>TX-NJ</td><td>3,000</td><td>• Chemicals or allied product
• Petroleum or coal products
• Food and kindred products</td></tr>
<tr><td>IA-IN</td><td>3,000</td><td>• Food and kindred products
• Chemicals or allied products
• Nonmetallic ores, minerals, excluding fuels</td></tr>
<tr><td>TX-GA</td><td>2,000</td><td>• Chemicals or allied products
• Petroleum or coal products
• Food and kindred products</td></tr>
<tr><td>TX-VA</td><td>2,000</td><td rowspan="2">• Petroleum or coal products
• Chemicals or allied products
• Food and kindred products</td></tr>
<tr><td>TX-NC</td><td>2,000</td></tr>
<tr><td>Top-10 total</td><td colspan="2">31,000</td></tr>
<tr><td>Grand total</td><td colspan="2">183,000</td></tr>
<tr><td>Top 10 as % of grand total</td><td colspan="2">17%</td></tr>
</table>

[40] See workpapers "All_Results_vF.xlsx" and "Top 10 OD pairs diverting T2R merch bulk traffic vF.sql."

4.3. New Finished Vehicle Rail Carloads

4.3.1. Approach, Assumptions, and Market Definitions

This section outlines our approach for estimating the finished-vehicle traffic that could realistically divert from truck to rail as a result of the UP-NS merger. Using the 2023 S&P Global Transearch database as the baseline, we began with 47.7 million tons of finished vehicles (STCC 3711) moving by truck and systematically narrowed this universe to isolate lanes where diversion to rail is operationally feasible and commercially realistic. Through a series of quantitative screens and a subsequent qualitative review informed by UP and NS subject-matter experts, we identified 418,000 tons as potentially divertible under improved single-line service. Applying additional market- and facility-access criteria reduced this to 123,000 tons across 36 origin-destination lanes. The steps in this filtering process are detailed below.

To calculate the potentially divertible tonnage of 418,000 from the 47.7 million total finished vehicle tons in Transearch, the following records were eliminated from consideration based on discussions with UP and NS personnel with knowledge of finished vehicle markets:

- Lanes less than 250 miles in length, which are not likely addressable by rail;
- Lanes that due to geographic data limitations we were unable to accurately identify;
- Origin points with no automotive assembly plant or port;
- Cross-border traffic, since this mostly travels by rail already;
- Ports, since finished vehicles arriving at a port are not generally trucked long-haul across the watershed region;
- Traffic originating in counties with Class 6-8 truck, school bus, and RV OEM assembly plants, as these types of vehicles are not suitable for transport by rail; and
- Lanes without rail service or where a UP-NS merger would not improve service.

The 418,000 tons of potentially divertible truck traffic were then divided into lanes based on the county of origin to the BEA of destination. The origin represents the county containing an automotive plant and the destination represents the larger market where final delivery from a rail ramp to a dealership is done by truck. This produced a limited set of lanes, which we then manually reviewed to identify feasible potential diversions. Lanes were eliminated if they failed any of the following criteria:

- The destination BEA does not have a UP or NS auto ramp.
- UP or NS does not have access to the originating OEM assembly plant.
- The OEM is known to have long-term contracts with other carriers.
- The OEM sells premium automobiles that have a higher sensitivity to transit times and risk of damage, like Mercedes in Alabama and BMW in South Carolina, and thus this traffic is less likely to shift to rail.[41]

This left a total of 123,000 tons in 36 county-to-BEA lanes that we considered to be realistic potential truck-to-rail diversions of finished vehicle traffic.

4.3.2. Estimated Traffic Diversions for Finished Vehicles

The finished vehicle market has unique infrastructure considerations, a consolidated shipper landscape, and high final-mile costs to deliver to dealerships compared to intermodal and merchandise/bulk traffic. Given these unique characteristics, we concluded that an "all or nothing" approach for diversions was appropriate for two reasons. First, as shown in Exhibit 4-15, the average revenue rail receives from moving a finished vehicle is significantly less than what trucks receive, particularly at longer lengths of hauls. If railroads can provide improved service, as single-line UP-NS moves would, then the traffic is highly likely to shift from truck to

[41] As evidenced by rail's limited penetration for domestic finished vehicle deliveries, despite providing rail service from these plants to export ports.

rail. Second, since shippers in this industry often enter into long-term, exclusive contracts with carriers, we expect that any diversions to UP-NS based on improved service would be all-or-nothing. Therefore, we diverted all 123,000 tons of finished vehicle traffic identified in Section 4.3.1 as potential diversions.

Exhibit 4-15: Average transportation price per finished vehicle (VIN), truck vs. rail[42]

Length of haul (miles)	Truck[43]	Rail[44]
250-499	835	564
500-749	1,055	730
750-999	1,395	890
1000-1499	1,875	1,117
1500-1999	2,513	1,373
2000+	3,196	1,752

We translated these 123,000 tons of finished vehicle traffic into 5,000 new carloads for UP-NS (see Section B.4.2), and an equivalent 7,000 truckloads removed from the roadways. Originations in Michigan and Indiana would account for 86% of finished vehicle traffic diversions, with Alabama, Ohio, and Texas providing the other 14%. Arizona, California, and Texas would account for 80% of destinations. Michigan to Arizona and Michigan to California are the two highest volume lanes for diversions (Exhibit 4-16).

Exhibit 4-16: Top five lanes for truck-to-carload rail diversion of finished vehicle traffic[45]

Lane	Estimated diversions (carloads)
MI-AZ	1,037
MI-CA	843
IN-CA	504
MI-TX	456
AL-AZ	409

[42] See workpaper "T2Auto Rail vs Truck price per finished vehicle vF.sql."
[43] Truck price per mile calculated using DAT Freight & Analytics data, which details average spot and contract rates for the 10,000 highest volume US dry van lanes for 2023.
[44] Includes a flat haul-away cost of $181 per finished vehicle for final-mile delivery from the rail unloading terminal to the dealership, derived from revenue per unit of company deliveries reported in Q3 2025 financial results for Proficient Auto Logistics, a publicly traded auto-hauler company that has one of the largest auto transportation fleets in North America.
[45] See workpaper "T2R_Auto_Diversions_vF.csv" and "Top 5 lanes for T2R diversion of finished vehicle vF.sql."

5. Truck-to-Intermodal Rail Traffic Diversions

5.1. Truck-to-Intermodal Rail Introduction

A UP-NS merger would remove an estimated 1.2 million truckload movements from the roads by converting truck traffic to intermodal rail traffic. This traffic is separate and distinct from the addressable market for truckload traffic converted to conventional railcar movements described in Section 4. All commodities were classified as likely to ship by carload or intermodal when converted to rail for these two separate analyses at the STCC4 level (see Appendix B.2). We do not consider specific commodities in this section but instead focus on the diversion of truckloads[46] to intermodal containers on a one-for-one basis.

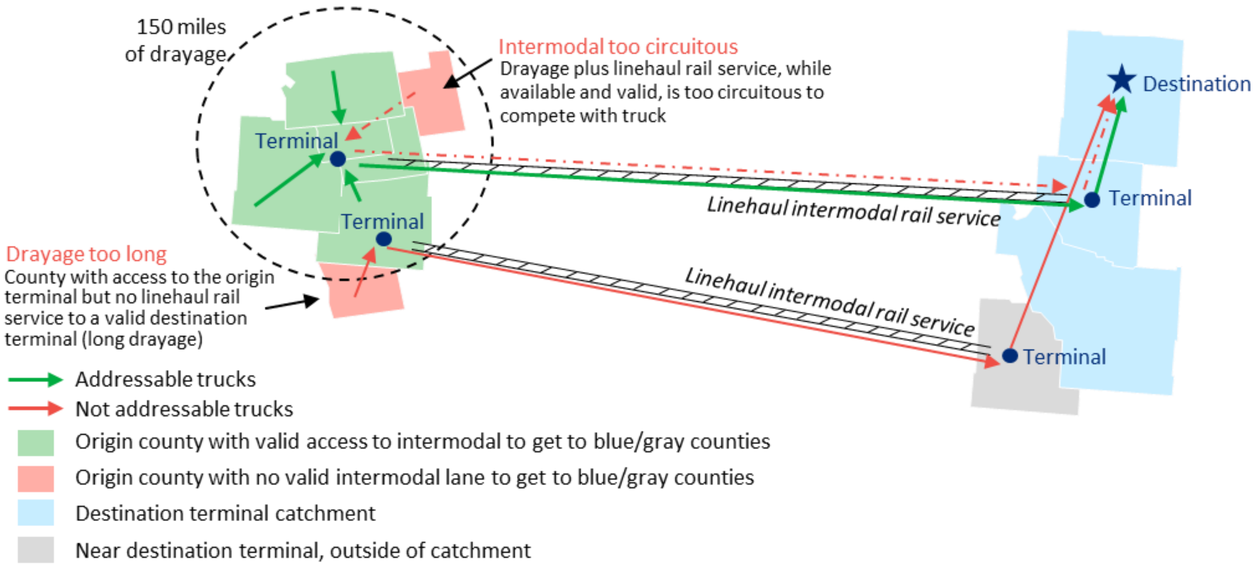
5.2. Approach, Assumptions, and Market Definitions

This section describes our approach to estimating the volume of truck traffic that could divert to domestic intermodal rail service under a UP-NS merger. Using Transearch county-to-county trucking data in combination with CCWS domestic intermodal movements, we applied a terminal catchment area model to identify the portion of the broader truck market that is realistically serviceable by intermodal rail. This model incorporates drayage economics, availability of linehaul rail service and railroad terminals, and minimum service-density thresholds to distinguish theoretical opportunities from ones in lanes where a viable rail offering could be provided. We then applied a lane-level lookalike methodology to assess modal shift potential based on observed shipper behavior in comparable markets, followed by operational feasibility tests with the railroads to ensure that any identified diversions could be competitively served by the combined network. The details of this methodology and resulting estimate of the addressable and serviceable intermodal market are presented below.

[46] Reported in Transearch, op. cit.

We began by combining Transearch county-to-county trucking data with CCWS domestic intermodal data[47] and used the terminal catchment area model (see Exhibit 5-1 and Appendix B.3.3.A) to develop a realistic sizing of serviceable trucks, a subset of the addressable market, that could be diverted from truck-to-rail intermodal traffic by lane.

Exhibit 5-1: Illustrative: creation of intermodal lanes



Once drayage economics and operational feasibility considerations were applied (see Section 5.3), we estimated that the addressable market for diversions to rail intermodal as a result of the merger would be 3,095,000 truckloads (Exhibit 5-2). This includes 310,000 truckloads moving transborder between Mexico and the eastern United States (see Exhibit B-5).

The methodology we used first identified all trucks in county-to-county lanes that, incorporating business rules on drayage economics, compete with existing single-line and interline domestic rail intermodal lanes (8,872,000 truckloads) where linehaul intermodal rail service is available (terminal to terminal) based on the 2023 CCWS (Exhibit 5-2).

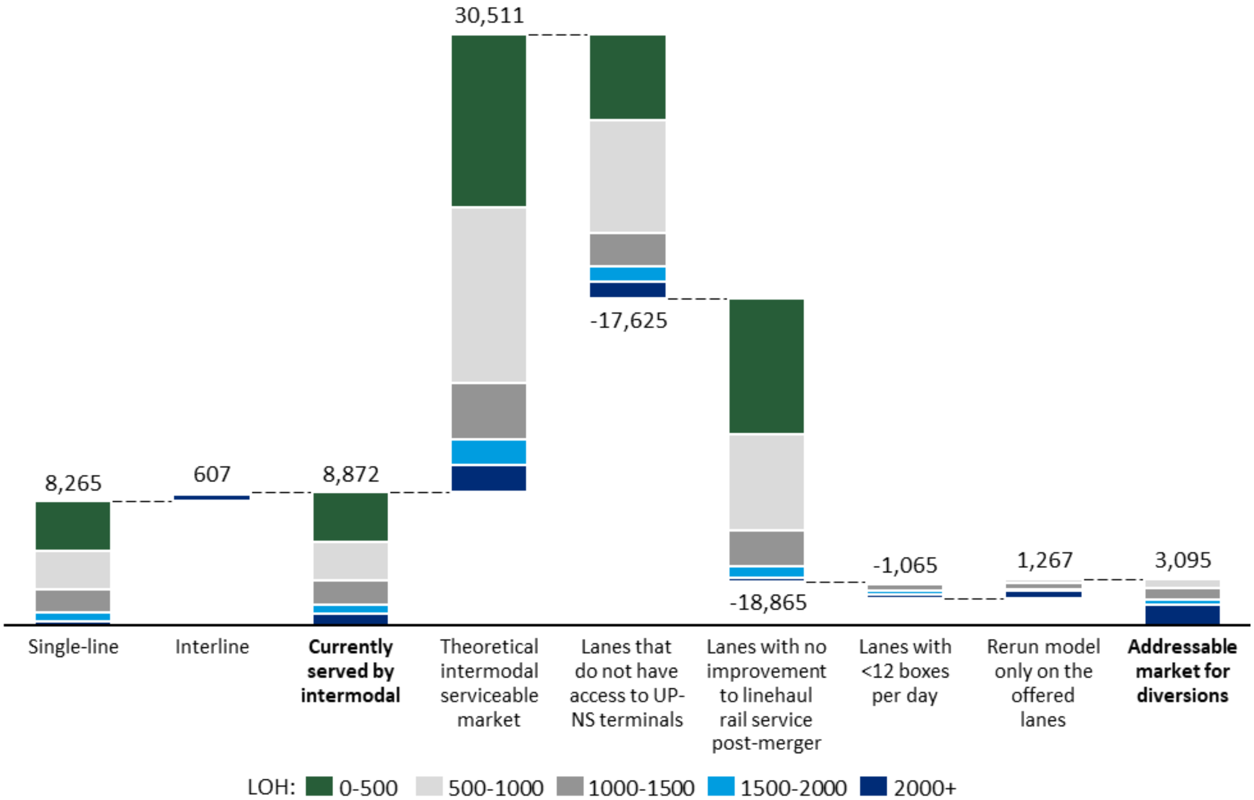
[47] Transearch, op. cit., Confidential Carload Waybill Sample op. cit.

As shown in Exhibit 5-2, in addition, 30,511,000 truckloads move in lanes that theoretically could be serviceable by intermodal if every intermodal rail terminal had linehaul rail service to every other intermodal rail terminal (referred to as "everywhere to everywhere"). Some of this traffic (17,625,000 truckloads) however, is in lanes where UP and NS do not have terminals available at both origin and destination. An additional 18,865,000 truckloads are in lanes that would see no improvement to linehaul rail service post-merger. And a further 1,065,000 truckloads are in lanes with insufficient volume to ensure operation of daily intermodal service when the diversion modal share estimate is applied. For modeling purposes, the threshold was set at 12 boxes per day (two railcars per day).

The terminal catchment area model was then rerun with this new set of valid lanes: existing lanes and new lanes where the merger could improve linehaul rail service, UP or NS have terminals at origin and destination, and the minimum volume density threshold is met. This added back 1,267,000 truckloads to the addressable market for diversion that preferred theoretical lanes in the everywhere to everywhere model that will not be available post-merger (i.e., from the 17,625,000 trucks in lanes that do not have access to UP-NS terminals and the 1,065,000 trucks in low-volume lanes based on the everywhere-to-everywhere model).

Exhibit 5-2: All addressable truckloads for truck-to-intermodal rail diversion[48]

Thousands of units



We employed a lookalike methodology at the lane level to size the potential intermodal traffic gains that could result from the merger. This relied on the following overarching assumptions:

- Given similar trade-offs between truck and rail freight products (transit time, price, and service differentials), shippers will make their mode choice consistently across the United States.
- New UP-NS terminal-to-terminal single-line service options would result in new truck-competitive intermodal linehaul products with characteristics comparable to existing single-line service lanes offered by Class I railroads.

[48] See workpaper "intermodal_diversions_model_vF.xlsx."

- There will be a meaningful improvement in the existing interline intermodal lanes offered today, and these lanes will behave like the existing single-line service lanes offered by Class I railroads.
- Decisions are made at the margin on a lane-by-lane basis, meaning shippers do not make all-or-nothing buying decisions between truck and rail.
- All domestic intermodal traffic is treated as a "gray box," meaning that the analysis did not consider any differences based on the choice of railroad or channel partner.

Intermodal lanes were grouped into groups with similar characteristics ("archetypes"), including length-of-haul, interline or single-line service, transit time versus truck, and price versus truck. The first two characteristics are rail-centric and capture how intermodal typically takes higher share in longer haul lanes and to show the difference between interline and single-line lanes in the current state. The second two capture key decision factors for shippers; that is, when intermodal can offer transit times of truck plus one day and offer a 10% lower price than truck, a shipper is likely to consider intermodal as a competitive substitute for truck. Archetypes are described in detail in Appendix B.3.4.B.

The lookalike analysis was applied to all lanes that post-merger would see an improvement in the impedance of the best available linehaul terminal to terminal rail route. Rail route impedance is defined in the same way as in the rail-to-rail analysis, where impedance is the sum of rail miles and junction impedance and is a proxy for the quality of rail service in a lane. Post-merger improvement could shift existing lanes from one archetype to another. Unlike merchandise traffic, however, there are many terminal-to-terminal intermodal lanes that do not have linehaul rail service today. If these unserved lanes showed reduced impedance post-merger (i.e., service could improve) in the model, then the model tested to see if sufficient trucks would divert to meet the minimum volume threshold.

After the lookalike analysis estimated the modal shift potential, operational considerations were applied (see Section 5.3). For a railroad to offer linehaul rail service, minimum density and feasible train service must be available, in addition to a UP or NS terminal being available at the origin and destination.

With these criteria, the list of existing and feasible lanes was then used to size the serviceable market a second time and apply the lookalike analysis to develop the final estimate of truck traffic volume that could potentially divert to rail intermodal as a result of the merger.

5.3. Operational Considerations

To shift from truck to rail intermodal, a key requirement would be for linehaul rail service to be on offer. A railroad requires sufficient traffic density and a feasible route to offer such service. This step in the analysis ensured that the final diverted traffic was realistically distributed into lanes with the scale necessary to operate linehaul rail service. This analysis was reviewed by both railroads' intermodal marketing and service design experts to reflect operational realities.

For potential modal shift growth to be captured, for rail-to-rail and truck-to-intermodal, the criteria in Exhibit 5-3 must be met.

Exhibit 5-3: Mode shift truck-to-intermodal rail diversion criteria

Criterion	Comments
Volume density: At least 12 units per day across all existing plus all diverted traffic (rail-to-rail, truck-to-intermodal, long-haul dray)	• Includes existing international volume on an origin terminal to destination terminal basis in the headhaul direction (i.e. higher loaded volume) on a lane • Applied on an O/D basis and does not allow for the potential to consolidate traffic and use switching, load centering, or rubber-tire connections to build density • Provided at least the headhaul[49] achieves the minimum density, the backhaul lane is also available to take diversions, as it is rare for a railroad to offer one-way only on a lane
Terminal availability: UP and/or NS must have a terminal in both the origin and destination intermodal markets	• Third-party terminals are generally excluded, with four exceptions: – Huntsville, AL (owned by the state of Alabama, served by NS) – Titusville (Orlando), FL (owned by NS, served by the FEC) – Miami/Fort Lauderdale, FL (owned and served by the FEC) – Council Bluffs, IA (owned and served by the IAIS) These terminals are all currently served by UP or NS as part of existing commercial agreements • Intermodal markets that only have terminals serving the international segment are generally not available for diversion growth – UP Phoenix, AZ that is currently used for international intermodal service from the Ports of Los Angeles and Long Beach was not considered for domestic intermodal, as the capacity footprint is small, and the Phoenix, AZ market can be accessed from Wilmot (Tucson), AZ – All on-dock and port controlled terminals were excluded – Exception: NS Charleston, SC was included as a feasible domestic intermodal market, even though today it only handles international freight, as it is owned and operated by NS • Idle NS terminals at McCalla, AL (Birmingham, AL intermodal market) and Greencastle, PA (Baltimore-Washington-Northern Virginia intermodal market) were made available for diversion traffic, as these can be reopened to add capacity and serve these markets • No new greenfield terminals on either railroad were considered
Terminal capacity: There must be sufficient terminal capacity or a reasonable expansion plan for growth lanes, and if not, then only the highest volume lanes divert until the terminal is full	• Traffic is capped at the current stretch capacity for the Twin Cities Intermodal Terminal (Minneapolis, MN) on UP because it cannot be expanded to capture all potential growth on the current footprint • In specific multi-terminal markets, lanes were rearranged between terminals or idle terminals reactivated to ensure all the growth could be handled • All other intermodal markets where volumes exceed capacity have the potential for terminal expansion, which was confirmed during meetings with UP and NS terminal capacity and operations experts
Train service: There must be a feasible routing plan using intermodal trains that is able to offer competitive transit times	• After review with the service design teams, all lanes from Texas to /from Huntsville, AL were removed because the intermodal train plan and mainline network only offer circuitous routes via Atlanta or Memphis, which would have uncompetitive transit times with truck

[49] "Headhaul" refers to the primary direction that loaded freight is moving. "Backhaul" is the return journey of empty or loaded containers.

Criterion	Comments
	• We considered but decided to retain new lanes from Twin Cities Intermodal Terminal (Minneapolis, MN) to eastern destinations – The shortest route goes via Wisconsin and Chicago, IL and the infrastructure currently only permits single-stack intermodal operation – Service Design developed a feasible routing with double-stack clearance that, while it adds some circuity, is still expected to achieve truck-competitive transit times for lower priority freight

These operational considerations were applied in two stages. After calculating the theoretical intermodal traffic at the everywhere-to-everywhere stage, where linehaul rail is set to be available between any two terminals, the lanes were down selected based on sufficient traffic density and the availability of UP-NS terminals at both origin and destination. Lanes which either had existing service or unserved lanes that met the criteria and gain improved linehaul rail service post-merger were carried forward to the next stage as future-state lanes.

After this screening stage, the drayage model was run a third time to assign intermodal addressable trucking to future-state lanes. Once the lookalike segmentation model was applied to serviceable trucking in those lanes, the operational criteria was applied again to confirm that there was sufficient volume from all traffic sources (existing, rail-to-rail, long-haul drayage extended hauls) and UP-NS terminal availability.

We then iterated with service designers to ensure that within a terminal catchment, there was sufficient terminal capacity to handle the diversion traffic. This required reorganizing some existing lane-terminal assignments. We do not believe any of these changes would impact the drayage economics for those lanes. This resulted in the elimination of some lanes from Twin Cities Intermodal Terminal (Minneapolis, MN), which cannot be easily expanded.

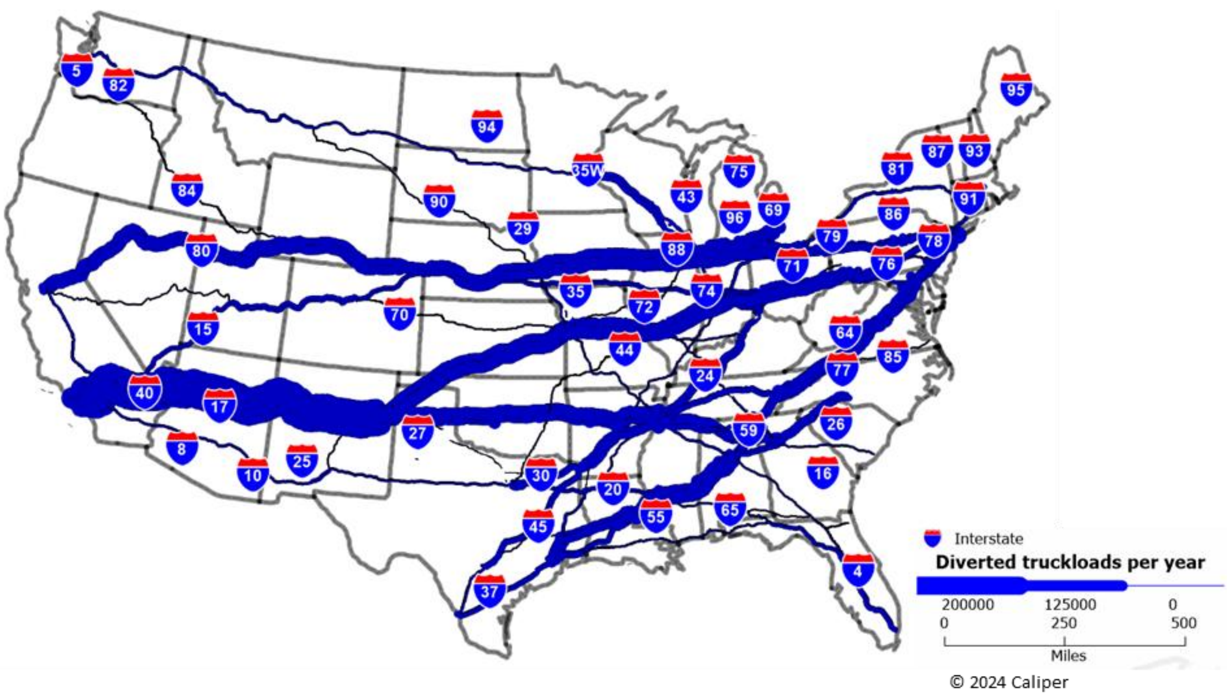
Finally, we worked with the service designers to ensure that the train service to operate the lane was feasible and truck-competitive. This resulted in the elimination of all lanes from Texas to Huntsville, AL.

5.4. Estimated Truck-to-Intermodal Rail Diversions

When the lookalike segmentation was applied to the addressable market for diversions, this projected that 1,166,000 of the total 3,095,000 identified intermodal-serviceable truckloads in lanes that see improved rail service are convertible to domestic intermodal units on the post-merger rail network, after all criteria were applied.

We identified a further 67,000 extended haul diversions from converting long-haul drayage moves over 250 miles to a longer rail transit across the watershed in two markets: Chicago, IL drayage to Detroit, MI and Toledo, OH; and Memphis, TN drayage to Huntsville, AL. These are discussed in Section 5.5.

Exhibit 5-4: Estimate of intermodal truckloads removed from roadways due to a UP-NS merger[50]



Some 56% of these unit-miles would move in long-haul lanes over 2,000 miles. For longer hauls, intermodal is closer to truck on transit times than other rail services, particularly once the

[50] Map created using TransCAD Transportation Planning Software and Oliver Wyman diversion analysis data; see workpaper "Trucks diverted from highway vF.xlsx."

interchange delay is removed due to single-line service. Thus, longer hauls have the potential to be a source of significant growth. The diversions have an average length of haul of 1,697 door-to-door miles, which compares well with J.B. Hunt, the largest private asset intermodal operator, which reported an average length of haul of 1,673 door-to-door miles in 2023 (Exhibit 5-5).[51]

Exhibit 5-5: Estimated truck-to-rail intermodal diversions by truck length of haul[52]

Truck mileage band	Truckloads (thousands)	Truck-miles (millions)	Average LOH (miles)
0-500	n/a	n/a	n/a
500-1000	156	118	757
1000-1500	260	319	1,224
1500-2000	273	480	1,756
2000-2500	353	801	2,271
2500+	124	330	2,658
Total	1,166	2,048	1,756

No assumption has been made to gross-up for empty miles. Industry-leading national trucking companies typically achieve 14% empty miles on their irregular route dry van operations.[53] The empty miles percentage is higher for drayage, as empty domestic containers must frequently be repositioned to a shipper for the next load by rail, leading to more drayage miles returning empty containers to the terminal. We would thus expect the national reduction in truck-miles to be higher than the numbers calculated for loads.[54]

5.5. Long-Haul Drayage Extended Haul

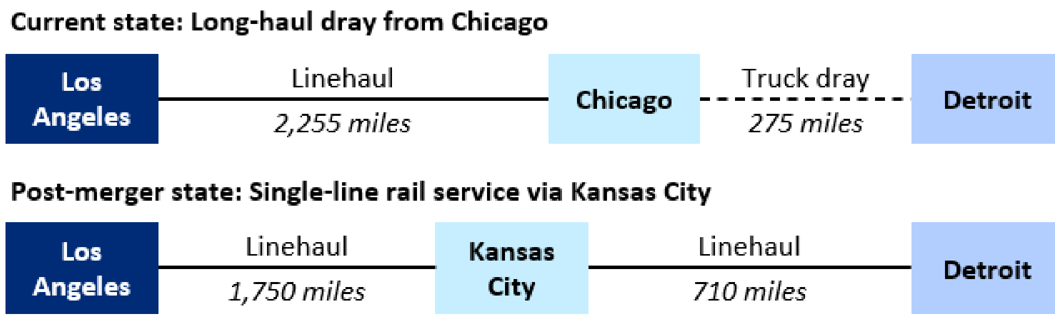
In addition, the addressable opportunity to convert truck traffic to rail intermodal includes extending the haulage of existing intermodal services, where a long-haul dray over 250 miles is currently required (Exhibit 5-6). There are two geographic markets where this is relevant:

---

[51] 2023 J.B. Hunt annual report; see reference source "JB_Hunt_2023_annual_report_VF.pdf."
[52] See workpaper "intermodal_diversions_model_vF.xlsx."
[53] 2023 Knight Swift annual report (14.3% empty miles) and Werner annual report (14.4%) for irregular route, for-hire trucking; see reference sources "Knight_Swift_2023_annual_report_VF.pdf" and "Werner_2023_annual_report_VF.pdf."
[54] See workpaper "Trucks diverted from highway vF.xlsx."

drayage from Chicago, IL to Detroit, MI and the northern Ohio region; and drayage from Memphis, TN to Huntsville, AL and northern Alabama.[55] Total addressable intermodal units, based on drayage moves from Transearch, is sized at 134,000 (both directions).[56]

Exhibit 5-6: Long-haul drayage extended haul diversion opportunity[57]
Example intermodal lane: Los Angeles to Detroit



We assumed that the linehaul intermodal leg of this long-haul drayage traffic is currently split 50:50 between the two western Class I railroads. This traffic was validated with UP subject matter experts, who have detailed data on the true origin/destination ZIP codes for a sizeable percentage of their intermodal traffic. The diversions are sized at 67,000 extended hauls substituting for a merged UP-NS.

We used UP internal traffic data to assign a true origin/destination in the Western United States to the 67,000 extended haul diversions. This review concluded that given the lanes in question and that shippers already use intermodal in these lanes, the post-merger addition of single-line service linking terminals closer to the freight could result in 100% of this traffic switching to an extended haul. Shippers would benefit from reducing drayage miles and, as a result, their door-to-door cost per shipment. This analysis is further detailed in Appendix B.3.3E.

[55] Chicago, IL to Detroit, MI drayage distance is approximately 284 miles according to Google Maps; Memphis, TN to Huntsville, AL drayage distance is approximately 216 miles according to Google Maps.
[56] See workpaper "intermodal_diversions_model_vF.xlsx."
[57] Mileages from workpaper "T2R_R2R_Intermodal_Diversions_vF.csv."

6. Rail-to-Rail Traffic Diversions

6.1. Rail-to-Rail Introduction

A UP-NS merger would create new, more efficient routes for rail shippers, particularly those that ship between the eastern and western United States, and that previously did not have access to a single-line carrier. Using 2023 historic traffic flows as a foundation for this analysis, since this is the most up-to-date sample of waybills the Board can provide, we estimate that a merged UP-NS would divert approximately 237,000 carloads and 204,000 containers annually of existing business that currently moves on other railroads. Extended hauls – that is, traffic currently handled by UP or NS with another carrier in interline service – are estimated to account for 66% of total rail diversions. New traffic accounts for 34% of estimated rail diversions.

Exhibit 6-1: Estimated rail-to-rail diversion to UP-NS[58]

Service type[59]	Extended haul	New traffic	Total cars/units
General merchandise	107,000	56,000	162,000
Intermodal	131,000	73,000	204,000
Bulk	17,000	12,000	28,000
Automotive	34,000	13,000	47,000
Total	**288,000**	**153,000**	**442,000**

Most of the estimated new traffic on UP-NS would be diverted from CSXT and BNSF. For CSXT, the estimated 249,000 carloads/units diverted represent 4.1% of the 6.1 million units handled by CSXT in 2023.[60] The estimated 246,000 units diverted from BNSF represent 2.7% of the 9.0 million units handled by BNSF in 2023.[61] Estimated diversions of carloads and intermodal units from the Class I carriers are shown in Exhibit 6-2.

---

[58] See workpapers "R2R_Diversions_Haul_Carrier.xlsx."
[59] Service type uses the Board definition found in the STB 2023 Confidential Carload Waybill Sample Reference Guide, March 5, 2025, Railinc, p. 63.
[60] Analysis of Class I Railroads 2023, Association of American Railroads, Line 713.
[61] Ibid.

Exhibit 6-2: Estimated Class I carriers with the largest loss in cars/units handled, where loss exceeds 1,000 cars/containers annually[62]

Carrier	General merchandise	Intermodal	Bulk	Automotive	Net change
CSXT	-92,000	-127,000	-2,000	-28,000	-249,000
BNSF	-69,000	-138,000	-21,000	-18,000	-246,000
CN	-18,000	-	-9,000	-6,000	-32,000
KCS	-10,000	-7,000	-	-2,000	-19,000
CPRS	-7,000	-4,000	-1,000	-	-11,000
KCSM	-1,000	-	-	-1,000	-2,000

No other railroad is expected to gain traffic exceeding five cars per day as a result of diversion. Diversions do not rely on other railroads to make changes to their service or capacity.

Section 6.2 provides a high-level overview of the traffic diversion modeling approach and the modeling assumptions. Further details of the rail-to-rail diversion model are provided in Appendix A. **Section 6.3** breaks out the estimated rail-to-rail diversion results in more detail for each of the four service types.

6.2. Approach and Assumptions

6.2.1. High-Level Description of Rail-to-Rail Modeling Approach

We utilized a traffic diversion model known as a "discrete choice model."[63] The model estimates the probability that a shipper selects a rail route (either a single railroad or combination of railroads) based on the characteristics of that route relative to all other competitive routes in the market. When rail industry changes occur, such as with a merger, the route characteristics of available routes in some markets will change, thus changing the probability of a shipper selecting a particular route. This change in probabilities is converted into an expected traffic diversion. If

[62] See workpaper "R2R_Diversions_Haul_Carrier.xlsx." Note that for railroads in the same "family" (e.g., CPRS, KCS, and KCSM) the railroads are listed as they appeared in the 2023 traffic data. The total estimated diversion from CPKC, for example, will be less than the sum of CPRS, KCS, and KCSM due to double and triple counting of cars handled.

[63] Discrete Choice Analysis: Theory and Application to Travel Demand, Moshe Ben-Akiva and Steven R. Lerman, MIT Press, 1985, Sections 5.1 "Theory of Multinomial Choice" and 5.2 "The Multinomial Choice Model."

there are no changes to the characteristics of any route in a market, then no diversions will occur in that market.

The following definitions are used for this diversion analysis:

- **Market**: a market is defined for purposes of this analysis as an origin, destination, and service type, where the four Board service types are used (general merchandise, intermodal, bulk, and automotive).
- **Characteristics**: refers to changes in the railroad network. For this modeling effort, the characteristics were the route costs (measured as impedance) and the number of non-corporate family railroads involved in the move (measured as junction frequency).
- **Impedance**: rail miles plus a miles-equivalent for the impact of each interline junction (interchange) on a route. The miles-equivalent for a junction is set based on the quantity of traffic that passes through the junction, varying between 90 miles (for intermodal run-through lanes) and 650 miles (for low-volume interchanges). This reflects the additional time and complexity cost for an interline handling (see Appendix A.6.4).
- **Junction frequency**: the number of interchanges between railroads that a railcar must undergo to get from its origin to its destination. In effect, this measure reflects the opportunity to use more efficient physical routings due to the merger and the elimination of interchange complexity between the merging railroads.

This specific form of discrete choice model is known as a "multinomial logit model" and is a common method for modeling transportation mode choice.[64] A detailed explanation of the rail-to-rail traffic diversion model is provided in Appendix A. The use of impedance and junction

[64] Ibid.

frequency to identify the routes most often selected by shippers is consistent with what is seen in the traffic data, as was shown in Exhibit 3-7.

6.2.2. Model Assumptions

Traffic diversion outputs are an estimate of how 2023 traffic would likely have moved over the rail network had UP and NS operated as a single railroad. Traffic diversion estimates are not constrained by line, yard, equipment, or other potential capacity constraints. Capacity is separately addressed in the UP-NS Operating Plan.[65] Key assumptions for the rail-to-rail traffic diversion model are shown in Exhibit 6-3.

Exhibit 6-3: Key rail-to-rail traffic diversion model assumptions
See Appendix A for additional detail

Assumption	Description
Base year for traffic	• The base year for traffic is 2023, with no forecast of future years, since this is the most current sample of waybills available • 2023 CCWS used to calibrate the model, to prevent any potential biasing of the model to railroads where 100% traffic was available • 2023 combined traffic file used to run the model. This includes full traffic records for UP, NS, BNSF, and CN, with the CCWS providing remaining traffic[66]
Recent industry changes not fully reflected in 2023 data	• The base 2023 traffic does not include or fully reflect recent industry changes from mergers/acquisitions involving CP-KCS, CSXT-Pan Am,[67] and CN-Iowa Northern, and other network changes such as BNSF-Montana Rail Link • No effort was made to estimate the impact of these mergers/acquisitions independently on changes to the base 2023 traffic • These railroad mergers/acquisitions were, however, allowed to compete for traffic as single-line railroads in the post-merger scenario
Modeling by service type	• Four versions of the traffic diversion model were used to estimate diversions. The four versions subset the traffic into the four Board-defined service types of general merchandise, intermodal, bulk, and automotive

[65] STB Finance Docket No. 3687, Union Pacific Corporation et. al. – Control – Norfolk Southern Corporation et. al., Operating Plan Verified Statement.
[66] A description of how the 2023 traffic base of record was created is provided in Appendix A.2.
[67] Although Springfield Terminal Railways (SCAC = ST) became part of CSXT in its 2022 acquisition of Pan Am Railways, traffic records in 2023 continued to use ST.

Assumption	Description
Market definition and parameters	• Markets were defined as origin, destination, and service type • Traffic origins and destinations remain fixed; source competition was not modeled • Only revenue movements were diverted
Competitive rail traffic definition based on BEA/SPLC	• Intermodal traffic was defined as competitive at a BEA level, with a small number of adjustments recommended by UP and NS to more accurately reflect real-world competition.[68] Thus, if a railroad can offer competitive service in both the origin and destination BEA (either single-line or via interchange), then that railroad can compete for the traffic • Automotive traffic was defined as competitive on an origin SPLC to destination BEA level • All other traffic was defined as competitive at an SPLC level, based on the definitions in the Switching Carrier/Reciprocal Switching ("SCRS") data,[69] which shows if a railroad can access or has reciprocal switching rights at a station – If a freight station in a SPLC was classified as "closed" in SCRS, then traffic at that station was treated as sole served by the serving carrier – Stations classified as "open" or "mixed" in SCRS were considered competitive by the serving railroad and all railroads listed by SCRS with access – This was applied to general merchandise and bulk at both the origin and destination, and automotive at the origin only
Competitive rail traffic based on historical service	• Any railroad or combination of railroads historically moving traffic between an origin and destination for a service type were defined as competitive routes in that market • Additionally, railroads (or combinations of railroads) able to provide service between the origin and destination but historically having zero volume were added. These rail routes were determined to be competitive if: – They are not part of an interline move with a carrier able to directly service the customer in the market – The route does not have an impedance that is more than twice the minimum impedance (i.e., lowest impedance route) in the market
Impedance	• Total impedance is the final "cost" of a route – calculated from the physical route distance (rail miles) and the assigned cost of the interchange(s) in mile-equivalents • All inter-railroad interchanges are assigned a cost (impedance) reflecting the delay and costs of interchanges • Interchange impedances were set to 350, 450, 550, or 650 miles. Historically high-volume interchanges receive an impedance of 350, while historically low-volume interchanges receive an impedance of 650. An impedance of 350 can be thought of as a 350-mile "cost" • Intermodal trains that operate run-through haulage service were given an impedance of 90 miles, reflecting an approximate three-hour delay for a crew change and the 2023 average reported intermodal train velocity in 49 CFR 1250.[70] These include UP, CPKC, and NS for traffic on the Meridian Speedway, BNSF-CSXT for traffic to/from Northwest Ohio and Atlanta Fairburn terminals, and CN-INRD for traffic to/from Indianapolis (see Appendix A for full list)

[68] See Appendix D.1.

[69] The Serving Carrier Reciprocal Switching database is maintained by Railinc. SCRS contains all active railroad freight stations and lists the serving carrier and an indication of whether the station is open to other railroads or closed. If open, the railroads with access are listed. (See Appendix A.3).

[70] US Code of Federal Regulations, Title 49, Part 1250 Railroad Performance Data Reporting.

Assumption	Description
	• Railroads in the same corporate family have a zero-interchange impedance (e.g., the CPKC family of CPRS, KCS, and KCSM) • Post-merger, UP-NS was modeled as a single-line railroad, with no inter-railroad penalties at interchanges
Removed traffic	• Some potentially diverted traffic was removed based on discussions with UP and NS personnel. This traffic typically involved long-term contracts by the incumbent railroad or lack of access by UP-NS. (Removed traffic is detailed in Section 6.3)

6.3. Estimated Rail-to-Rail Traffic Diversions by Service Type

6.3.1. General Merchandise Traffic

We estimate that a merged UP-NS would attract 162,000 carloads of general merchandise traffic currently moving on other railroads, as shown in Exhibit 6-4. When calculating the impacts on other railroads, each diverted carload counts once for each railroad in the trip, so a BNSF-CSXT interline move would count as a gain of one carload of new traffic for UP-NS and a loss of one carload for each of BNSF and CSXT.

Exhibit 6-4: Estimated Class I rail-to-rail annual diversion of general merchandise traffic[71]

Carrier	Extended hauls	New traffic from third parties	Total carloads
UP-NS	**107,000**	**56,000**	**162,000**
CSXT	-53,000	-39,000	-92,000
BNSF	-27,000	-42,000	-69,000
CN	-7,000	-10,000	-18,000
KCS	-7,000	-3,000	-10,000
CPRS	-5,000	-2,000	-7,000
KCSM	-	-1,000	-1,000

An estimated 58% of traffic projected to be diverted from CSXT would involve an extended haul move on UP-NS. Most of this traffic historically moved over UP-CSXT but would likely shift to a single-line UP-NS route. The remaining 42% of projected diversions from CSXT

[71] See workpaper "R2R_Diversions_Haul_Carrier.xlsx." UP-NS gains are less than the losses on other railroads due to multiple counting. For example, a diversion from BNSF-CSXT to UP-NS counts as one carload lost by BNSF and one carload lost by CSXT, but only one carload gained by UP-NS.

involve traffic not historically handled by UP or NS, but this traffic moves in lanes where UP and/or NS have historically offered rail service. BNSF shows the opposite pattern, with the majority (61%) of projected diversions involving new traffic for UP or NS, as opposed to 39% involving extended hauls if moving from a NS-BNSF route to UP-NS.

The base 2023 traffic does not include industry changes since 2023; thus, CPKC is reported as three separate railroads (CPRS, KCS, and KCSM). We allowed railroads that had merged or otherwise become part of the same corporate family since 2023 to compete as a single railroad for traffic in the model but made no effort to estimate the impact of these mergers/acquisitions independently on changes to the base 2023 traffic. In Exhibit 6-4, we report CPKC as three separate railroads as reflected in the 2023 data. If the same shipment is handled more than once by CPKC corporate family members, adding the totals of the three carriers would cause some cars to be counted more than once.[72]

A breakout of rail-to-rail diversions by key commodity is provided in Exhibit 6-5. The largest category of diversions is chemicals, which accounts for 23% of the estimated rail-to-rail diversion of general merchandise traffic. Over half of chemical diversions are from extended haul moves, where UP or NS currently participates in the move with another carrier. Other top commodities diverted include food and kindred products (19%), hazardous materials (19%), and primary metal products (14%).

[72] For example, a movement from Calgary to Mexico City will show as three car handlings in the traffic data (CPRS to KCS to KCSM) and will count as three cars diverted from CPKC family members.

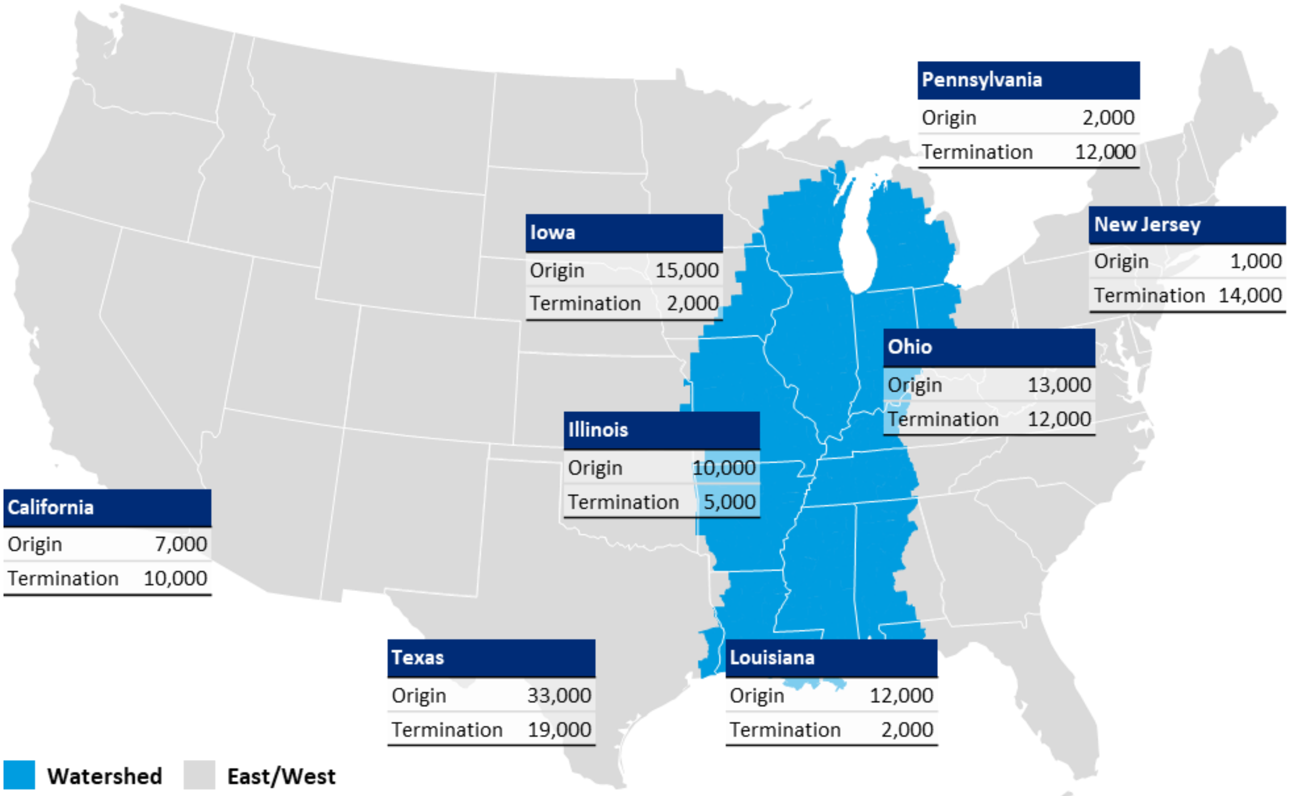
Exhibit 6-5: Estimated rail-to-rail diversion of general merchandise traffic by key commodity[73]

Commodity (STCC2)	Extended haul	New traffic in existing lanes	Total carloads
Chemicals or allied products (28)	26,000	12,000	38,000
Food and kindred products (20)	22,000	9,000	31,000
Hazardous materials (49)	21,000	10,000	31,000
Primary metal products (33)	13,000	10,000	23,000
Pulp, paper, or allied products (26)	6,000	4,000	10,000
Clay, concrete, glass, or stone products (32)	3,000	3,000	6,000
Transportation equipment (37)	2,000	3,000	5,000
Petroleum or coal products (29)	3,000	2,000	5,000
Lumber or wood products, excluding furniture (24)	3,000	1,000	4,000
Nonmetallic ores, minerals, excluding fuels (14)	3,000	-	3,000
Waste or scrap materials not identified by producing industry (40)	1,000	1,000	2,000
Farm products (01)	1,000	1,000	2,000
All other	0	0	1,000
Total	107,000	56,000	162,000

As shown in Exhibit 6-6, the states that would originate the most general merchandise diversions are Texas, Iowa, Ohio, Louisiana, and Illinois. These five states account for 51% of general merchandise diverted origins. The states with the most terminations of general merchandise diversions are Texas, New Jersey, Ohio, Pennsylvania, and California. The top five terminating states account for 41% of diversions.

[73] See workpapers "R2R_Diversions_Haul_Carrier.xlsx."

Exhibit 6-6: Top originating/terminating states for estimated rail-to-rail diversion of general merchandise traffic[74]



The top ten state-to-state lanes for estimated diversions of general merchandise traffic are led by Iowa to New Jersey, and then the Ohio-Texas corridor (Exhibit 6-7). There were no adjustments made to estimated traffic diversions for general merchandise traffic based on reviews with the railroads' commercial teams.

[74] See workpapers "All_Results_vF.xlsx" and "Top origin-termination states for R2R diversion of merch vF.sql."

Exhibit 6-7: Top state-to-state lanes and primary commodities for rail-to-rail diversion of general merchandise traffic[75]

Lane	Estimated carload diversions	Primary commodities
IA-NJ	5,000	• Hazardous materials • Chemicals or allied products • Food and kindred products
OH-TX	5,000	• Primary metal products • Hazardous materials • Transportation equipment
TX-OH	4,000	• Chemicals or allied products • Hazardous materials • Transportation equipment
AL-TX	3,000	• Primary metal products • Chemicals or allied products • Pulp, paper, or allied products
TX-IN	3,000	• Chemicals or allied products • Hazardous materials • Primary metal products
TX-GA	3,000	• Chemicals or allied products • Hazardous materials • Clay, concrete, glass, or stone products
TX-NJ	3,000	• Hazardous materials • Chemicals or allied products • Petroleum or coal products
TX-TN	3,000	• Hazardous materials • Chemicals or allied products • Food and kindred products
OH-CA	3,000	• Primary metal products • Food and kindred products • Hazardous materials
TX-SC	3,000	• Chemicals or allied products • Hazardous materials • Petroleum or coal products
Top 10 total		**35,000**
All other total		**127,000**
Grand total		**162,000**

75 See workpaper "All_Results_vF.xlsx" and "Top state to state lanes and primary commodities for R2R merch diversion vF.sql."

6.3.2. Intermodal Traffic

We estimate that a merged UP-NS would attract 204,000 intermodal containers currently moving on other railroads, as shown in Exhibit 6-8. When calculating the impacts on other railroads, each diverted container counts once for each railroad in the trip, so a BNSF-CSXT interline move would count as a gain of one unit of new traffic for UP-NS and a loss of one unit for each of BNSF and CSXT.

If a railroad submits revenue empties for private containers as loads, then the model will divert these empties. The model does not, at this stage, seek to balance any flows with empty repositioning. Empties are generated in the UP-NS Operating Plan.[76]

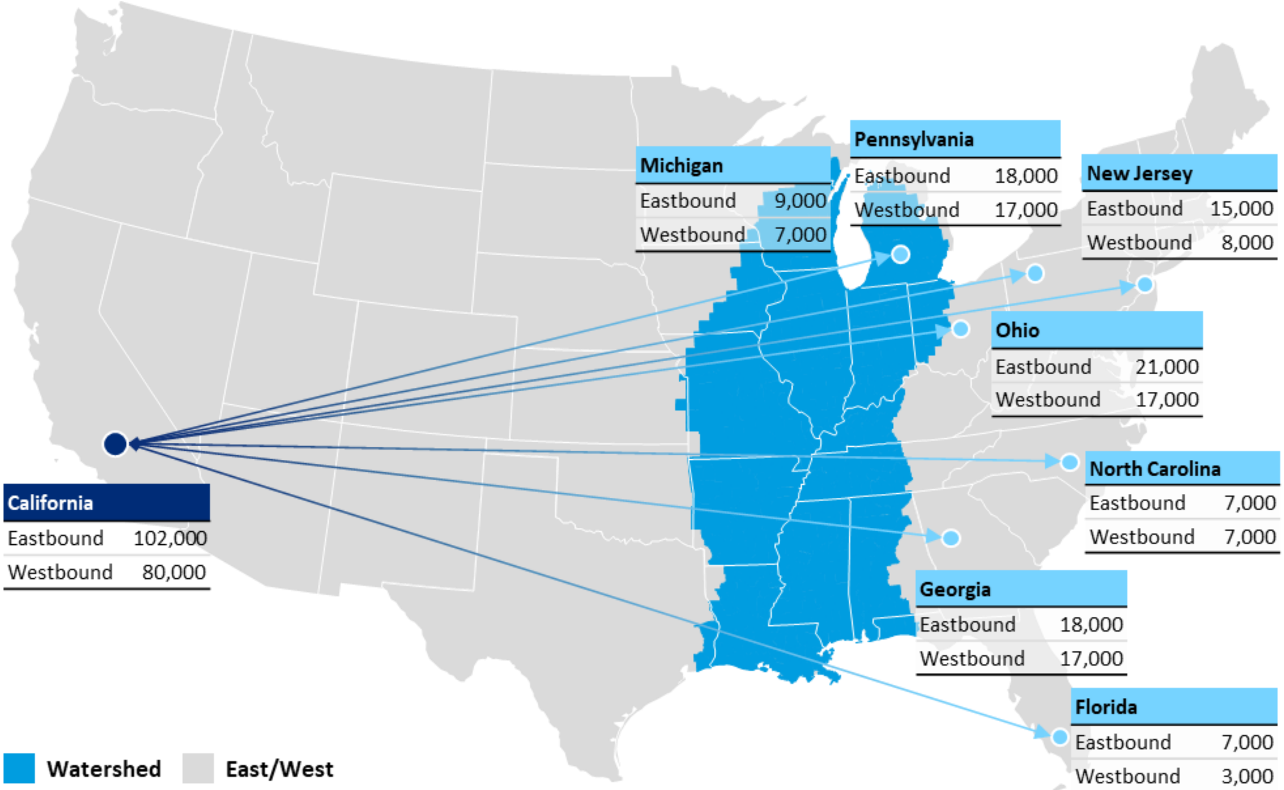
Exhibit 6-8: Estimated Class I rail-to-rail diversion of intermodal containers[77]

Carrier	Extended haul	New traffic	Total intermodal units
UP-NS	**131,000**	**73,000**	**204,000**
BNSF	-67,000	-71,000	-138,000
CSXT	-63,000	-64,000	-127,000
KCS	-1,000	-5,000	-7,000
CPRS	-	-4,000	-4,000

As can be seen in Exhibit 6-9, most of the traffic diversions would involve traffic between California and eastern states. These are lanes where single-line rail service is not currently available. The largest diversions would occur in cross-watershed lanes, including the intermodal trains added to serve Southern California-Northeast via Kansas City, and Southern California-Southeast via Meridian Speedway routes in the UP-NS Optimized Plan. These routes are further enhanced in the UP-NS Growth Plan, where additional new single-line service train pairs are added to serve this traffic.

[76] STB Finance Docket No. 3687, Operating Plan Verified Statement, op. cit.
[77] See workpapers "R2R_Diversions_Haul_Carrier.xlsx."

Exhibit 6-9: Traffic to/from California accounts for 89% of estimated rail-to-rail intermodal diversions[78]



Two adjustments were made to the estimated traffic diversions for intermodal containers. First, the estimate of 204,000 diverted containers does not include intermodal diversions between Dallas, TX and the Southeast. This lane was excluded because NS currently has an interline steel-wheel service in this market today over the Meridian Speedway, which will not be impacted by the merger. Second, the estimate of 204,000 diverted containers does not include lanes that do not exceed a minimum volume threshold. Unlike merchandise traffic, where a single carload can be shipped between any two stations, intermodal requires that the railroad(s) offer linehaul terminal-to-terminal service. We allowed diversions only in lanes (for a defined UP-NS terminal to UP-NS terminal), where the total of existing traffic (domestic and international), rail-to-rail diversions, truck-to-rail diversions, and conversion of long-haul

[78] See workpapers "All_Results_vF.xlsx" and "Top origin-termination states for R2R diversion of IM vF.sql." The California eastbound/westbound numbers are for all California traffic and not just the seven states listed.

drayage to an extended haul in a lane (origin terminal to destination terminal) would be of sufficient density for UP-NS to consider offering intermodal service in the future. This minimum threshold was set at 4,380 units per year, or 12 units per calendar day, which is two articulated 3-well intermodal stack cars per day. See further discussion in Appendix B.3.3.C.

6.3.3. Bulk Traffic

We estimate that a merged UP-NS would attract 28,000 carloads of bulk traffic currently moving on other railroads, as shown in Exhibit 6-10.

Exhibit 6-10: Estimated Class I rail-to-rail diversion of bulk traffic[79]

Carrier	Extended haul	New traffic	Total carloads
UP-NS	**17,000**	**12,000**	**28,000**
BNSF	-11,000	-10,000	-21,000
CN	-2,000	-7,000	-9,000
CSXT	-1,000	-1,000	-2,000

A majority of estimated bulk diversions (approximately 59%) would be from extended haul traffic; moves that either UP or NS already participate in pre-merger. The largest projected loss is for BNSF and stems from coal shipments from the Powder River Basin to Michigan and Georgia.

A breakout by commodity for rail-to-rail diversion of bulk traffic is provided in Exhibit 6-11. Coal originating in Wyoming is the primary diverted commodity, followed by grain originating in Illinois, Minnesota, Iowa, Kansas, and Nebraska.

[79] See workpaper “R2R_Diversions_Haul_Carrier.xlsx.”

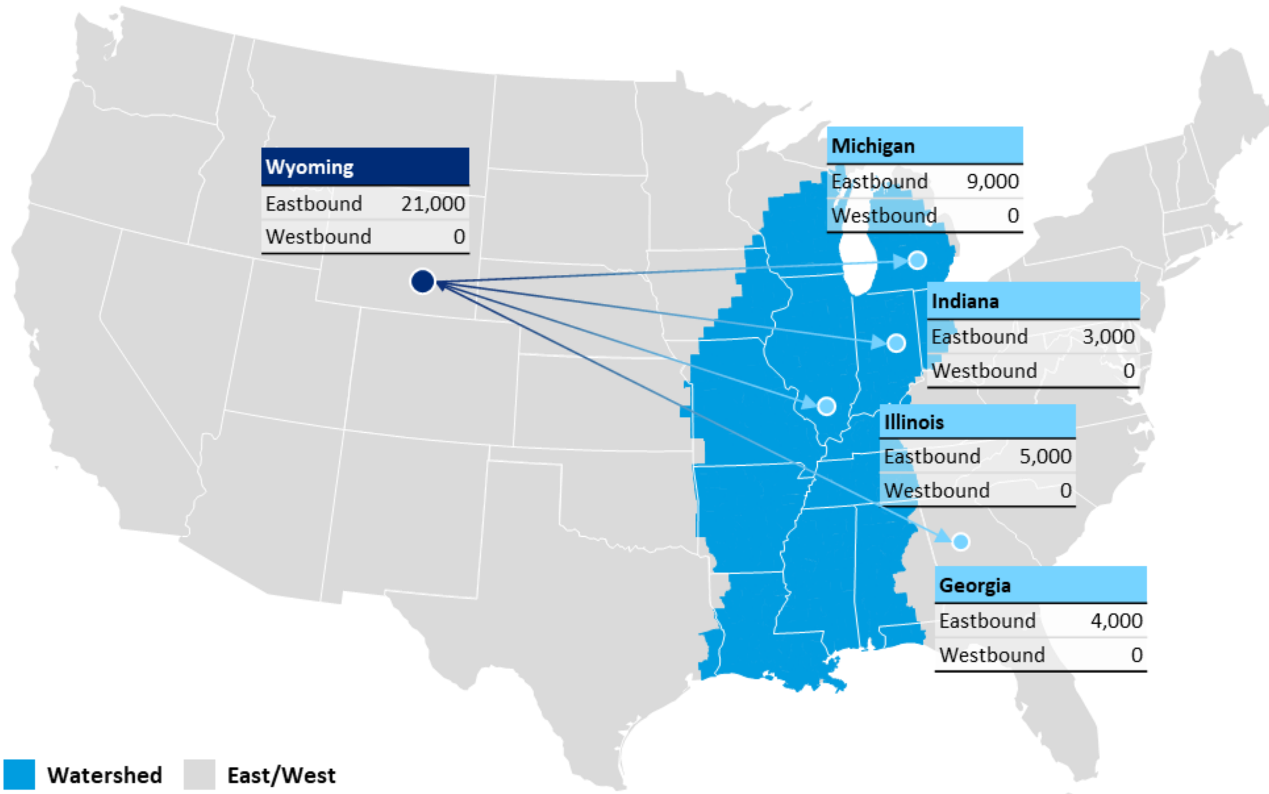
Exhibit 6-11: Estimated rail-to-rail diversion of bulk traffic by key commodity[80]

Commodity (STCC2)	Extended haul	New traffic	Total carloads
Coal (11)	13,000	9,000	22,000
Farm products (01)	3,000	2,000	5,000
Petroleum or coal products (29)	0	1,000	1,000
Total	**17,000**	**12,000**	**28,000**

Exhibit 6-12 shows that 75% of the estimated diversion of bulk traffic would originate in Wyoming. Almost all of this traffic would be delivered to four states, with Michigan and Georgia being states predominantly served by eastern railroads, and Illinois and Indiana being in the watershed region, but destinations that currently are inaccessible by the western railroads. In all cases, UP-NS could offer these shippers new single-line rail service where previously it has been unavailable. There were no adjustments made to the estimated traffic diversions for bulk.

[80] Ibid.

Exhibit 6-12: Top originating/terminating states for estimated rail-to-rail diversion of bulk traffic[81]



6.3.4. Automotive Traffic[82]

We estimate that a merged UP-NS would attract 47,000 carloads of automotive traffic currently moving on other railroads, as shown in Exhibit 6-13.

Exhibit 6-13: Estimated Class I rail-to-rail diversion of automotive traffic[83]

Carrier	Extended haul	New traffic	Total carloads
UP-NS	**34,000**	**13,000**	**47,000**
CSXT	-19,000	-9,000	-28,000
BNSF	-7,000	-11,000	-18,000
CN	-3,000	-3,000	-6,000
KCS	0	-1,000	-2,000
KCSM	0	-1,000	-1,000

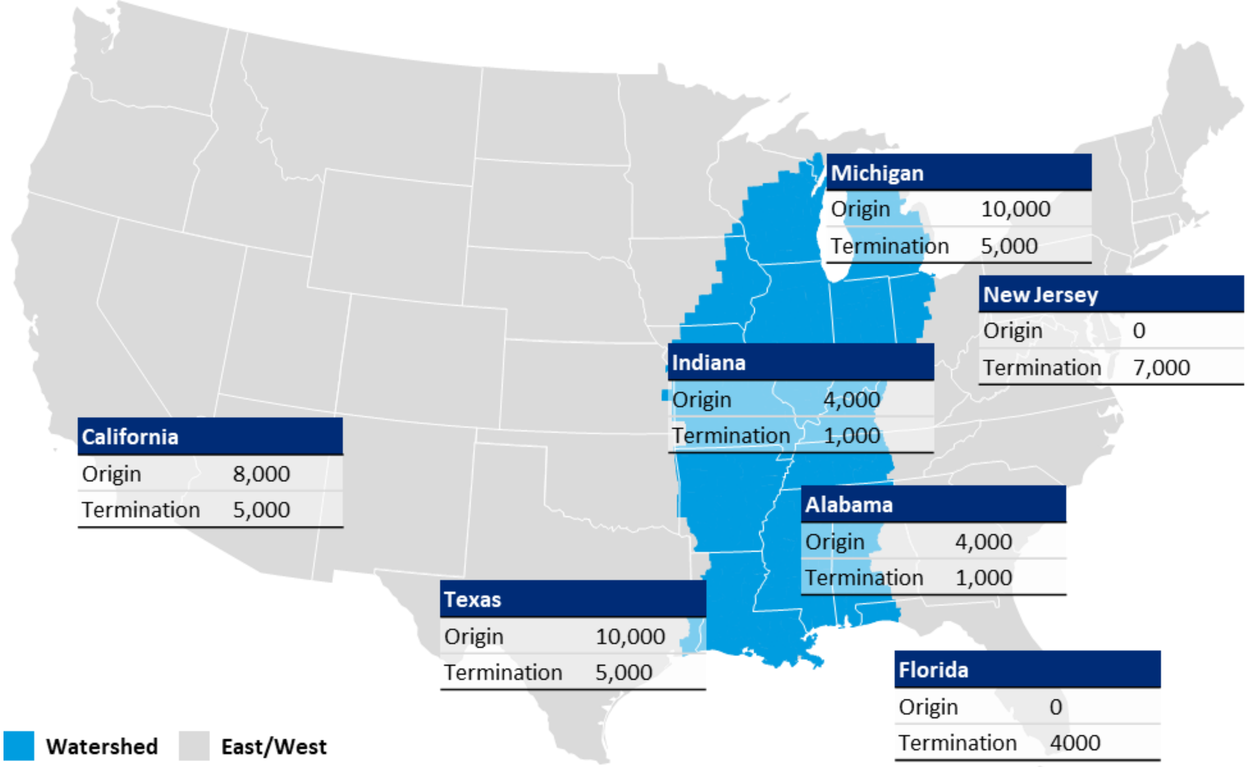
[81] See workpapers "All_Results_vF.xlsx" and "Top origin-termination states for R2R diversion of bulk vF.sql." Eastbound is for all Wyoming markets, not just the top four shown.
[82] Includes both finished vehicles and parts.
[83] See workpaper "R2R_Diversions_Haul_Carrier.xlsx."

Over 70% of the estimated diversions would be the result of extended hauls, with the largest portion likely to be diverted from a historic UP-CSXT interline move to a new single-line UP-NS route. The states that would originate the most automotive estimated diversions are Texas, Michigan, California, Indiana, and Oregon (Exhibit 6-14). These five states account for 71% of diverted origins. The states with the most diverted terminations would be New Jersey, Michigan, Texas, California, and Florida. The top five terminating states account for 55% of diversions.

As described in the Operating Plan Verified Statement, in addition to an improved service product from conversion of interline to single-line service, the railroads intend to rationalize automotive terminals at the Chicago, IL; Kansas City, MO; and St. Louis, MO gateways; and invest in capacity expansion at multiple terminals.[84] Consolidating service to a single location in a metro area generally improves automotive final-mile haul-away economics. OEMs prefer one location in a metro area or region because it builds density for full truckloads to dealerships. The UP-NS Operating Plan also considers optimization opportunities for empty multilevel railcars. The single network creates opportunities to reduce empty miles, improving the competitiveness of the UP-NS automotive offering to OEMs beyond single-line service improvements.

[84] STB Finance Docket No. 3687, Operating Plan Verified Statement, op. cit.

Exhibit 6-14: Top originating/terminating states for estimated rail-to-rail diversion of automotive traffic[85]



The top ten state-to-state lanes for estimated diversions of automotive traffic are shown in Exhibit 6-15. The leading corridor for estimated rail-to-rail diversions of automotive traffic would be California to New Jersey, followed by Michigan to Texas, and Texas to New Jersey.

[85] See workpapers "All_Results_vF.xlsx" and "Top origin-termination states for R2R diversion of auto vF.sql."

Exhibit 6-15: Top state-to-state lanes for rail-to-rail diversion of automotive traffic[86]
Loaded direction only

Origin-destination lane	Estimated carload diversions
CA-NJ	4,000
MI-TX	3,000
TX-NJ	3,000
CA-FL	2,000
TX-FL	2,000
CA-MD	1,000
MI-CA	1,000
OR-MI	1,000
MI-OR	1,000
TX-MD	1,000
Top 10 total	**20,000**
All other	**27,000**
Grand total	**47,000**

Operational and commercial adjustments

Adjustments were made to remove diversions in the model to locations that, based on Oliver Wyman knowledge and confirmation with subject matter experts at UP and NS, do not have active auto ramps in the area to handle the traffic. Any existing auto traffic to/from those BEAs represents either an OEM assembly plant or a private facility. The diversion estimate above has excluded this traffic.

[86] See workpapers "All_Results_vF.xlsx" and "Top state to state lanes for R2R diversion of auto vF.sql."

7. Total Traffic Diversions

7.1. Total Intermodal Diversions

We estimate that a total of 1,437,000 diverted intermodal units could result from the UP-NS merger. This includes 1,166,000 truck-to-rail intermodal diversions, 204,000 rail-to-rail intermodal diversions, and 67,000 from length of haul extensions.

Some rail-to-rail and all long-haul drayage diversions are length of haul extensions, where either UP or NS already serve part of the move. We generated new intermodal traffic movements that reflected the revised origin and destination of these movements. Since we already had a traffic record for the historic, shorter move in our base traffic, we had to reduce the volumes in the historic lane so as to avoid double counting. For example, conversion of a long-haul dray from Memphis, TN to Huntsville, AL, which is part of a trip originating in Southern California, must be offset by reducing the quantity of Southern California – Memphis, TN intermodal units. The total offsets are 131,000 for rail-to-rail and 67,000 for long-haul dray.

The net impact on UP-NS intermodal traffic would be an increase of 1,239,000 loaded intermodal units compared to the current volume of 7,385,000 intermodal units, a 17% increase. The merger would unlock single-line intermodal service for a number of major freight lanes. These corridors are a key source of traffic growth and split into three categories:

- Existing UP-NS interline intermodal lanes that receive improved service through the removal of interchanges and miles;
- Lanes offered by other railroads as interline, where UP-NS would be able to offer new single-line service; and
- New intermodal lanes that are not currently served by any railroad.

Existing UP-NS or competitor interline lanes are 73% of diverted units, where UP-NS would offer an improvement in terms of the lowest linehaul rail impedance. The largest of these traffic flows use the Shreveport, LA interchange, where rail linehaul would improve by reducing a three-party move today (UP, CPKC, NS) to a two-party move (UP-NS, CPKC) post-merger. These lanes skew long-haul, cross the watershed, and account for 77% of unit-miles.[87]

The merger also would enable new shorter-haul lanes crossing the watershed. Examples of these include from South Texas to the Southeast and from the Midwest into the Ohio Valley and Northeast. The UP-NS Operating Plan offers 24 new single-line domestic lanes that are not currently offered by any railroads on a single-line or interline basis.[88] These new domestic lanes account for 27% of diverted units and 23% of unit-miles.

The top 15 lanes by revenue are shown in Exhibit 7-1; the full list of lanes with existing and diverted traffic is included in the referenced workpaper.

[87] See workpaper "Revenue_Calculation_vF.xlsx"
[88] See workpaper "intermodal_diversions_model_vF.xlsx."

Exhibit 7-1: Top 15 state-state intermodal lanes by revenue (all diversions) [89]
Units, unit-miles, and revenue in thousands

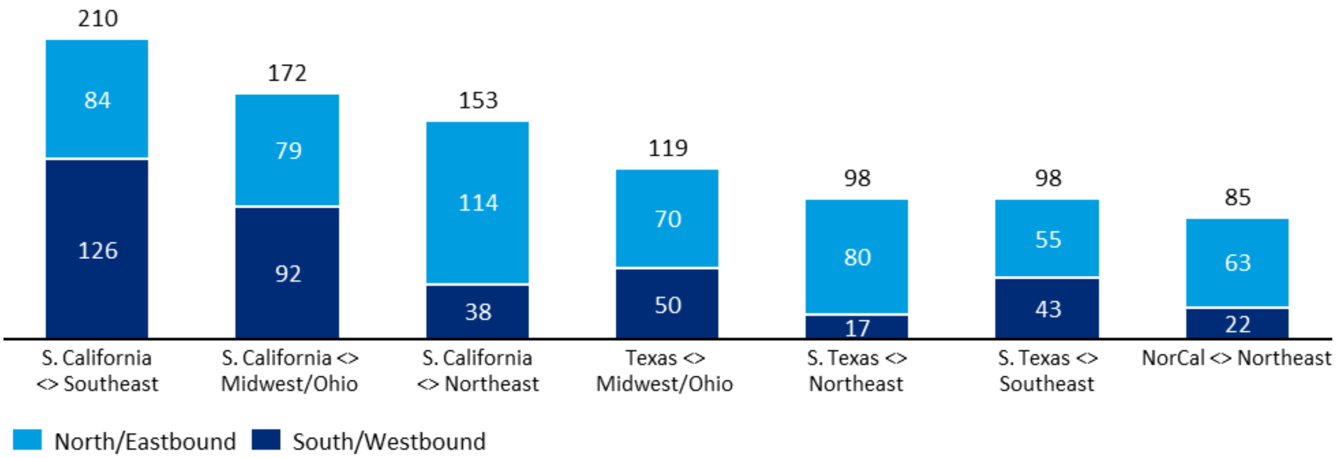
Origin state	Destination state	Net diversions (units)	Net diversions (unit-miles)	Net diversions (revenue)
Ohio	California	111	270,372	$204,145
California	Pennsylvania	100	250,178	$194,412
California	New Jersey	93	285,334	$184,534
Texas	Ohio	74	124,711	$108,562
California	Ohio	62	145,738	$113,258
Texas	New Jersey	60	111,279	$98,051
Pennsylvania	California	59	139,713	$113,828
North Carolina	California	54	137,884	$102,749
Ohio	Texas	53	88,616	$78,797
Georgia	California	47	111,217	$86,709
Alabama	California	41	83,779	$72,914
Texas	Pennsylvania	35	70,098	$56,837
Minnesota	Ohio	34	55,079	$41,907
California	Michigan	32	79,146	$59,109
Texas	Massachusetts	31	68,033	$51,843

7.1.1. Key Traffic Flows

Approximately 65% of diverted intermodal traffic falls into seven key traffic flows where there is projected to be sufficient volume to launch new truck-competitive intermodal service (Exhibit 7-2).

[89] Includes truck-to-rail, extensions to long-haul dray, and rail-to-rail. Top 15 intermodal flows not a source of rail-to-rail revenue offsets. See workpaper "Revenue_Calculation_vF.xlsx."

Exhibit 7-2: Key intermodal lanes where new UP-NS single-line service is planned[90]
Thousands of units; total = 934,000 units



These traffic flows would receive single-line intermodal service, and often direct train service without intermediate handlings in the proposed UP-NS Operating Plan, for the first time. The seven regional traffic flows will be served by new trains designed in the UP-NS Growth Plan to offer truck-competitive transit times, faster than what can be achieved today. We worked closely with the railroad service design team in developing the UP-NS Growth Plan to ensure that train service in these key traffic flows would meet the needs of shippers and be truly truck-competitive. This will be accomplished in each flow as follows:

- **Southern California – Southeast (Georgia, North Carolina, Florida).** As a single railroad and with projected growth, UP-NS would see sufficient density to consolidate domestic and international traffic in the corridor to go via Shreveport, LA. This would allow for additional daily departures, effectively improving door-to-door transit time (due to reduced schedule delay). One eastbound train per day which today terminates in Atlanta, GA will be extended to Jacksonville, FL. One westbound train will originate in Charlotte, NC instead of Atlanta, GA. These train extensions will eliminate intermediate handlings in Atlanta, GA. The result

[90] STB Finance Docket No. 3687, Operating Plan Verified Statement, op. cit.

is a truck plus 24 hours door-to-door offer in both directions. The operating teams also expect improved reliability, as Shreveport, LA–Meridian, MS haulage would go from a three-party coordination exercise to two (UP-NS, CPKC).

- **Southern California – Midwest and Ohio Valley.** As a single railroad, UP-NS would be able to efficiently serve these lanes via the Kansas City Gateway. UP-NS would introduce a new Los Angeles, CA to Detroit, MI train. This also would carry traffic for the Kansas City market. At the NS Voltz, MO terminal, the eastbound train from Los Angeles, CA would split and combine with two existing NS intermodal trains: one that runs daily to Detroit, MI and the other that serves the "W Line" terminals at St. Louis, MO; Louisville, KY; Cincinnati, OH; and Columbus, OH. This would provide a direct single-line intermodal train to Detroit, MI from Southern California for the first time, which will be between truck plus zero hours and truck plus 24 hours, and service to other Ohio Valley markets with a single block swap.
- **Southern California – Northeast (Pennsylvania and New York-New Jersey).** Shippers currently using existing interline services via Chicago, offered by all Class I railroads, will benefit from new single-line service in two ways:
    - A new direct train service (ZCICX / ZCXCI in the operating plan) with no intermediate handlings that crosses from legacy UP to legacy NS in Kansas City, MO, reducing the total mileage versus going through existing rail interchange points in Chicago, IL; and
    - The merged railroads will invest in infrastructure that neither would be able to justify independently, such as reopening and investing in the NS terminal at E-Rail in New Jersey and upgrading sidings and mainline running speeds between Voltz, MO and Butler, IN on the NS line.

The UP-NS Growth Plan would reduce terminal to terminal transit in these lanes by 17 hours to 95 hours, versus a door-to-door truck transit of 111 hours, enabling a truck plus zero hours to truck plus 24 hours intermodal service offering. In addition, the train will have no intermediate work events between City of Industry in Southern California and Harrisburg, PA which should result in more reliable transit times than existing interline services.

- **Texas – Midwest/Ohio Valley.** Combining UP-NS unlocks viable intermodal lanes between Texas and the Ohio Valley (Louisville, KY; Cincinnati, OH; Columbus, OH). Interline service is not currently competitive with truck because of the interchange delay and the short hauls on one or both legs of the trip. The merger enables new intermodal lanes from southern Texas (Houston and Laredo) via the New Orleans gateway because there would now be sufficient density to offer this train service in the UP-NS Growth Plan when combined with traffic to the Southeast and Northeast.
- **South Texas – Northeast and Southeast.** These are new lanes that have not been offered before on a single-line basis. Houston to Atlanta and the Southeast is only 800 miles, making it challenging to offer on an interline basis. There is sufficient demand from diversions for two new train pairs in the UP-NS Growth Plan via New Orleans between South Texas (Port Laredo and Houston) and Atlanta, with one continuing to Croxton, NJ. Both will be able to offer a planned schedule of truck plus 24 hours for door-to-door intermodal service. The new train from Laredo, TX to Croxton, NJ enables, for the first time, direct intermodal rail service without intermediate handlings between the Mexican border crossing and key East Coast distribution hubs (Atlanta, GA; Charlotte, NC; Harrisburg, PA; and New Jersey). This is a significant improvement on existing interline alternatives, typically involving rubber-tire interchange in Chicago, IL.

- **Northern California – Northeast.** With truck-to-rail diversions there is sufficient demand to introduce a new intermodal train pair between Lathrop, CA and Croxton, NJ that would bypass Chicago, IL. This removes intermediate handlings required in the UP-NS Optimized Plan. The new train has no planned work event in Chicago. The planned terminal-to-terminal transit time end-to-end is 83 hours eastbound, 20 hours faster than solo driver truck transit time. This will provide shippers with intermodal service between truck plus zero hours and truck plus 24 hours. The train also will serve Toledo, OH and Harrisburg, PA.

These trains were developed by the railroads' service designers to meet the needs of the identified intermodal growth. They are described here to illustrate that the UP-NS Growth Plan can execute truly truck-competitive or truck plus 24 hours door-to-door transit times in these key lanes. The planned terminal-to-terminal transit times are shown in Exhibit 7-3, compared with door-to-door solo truck transits. Depending on the exact schedules and shipper locations, adding 18-36 hours to the terminal-to-terminal rail transits yields an approximate door-to-door transit for intermodal to account for drayage, loading, and unloading. All proposed services can provide a truck plus 24 hours intermodal door-to-door transit time.

Exhibit 7-3: Key planned UP-NS intermodal service transit time improvements (linehaul terminal-terminal) compared to trucks (door-door, solo driver)[91]
Note: add 18-36 hours to the rail linehaul terminal-to-terminal hours to get door-to-door intermodal transit

Eastbound

Train symbol	Origin	Destination	Gateway	Total current hours	Total Plan hours	Improve-ment (hours)	Highway mileage	Truck transit hours
ZLCCX	LATC[92]	Croxton	Kansas City	112	95	17	2,785	111
ZLBAT	Long Beach ICTF[93]	Atlanta	Shreveport	144	74	70	2,194	78
ZLTCX	Lathrop	Croxton	Chicago		83	New	2,897	113
ZCICX	City of Industry	Croxton	Kansas City		95	New	2,770	110
ZLCDT	LATC	Livernois	Kansas City		73	New	2,275	90
ZIEJX	IEIT[94]	Jacksonville	Shreveport		83	New	2,378	92
ZMXCX	Mexico	Croxton	New Orleans		85	New	1,995	74
ZHOAT	Houston	Atlanta	New Orleans		39	New	810	29

Westbound

Train symbol	Origin	Destination	Gateway	Total current hours	Total Plan hours	Improve-ment (hours)	Highway mileage	Truck transit hours
ZHBLC	Harrisburg	LATC	Kansas City	112	93	19	2,617	97
ZCTLB	Charlotte	Long Beach ITCF	Shreveport	179	83	95	2,462	94
ZCXLT	Croxton	Lathrop	Chicago		85	New	2,910	114
ZCXCI	Croxton	City of Industry	Kansas City		99	New	2,757	110
ZDTLC	Livernois	LATC	Kansas City		80	New	2,273	90
ZCTLB	Charlotte	IEIT	Shreveport		83	New	2,371	92
ZCXMX	Croxton	Mexico	New Orleans		83	New	1,998	74
ZATHO	Atlanta	Houston	New Orleans		36	New	807	29

7.2. Total Carload Diversions

UP-NS is projected to attract a total of 425,000 carloads of new traffic, with 373,000 in merchandise/bulk traffic and another 52,000 in multilevels hauling finished vehicles. Of this 425,000 total, 237,000 is due to rail-to-rail diversions, both new traffic and extended hauls on

[91] STB Finance Docket No. 3687,Operating Plan Verified Statement, op. cit. Current and planned transit times are sourced from the UP-NS Operating Plan, highway mileage based on Google Maps, truck transit hours based on assumptions detailed in Appendix B.10. Truck transit times estimated based on Google Maps mileages and applying the Federal Motor Carrier Safety Administration's hours of service regulations to a solo driver.
[92] Los Angeles Transportation Center Intermodal Terminal, operated by UP.
[93] Long Beach Intermodal Container Transfer Facility, operated by UP.
[94] Inland Empire Intermodal Terminal, operated by UP in Southern California.

existing UP and/or NS traffic, while the remaining 188,000 are diverted from trucks.[95] As a practical measure, the merchandise/bulk diversions are compressed to 3,622 representative lanes, so that each STCC2 has traffic in origin-destination lanes based on the largest diversion flows, thus adding 10,000 cars while preserving total diverted car-miles for the purposes of modeling the UP-NS Operating Plan. Thus, the UP-NS Operating Plan shows 383,000 diverted merchandise/bulk cars.

A merged UP-NS network would open new direct rail service for shippers wanting to move goods between states that previously required two railroads for the movement. We estimate there are over 100 such state-to-state pairs where the total traffic in both directions exceeds 1,000 loaded cars per year. Lanes such as Ohio-Texas, California-New Jersey, Iowa-Pennsylvania, and Minnesota-North Carolina are some of the state pairs where shippers would be able to leverage new single-line rail service. Exhibit 7-4 provides the top 15 state pairs, which account for 28% of total diversions; the other 72% of diversions are distributed across many state combinations – an indication of the nationwide benefits shippers could realize from the first US transcontinental railroad.

[95] See workpaper "All_Results_vF.xlsx."

Exhibit 7-4: State-to-state carloads diversions of rail and truck traffic to UP-NS[96]
Totals are loaded cars in both directions

State pairs	Diversions sum of both directions	Cumulative share
OH<->TX	14,940	3.5%
AL<->TX	10,745	6.0%
NJ<->TX	9,700	8.3%
MI<->WY	9,520	10.5%
GA<->TX	9,489	12.8%
IN<->TX	9,434	15.0%
MI<->TX	9,338	17.2%
PA<->TX	7,943	19.0%
TN<->TX	7,540	20.8%
CA<->NJ	6,231	22.3%
CA<->OH	6,153	23.7%
IA<->NJ	5,503	25.0%
SC<->TX	5,450	26.3%
NC<->TX	5,238	27.5%
GA<->LA	5,188	28.7%

A small sampling of the industries we expect to benefit from a UP-NS system include:

- Food products shippers that could utilize faster, direct rail service from producing states like Iowa, Nebraska, and California to move products to US Northeast and Southeast consumers;
- Chemical manufacturers moving products from the Chemical Coast in Southeast Texas and Southwest Louisiana to Ohio, Pennsylvania, and Georgia;
- Petroleum refineries in Texas and Louisiana moving refined products to consumers in the US Northeast and Southeast;
- Shippers of non-metallic minerals moving products from Wisconsin to Ohio and North Carolina; and
- Lumber producers moving products from Arkansas to Virginia and Georgia.

[96] Cumulative percentage based on total of 425,000 diverted carloads. See workpaper "All_Results_vF.xlsx."

8. Revenue

We calculated revenue after the estimated rail-to-rail, truck-to-rail, and intermodal long-haul drayage diversion traffic had been consolidated and processed for the UP-NS Operating Plan. (See Appendix C for details.)

To estimate revenue, we used a revenue-per-ton mile figure calculated from the CCWS and multiplied that by the miles traffic would travel on the UP-NS network for that route, as calculated within the UP-NS Operating Plan. We subtracted any pre-existing revenue that would be offset as a result of any extended haul rail-to-rail or long-haul drayage diversions. Appendix C.3 provides full details on this calculation. Note that there are rail-to-rail diversions for commodities that move on UP or NS in bulk trains (e.g., frac sand). This is why the bulk offsets exceed the bulk gains, because some offsets to merchandise traffic are captured here.

The expected revenue impact is shown in Exhibit 8-1. We estimate that the diverted traffic will generate $4.2 billion in revenue, with more than half (approximately $2.2 billion) coming from all intermodal diversions. Overall, the primary contributor to revenue uplift is diversion from trucks, which is anticipated to account for 63% of total new revenue.[97]

Exhibit 8-1: Total diversion revenue estimate[98]
$ millions

Service type	Rail-to-rail	Truck-to-rail	Long-haul drayage	Offsets	Net revenue
Merchandise	$1,059.6	$1,213.9	$0	$364.5	$1,909.0
Intermodal	$378.4	$1,995.2	$112.8	$298.7	$2,187.7
Bulk	$126.7	$0	$0	$128.6	-$2.0
Automotive (multilevels)	$213.6	$22.2	$0	$116.5	$119.4
Total	$1,778.3	$3,231.3	$112.8	$908.3	$4,214.1

[97] 3,231 million truck-to-rail / (3,231 million truck-to-rail + 1,778 million rail-to-rail + 113 million long-haul drayage).
[98] See Appendix C.2 for explanation of why bulk revenue is reported as a net loss. See workpaper "Revenue_Calculation_vF.xlsx."

VERIFICATION

I, David T. Hunt, declare under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this statement.

Executed on this 18th day of December, 2025.

David T. Hunt
Vice President
Oliver Wyman

VERIFICATION

I, Matthew Schabas, declare under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this statement.

Executed on this 18th day of December, 2025.

MES

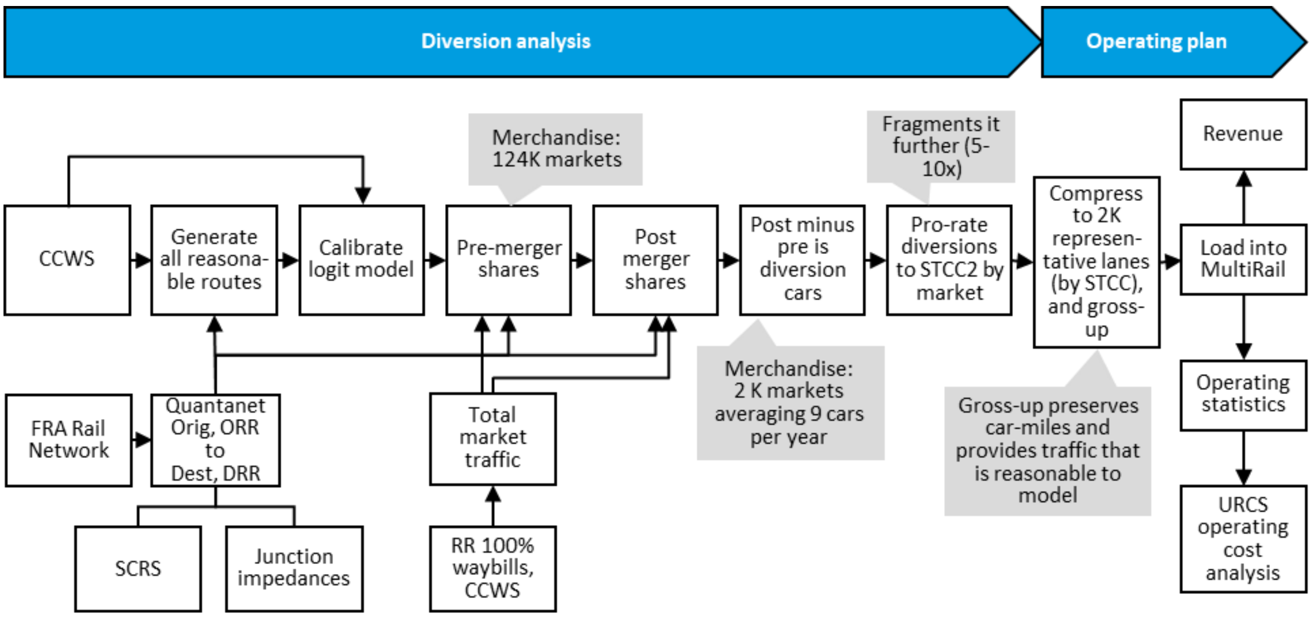
Matthew Schabas
Principal
Oliver Wyman

Appendix A. Rail-to-Rail Diversion Model

A.1. Overview

The elements of Oliver Wyman's rail-to-rail model appear below in Exhibit A-1 and are described in detail in the following sections.

Exhibit A-1: Oliver Wyman rail-to-rail diversion model overview



We estimated the likely diversion of rail traffic to a combined UP-NS system by examining the network improvements that the merger could achieve relative to other potential rail options. The key assumptions used in modeling the potential rail-to-rail diversions due to a UP/NS merger are:

- A market is defined as an origin, destination, and service type.
- Impedance[99] and junction frequency[100] are surrogates for price, reliability, and transit time, which are properties that influence shipper route choice selection.

[99] Total route impedance = miles + interchange penalties in miles.
[100] The number of interchanges a rail route contains.

A.2. Rail Traffic Sources

In the analysis, we relied on traffic flows from the 2023 CCWS and a merged traffic file that combines 100% of the 2023 waybills from four Class 1 railroads (UP, NS, BNSF, CN) that were available at the time this analysis was prepared.[101] We consolidated these waybills with the CCWS to produce a 2023 traffic base of record that captured rail shipments more precisely than the CCWS alone. This increased fidelity comes in part from accurately capturing the full route of a shipment, even for Rule 11 shipments.[102] In the CCWS, the full path of a shipment is not captured when Rule 11 is invoked (i.e., the shipment is rebilled); whereas in the actual waybills the true origin and destination are captured even if the shipment is rebilled.

Rule 11 has significant implications for calculating diversions, since understanding the full path of a move is essential for determining if and how a shipment would theoretically divert in a post-merger state, as well as sizing the extent of interline traffic between carriers. This was especially important for a transcontinental merger, since most rebills occur at the interchanges within the watershed region, such as Chicago, Memphis, St. Louis, and New Orleans. Therefore, by relying on 100% waybills for the Class I carriers for which we had data, we were able to provide the model with more accurate inputs for current-state rail traffic. For this same reason, we removed rebilled records from CCWS, since they only capture part of the full movement, leaving only records where the rebill code = 0. Given we did not have 100% waybills for CPKC and CSXT at the time we created the consolidated file, the interline traffic between these two

[101] BNSF and CN traffic tapes were both provided to Applicants' counsel in September. Although CSX later in October provided its 100% traffic tape, Oliver Wyman had already begun the process of consolidating waybills. CPKC did not provide its 100% traffic tape.

[102] Rule 11, commonly known as the Freight Mandatory Rule, allows railroads to rebill deregulated traffic for quicker revenue settlements and competitiveness. This accounting method, primarily seen in waybills, gives the appearance of local movements while actually indicating long-distance traffic rebilled in key locations like Chicago. The rebilling process can lead to overstated tonnage and carload units, as each rebilled waybill effectively double counts the originating shipment, while understating the length of haul in the data. See 2023 STB Waybill Reference Guide, p. 186 for a complete Rule 11 overview.

carriers (estimated at 17,000 carloads) was omitted from the final output, because we could not accurately capture their interline traffic that did not involve one of the Class I railroads for which we had 100% waybills. The other advantage of creating a 2023 traffic base of record with available 100% waybills is that these records fully capture 2023 rail shipments, rather than relying on an extrapolated sample from the CCWS.

Charles River Associates ("CRA") provide a de-duplicated UP-NS interline file, which enabled combining the UP and NS 100% waybill files without double counting UP-NS interline moves. We then processed the 2023 waybills from BNSF and CN as follows:

- Assigned service type to all records based on the definition used by the agency[103]
- [BNSF only] Translated 333 location names to FSAC, SCAC, and SPLC using the Railinc North American Station Master provided by NS and UP and manual mappings. Less than 1% of records were not positively identifiable and were dropped.
- [CN only] Dropped all records involving NS and UP to prevent redundancies
- [BNSF only] Dropped all records involving NS, UP, and CN to prevent redundancies

We then processed the CCWS according to the following procedure:

- Stitched artificial Canada-US border crossings for CPKC and CN traffic to reconcile duplicate records (i.e., removed references in the CCWS to CNUS and CPUS, and adjusted the junction frequency)
- Dropped all records involving NS, UP, CN, and BNSF from the CCWS to prevent redundancies

[103] STB 2023 Carload Waybill Sample Reference Guide, March 5, 2025, p. 63.

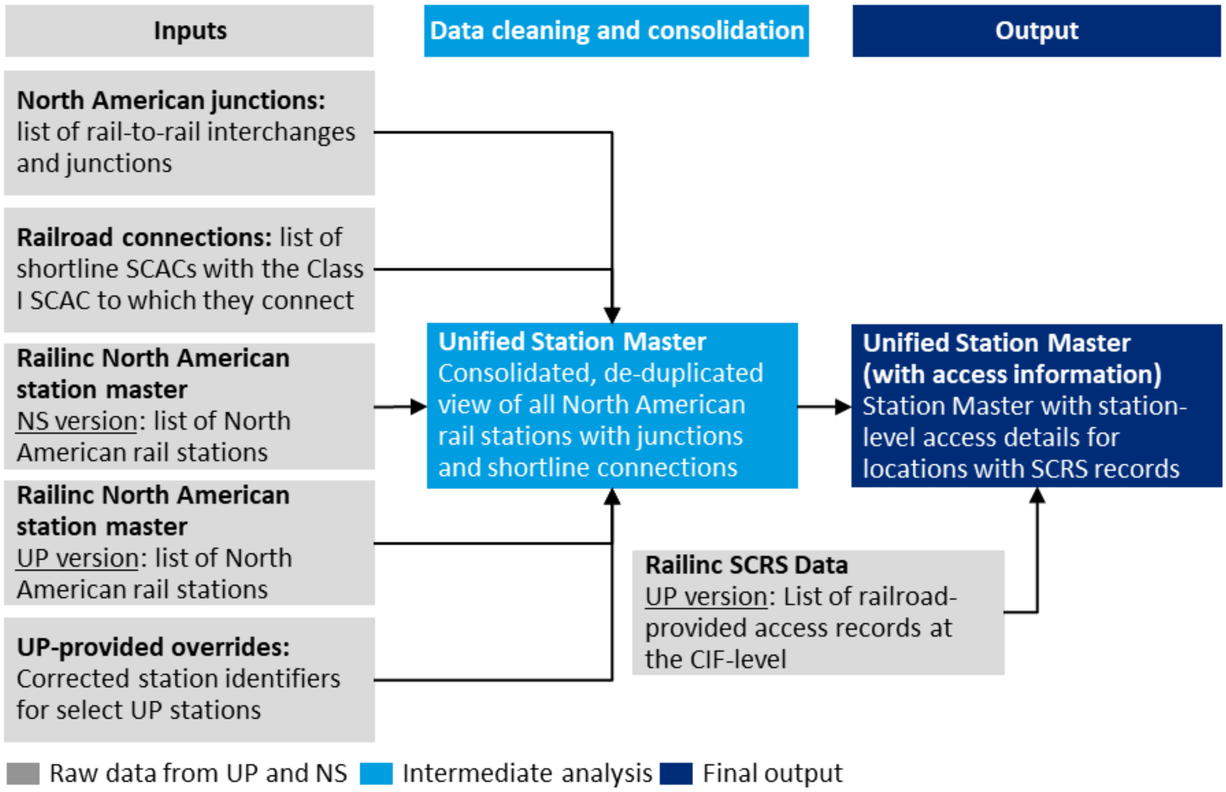
- Included only local traffic (i.e., not a Rule 11 shipment) or interline traffic where Rule 11 was not invoked (i.e., rebill = 0) to mirror the true origin and true destination provided in the 100% waybills
- Dropped approximately 17,000 carloads of interline traffic between CPKC and CSXT, since we did not have 100% waybills for these carriers, so their mutual interline traffic could not be accurately captured from CCWS alone.

A.3. Station Master and SCRS Database Creation

Railinc maintains both a North American Station Master and a Serving Carrier Reciprocal Switching ("SCRS") database. The former is intended to serve as a comprehensive list of rail stations in North America by Freight Station Accounting Code ("FSAC") and Standard Carrier Alpha Code ("SCAC"). SCRS is a compilation of Customer Identification Files ("CIFs"), which are railroad-provided records of individual shipper agreements at a given facility that dictate access and reciprocal switching rights at a location for a specific shipper. To understand the competitive implications of the merger, we generated a Unified Station Master with station-level access information where available (Exhibit A-2).[104] In doing so, we were able to categorize the stations as sole-served, multi-served, or "mixed," meaning a combination of the two, based on shipping agreements. Ultimately, this file provides a framework for identifying where the competitive landscape could theoretically shift in a post-merger state.

[104] See "20250902 Unified Station Access Master v1.1_SCRS.csv."

Exhibit A-2: Unified station access master database creation



To create a comprehensive Unified Station Master, we aggregated and deduplicated the NS and UP versions of Railinc's North American Station Master provided by NS and UP, including OpSta (NS) and CIRC 7 (UP) codes where available. Certain stations in the input data are no longer in service, meaning there are more locations in the consolidated Station Master than appear in the 2023 waybills from NS and UP.

To add access information at a given station, we mapped Railinc's SCRS data provided by UP to assign an access type at each station (open, restricted, local, or closed) based on the CIFs associated with each station.[105] For stations with multiple CIFs having conflicting access types, we assigned a station-level access category of "mixed" and listed the constituent CIF access

[105] "Open" is open to reciprocal switching; "Restricted" is conditionally open under specified conditions or only for selected commodities; "Local" only one carrier serves a location that is not within the switch limits of another station served by multiple carriers; and "Closed" is closed to reciprocal switching.

types. For CIFs with conflicting records, we trusted the least-restrictive access type for that CIF. There are more locations in the consolidated Station Master than in the input SCRS data; these additional stations do not have SCRS access information. For stations with SCRS data available, we included the list of known accessing carriers beyond the named serving carrier.

We used a list of North American junctions to add junction information for applicable stations. We also leveraged a list of railroad connections, which indicates to which Class I network a given interline connects, to populate "access via short line" columns for stations where relevant. We applied UP-provided overrides to update stations with missing or outdated identifiers (i.e., FSAC, latitude/longitude, etc.). We derived additional columns to identify alternate FSACs for co-located Class I stations at the same customer facility by identifying shared CIFs.

The final output was a Unified Station Master, which is a comprehensive list of North American rail stations with key identifiers and inferred access information based on CIF-level records associated with a given station in the SCRS data when available.

A.4. Market Definition

We defined markets at either the city (based on SPLC) or Business Economic Areas ("BEA") level to reflect the physical and commercial drivers of each rail service. Merchandise and bulk (service types 1 and 3) markets are city-to-city[106] to capture local competition and station access. Automotive (service type 4) markets are city to BEA to reflect plant origins serving broader regional markets, Intermodal (service type 2) markets are BEA to BEA to better represent the broader competitive geographic regions for intermodal origins and destinations. We

[106] A 6-digit Standard Point Location Code (i.e., SPLC) is used to refer to a city or municipal region.

relied on the CCWS/PUWS assignment of FSAC-county Federal Information Processing Standards ("FIPS") to BEA mappings, with adjustments for intermodal.[107]

We used a 6-digit SPLC, which represents a city, as the origin and destination locations. Freight stations (i.e., FSACs), representing customer locations or other traffic generators, were aggregated within a SPLC, allowing railroads to compete for traffic. To more accurately reflect competition, the SCRS file was used to identify which FSACs are open or closed, and which railroads have access. Traffic at closed FSACs was not considered for diversion to another railroad at the closed station.

The origin, origin railroad, destination, and destination railroad are referred to as a "quad." For each unique quad, the route with the minimum cost (impedance) was selected (see Appendix A.6.4). For each origin and destination, we identified the railroads that can serve that location, using the Station Level SCRS Consolidation file for automotive, merchandise, and bulk traffic. For intermodal traffic, we determined which FSACs and SCACs have intermodal service based on the presence of intermodal traffic within the CCWS. For automotive traffic, we used all FSACs with terminating automotive traffic in a BEA to determine which railroads to include in the available quads. Service types follow Board definitions.[108]

A.5. Generation of Feasible Routes

We calibrated and executed the rail-to-rail diversion model on a set of feasible routes based on combinations of railroads serving the origin and destination SPLC. All historical traffic revenue routes are included in the calibration phase.

There also are competitive routes with no historical volume included in the analysis. Incorporating these competitive routes with no historical volume ensures the analysis reflects

[107] Adjustments are listed within Appendix D.1.
[108] 1 – General Merchandise; 2 – Intermodal; 3 – Bulk, 4 – Automotive.

competitive rail options that existed but were unused for whatever reason in the base year. This approach enables more realistic calibration, since there may be some routes with no volume that have a lower impedance and/or fewer interchanges than the routes selected by the shipper. Also, in the post-merger scenario, it generates competitive UP-NS routes where that railroad combination did not move traffic pre-merger.

We eliminated competitive routes with no historical volume that are not viable based on the following set of competitiveness criteria:[109]

- Multicarrier routes in intranodal markets (i.e., same SPLC), as no diversions are allowed to occur in the model if the origin and destination locations are identical.
- Multicarrier routes where the origin or termination railroad can offer local service in the market.
- Multicarrier routes where the originating or terminating railroad can offer local service within its railroad family in a market.
- Multicarrier routes where the total impedance (total rail miles plus interchange penalty, see Appendix A.6.4) is more than twice the minimum impedance in the market, to avoid assigning share to routes that are not competitive.

These rules are conservative to retain possible competitive routes while eliminating non-competitive combinations.

We then combined railroads with different reporting marks into one "family," so the model calculates junction impedances and competitive routes with no historical volume as if the railroads in a family are a single system (Exhibit A-3). While CN, CPKC, and CSXT all include

[109] See FD 32549, Verified Statement of Mark Hornung of ALK Associates.

railroads within their corporate family, we also combined reporting marks for BNSF and Montana Rail Link.

Exhibit A-3: Railroad reporting mark combinations[110]

Railroad family	Combined reporting marks
CN	CN, CNUS, IANR
CPKC	CPKC, CPRS, CPUS, KCS, KCSM
CSXT	CSXT, PAS, ST
BNSF	BNSF, MRL

A.6. Rail Mileage Calculation

A.6.1. Overview

To isolate the impacts of the merger on price, reliability, and transit time – properties that influence shipper route choice selection – we established a clear baseline (pre-merger) and a corresponding future state (post-merger). We used Oliver Wyman's proprietary software, Quantanet, to compute both route mileage and interchange penalties (impedance) across the quads, which allows the model to keep routing logic constant across scenarios while varying only the junction impedance assumptions that change under the merger. The cost and service quality, represented by total route impedance and junction frequency, were subsequently used in statistical analyses.

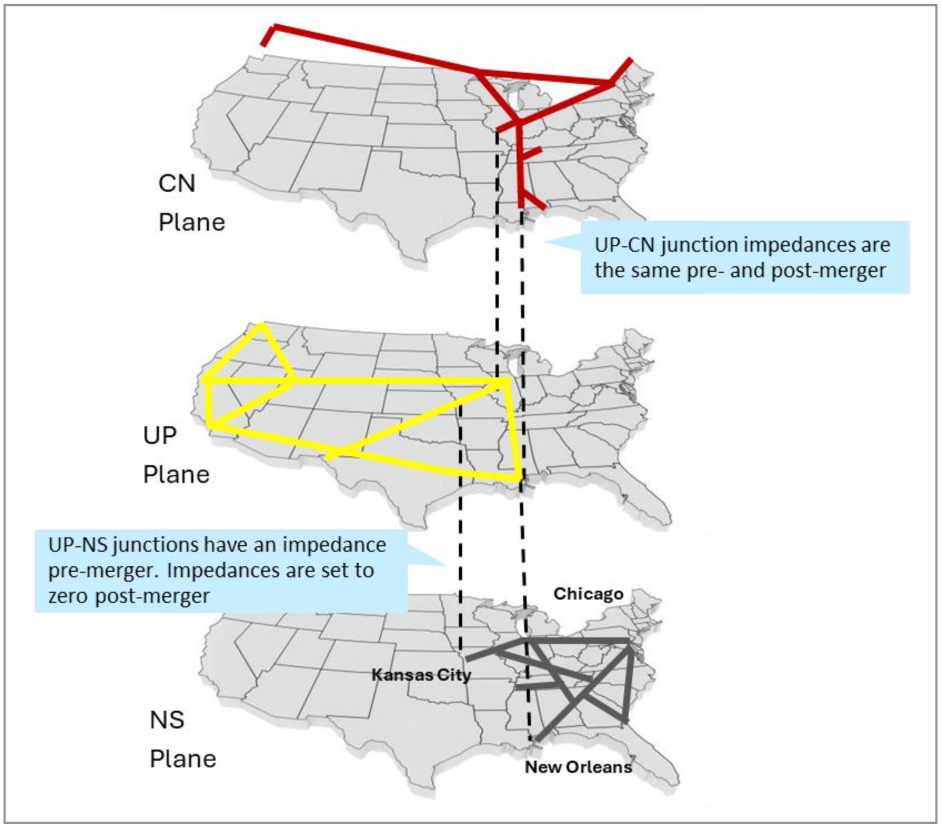
A.6.2. Quantanet Description

Oliver Wyman's Quantanet uses the Federal Railroad Administration ("FRA") North American Lines and Nodes[111] as the base network in a path-finding software module. We used Quantanet to estimate, for each route in the waybill file, rail miles, total route impedance, and the number of interchanges (Exhibit A-4).

[110] See workpaper "Railroad families.xlsx."
[111] FRA nodes represent stations where freight can originate or terminate, while FRA lines represent track segments that one or more railroads can operate under trackage rights.

For each origin station and carrier to each destination station and carrier in the rail traffic file described in Appendix A.2, Quantanet calculates the least impeded path between the origin and destination nodes on the network. The least impeded path is the path that minimizes the total impedance.

Exhibit A-4: Oliver Wyman Quantanet (illustrative)



A.6.3. Geocoding Procedure

Each rail station, defined as a unique combination of FSAC and SCAC, needs to be assigned (i.e., geocoded) in Quantanet. This is accomplished by selecting the closest FRA node that is served by the specific railroad in the Unified Station Master. Rail stations that cannot find a match within 50 miles of their established location within the Unified Station Master are added to a list of stations that cannot be accurately geocoded. Any generated quads with originating or terminating participation in this list are removed as viable competitive candidates due to bad quality data. This screening removed approximately 3% of merchandise, bulk, and automotive routes, and approximately 2% of intermodal routes, with no impact on volume.

A.6.4. Junction Impedances

Junction impedances refer to the impedance assigned to a rail path as a penalty for interchanging. The junction impedances are based on the volume of loaded units per day (Exhibit A-5).

Exhibit A-5: Junction impedances based on 2023 CCWS interchange volumes[112]

	Junction impedance (mileage equivalent)	Notes
No impedance at the interchange	0	Same family
<2 loaded units/day	650	<730
2 to 10 loaded units/day	550	730 to <3,650
10 to 50 loaded units/day	450	3,650 to < 17,800
>50 loaded units/day	350	17,800+
Run-through intermodal unit train	90	Reflects a 3-hour delay to change crews

We balanced junction impedance at each interchange so that all carriers that are not in the same corporate family receive the same penalty at that location. For example, if pre-transaction volumes imply CN/UP should have an impedance of 350 and CN/BNSF should have 450 at the same location, we set both to 350 to preserve fair competition among carriers.

There are some junctions known to have traffic restrictions. The junction impedance between UP/NS at Shreveport is set to 10,000, to restrict access to non-intermodal traffic interchanging at Shreveport, as this type of interchange is not available today. A separate intermodal junction impedance table was used for intermodal to ensure the model does not create intermodal routes through non-intermodal gateways (e.g., New Orleans, LA does not have any steel-wheel intermodal interline service).

112 See workpaper "CCWS interchanges.xlsx."

To model the improvement of rail service before and after the UP/NS merger, junction impedances between the UP and NS were reduced from their pre-merger impedances to 0. Additionally, a 0-impedance junction was added at Sidney, IL to reflect the additional possibility of single-line service through that interchange location. This gateway between the legacy UP and legacy NS networks is used in the UP-NS Optimized and Growth Operating Plans to introduce new train service which increases car velocity and bypasses the Chicago gateway, so it is right to introduce it in the post-merger network.[113]

A.6.5. Run-Through Haulage Adjustments for Junction Impedance

Run-through intermodal trains with haulage agreements operate closer to a crew change than a regular interchange, which we reflected with a lower impedance than the standard 350 miles-equivalent for an interchange with >50 loaded units per day. This is set at 90-mile equivalent, which represents three hours at an average train speed of 30 miles per hour, as a realistic representation of the additional complexity from the hand-off. In the future state, we removed one interchange from the Meridian Speedway for the traffic via Shreveport, because it changes from three carriers (i.e., UP, NS, CPKC) to two carriers (UP-NS, CPKC) and is a short bridge move. This was validated with both railroads operations departments.

The following adjustments are made to route impedances to better reflect the penalties of run-through haulage agreements being lower than true interchanges:

- Intermodal
  - The UP-CPKC-NS interchange lanes via Shreveport, LA onto the Meridian Speedway receives 180 impedance in the pre-merger case (interchange at Shreveport, LA and

[113] STB Finance Docket No. 3687, Operating Plan Verified Statement, op. cit.

Meridian, MS), and 90 impedance post-merger (simplified to a UP-CPKC haulage agreement).

- The BNSF-CSX interchange at Birmingham receives 90 impedance in both the pre- and post-cases for the BNSF lanes to/from Atlanta Fairburn and the Southeast.
- All BNSF-CSXT traffic between BNSF's Los Angeles terminals and CSX's NW Ohio terminal in North Baltimore, OH receives 90 impedance.

  The NS-KCS interchange at Meridian receives 90 impedance for lanes to/from the Wylie terminal in Dallas, TX.

- All service types: All routes that include NS and Ayer, MA receive 90 impedance.

A.7. Rail Logit Model

A.7.1. Overview

We used a multinomial logit model, a form of logistic regression,[114] to estimate the market share a particular route would receive based on the characteristics of total route impedance and junction frequency.

A.7.2. Calibration

We calibrated the rail-to-rail diversion model using CCWS instead of the 2023 traffic base of record, so the model is not skewed by the influence of any single shipper or regional market that is of higher resolution in the complete waybill data. This data collection of modal characteristics is based on the total route impedance, which is the total rail distance plus any penalties added at interchanges, as well as the number of rail-to-rail interchanges, collected from Quantanet.

[114] A standard textbook describing the nested logit model is Discrete Choice Analysis: Theory and Application to Travel Demand, op. cit., see Chapter 10.

Instead of using the absolute values of total route impedance and junction frequency, we computed a market's minimum impedance and its junction frequency, then indexed every route in that market to those minimums using the formulas below, to ensure that the features of total route impedance and junction frequency are treated equally and, on a market-by-market basis. We used the indexes because it reflects the percentage difference to the market regardless of the length of haul. The formulas for indexing impedance and junction frequency are as follows:

$$Indexed\ impedance = \frac{Total\ route\ impedance}{Market\ minimum\ impedance}$$

$$Indexed\ junction\ frequency = \frac{Route\ junction\ frequency + 1}{Market\ minimum\ junction\ frequency + 1}$$

With an indexed impedance and indexed junction frequency for every route in every valid market, we calculated coefficients alpha (α) and beta (β) that minimize the sum of squares between the predicted market shares and the actual market shares, given the following formula:[115]

$$S_i = \frac{e^{-\alpha x_i - \beta y_i}}{\sum_{i=1}^{n} e^{-\alpha x_i - \beta y_i}}$$

Where:

S_i = Predicted share for route i

α = Calibrated coefficient for indexed impedance

x = Route indexed impedance

β = Calibrated coefficient for indexed junction frequency

y = Route indexed junction frequency

n = Number of rail routes in market

This yields the following calibrated coefficients for the execution of the logit model (Exhibit A-6).

[115]Discrete Choice Methods with Simulation, Second Edition, Cambridge University Press, Train, Kenneth E., pp. 37-38.

Exhibit A-6: Calibrated coefficients for logit model[116]

Service type	Merchandise	Intermodal	Bulk	Automotive
Alpha (Impedance)	1.5689	1.7919	2.6284	0.0157
Beta (Jct. Freq.)	3.0995	0.5536	4.6150	3.1134

The use of impedance and junction frequency to identify the routes most likely to be selected by shippers is consistent with what is seen in the calibration data. Exhibit A-7 categorizes records as either having the market minimum impedance or not, as well as a share equal to the maximum historical share of the market or not.

Exhibit A-7: Percentage of calibration records by low impedance and maximum share of market criteria[117]

Market segment	Lowest impedance	Non-lowest impedance
Merchandise		
Max share of market	56%	6%
<Max share of market	5%	33%
Intermodal		
Max share of market	18%	13%
<Max share of market	13%	56%
Bulk		
Max share of market	69%	3%
<Max share of market	3%	25%
Automotive		
Max share of market	41%	9%
<Max share of market	10%	40%

If we consider a "positive match rate" to include routes where either the max-share/low impedance or non-max share/non-low impedance condition holds, Exhibit A-8 shows the match rate table produced for impedance, with all service types scoring over 70% matches. Exhibit A-9 shows a similar analysis comparing historical market share to junction frequency.

116 See workpaper "HC Filtered CCWS Calibration.xlsx."
117 Ibid.

Exhibit A-8: Percentage of calibration records by service type, where the positive match rate criteria holds for impedance[118]

Service type	Meets positive match rate criteria, impedance
Merchandise	89%
Intermodal	74%
Bulk	94%
Automotive	81%

Exhibit A-9: Percentage of calibration records by low junction frequency (JF) and max share of market criteria[119]

Service type	Lowest JF	Non-lowest JF
Merchandise		
Max share of market	60%	1%
<Max share of market	12%	27%
Intermodal		
Max share of market	30%	1%
<Max share of market	59%	10%
Bulk		
Max share of market	72%	0%
<Max share of market	7%	21%
Automotive		
Max share of market	50%	0%
< Max share of market	29%	21%

Merchandise, bulk, and automotive traffic all exhibit positive match rates above 70%, while intermodal is lower at 40% (Exhibit A-10). The 59% of intermodal routes with the lowest junction frequency and sub-maximal market share reflects that many of the largest intermodal lanes are single-line (e.g., Los Angeles-Chicago and Los Angeles-Dallas). Where interline intermodal rail service has been able to capture share has been in run-through service, such as NS-CPKC on the Meridian Speedway.

[118] Ibid.
[119] Ibid.

Exhibit A-10: Percentage share of calibration routes by maximum share of market and lowest market junction frequency status[120]

Service type	Meets positive match criteria, junction frequency
Merchandise	87%
Intermodal	40%
Bulk	93%
Automotive	71%

A.7.3. Execution

We used the calibrated coefficients on the 2023 traffic base of record to estimate the market share of each route using the pre-merger and post-merger total route impedances and junction frequencies indexed to the market minimums. If no routes in a market were altered based on the changes to Quantanet, no diversions would occur in that market. In markets where UP-NS would lower the market minimum impedance and number of interchanges, traffic would be attracted to the UP-NS network, resulting in a diversion. The change in the predicted share of the market a route receives multiplied by the market size (e.g., number of carloads) becomes the amount of diverted traffic**.** If rail shares increase on one route, the model output will show the rail share decreases on other routes.

For merchandise and bulk traffic, commodity allocations were applied based on the historical percentage of flows of each commodity in every market for revenue calculations. Automotive traffic was assigned to STCC2 code 37 (i.e., transportation equipment), and intermodal traffic was assigned to STCC2 code 46 (i.e., miscellaneous mixed shipments).

We excluded certain flows from the top-line diverted car totals to focus on traffic that can realistically divert on the combined UP-NS network:

[120] Ibid.

- Intermodal markets between Dallas and all Southeast BEAs, because NS offers interline service with CPKC haulage on the Meridian Speedway, which will not change post-merger.
- Intermodal diversions in origin-destination lanes that do not carry at least 4,280 units per year (i.e., 12 units per day) across existing traffic, rail-to-rail intermodal diversions, truck-to-intermodal diversions, and long-haul drayage diversions, less the impact of offsets.
- Automotive flows that originate or terminate in Amarillo, Jackson, Indianapolis, Scottsbluff, Fargo–Moorhead, Billings, Chattanooga, and Belvidere, and automotive flows that terminate in Warren, OH, due to lack of auto-ramp access on the combined UP-NS network.
- Automotive flows that originate or terminate in Greensburg or Indianapolis, as trackage rights with CSXT would not be used to divert this traffic.
- Automotive diversions from CSXT in the Chicago area, because these are considered unlikely to divert.
- Automotive flows terminating in Lordstown, because the NS ramp is idled and would not be reopened for this volume.
- Automotive flows in markets with less than 10 cars per year.
- Automotive flows that terminate in the following BEAs could not be destinations of loaded multilevels for diversions: Indianapolis IN (067), Nashville TN (071), Mobile AL (077), Minneapolis MN (113), Oklahoma OK (138), South Dakota (142), and Montana (144).

A.8. Rail-to-Rail Final Diversions and Traffic Compression

Although the rail-to-rail model was calibrated to minimize the differences between historical and model estimated pre-merger shares, no model can exactly replicate historical market shares by route. Individual shippers rarely split their traffic between competing routes, as the contract rate model favors selecting a single vendor for a period of time.

Consequently, the rail-to-rail diversion opportunity is sized by comparing the routes that UP-NS participate in pre-merger and post-merger. The model vs. model difference between the two is the forecast diversions for the route. This is irrespective of the existing market share that UP-NS already hold. It is important, particularly for the merchandise service type, that the bottom-up analysis from the SPLC-SPLC level is most appropriate to view in aggregate. The model predicts share shift market-by-market and the overall net increase in share is what is important. Overall, we expect that post-merger market share for UP-NS will increase by 15-26%, depending on service type.

In aggregate across all markets, rail-to-rail model pre-merger estimates of UP-NS predict the higher market share UP-NS had historically in the set of lanes where service will improve post-merger (Exhibit A-11). This results in post-merger traffic shares (actual UP-NS traffic plus diversions) generally below what the model predicts post-merger, had the difference in the model pre- and post-estimates simply been applied to the existing historical UP-NS share. This gives confidence that the additional cars from rail-to-rail diversions are a realistic projection for post-merger share shift. We assume that some of the difference between model pre-merger prediction and the historical traffic reflects commercial agreements, SCRS industry access, and other factors that are not captured in the model. These would continue to exist, and on average, result in a continued lower share than the logit model predicts.

Only in intermodal do the two railroads together outperform the UP-NS pre-merger model prediction by a small amount (33,000 intermodal units per year, or 90 per day). For context, this is less than 0.5% of the current combined intermodal units for UP plus NS (7.4 million after de-duplicating interline and removing rubber-tire conversions). There is more than sufficient other intermodal traffic across these markets (which total 1.2 million units) to consider this a realistic projection for the post-merger state.

The highest predicted market share post-merger is for automotive: 61%. A 46% market share in automotive was used for the UP-NS Operating Plan (actual traffic plus diversions) and revenue calculations. Given long-term, network-wide commercial agreements with automotive OEMs, continuing to have share below the model prediction is reasonable.

Exhibit A-11: Comparison of UP-NS historical traffic vs. rail-to-rail diversion model pre-merger and post-merger estimates[121]

Thousands of carloads/intermodal units

	Total market	Actual UP-NS carloads	Model: Est. UP-NS carloads pre-merger	Model: Est. UP-NS carloads post-merger	Diversions (post- minus pre-)	Traffic (actual UP-NS + diversions)	Diff: traffic minus post-
Merchandise	780	252	277	439	162	414	(25)
Intermodal	1,217	379	346	550	204	583	33
Bulk	192	53	87	115	28	81	(34)
Automotive	201	41	72	124	52	93	(31)
Total	*2,390*	*725*	*782*	*1,228*	*447*	*1,171*	*(57)*

Percentage of market

	Total market	Actual UP-NS cars	Model: Est. UP-NS share pre-merger	Model: Est. UP-NS share post-merger	Diversions (post- minus pre-)	Traffic (actual UP-NS + diversions)	Diff: traffic minus post-
Merchandise	100%	32%	36%	56%	21%	53%	-3%
Intermodal	100%	31%	28%	45%	17%	48%	3%
Bulk	100%	28%	45%	60%	15%	42%	-18%
Automotive	100%	20%	36%	61%	26%	46%	-15%

The model predicts the diverted traffic on a SPLC-to-SPLC basis. The nature of the merchandise segment is that the traffic is highly fragmented (21,000 merchandise markets have diversions). When adding STCC2 to the records by prorating using historical commodity proportions, this further fragmented the traffic lanes. Since we used the pre- versus post-

[121] Note: Except intermodal, UP-NS underperforms theoretical model pre-merger, total traffic is less than model prediction, and where UP-NS share of markets in estimated to be 50% or less is generally where UP-NS plans to offer new single-line service. See workpapers “R2R_Merchandise_Bulk_Diversions_vF.csv.”, R2R_Auto_Diversions_vF.csv,” and “Intermodal - R2R highly confidential.xlsx.”

calculation to predict diversions, the outputs are best viewed in aggregate, and we took the practical step to compress the traffic into approximately this data. As described further in Appendix C.1, we algorithmically identified ~2,000 lanes to represent the diversions in a way which the operating plan could model effectively. The 2,000 lanes are the largest origins to destinations by volume across the different STCC2 codes. The volume of diversions on these lanes was adjusted to ensure that the total car-miles, by STCC2, for the diversions were retained. The 2,000 representative lanes were then used to estimate revenue.

A.9. Estimated Diversion Impact on Other Railroads

We estimated the net change in carloads handled from rail-to-rail diversions to estimate the UP–NS merger impact on each railroad. Where a route would lose diverted carloads to the UP-NS network, we treated every reporting railroad on that route as losing the handlings of the diverted car count.

Conversely, where a route would gain diversions, we treated every reporting railroad on that route as gaining the number of handlings. The gain or loss of carloads handled does not sum to the total diversions, because each carload handled applied to each railroad on the route that would lose cars. For example, when traffic shifts from a BNSF-CSXT routing to a UP-NS routing in the model, the diverted carloads are recorded as reductions for both BNSF and CSXT. As a result, the aggregate diversions reported for CPRS, KCS, and KCSM overstate the net impact on the combined CPKC network, because the 2023 waybill data reports each SCAC as a separate railroad, and no adjustments were made to consider other railroad families as single entities. The net change in carloads handled (i.e., carloads handled gained – carloads handled lost) is reported for each railroad family member.

Appendix B. Truck-to-Rail Diversion Model

B.1. Freight Market Sources

B.1.1. Transearch, S&P Global Markets, 2023

The truck traffic data for the truck-to-rail analysis came from the Transearch, S&P Global Markets, 2023 freight database, which includes essentially all freight flows within, into, and out of the United States with county-to-county geographic detail and commodities at a 4-digit STCC level, for seven modes of transportation.

Transearch is broadly used by private-sector transportation-related firms such as Class I and short-line railroads for market sizing purposes. Public sector users such as state departments of transportation also often use the database as a key input to federally mandated freight and rail plans. The database was developed 40 years ago and has been recognized as long-term market tested and proven, with validation quality control measures in place during each year's processing cycle. Transearch is constructed and released annually, where validation is performed using the Bureau of Transportation Statistic's Commodity Flow Survey ("CFS") and the Federal Highway Administration's Freight Analysis Framework ("FAF").

B.1.2. STB Confidential Waybill Sample, 2023

For our rail traffic source, we used the STB Confidential Carload Waybill Sample, 2023 ("CCWS"). We first processed the CCWS for data handling.[122] CCWS codes traffic for railroads Canadian National and Canadian Pacific differently, depending on whether it is in the US or Canada. To ensure the model treated them as a single railroad, we removed artificial junctions between Canadian National (CN) operating in Canada and in the US (CNUS), as well as junctions between Canadian Pacific Railway (CPRS) operating in Canada and operating in the

[122] See workpaper "Raw_CCWS_Processing_vF.ipynb."

US (CPUS). In this process, we also fixed seven data issues found during our review of the CCWS – instances of mismatches between railroad code and railroad names for the New England Central Railroad (NECR) and CSX.

Since Transearch is a county-to-county (FIPS-to-FIPS) geography and is based on sampled data, we opted to use the CCWS rather than the 100% data used in the rail-to-rail model. The purpose of the rail data was to establish county-to-county rail shares versus truck at a rail industry level rather than an individual railroad. The precision of the CCWS was sufficient for this purpose.

B.2. In-Scope Trucking

Transearch includes four truck-related transportation modes. We defined "trucks" as Truck Truckload and Truck Private (Domestic US traffic only), and Truck NEC (NAFTA traffic only). We did not include Truck Less-Than-Truckload (LTL) as part of this study, given this type of trucking includes multiple pick-ups and stops along the route and is not a type of truck traffic UP-NS would be likely to divert. LTL only makes up 187 million tons (2%) of total Transearch trucking (see Exhibit B-1). We believe these three truck modes are representative of all the domestic and transborder types of trucking that could be potentially impacted by the merger.

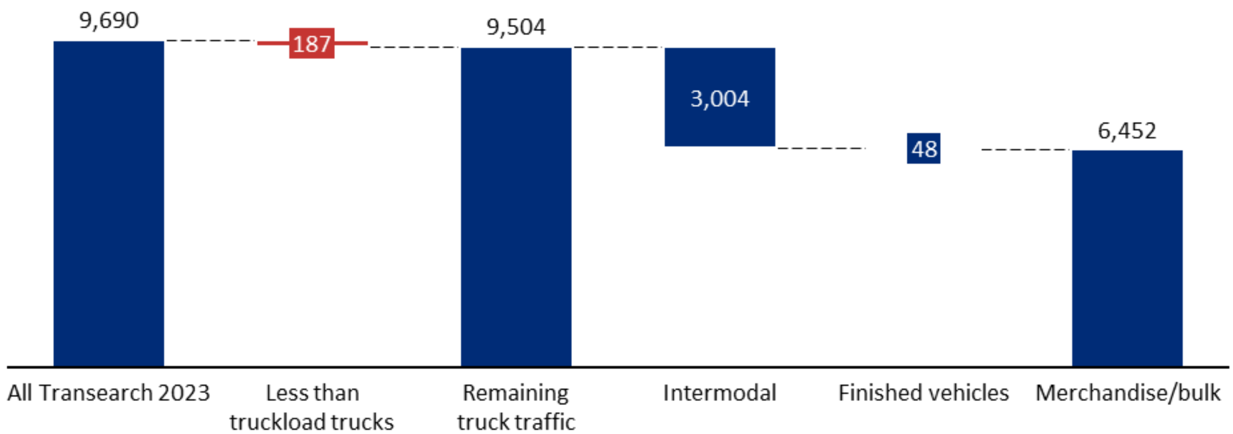
Exhibit B-1: Transearch truck transportation modes and total tonnage[123]

Num.	Description	Total tons (millions)	Included in analysis
4	Truck Truckload – Domestic US traffic only	5,085	Included
5	Truck Less-Than-Truckload – Domestic US traffic only	187	Excluded
6	Truck Private – Domestic US traffic only	4,206	Included
7	Truck NEC – NAFTA traffic only	212	Included

[123]Transearch, op. cit.; see workpaper "Transearch truck modes and tonnage vF.sql."

After excluding LTL from the Transearch truck traffic, the remaining truck traffic was broken across intermodal (31%), finished vehicles (0.5%), and merchandise/bulk (67%) (Exhibit B-2).

Exhibit B-2: Breakdown of Transearch trucking to intermodal, finished vehicles, and merchandise/bulk[124]
Millions of tons



These three types of traffic are segmented when calculating diversions due to the different geographic areas this traffic competes in, and because this represents different segments of potential business for the merged UP-NS. We estimated diversions separately across these three segments, as explained in the next three subsections. We segmented the traffic based on the following rules:

- **Finished vehicles:** Only STCC 3711 commodity, finished vehicle, was considered**.**
- **Intermodal and merchandise/bulk:** Transearch provides no visibility into the likely rail service that truck traffic would convert to; it only provides commodities and the truck equipment type. The best way to infer the likely rail service type (intermodal, carload, automotive, bulk) is the commodity. Based on the Public Use Waybill Sample, we calculated the frequency each STCC4 commodity travels in rail intermodal containers vs. carload. Any

[124] Transearch, op. cit.; see workpaper "Transearch trucking to IM, VIN, and merch vF.sql."

commodities with over 50% of their rail traffic in intermodal containers were treated as an intermodal-favored commodity.[125]

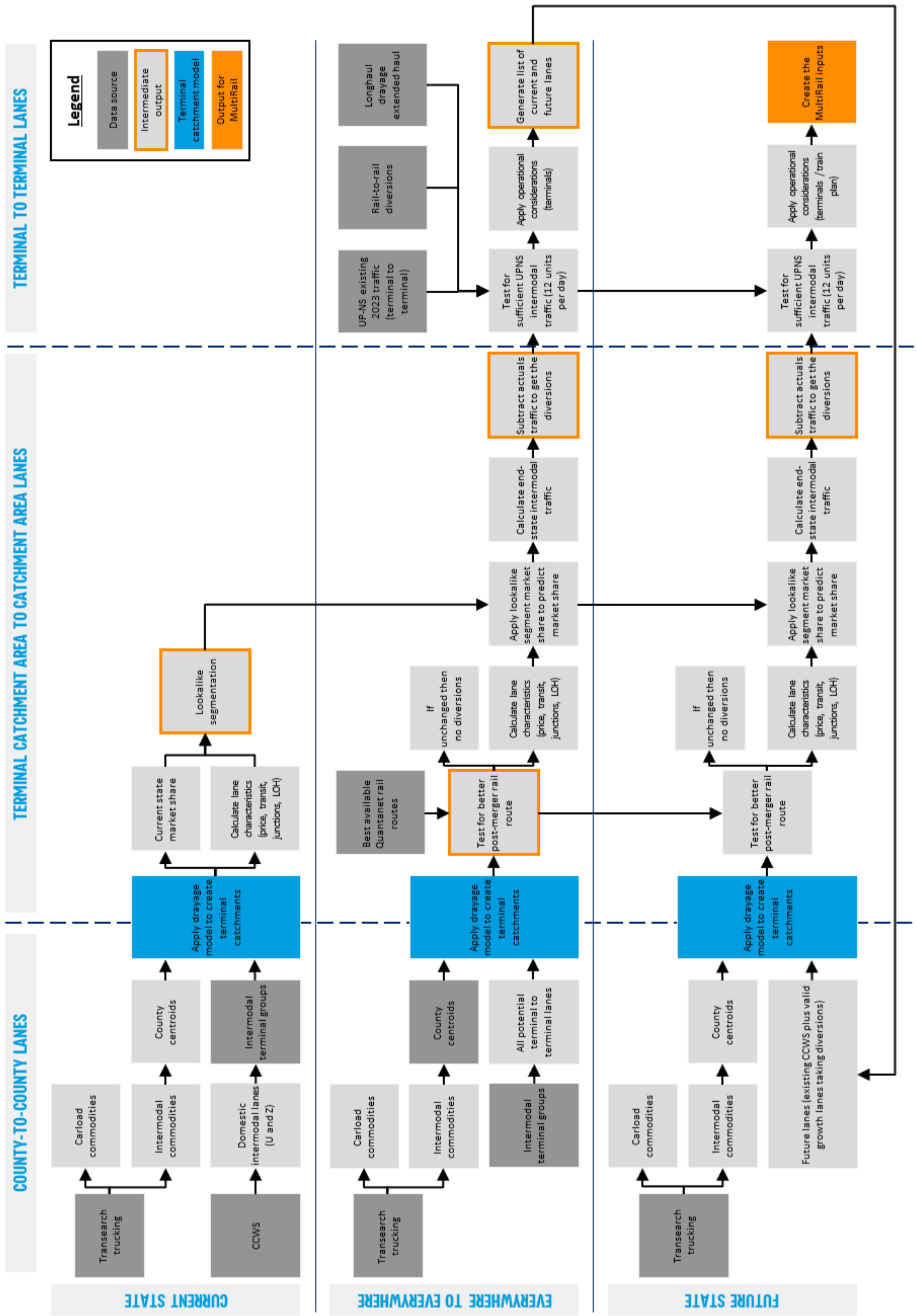
B.3. Intermodal Analysis

Exhibit B-3 illustrates the architecture of the truck-to-intermodal diversion analysis. This was an iterative three-step process:

1. The **current-state** intermodal share by lane of each lane's serviceable addressable market (truckloads plus intermodal units moving catchment to catchment) was calculated, for lanes where linehaul intermodal service is available based on the CCWS traffic, to calibrate the intermodal share by segment, after segmenting the lanes by price vs. truck, transit time vs. truck, length-of-haul, and interchange junctions.
2. The **everywhere-to-everywhere** opportunity was sized; this is where we first allowed linehaul service between every pair of catchment areas and tested for improvement in rail service as a result of the merger. For those which improved, we applied the modal share by segment and then tested for operational considerations to determine if new lanes are feasible.
3. The **future state** is based on linehaul rail service being available in the existing lanes (Step 1) plus the new lanes (Step 2). Segmentation and operational considerations were then applied, including converting the output to the exact terminal-to-terminal lane for use with MultiRail.[126]

[125] See workpaper "STCC4-CLvsIM.xlsx."
[126] STB Finance Docket No. 3687, Operating Plan Verified Statement, op. cit. MultiRail is Oliver Wyman's proprietary network modeling software, which was used to develop diversion data.

Exhibit B-3: Intermodal truck-to-rail diversion model

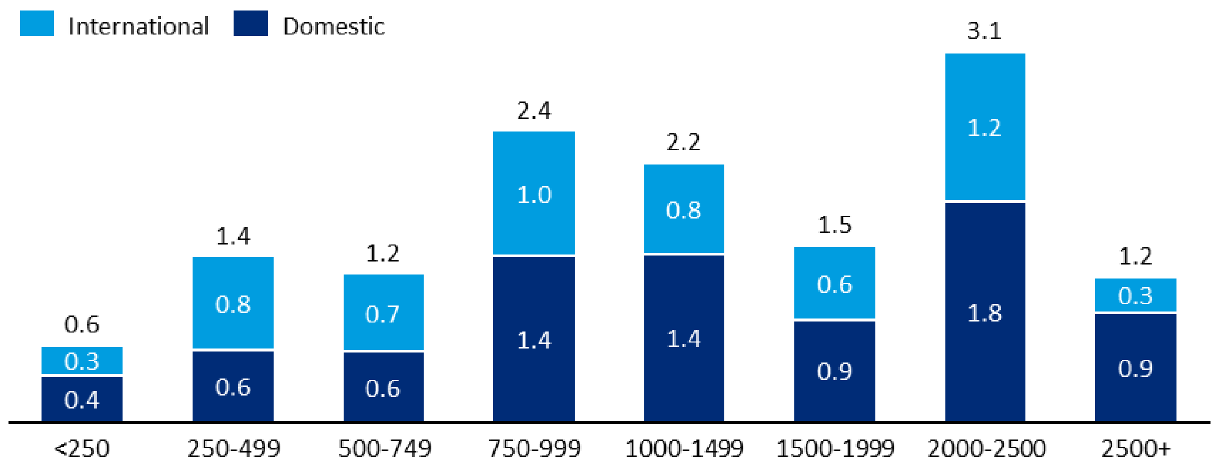


B.3.1. Total Addressable Market

The total addressable market for truck diversion to rail intermodal was defined as all trucking with a length of haul over 250 miles and with a commodity defined as intermodal (Exhibit B-4).[127] This translates to 72 million truckloads out of a total of 606 million truckloads (an equivalent 3,004 million tons).

The CCWS shows 13.6 million intermodal units in 2023, split between 53-foot domestic intermodal service (8.0 million units) and international intermodal service (5.6 million units), based on the IMSvcCodes field in the CCWS.[128] All modal shift is assumed to be from truck to domestic 53-foot intermodal containers.

Exhibit B-4: Rail intermodal units by length of haul[129]
Millions of units



The total addressable market of truck and intermodal units over 250 miles under consideration is 79.4 million (71.9 million truck units plus 7.5 million intermodal units, as a 53-foot truckload is approximately equivalent to a 53-foot container in capacity. However, it is

[127] Two hundred and fifty miles was set as a minimum threshold for intermodal to be a feasible alternative to truck, as shorter hauls would be uncompetitive on transit time and price. Categorization of commodities as intermodal, merchandise/bulk, and finished vehicles described in Appendix B.2 In Scope Trucking.
[128] Domestic intermodal is defined using the service type code(s) ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'K', 'L', 'M', 'N'] in the field IMSvcCodes in the CCWS.
[129] STB Confidential Carload Waybill Sample, 2023. Domestic service includes CCWS field IMSvcCodes IN (A-we and K-N).| Excludes revenue empty moves (i.e., CCWS ExpandedTons > 0). See workpaper "IM units by LOH vF.sql."

important to appreciate that while all domestic intermodal is serviceable by the trucking industry, the reverse is not true (that is, some containerized trucking cannot be serviced by rail intermodal), due to the current terminal footprint and railroad linehaul service offerings.

The potential for improved rail service because of the merger is a key input to sizing the modal shift opportunity. Improved rail service is defined as when the best rail route, terminal catchment area to terminal catchment area, would see a decrease in impedance (rail miles plus junction impedance) from pre- to post- merger. This further reduces the number of trucks available to convert as a result of a UP-NS merger.

Mexico and Canada assumptions

Within the addressable intermodal market, there are 854,000 truck units between Mexico and the eastern United States. These lanes will gain improved intermodal linehaul rail service as a result of the merger. NS does not have interchange access to FXE or KCSM via Eagle Pass, TX, El Paso, TX, or Laredo, TX. The merger would create the opportunity to launch single-line service into the eastern US from these points and serve the transborder trucking market.

However, the transborder market is complex, with moves often involving three trucking carriers and a customs broker. UP does not control access to the terminals in Mexico and would need to rely on a Mexican rail partner to provide access to capacity and commercial control to penetrate this segment.

The addressable market for diversion of trucks to rail intermodal was set at the Mexican states adjacent to the border, with all other long-haul trucking from further into Mexico not addressable. Conceptually, this is based on 1) the lower barrier to converting freight from truck directly to a container (the northern Mexican states are within realistic drayage distance of Port Laredo, TX; Santa Teresa, NM (El Paso, TX); Southern California; and Wilmot (Tucson), AZ intermodal terminals). This reduces the serviceable addressable market to 310,000 truck units to and from the Mexican border states.

Exhibit B-5: Addressable transborder truckloads traveling between Mexico and eastern US[130]
Thousands of truckloads

Mexican states	Trucks going to eastern US	Trucks arriving from eastern US
Nuevo León (NL)	101	41
Baja California (BJ)	62	14
Tamaulipas (TM)	23	8
Coahuila (CU)	7	15
Sonora (SO)	6	7
Chihuahua State (CH)	6	20
México (EM)	101	43
Guanajuato (GJ)	47	19
Distrito Federal (DF)	41	12
Jalisco (JA)	41	8
Querétaro (QA)	38	15
San Luis Potosí (SL)	27	14
Puebla (PU)	25	9
Aguascalientes (AG)	11	5
Rest of Mexico	74	13
Total	**611**	**243**

Canadian transborder trucking is not addressable for diversion, because the merger would not enable the creation of any new single-line lanes or clear service improvements. Both UP and NS already have interchange access to both Canadian Class I railroads so nothing will change post-merger.

Other assumptions

The analysis assumed no geographic substitution or changes to the siting of logistics facilities as a result of the merger. Large and sophisticated shippers consider the holistic cost of their supply chain from supplier to buyer. Over the time horizon of this analysis, shippers would

[130] Note: Truck units defined as transborder trucks carrying intermodal commodities traveling between Mexico and eastern US. UP has intermodal terminal access in the Mexican states of Nuevo León, México and Guanajuato via FXE, and in México, San Luis Potosí, and Nuevo León via CPKC. See workpaper "MX to US East IM Truck Traffic vF.xlsx."

not be able to reshape the geography of their supply chains to utilize any rail service improvements created by the merger (e.g., relocating national distribution centers to new metro areas). There was no attempt to include the effects of onshoring, changing import/export ports-of-entry or other macro supply chain strategies that might change post-merger.

B.3.2. Run-Through Haulage Adjustments for Junction Impedance

Run-through intermodal trains with haulage agreements operate closer to a crew change than a regular interchange, which we reflected with a lower impedance than the standard 350 miles-equivalent for an interchange with >50 loaded units per day. This is set at 90-mile equivalent, which represents three hours at an average train speed of 30 miles per hour, as a realistic representation of the additional complexity from the hand-off. In the future state, we removed one interchange from the Meridian Speedway for the traffic via Shreveport, because it changes from three carriers (i.e., UP, NS, CPKC) to two carriers (UP-NS, CPKC) and is a short bridge move. This was validated with both railroads operations departments.

The following adjustments are made to route impedances to better reflect the penalties of run-through haulage agreements being lower than true interchanges:

- Intermodal
  - The UP-CPKC-NS interchange lanes via Shreveport, LA onto the Meridian Speedway receives 180 impedance in the pre-merger case (interchange at Shreveport, LA and Meridian, MS), and 90 impedance post-merger (simplified to a UP-CPKC haulage agreement).
  - The BNSF-CSX interchange at Birmingham receives 90 impedance in both the pre- and post-cases for the BNSF lanes to/from Atlanta Fairburn and the Southeast.

All BNSF-CSXT traffic between BNSF's Los Angeles terminals and CSX's NW Ohio terminal in North Baltimore, OH receives 90 impedance.

The NS-KCS interchange at Meridian receives 90 impedance for lanes to/from the Wylie terminal in Dallas, TX.

- All service types: All routes that include NS and Ayer, MA receive 90 impedance.

B.3.3. Serviceable Addressable Market

We then defined the serviceable addressable market (SAM) to reflect the door-to-door economics of trucking versus rail intermodal, which must reflect realistic terminal catchment areas, availability of linehaul rail service, and drayage costs.

A. Terminal catchment areas

Transearch trucking data is on a county-to-county basis, which must be aligned with door-to-door intermodal service, which is a three-stage process: origin drayage (shipper to origin intermodal terminal), linehaul rail service (from origin intermodal terminal to destination intermodal terminal), and terminal drayage (from destination intermodal terminal to the receiver).

Defining the serviceable market for an intermodal lane required establishing a catchment area for the terminal to determine which counties are served. The catchment area will vary based on the length of haul to fairly reflect drayage economics, where a longer drayage move at the origin or destination could still be competitive for a long-haul truck move.

The catchment areas also will be asymmetric. An eastbound trip at a given length of haul will be less competitive for an origin county to the east of the intermodal terminal than to the west, because the intermodal move will be circuitous and add cost and transit time.

To create realistic and dynamic lane catchment areas, the model considered available terminals, linehaul rail service, and business rules on circuity for all county-to-county pairs. Each county was converted to a "freight centroid" (i.e., a point center of mass for freight) based on the density of railroad FSACs, as an approximation for freight activity or the population centroid if that was not available. This is fully detailed in Appendix B.3.3.B.

Intermodal terminals also were grouped into intermodal markets that are largely aligned with BEAs. The adjustments to the BEA assignment of CCWS traffic data is shown in Appendix D. Larger BEAs were partitioned to better reflect the different intermodal markets and align with the UP-NS terminal network (e.g., Laredo, TX was separated from San Antonio, TX, which are grouped together in the CCWS), to ensure diversion growth traffic was assigned to the correct terminal(s) on the UP-NS network.

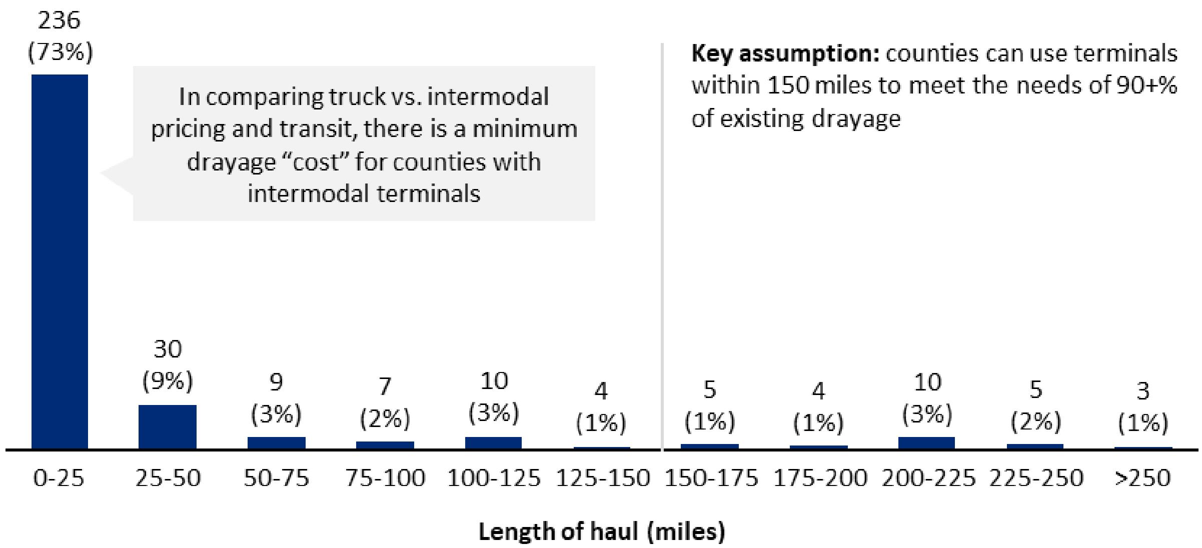
The county (FIPS code) with the most intermodal originations plus terminations in the CCWS was considered the primary terminal county for each intermodal terminal group for the purposes of measuring drayage distances.

For a county-to-county truck lane to be considered part of the serviceable market for an intermodal terminal-to-terminal lane, the following criteria had to be met:

- Maximum drayage distance: Both origin and destination county centroid must be within 150 miles of the centroid for at least one primary terminal location county for an intermodal terminal market. Based on Transearch data, over 90% of all drayage is under 150 miles as shown in Exhibit B-6. The 150-mile maximum was set based on this data analysis as a realistic basis for mode share calculations.

Exhibit B-6: 2023 origin plus destination rail intermodal drayage by length of haul[131]

Millions of tons; total = 320 million



- Available linehaul rail service: There must be rail service between the origin and destination intermodal markets
- Drayage economics: Total drayage mileage must be less than [20%] of total intermodal mileage (origin drayage plus linehaul rail plus destination drayage mileage). In our judgement, this is a reasonable modeling assumption and was confirmed with the railroad intermodal marketing departments. Drayage is an important part of the intermodal service offering, as it drives a disproportionate amount of the cost to the shipper compared with door-to-door mileage.
- Circuity: Door-to-door circuity versus truck must be below 1.57 defined as intermodal mileage divided by truck mileage. This is based on average rail to truck circuity plus 25 percentage points, since the purpose of these criteria is to set an upper bound on what is the valid serviceable market for an intermodal lane.

---

[131] Transearch, op. cit.; see workpaper "Rail intermodal drayage by LOH vF.sql."

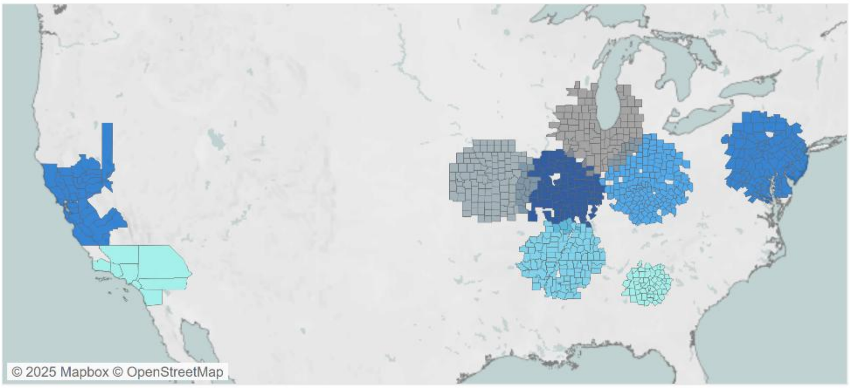
To match county-to-county lanes to intermodal terminal-to-terminal lanes, the model takes a simple approach to picking the best intermodal lane when multiple valid options are available: The best intermodal lane will have the lowest door-to-door cost. It scores each valid lane based on drayage and intermodal mileage using a 6.6:1 ratio.[132] This captures the difference in average price per mile for shorthaul trucking, based on DAT data, of $5.48, which is representative of a drayage price, and the average revenue per mile for an intermodal unit for the linehaul move of $0.84, as reported in the CCWS. While simplified, the logic will capture the trade-off shippers make between trucking versus drayage to the nearest intermodal terminal – even if this adds circuity or total door-to-door mileage.

As an illustration of the outcome of this model, consider the example of Jacksonville, FL (Exhibit B-7). The model looks at all county-to-county truck lanes into the Jacksonville, FL catchment area. It applies the drayage economics to create appropriate terminal catchments. Note that the Atlanta, GA lane catchment is smaller – at both ends – compared to longer haul lanes. Where other nearby terminals offer alternative service, the catchment areas will differ by lane. Most lanes to Jacksonville, FL have a larger destination catchment than the Los Angeles lane. This is because the model has also identified Los Angeles, CA to Charleston, SC as a truck-to-rail diversion lane. This means trucking to counties further north will begin to prefer using Charleston, SC over Jacksonville, FL because of the reduced drayage mileage.

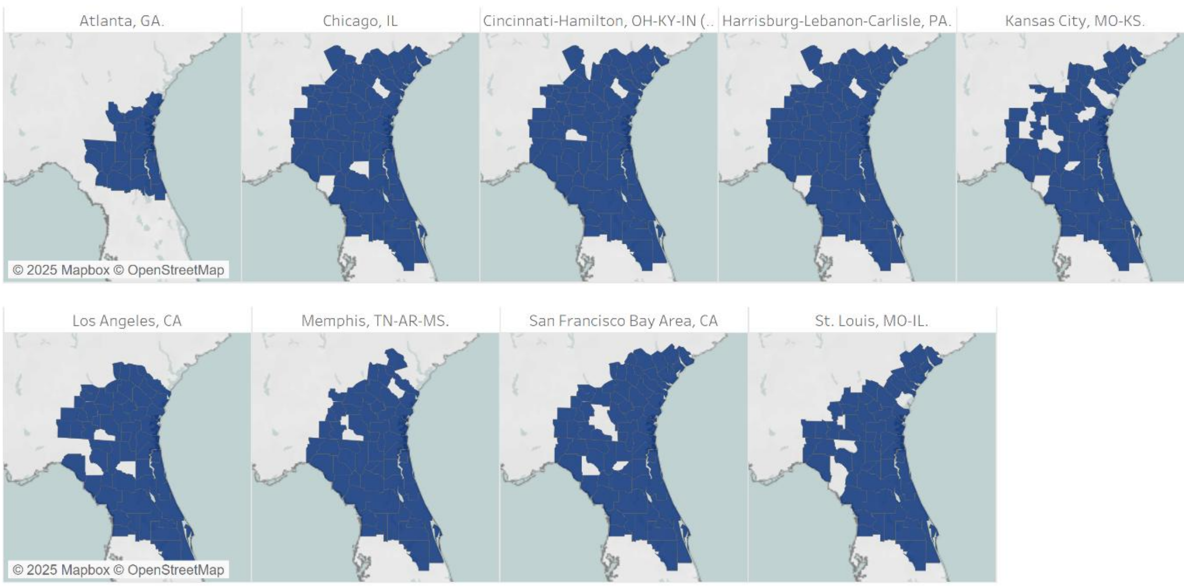
[132] The 6.6:1 ratio is the DAT shorthaul truck price divided by the average intermodal unit revenue per mile (rounding of inputs is what is shown here, the actuals results in 6.6:1)

Exhibit B-7: Drayage catchment areas: example of domestic intermodal lanes to/from Detroit-Toledo for sizing truck-to-rail diversions; counties shaded where served[133]

Origin terminal catchments



Destination catchments by lane



The model was applied at each stage of the iterative analysis: 1) existing terminal-to-terminal rail service, 2) everywhere to everywhere rail service (i.e., every possible terminal pair offered, regardless of railroad), and 3) post-merger terminal-to-terminal rail service where all lanes exceed the minimum volume threshold and other operational criteria.

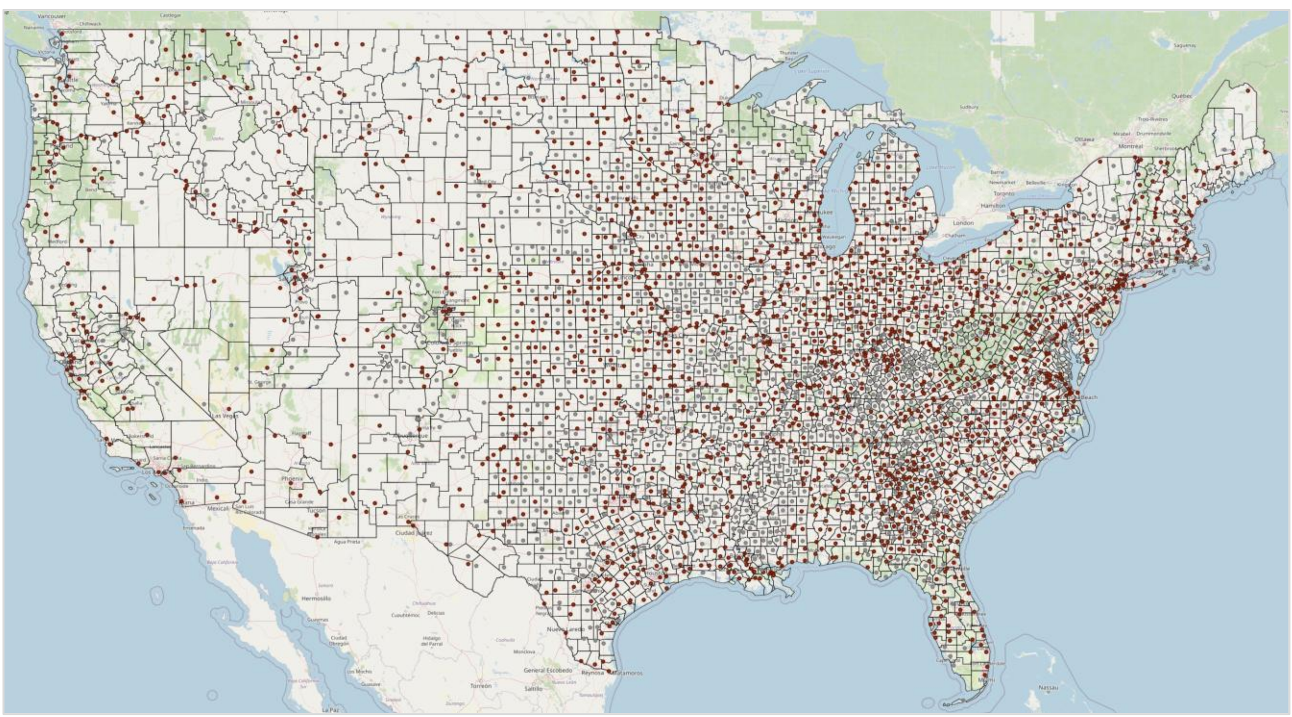
---

[133] See workpaper "truck_to_intermodal_mapping.twb."

B. County centroid methodology

A centroid for each county was estimated using a weight-based method where CCWS station data was available and a population-based method otherwise. For the freight-based approach, we calculated a weight for each freight station equal to its total tons originated or terminated in the CCWS, assigned each station a latitude and longitude from the unified station master, and computed the county's freight centroid as the weighted average of the coordinates of all CCWS-represented stations located within that county. For counties with no stations represented in the 2023 CCWS, the US Census Bureau's 2020 Census Population centroid dataset was used to approximate the county's center of economic activity.

Exhibit B-8: County centroids for the lower 48 states[134]
Freight weighted in brown and population weighted in gray



[134] See workpaper "Center_of_Freight_Mapping.ipynb."

C. Existing terminal-to-terminal rail service

There is terminal-to-terminal domestic intermodal rail service in 97 directional origin-destination catchment areas.[135] Current service is based on existing domestic intermodal terminal-to-terminal traffic in the CCWS, where the traffic exceeds an average of 12 units per day in at least one direction (4,380 units per year). This threshold to qualify as offering intermodal service is based on two 3-well articulated intermodal stack cars per day and agreement with the railroad marketing departments as a realistic minimum volume to offer scheduled 5 or 7 day per week service. Domestic intermodal is defined using the service type code(s) 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'K', 'L', 'M', 'N' in the field IMSvcCodes in the CCWS.

There are a small number of intermodal rail services under 500 miles in operation today, including Jacksonville, FL to Miami, FL (FEC – 350 miles) and Atlanta, GA (NS/CSX – 350 miles). We used 250 miles as approximately the maximum range a truck driver can drive a round trip (out and back) in a single day averaging 50 mph.

D. Serviceable truck market and intermodal modal share

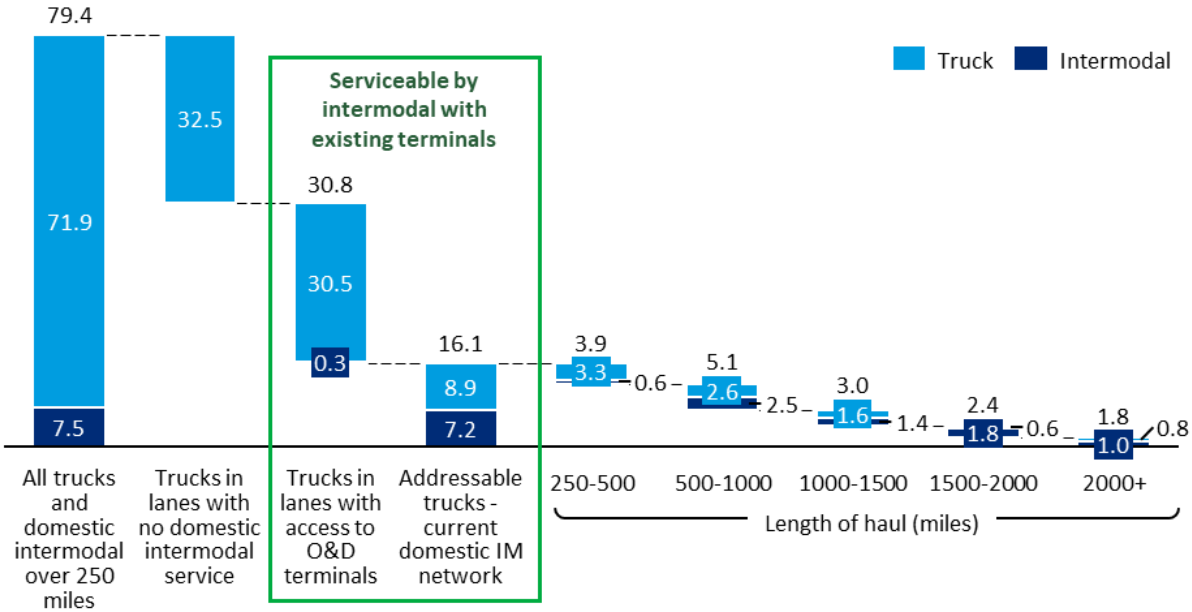
Based on the model's analysis of the current network of domestic intermodal lanes and terminal catchments as described above, 9 million truckloads are in lanes that also are currently served by rail intermodal.

A further 31 million truckloads of intermodal-addressable freight is in lanes that could theoretically be served by intermodal using the existing intermodal terminal network under the "everywhere to everywhere rail service" scenario. This does not consider the feasibility of offering linehaul rail service that would enable a truck-competitive intermodal rail service

[135] See workpaper "intermodal_diversions_model_vF.xlsx."

product. It is included to show how the serviceable market could expand through the addition of new routes, which is projected to be a key source of growth traffic from the UP-NS merger.

Exhibit B-9: Serviceable addressable market for truck-to-rail intermodal diversion[136]
Millions of truck/intermodal units



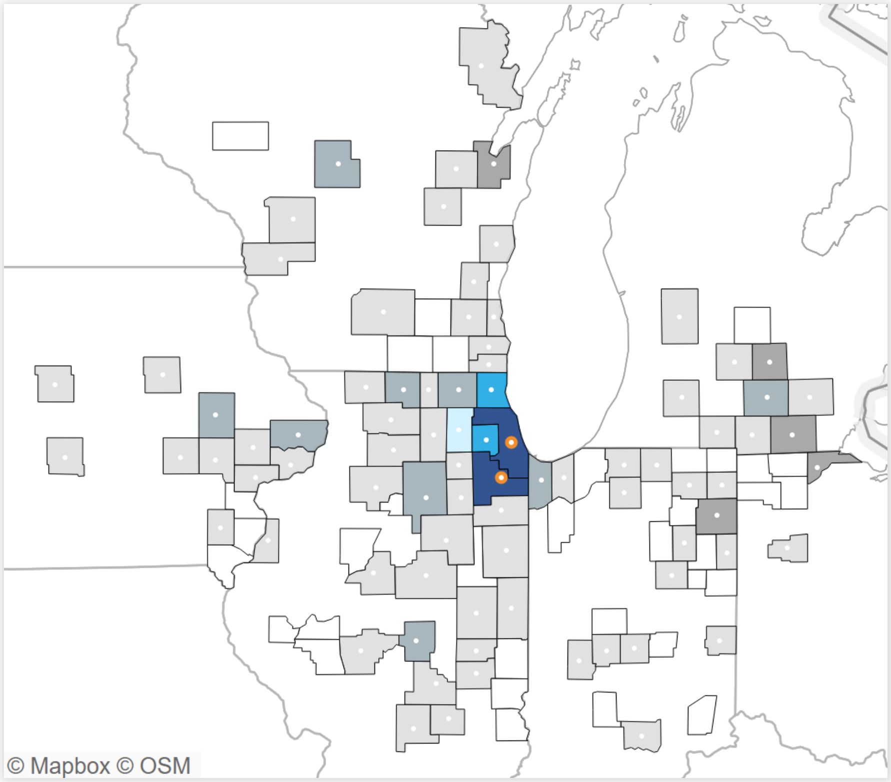
E. Extended haul to substitute for long-haul drayage

In addition, the addressable opportunity to convert truck traffic to rail intermodal includes extended haul of existing intermodal, where a long-haul dray over 250 miles is required. There are two geographic markets where this is relevant: drayage from Chicago, IL to the Detroit, MI and northern Ohio region; and drayage from Memphis, TN to Huntsville, AL and northern Alabama. The total addressable intermodal units, based on drayage moves, is sized at 134,000.

[136] Ibid.

B-10: Heatmap of drayage from Chicago by destination county[137]

Darker colored indicates more drayage activity, orange dots indicate Chicago area intermodal terminals



The intermodal drayage traffic reported by Transearch (STCC codes 5021 and 5022) in these lanes was approximately matched up with the linehaul rail move to and from the western US using data provided by UP's marketing department. This data was derived from UP's internal container waybill data, which includes information on the true origin and destination of shipments at the ZIP code level. This was treated as a representative sample and used to convert 67,000 long-haul drayage moves into the true origin to true destination, which could ultimately divert into an extended haul rail move (e.g., moving by rail from California to Detroit, MI instead of California to Chicago, IL).

[137] Transearch op. cit., mapped using Tableau.

Exhibit B-11: UP mix of intermodal traffic to long-haul drayage O/D BEAs from Memphis, TN[138]
Percentage of intermodal traffic

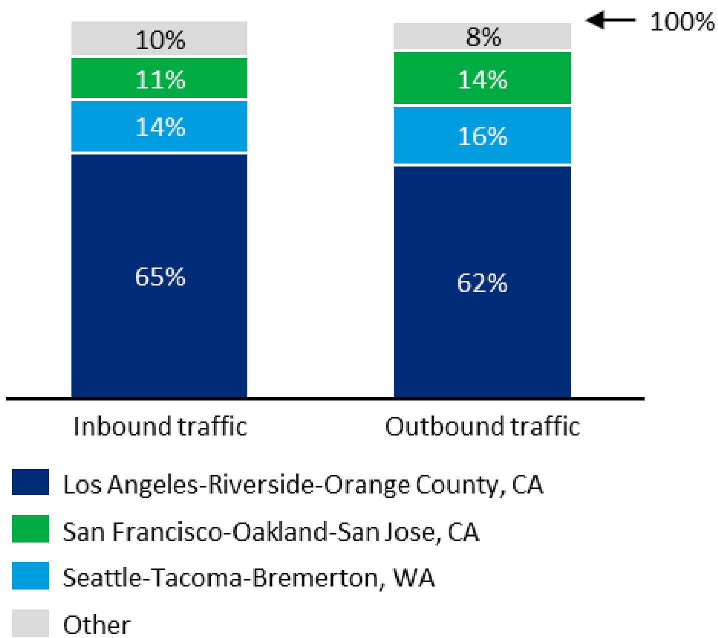
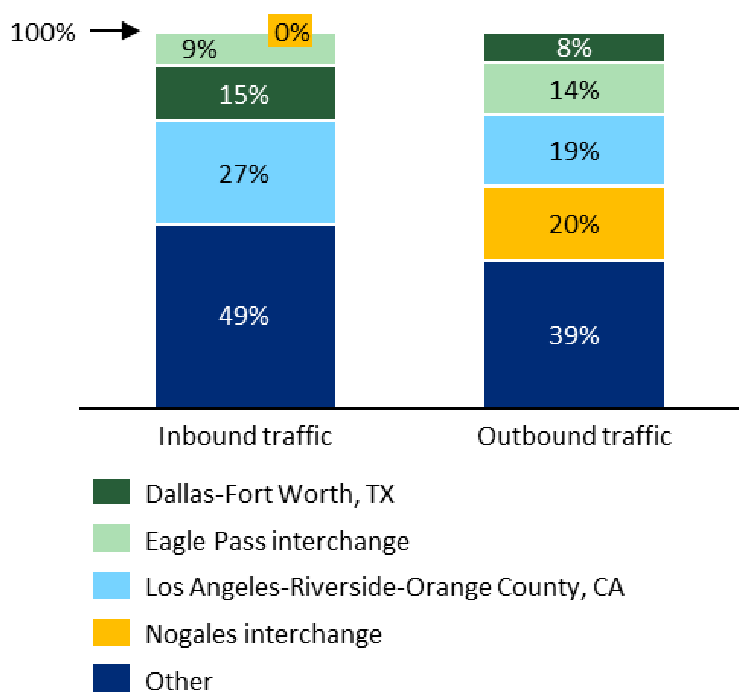


Exhibit B-12: UP mix of intermodal traffic to long-haul drayage O/D BEAs from Chicago, IL[139]
Percentage of intermodal traffic



B.3.4. Model Methodology

A. Mode shift sizing methodology

We employed a "lookalike" methodology at the lane level to size the intermodal traffic modal shift that could result from the merger. This relied on the following overarching assumptions:

- Given similar trade-offs between truck and rail freight products (transit time differentials, price differentials, service differential), shippers will make their mode choice consistently across the United States.
- New UP-NS terminal-to-terminal single-line service options will result in new truck-competitive intermodal linehaul products with characteristics comparable to existing single-line service lanes offered by Class I railroads.
- There will be a meaningful improvement in the existing interline intermodal lanes offered today and these lanes will behave like the existing single-line service lanes offered by Class I railroads.
- Decisions are made at the margin on a lane-by-lane basis, meaning shippers do not make all-or-nothing buying decisions between truck and rail.
- All domestic intermodal traffic, existing plus the mode shift growth opportunity, is treated as a "gray box," meaning that the analysis did not consider any differences that could occur as a result of the available domestic intermodal channel partner.

After the "lookalike" analysis estimated the modal shift potential, operational considerations were applied. For the railroad to offer linehaul rail service, minimum density and feasible train

[138] See workpaper "Long-haul dray vF.xlsx."
[139] Ibid.

service must be available, in addition to a UP or NS terminal being available at the origin and destination.

With this criteria, the list of existing and feasible lanes was then used to size the serviceable market a second time and apply the "lookalike" analysis to get to the final diverted truck traffic volume that could potentially shift to rail intermodal as a result of the merger.

B. Segmentation and lane "lookalike" analysis

The "lookalike" approach compares each lane that would receive improved rail service post-merger with the appropriate group of other current-state lanes with similar characteristics. Over time, shippers would evaluate their mode choices in the same way as other lanes today and the end-state rail market share would increase to that level.

Intermodal lanes were grouped based on the following characteristics: length-of-haul, interline or single-line rail linehaul, transit time versus truck, and price versus truck. The first two characteristics are rail-centric and capture how intermodal typically takes higher share in longer haul lanes and to show the difference between interline and single-line lanes in the current state. The second two capture key decision factors for shippers: price and transit. Based on Oliver Wyman's collective experience, when intermodal can offer transit times of truck plus one day and offer a 10% lower price than truck, a shipper is likely to strongly consider intermodal as a competitive substitute for truck.

Each of these factors was analyzed for each intermodal lane using the following methodology:

- **Length of haul** is based on average intermodal mileage. Intermodal mileage is the sum of the linehaul rail mileage (terminal-to-terminal) and the average drayage mileage (origin and destination).

- The rail miles are the terminal-to-terminal rail miles for the lowest impedance route, as calculated using Oliver Wyman's Quantanet model, for that intermodal market to intermodal market lane.
- The average drayage mileage is the weighted average distance from the terminal county to the centroids of all counties in the catchment area, for origin plus destination. Length-of-haul is segmented in 500 mile increments up to 2,500 miles.

- **Interline or single-line rail linehaul** comes directly from Oliver Wyman's Quantanet model. For the best rail route, the number of Rule 260 Junctions was calculated.
  - The Quantanet model applies an impedance factor to the junctions, so that the "best route" reflects the benefits of single-line service. For this analysis, the junction impedance was increased at gateways which do not have any steel wheel interline intermodal service today (e.g. New Orleans, LA).
  - This generated a set of feasible routes for each lane that represent where intermodal linehaul rail service is available today or could be readily offered.
- **Transit time** differences between modes were calculated for trucks and intermodal differently to reflect the difference in mode.
  - For truck, the Federal Motor Carrier Safety Administration hours-of-service rules were applied to the average truck mileage in the lane and a 50 mph truck velocity (see Appendix B.9). The average truck mileage was weighted and averaged across all the Transearch county-to-county traffic records in the intermodal lane.
  - The intermodal door-to-door transit time is the sum of five stages of the trip: origin drayage, origin terminal dwell, linehaul rail linehaul, destination terminal dwell and destination drayage. The assumptions used are shown in Exhibit B-13.

Exhibit B-13: Assumptions for intermodal door-to-door transit time

Assumption	Description
Intermodal train velocity	30.7 miles (STB EP724[140], unweighted average) to convert linehaul rail miles to transit time
Interchange dwell	22 hours (STB EP724, unweighted terminal dwell)
Average origin dwell	6 hours (Oliver Wyman experience plus validation with railroads)
Average destination dwell	12 hours (Oliver Wyman experience plus validation with railroads)
Minimum drayage transit time	2 hours
Drayage truck velocity	50 mph

What is most important is the difference in transit time between truck and intermodal, not the absolute transit time. The intermodal lanes were segmented into three categories: truck plus 24 hours, plus 72 hours, and worse than plus 72 hours.

- **Price differences** between modes were taken from the DAT 2023 lane level data for trucks and estimated for intermodal using the drayage cost, based on industry knowledge and the intermodal linehaul revenue by lane segment, estimated using CCWS data and a multivariate regression model. The multivariate regression model for linehaul rail used three input variables to capture length-of-haul and headhaul/backhaul economics to estimate the linehaul terminal-to-terminal price. Drayage was then added as the higher of the mileage times the shorthaul trucking rate ($5.68) and $200 (based on Oliver Wyman experience) as a minimum drayage move price for a load, including empty return. The regression model takes the following form:

$$im\ price\ per\ unit = 0.6738\ \times railmiles +\ 4.442 \times avgtons + 568 \times HHBH$$

- Rail miles is the average linehaul terminal to terminal miles reported in CCWS for the lane.
- Average tons is the average tons per trailer-container unit reported in CCWS for the directional O&D lane.

[140] US Code of Federal Regulations, Title 49, Part 1250, op. cit.

- HHBH is a headhaul/backhaul indicator, defined as the directional total expanded tons divided by the sum of expanded tons in both directions on an OD. So, 0.5 would be a perfectly balanced O&D lane.

This regression performs strongly with an R^2 of 0.91. A review of the errors showed that these are generally symmetrical without any obvious bias.

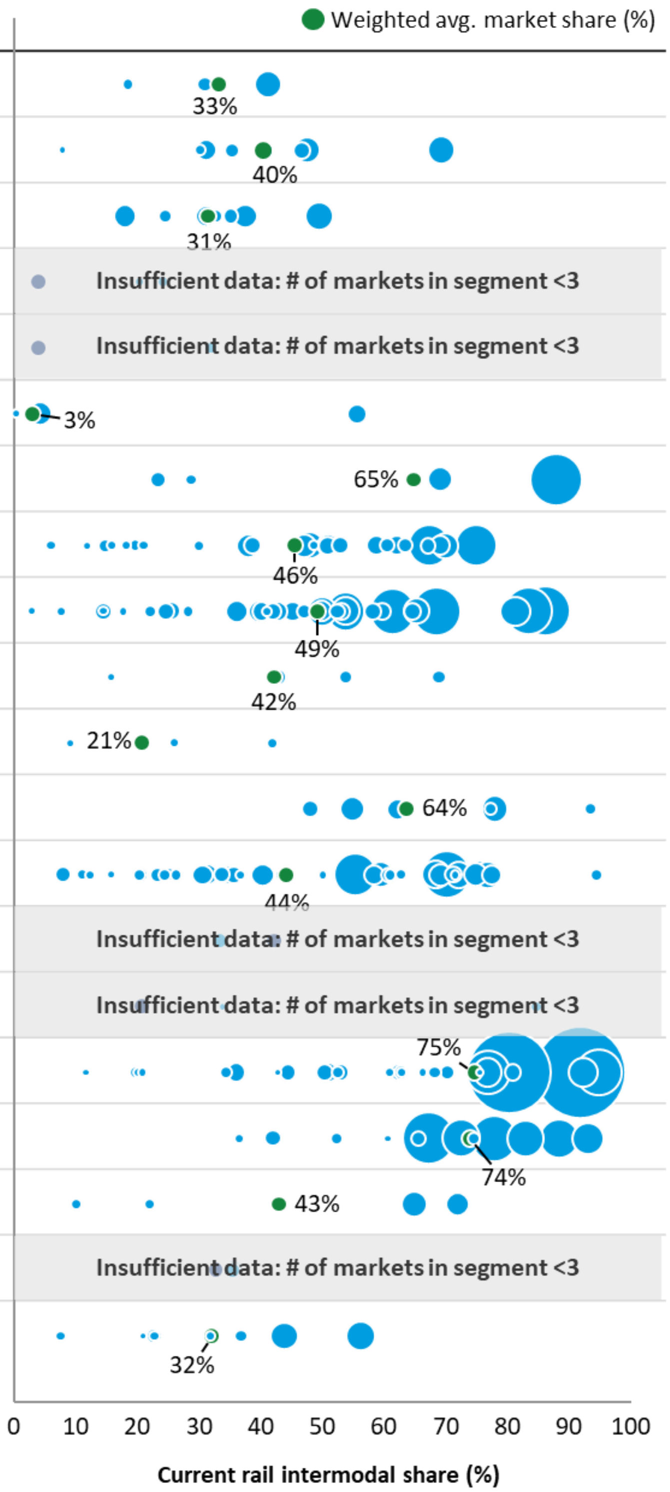
This pricing analysis was used to segment intermodal lanes based on the typical discount to truck on a door-to-door basis into 10+% premium to truck, within 10% of truck and a 10+% discount to truck.

For all the segmentation categories, the relevant intermodal lanes were used to calculate the weighted average intermodal mode share ([total intermodal units] divided by [total truck plus intermodal units]). A minimum of three intermodal lanes was required for the segment to be calculated and considered a valid reference mode share.

Exhibit B-14: Weighted average intermodal rail market share for 20 segments[141]

Markets in segment = # of bubbles, size of bubble = # of intermodal units in market

Segment Characteristics					
JF	LOH	Transit time	Price	# of markets	Segment #
0	0-500	T+24	>10% expensive	3	1
0	0-500	T+24	+-10%	8	2
0	0-500	T+24	10+% better	7	3
0	0-500	T+72	>10% expensive	2	4
0	0-500	T+72	+-10%	1	5
0	0-500	T+72	10+% better	3	6
0	500-1000	T+24	>10% expensive	5	7
0	500-1000	T+24	+-10%	25	8
0	500-1000	T+24	10+% better	32	9
0	500-1000	T+72	+-10%	4	10
0	500-1000	T+72	10+% better	3	11
0	1000-1500	T+24	+-10%	6	12
0	1000-1500	T+24	10+% better	36	13
0	1000-1500	T+72	+-10%	1	14
0	1000-1500	T+72	10+% better	2	15
0	1500-2000	T+24	10+% better	27	16
0	2000+	T+24	10+% better	12	17
1+	1000-1500	T+72	10+% better	4	18
1+	2000+	T+24	10+% better	2	19
1+	2000+	T+72	10+% better	9	20



[141] See workpaper "T2R Intermodal segmentation dataset vF.xlsx."

For segments with insufficient existing lanes, a filling process was used. The assumption was that intermodal mode share should perform at least as well at a shorter length of haul. If looking at the shorter length of haul categories does not produce a valid result, the matching criteria looked at the same length of haul and gradually relaxed the matching criteria. First, it considered lanes with a different price difference category, then transit time, and then finally relaxed the requirement to match on junctions. This ensured that all relevant combinations produced a realistic intermodal share.

The intermodal lanes which could receive improved rail service post-merger were segmented based on their post-merger characteristics. The weighted average mode share was then applied to the serviceable addressable market (truck plus any existing intermodal traffic) to determine potential post-merger traffic once the lane reaches maturity.

C. Extended haul to substitute for long-haul drayage

The methodology applied here to size the mode shift opportunity was based on the following assumptions:

- The addressable long-haul drayage splits 50:50 between UP and BNSF, because both offer the full range of lanes from West Coast and Texas markets to/from the Chicago, IL and Memphis, TN markets.
- Post-merger, UP would market the extended haul at legacy NS network terminals at Detroit, MI, Toledo, OH, and Huntsville, AL to the existing customer base as an alternative to bypass Chicago.
- Shippers would choose this option for 100% of their existing intermodal freight moving on UP in these true origin to true destination lanes, because the linehaul rail service would improve versus a short-haul move after a steel-wheel interchange, which is the current

alternative. The longer rail move would save shippers money and time versus their current intermodal move to the gateway and expensive long-haul drayage. If intermodal was already meeting the needs of this freight to the gateway city, then a longer haul across the watershed would also meet these needs.

The result of applying these assumptions adds 67,000 units of extended haul diversions. This would add 26,256,000 unit-miles to the network of incremental traffic. The traffic, in units, is unchanged, as these units already involve a long-haul move on UP.

B.4. Finished Vehicles Analysis

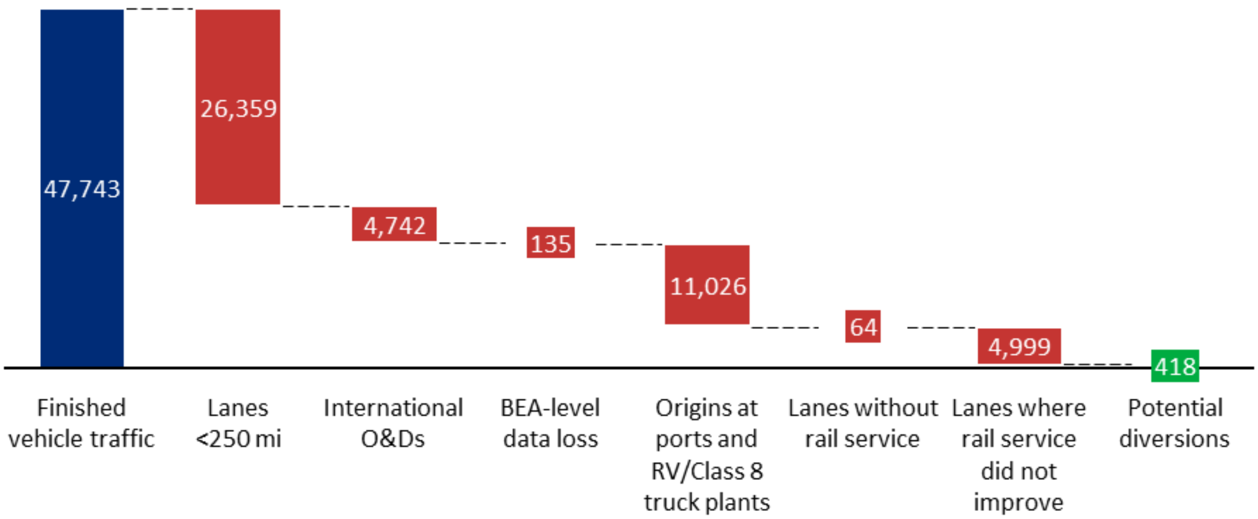
B.4.1. Addressable Market

We defined finished vehicle traffic as automotive shipments (STCC = 3711) from Transearch (47.7 million tons) (Exhibit B-15). To determine feasible diversion cases from this initial pool of truck traffic, we applied a series of exclusions to identify lanes where rail could capture market share. From these exclusions, we estimated that 418,000 tons, less than 1%, has the potential to be diverted by the UP-NS merger. We developed the following exclusions in close collaboration with UP and NS subject matter experts:

- Lanes less than 250 miles are not likely to be addressable by rail.
- International origins and destinations: finished vehicles crossing the border are typically already shipped via rail or NS and UP do not have access to the plant.
- Lanes that were unable to be accurately identified, due to data limitations.
- Traffic originating in counties with Class 6-8 truck, schoolbus, and RV OEM assembly plants, as these vehicles are not suitable for transport by rail.
- Ports, since finished vehicles arriving at a port are not generally trucked long-haul across the watershed region, and rail has fully penetrated this segment.
- Lanes without rail service where a UP-NS merger would not improve service.

• Lanes where rail service would not improve post-merger.

Exhibit B-15: Breakdown of addressable finished vehicle truck traffic[142]
Thousands of tons



The top 10 origins excluded as ports or as Class 8/RV OEMs, accounting for 11 million tons of finished vehicle traffic, are shown in Exhibit B-16.

Exhibit B-16: Top 10 truck origins excluded as a port of Class 8/RV OEM[143]

County	Originating truck tons (shipments >250 miles)	Port or OEM
Glynn County, GA	1,141,953	Port
Baltimore City, MD	829,690	Port
Pulaski County, VA	808,795	Class 8/RV OEM
Denton County, TX	668,305	Class 8/RV OEM
Ross County, OH	662,233	Class 8/RV OEM
Duval County, FL	580,064	Port
Pierce County, WA	355,517	Port
Ventura County, CA	340,832	Port
Rowan County, NC	311,316	Class 8/RV OEM
Multnomah County, OR	277,999	Port

[142] Transearch op. cit., see workpaper "t2r_auto_addressable_market_to_diversions_VF."
[143] See workpaper "truck-to-rail_finished_vehicle_ports_and_rev_class8_VF.sql."

B.4.2. Process to Estimate Diversions

We next analyzed which finished vehicle lanes for trucking would most likely divert to a combined UP-NS network. We constructed lanes with county origin and destination BEAs, providing visibility into how domestic automotive traffic flows from individual plants to markets across the US. Given the unique infrastructure considerations and limited pool of shippers for finished vehicle traffic, we used a manual approach to select truck-to-rail finished vehicle diversions. Specifically, we evaluated the following criteria to determine which finished vehicle lanes could be potentially diverted. We developed these criteria in close collaboration with NS and UP experts (see also Exhibit B-17):

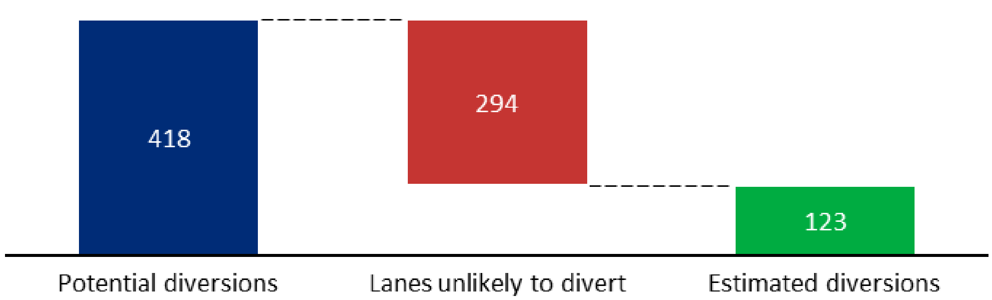
- Excluded economic area destinations without an auto ramp
- Excluded OEM origins to which neither NS nor UP has access/contract. OEMs with existing long-term contracts with other shippers also were excluded under this condition, even if NS or UP technically has access to the customer facility.
- Excluded OEM origins that have lower volumes but higher sensitivity to transit time. Per experts at NS and UP, plants like Mercedes in Alabama and BMW in South Carolina were excluded under this criterion.

Exhibit B-17: Example exclusions for finished vehicle lanes unlikely to divert[144]

Location	Reason
Tuscaloosa County, AL	Mercedes-Benz, the OEM at this origin, has a higher sensitivity to transit time and a lower output volume compared to non-luxury OEMs
Hamilton County, TN	Volkswagen, the OEM at this origin, has a contract with CSXT, so unlikely to divert truck volume to NS/UP post-merger
Spartanburg County, SC	BMW, the OEM at this origin, has a higher sensitivity to transit time and a lower output volume compared to non-luxury OEMs
Talladega County, AL	Honda, the OEM at this origin, has a contract with CSXT, so unlikely to divert truck volume to NS/UP post-merger
St. Charles County, MO	Lanes to Kansas City, MO were excluded due to the short distance

After manually filtering out 1,250 lanes unlikely to divert to UP-NS and adding back one lane (Wayne County, MI to Shreveport, LA) we deemed a prime candidate for diversion, the output is 123,00 tons across 36 county-to-BEA lanes, which we consider to be the true potential for truck-to-rail finished vehicle diversions (Exhibit B-18); all truck tonnage in these lanes was considered as likely to divert. 100% of the truck tonnage in these lanes was considered as likely to divert.

Exhibit B-18: Estimated truck-to-rail finished vehicle diversions, based on manual lane analysis[145]
Thousands of tons



This more manual approach for estimating truck-to-rail diversions for finished vehicle traffic reflects the unique infrastructure considerations, consolidated shipper landscape, and high drayage costs for vehicle traffic compared to intermodal and merchandise/bulk traffic.

[144] See workpaper "truck-to-rail_finished_vehicle_lane_filtering_VF.sql."
[145] See workpaper "t2r_auto_addressable_market_to_diversions_VF.sql."

Exhibit B-19 shows a price per finished vehicle comparison between truck and rail pre-merger for the same county-to-county flow, where the number of finished vehicles is derived using the following formula:

# of finished vehicles flowing between county pairs = (truck tons + rail tons) / 2.5 tons per finished vehicle.[146]

Exhibit B-19: Finished vehicle traffic: price per finished vehicle, truck vs. rail pre-merger by LOH[147]
Average $/finished vehicle

Length of haul (miles)	Truck	Rail (per-merger)[148]
250-499	835	564
500-749	1,055	730
750-999	1,395	890
1000-1499	1,875	1,117
1500-1999	2,513	1,373
2000+	3,196	1,752

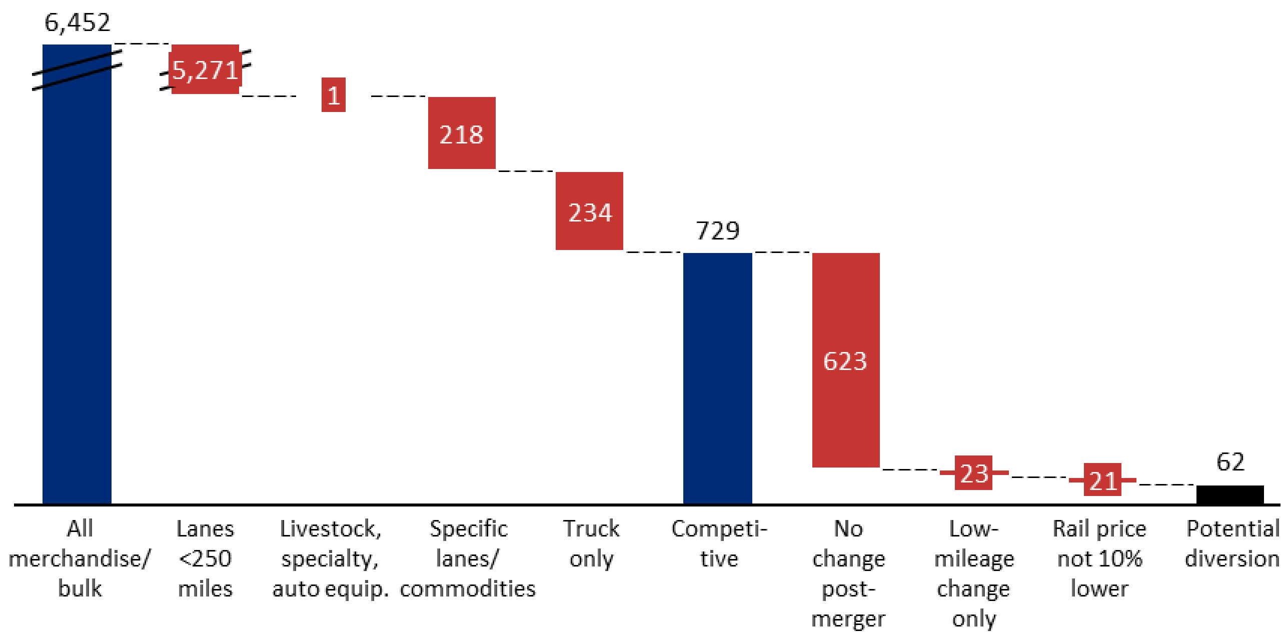
B.5. Merchandise/Bulk Traffic Analysis

B.5.1. Addressable Market

Within the merchandise/bulk market, we estimate there are 729 million tons in county-county lanes where both truck and rail compete. We estimate that 62 million tons of this competitive market, around 9%, has the potential to be diverted by the UP-NS merger.

[146] Based on 2024 preliminary vehicle weight (lbs.) of 4,419 (rounded up to 2.5 tons) as reported in Table 3.1. Vehicle Attributes by Model Year, 2024 Automotive Trends Report, US Environmental Protection Agency, p. 42.
[147] See workpaper "T2Auto Rail vs Truck price per finished vehicle comparison vF.sql."
[148] Includes a flat haul-away cost of $181.42 per finished vehicle derived from revenue per unit of company deliveries reported in Proficient Auto Logistics' Q3 2025 financial results, op. cit.

Exhibit B-20: Breakdown of addressable merchandise/bulk truck traffic[149]
Millions of tons



Estimated diversions were based on eliminating from consideration all truck traffic where:

- Lanes are less than or equal to 250 miles long.
- Traffic travels on specific truck equipment types that we do not believe have the potential to divert to rail. This includes livestock, specialty equipment (which is primarily wet cement trucks), and automotive trucks.
- Upon detailed review of Transearch trucking data and discussions with UP and NS experts , specific lanes and commodities were excluded for various reasons, as shown in Exhibit B-21.
- County-to-county lanes where rail service was not identified ("truck only") or where the merger would not improve rail service were excluded from the addressable market.

[149] Transearch, op. cit.; see workpaper "t2merch_lookalike_analysis.ipynb" and "t2merch_addressable_breakdown.sql."

- Lanes that were improved but less than 163 miles were excluded; as 163 miles per day is the average distance for a railcar to travel in one day,[150] and this is not seen as a large enough improvement to attract a shipper to switch from truck to rail service.
- Lanes where the rail price was <10% better than the truck price were excluded.[151]

Note that is difficult to accurately match Mexican transborder rail traffic to Transearch truck traffic due to data limitations. Thus, this traffic also is excluded from the analysis, which instead focuses on US domestic traffic and Canadian transborder traffic.

Exhibit B-21: Specific lane/commodity exclusions from Transearch data

Lane	STCC4	STCC4 Name	Truck equipment type	Tonnage excluded	Reason
Muskegon County, MI to Harris County, TX	1441	Gravel or sand	Bulk, Tank	All	Per UP Industrial team review
Harris County, TX to Philadelphia County, PA	2815	Cyclic Intermediates or Dyes	Bulk, Tank	All	Per UP Industrial team review
Harris County, TX to Jasper County, SC	2815	Cyclic Intermediates or Dyes	Bulk, Tank	All	Per UP Industrial team review
Nueces County, TX to Richland County, SC	2815	Cyclic Intermediates or Dyes	Bulk, Tank	All	Per UP Industrial team review
Nueces County, TX to Philadelphia County, PA	2815	Cyclic Intermediates or Dyes	Bulk, Tank	All	Per UP Industrial team review
All	1471	Chem or fertilizer minerals, crude	Bulk	All	Primarily WY soda ash manufacturing originations; assumed to be false transload data
All	0131	Bulbs, roots & tubers	All	All	Refrigerated commodity considered "out of scope" for diversions from truck
All	2021	Creamery butter	All	All	Refrigerated commodity considered "out of

[150] See Appendix B.8: Merchandise/Bulk Train Transit Time.
[151] 1994 Verified Statement of Peter Stone submitted to the Surface Transportation Board; see reference source "FD_32549_VS_Stone_Reebie_Truck_to_Rail_Diversion."

Lane	STCC4	STCC4 Name	Truck equipment type	Tonnage excluded	Reason
					scope" for diversions from truck
All	2016	Frozen dressed poultry	All	All	Refrigerated commodity considered "out of scope" for diversions from truck
All	2036	Fresh or frozen packaged fish	All	All	Refrigerated commodity considered "out of scope" for diversions from truck
All	0912	Fish & whale product including frozen	All	All	Refrigerated commodity considered "out of scope" for diversions from truck
All	0122	Deciduous fruits	All	All	Refrigerated commodity considered "out of scope" for diversions from truck
All	2092	Soybean oil or by-products	Bulk, Tank	All	Per UP Bulk team review
All	0113	Grain	Bulk, Tank	All	Per UP Bulk team review
All	2813	Industrial gases	All	50% of all tonnage	Per UP Industrial team review
All	2818	Miscellaneous industrial organic chemicals	All	50% of all tonnage	Per UP Industrial team review
All	2821	Plastic matter or synthetic fibers	All	50% of all tonnage	Per UP Industrial team review

B.5.2. Model Methodology

A. Truck and rail traffic matching

We matched the truck traffic from Transearch and rail traffic from CCWS to create a merchandise truck and rail database, where each row represents a single county-county-STCC2 commodity lane. For CCWS, we rolled up from the STCC6 or STCC7 level. We similarly rolled up Transearch from a STCC4 level to STCC2 to be comparable.

Transearch reports truck traffic with both commodities and truck equipment types, which was necessary to calculate a representative truck price. To spread the rail tonnage in that lane, we assumed the spread of a commodity's truck tons across equipment types would be the same for rail. We outline an illustrative example of this spread in the exhibit below.

Exhibit B-22: Illustrative example of spreading CCWS rail traffic across truck equipment types[152]

CCWS			
OFIPS	DFIPS	STCC2	Rail tons
12345	22345	20	200
12345	22345	14	20
12345	22345	11	30
12345	22345	28	50

Combined merchandise truck and rail database					
OFIPS	DFIPS	STCC2	Truck equipment type	Truck tons	Rail tons
12345	22345	20	Dry Van	50	100
12345	22345	20	Reefer	50	100
12345	22345	14	Bulk	100	20
12345	22345	11	Bulk	100	30
12345	22345	28	Tank	100	50

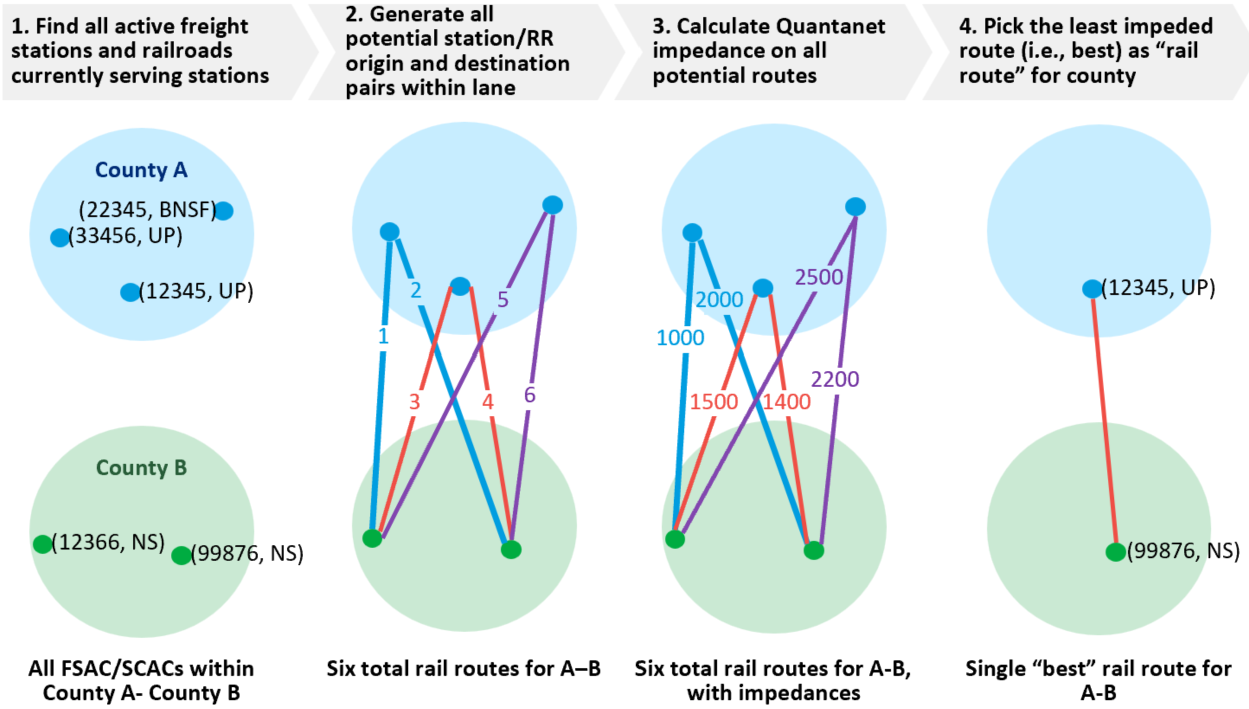
B. Rail county-county mileage

Because Transearch is at the county-to-county breakdown, a single rail route for each county-county lane is required to compare to the truck route. To get a single rail route, we chose the "best" rail route available; thus, if a shipper is choosing truck over rail, we assumed it is because the truck route is a more attractive option over all the rail routes available in that county.

To do so, for every county-county pair, as shown in Exhibit B-23, we generated every possible rail route option in that lane, using the rail mileage program described in Appendix A.6. We then selected the "best" rail route, which is defined as the lowest impended route. This process was completed twice – once to create the pre-merger network, and a second time to create the post-merger network. Where the UP-NS merger would improve service in certain lanes, that becomes a better route within that county to compete against truck options.

[152] Illustrative example of analysis within workpaper "MerchBuildAll_vF.sql"

Exhibit B-23: Illustrative process to choose a single rail route for each county-to-county lane



C. Lookalike model to estimate diversions

To estimate merchandise truck diversions, we used a lane "lookalike" analysis. The assumption is that rail lanes with similar characteristics will have a similar rail market share. We created lane "archetypes" based on similar characteristics; these archetypes are built off all county-county routes where both rail and truck have competing service (see Exhibit B-20 for the size of this set). We then grouped these "competitive" county-county routes into county-county-STCC2 lanes and into different "archetypes" based on similar characteristics.

As the UP-NS merger would improve service in specific lanes, it would shift some of these improved lanes into a different archetype. We assumed that lanes post-merger could be applied to the same rail market share as pre-merger. This lookalike analysis was performed across each of the five truck types as provided by Transearch: bulk, reefer, dry van, tanker, and flatbeds.

Lane archetypes: we utilized three key characteristics to group the lanes into archetypes: rail mileage, rail transit hours, and rail price. As a backup, we created a simplified archetype based on rail mileage and the distinction between single-line and interline service. This simplified archetype was used only when an improved lane post-merger fell into a new primary archetype that was not previously defined. We only used this simplified archetype for 55 lanes.

To create the archetypes, different "bins" were applied for each characteristic:

- Rail mileage was split into 250-mile increments: 250-499, 500-749, 750-999, 1000-1249, 1250-1499, 1500-1749, 1750-1999, 2000+.
- Rail transit hours were split into 15-hour increments, with bottom bin <50 miles, and top bin 350+ miles; 15-hours roughly equates to 100 car-miles based on agency sources (see "Rail Transit Time" section, where 163 car miles per day. A 100 car-mile difference we believe is a large enough change that shippers might reconsider their shipping mode choice.
- Rail price bins were calculated separately for each truck equipment type. We used the average price difference between pre-merger and post-merger prices within that equipment type to determine the bin sizes, given that pricing is the most significant difference between equipment types (see Exhibit B-24).

Exhibit B-24: Average rail price difference between pre- and post-merger by truck equipment type[153]

Equipment type	Avg. rail price difference
Bulk	$0.0057
Reefer	$0.0066
Dry van	$0.0083
Tank	$0.0031
Flatbed	$0.0059

[153] See workpaper "t2merch_lookalike_analysis.ipynb."

We used a range of 68-227 unique archetypes across the five truck types. The average rail market share for each of these archetypes comprises a set of current-state competitive lanes. The average number of lanes in each archetype ranges between 2,342 to 10,384 lanes across the five truck types, which provides confidence that the archetypes are representative. Only dry vans, flatbeds, and tanks have any archetypes with <30 observations, and these 21 low-observation archetypes only involve 19 diverted carloads. See Exhibit B-25 for a summary of this performance. The robustness of these archetypes provides strong confidence in the outputs of this analysis.

Exhibit B-25: Truck to rail carload, merchandise/bulk archetype robustness[154]

Equipment type	# of unique archetypes used	Avg. observations per archetype	# of archetypes composed of <30 observations	Diverted carloads attributed to these <30 observations
Bulk	203	4,882	1	1
Dry van	216	10,384	8	4
Reefer	68	4,452	0	0
Tank	227	2,342	8	12
Flatbed	195	3,974	4	2

Market share estimation: We calculated the average rail market share for each archetype based on all the lanes categorized within that archetype pre-merger. This average was weighted by the total market tons (defined as rail + truck tons within that lane). By doing this, higher-volume traffic lanes exert a greater influence on the archetype's average rail market share, under the assumption that market dynamics are more consistent with increased volume.

This current-state average market share by archetype was then directly applied to post-merger lanes, reflecting the new archetype classification following expected UP-NS

[154] See workpaper "t2merch_lookalike_market_share_vF.xlsx."

improvements. Consequently, most lanes that would be enhanced by the UP-NS merger transition into a new archetype, often characterized by a higher rail market share.

Diversion calculation: For lanes improved by the UP-NS merger, we calculated the estimated rail market size post-merger by multiplying the estimated rail market share by the current total market size. Potentially divertible traffic was determined by subtracting the current-state rail tons from the estimated rail tons post-merger.

After review of these quantitatively driven diversions, we excluded diverted traffic to better reflect what traffic would realistically be converted:

- In many cases, truck traffic is being diverted in the model to rail in counties where the potential for rail service exists today, but UP-NS does not have any existing traffic. In some of these cases, the rail volume being diverted is so low that UP-NS would not realistically begin service. Thus, if the origin county did not show at least two carloads a week of existing plus diverted traffic in the model, we excluded the diversion.
- The model identified 414 diverted carloads in South Dakota, Montana, and North Dakota, which are currently sole served by short lines but UP can access. We excluded those diversions because converting this traffic is complex and would rely on short-line partnerships, which is out of scope for this analysis.
- We excluded 1,938 carloads (see Exhibit B-26) that upon further inspection of the routes, the routing algorithm found little to no improvement to warrant a change in rail market share.

Exhibit B-26: Excluded diversions due to little to no improvement in routings[155]

Equipment type	Diverted carloads
Bulk	645
Dry van	63
Reefer	907
Tank	224
Flatbed	99
Total	1,938

- If rail already performed better pre-merger than predicted to perform post-merger, we excluded these diversions. This was <1% of all diversions (see Exhibit B-27).

Exhibit B-27: Excluded diversions where rail performance already better pre-merger[156]

Equipment type	% of diverted lanes
Bulk	0.39%
Dry van	0.53%
Reefer	0.58%
Tank	0.45%
Flatbed	0.86%

We then converted diverted traffic, calculated in tons given the comparison to truck traffic, to railcar units. From the Public Use Waybill Sample, we calculated tons/railcar for each STCC2 commodity and applied this conversion to the diversions.[157]

B.5.3. Watershed Region Definition

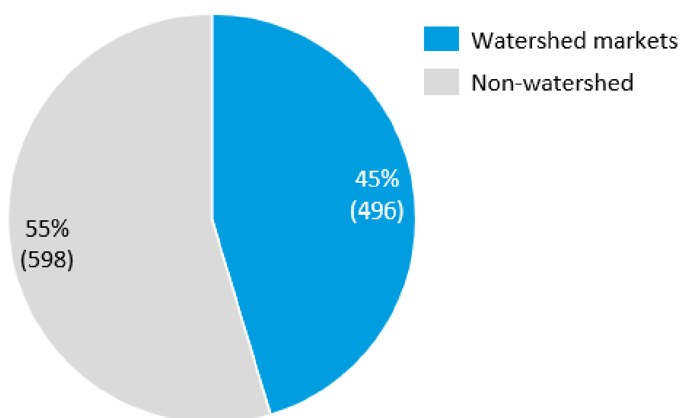
Watershed markets are defined as inter-watershed and intra-watershed lanes. These lanes accounted for 45% of the merchandise/bulk truck and rail traffic in 2023, while non-watershed lanes accounted for 55% (Exhibit B-28).

[155] Ibid.
[156] See workpaper "t2merch_lookalike_analysis.ipynb."
[157] Public Use Waybill Sample, op. cit.; see workpaper "2023 Tons per Car PUWS.xlsx."

To observe the relative impact on merchandise/bulk traffic in/across the watershed compared to the rest of the US, we categorized existing lanes and estimated diversions as one of four lane types:

- **Inter-watershed:** a lane either originating or terminating in the watershed region
- **Intra-watershed:** a lane both originating and terminating in the watershed region
- **Cross-watershed:** a lane originating east of the watershed and terminating west of the watershed or a lane originating west of the watershed and terminating east of the watershed
- **All east or all west:** a lane that originates and terminates in either west or east

Exhibit B-28: Watershed vs. non-watershed merchandise/bulk markets[158]
Millions of tons; US Total = 1,094 million tons



We defined the watershed by identifying counties that fall within a 250-mile radius of one of four key gateways in this region: Chicago, St. Louis, Memphis, and New Orleans, as shown in Exhibit 4-8.[159] We selected this range to capture traffic at these four major interchange points at the convergence of existing US rail networks, as well as shippers located in and around these gateways. We then assigned all US counties outside these radii a designation of east or west, based on which side of the watershed they fall. We used these county designations to categorize

[158] See workpaper "t2merch_watershed_summary_vF.ipynb."
[159] A full list of counties included in this watershed region are available in the workpaper "all_fips_250_lookup.csv."

all lanes for both existing traffic and calculated estimated diversions for the four lane types by determining in which county each lane originates and terminates.

B.5.4. Rail Performance vs. Truck

A. Single-line vs. interline performance compared to truck

To determine rail's performance against trucking on routes with single line vs. only interline service available, we analyzed all "competitive" county-county merchandise lanes that are served by both rail and truck today. The exclusions that have been applied to these "competitive" lanes are explained in Section B.2.4 "Addressable Market: Merchandise/Bulk."

We looked at the best rail option available (as defined in Section B.3.) on each competitive lane and classified it as either single-line service (0 interchanges) or interline service (1+ interchanges). By the current-state rail length of haul, we then added truck and rail tons across single-line vs. interline lanes. The rail market share is the rail tons divided by total rail + truck market tons. The results in Exhibit B-29 show that rail is much less competitive against truck in lanes where only interline service is available to shippers.

Exhibit B-29: Rail performance across merchandise lanes, where single-line service vs. only interline service is available today[160]

Rail LOH	Single-line service available: truck tons (millions)	Single-line service available: rail tons (millions)	Single-line service available: rail market share	Only interline service available: truck tons (millions)	Only interline service available: rail tons (millions)	Only interline service available: rail market share
250-499	213.3	105.1	33%	70.4	7.2	9%
500-749	100.4	57.4	36%	47.4	5.0	9%
750-999	55.9	64.8	54%	36.0	5.6	13%
1000-1499	51.7	53.9	51%	57.2	10.3	15%
1500-1999	24.5	30.4	55%	20.7	4.1	16%
2000+	14.0	11.7	45%	37.5	9.6	20%

[160] See workpaper "t2merch_watershed_summary_vF.ipynb."

B. Single-line vs. interline performance compared to truck in the watershed

To evaluate merchandise rail performance against truck specifically within the watershed, we conducted the same analysis as done across all merchandise lanes but then split additionally by the four watershed lane types (cross watershed, inter-watershed, intra-watershed, and all east/west; see Section B.4 "Impacts on the Watershed Region" for lane-type definitions). The results show that lanes in the watershed with only interline service available underperform by 20-22 ppts compared to lanes in the East or West.

Exhibit B-30: Rail performance across merchandise lanes where single-line service vs. only interline service is available today, by lane type[161]

Lane Type	Single-line service available: truck tons (millions)	Single-line service available: rail tons (millions)	Single-line service available: rail market share	Only interline service available: truck tons (millions)	Only interline service available: rail tons (millions)	Only interline service available: rail market share
Cross-watershed	1.1	0.3	24%	63.4	4.8	7%
Inter-watershed	139.7	130.3	48%	110.5	11.3	9%
Intra-watershed	31.7	29.7	48%	40.1	3.1	7%
All east/west	287.4	163.0	36%	55.1	22.6	29%

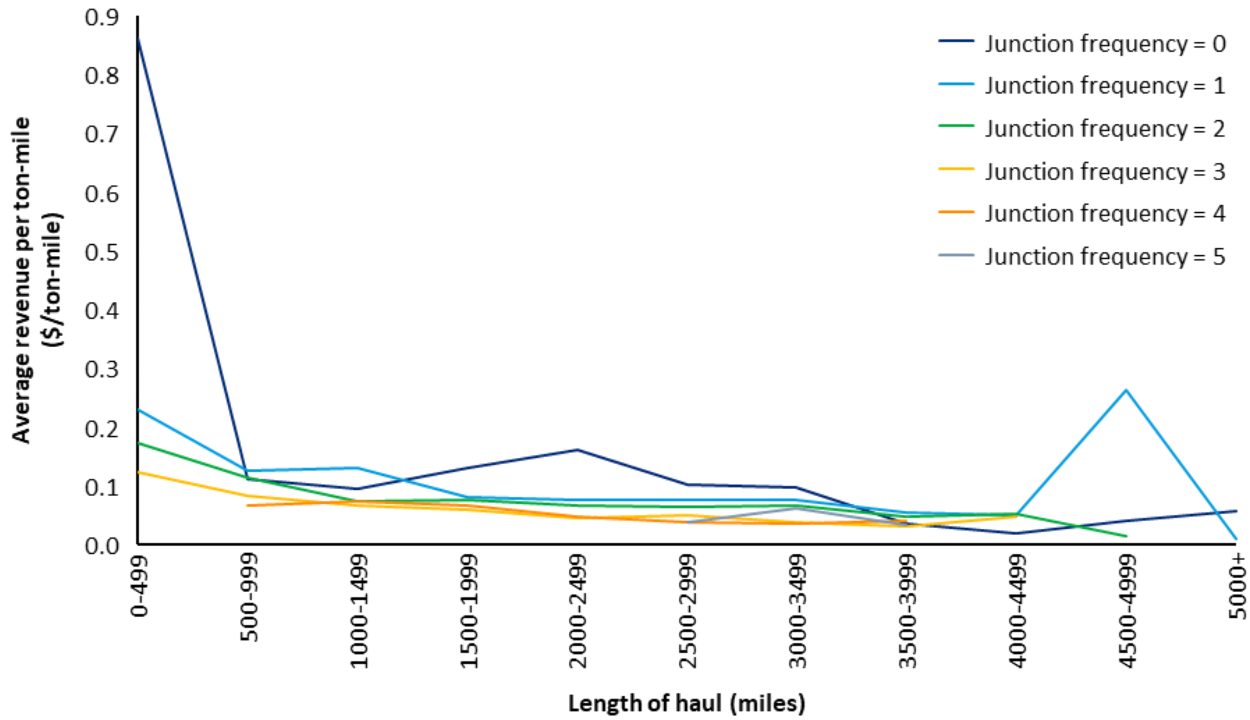
B.6. Merchandise/Bulk Price Methodology

To estimate the cost per ton-mile for a merchandise train haul, we used data from the 2023 CCWS, as it is the most comprehensive and accurate source for rail pricing data in the industry that contains expanded revenue, expanded tons, and mileage information representative of all 2023 waybills. While the revenue per ton-mile figures from CCWS could be directly applied as a pricing lookup, the data also includes commercial considerations, which resulted in inexplicable increases in revenue per ton-mile as the rail mileage increased when all other factors were held

[161] Ibid.

constant, despite common industry knowledge suggesting an inverse relationship between these two variables (see Exhibit B-31).

Exhibit B-31: CCWS average revenue per ton-mile for all STCC2 commodities and service types by length of haul and junction frequency[162]



Due to these abnormalities seen in the raw CCWS data, we smoothed the price curves so that it is reflective of more logical behaviors and real-world pricing patterns. To produce new revenue per ton-mile curves for merchandise train types, we used power-law regression to regress revenue per ton-mile onto rail mileage for all CCWS merchandise train waybill records (service type = 1) not billed as a Rule 11 shipment (rebill code = 0). This regression was performed three times – once on waybills with no junction frequency (i.e., singe-line service), a second time on waybills with one junction frequency, and a third time on all remaining waybills with two or more junction frequencies. We assumed that when all other variables were held

[162] See workpaper "Raw - CCWS-Rail rev per ton mile by STCC2.xlsx."

constant, revenue per ton-mile would be the same for all merchandise train hauls with two or more interchanges. This assumption was adopted because the CCWS dataset contains very few records with more than two junction frequencies, so there was insufficient data to justify fitting a regression curve for these waybills (Exhibit B-32).

Exhibit B-32: Number of records and expanded cars in CCWS by junction frequency[163]

# of junction frequencies	Count of waybill records	# of expanded cars
0	1,880,986	30,645,562
1	203,759	2,261,278
2	23,044	237,061
3	812	4,240
4	8	40

Because these regressions were not done at a commodity-specific level, we indexed the CCWS revenue per ton-mile for each STCC2 commodity to the overall average revenue per ton-mile across all STCC2s to get a commodity-specific adjustment ratio. Given CCWS revenues account for tariff rates, we also applied another revenue adjustment ratio based on the revenue per ton-mile reported by the 2023 FCS for each STCC2, to more accurately capture the rate that shippers pay.

After all revenue adjustments were applied, a table of revenue per ton-mile by STCC2 commodity, length of haul (100-mile increments), and junction frequency was produced, to be used as a lookup to match revenue per ton-mile values to each merchandise train move. The resulting revenue per ton-mile curves averaged across all STCC2 commodities are summarized in Exhibit B-33.

[163] See workpaper "CCWS_by_JF_VF.sql."

Exhibit B-33: Adjusted CCWS revenue per ton-mile averaged across all commodities by length of haul and junction frequency for merchandise trains[164]

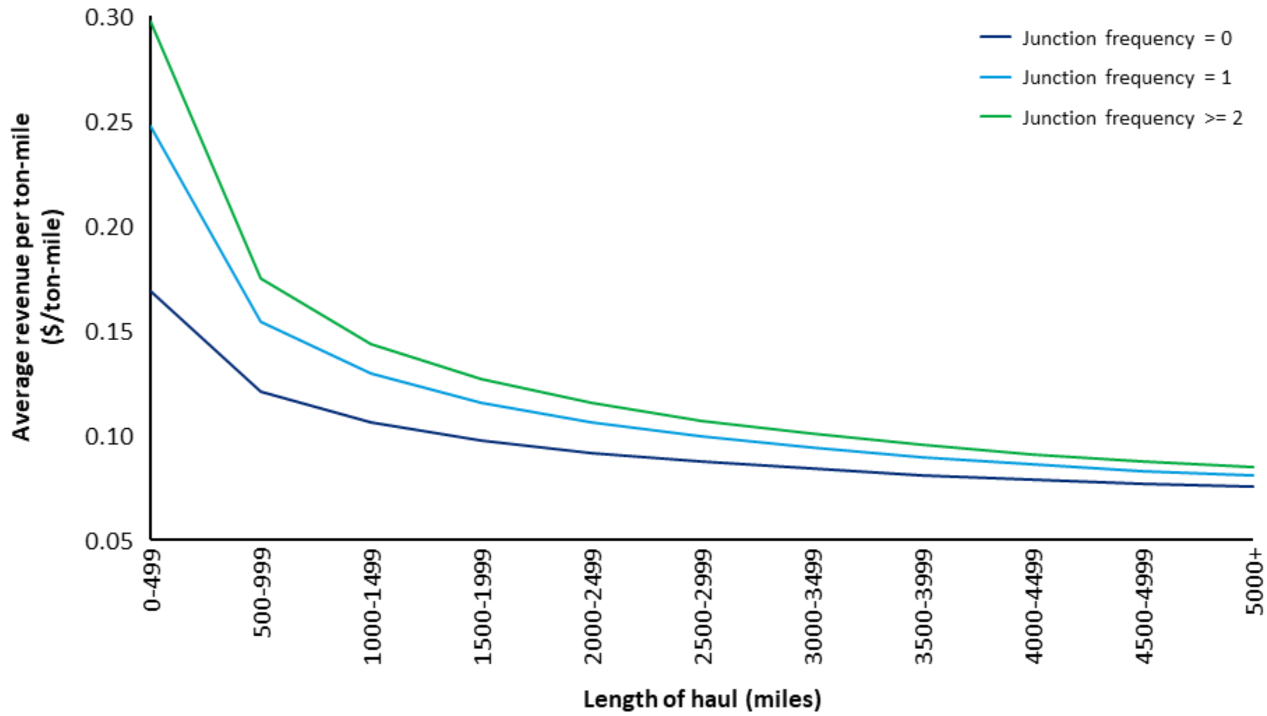


Exhibit B-34 depicts the entire rail price estimation process for merchandise trains, Exhibit B-35 shows summarized outputs of average rail price per ton-mile for merchandise trains pre-merger by length of haul.

[164] See workpaper "Revised revenue per ton mile.xlsx."

Exhibit B-34: Process used to estimate rail price per ton-mile pre/post-merger for merchandise trains

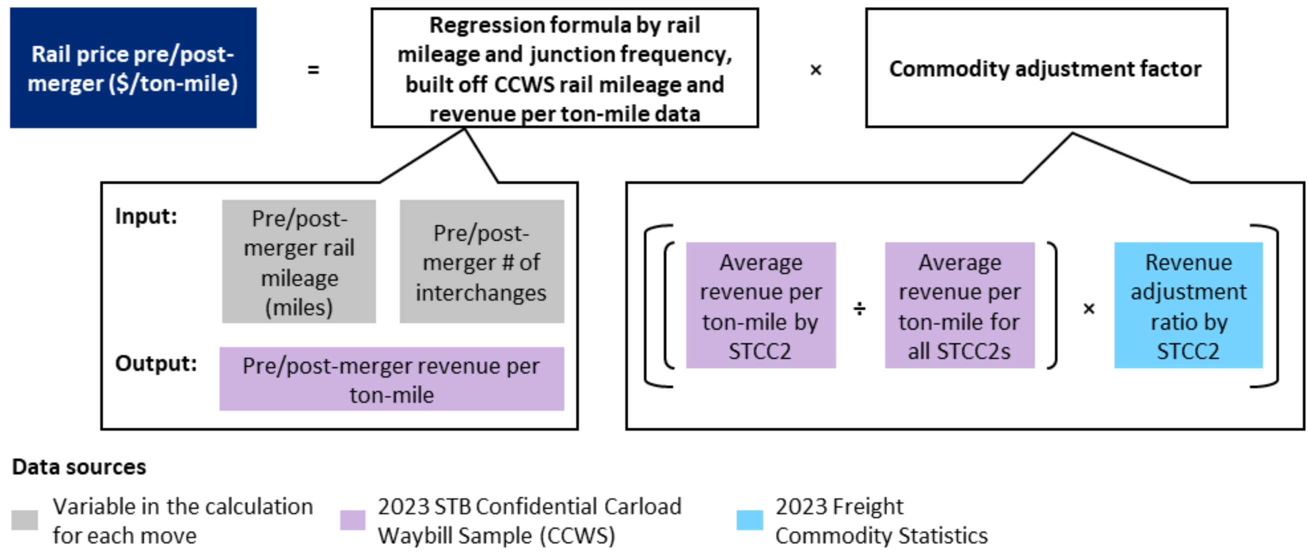


Exhibit B-35: Summarized outputs of average price per ton-mile for merchandise trains pre-merger by length of haul for merchandise/bulk traffic[165]

Rail length of haul (miles)	Avg. price per ton-mile pre-merger for merchandise trains	
	Single line	Interline
250-499	0.089	0.115
500-749	0.081	0.102
750-999	0.077	0.094
1000-1499	0.071	0.085
1500-1999	0.066	0.074
2000+	0.060	0.064

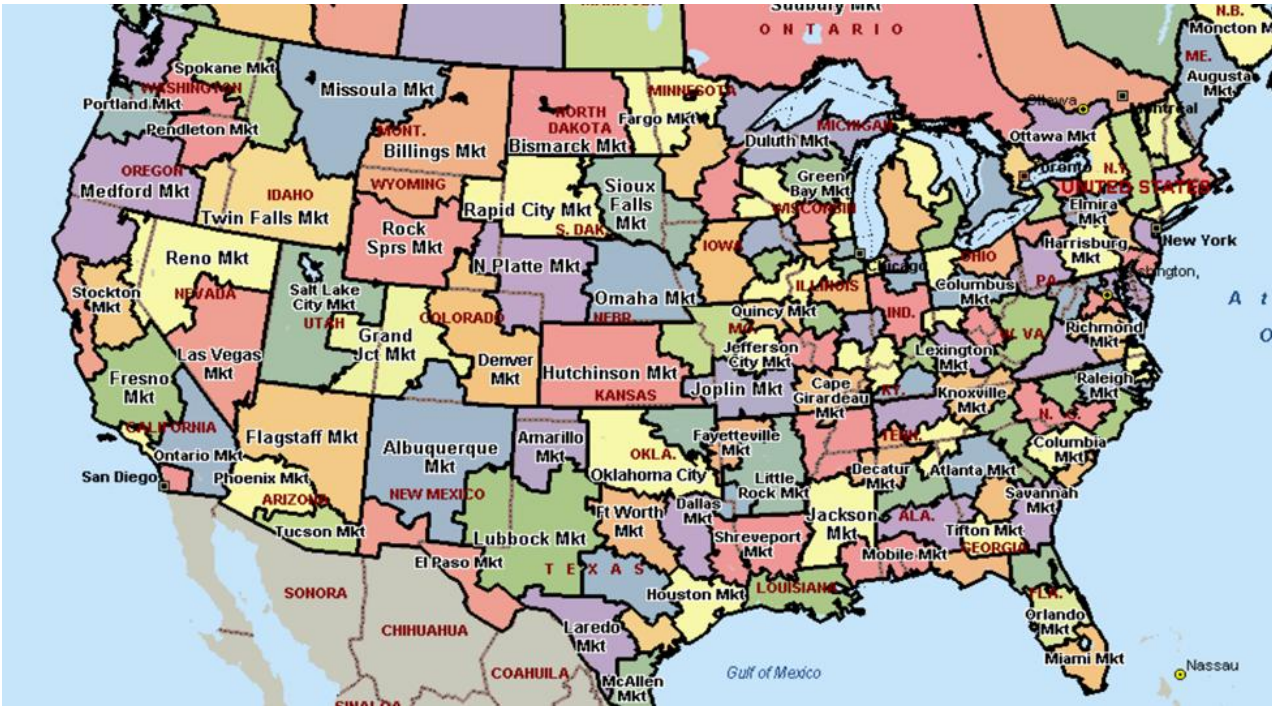
B.7. Truck Price Assumptions

To estimate the cost per ton-mile for a truck haul, we used data purchased from DAT Freight & Analytics ("DAT") which details average spot and contract rates for the 10,000 highest volume US dry van lanes for 2023. DAT is North America's largest truckload freight marketplace and leads the industry in freight data analytics. DAT dry van cost per-mile is

[165] See workpaper "avg_rail_price_per_ton_mile_pre_VF.sql."

provided at the key market area ("KMA") lane level, where each origin and destination key market area is defined as a combination of multiple 3-digit ZIP code regions (Exhibit B-36).

Exhibit B-36: DAT key market areas (KMAs)



To match DAT lanes with Transearch lanes, which are defined at the more granular county level, the origin and destination KMAs were mapped to their corresponding counties, and the same spot/contract rates were assigned to every lane that originated and terminated in counties contained within each origin-destination KMA pair.

Since DAT only includes costs for US-based lanes and there is not a comparable source for transborder trucking, we estimated truck costs to/from Canada or Mexico using DAT's average rates by length of haul. For any lanes lacking DAT pricing, spot and contract rates were estimated using group averages by length-of-haul (LOH) across all county-to-county lanes with DAT cost data, after mapping KMAs to counties (Exhibit B-37).

Exhibit B-37: Average DAT contract and spot rate per mile by length of haul for merchandise/bulk traffic[166]

Length of haul (miles)	Average contract rate per mile ($/mile) for dry vans	Average spot rate per mile ($/mile) for dry vans
250-499	3.999	3.997
500-749	1.829	1.830
750-999	1.709	1.710
1000-1499	1.582	1.583
1500-1999	1.502	1.503
2000+	1.332	1.334

Once a dry van contract/spot rate per mile had been matched to every Transearch county-to-county lane, a dry van cost per-mile was calculated using the formula below:

> *Dry van cost per mile for lane = (average spot rate for lane + average contract rate for lane)/2 + $0.44 per mile of average fuel surcharge rate*

Since DAT only carries cost per mile information for dry vans, we adjusted those rates to represent the broader set of truck equipment in Transearch, by applying various truck cost to dry van cost ratios reported by the American Transportation Research Institute ("ATRI") to more accurately reflect prices for the different truck equipment types contained in Transearch (Exhibit B-38). In our experience, ATRI is another data source that provides credible and useful insights on trucking costs.

Exhibit B-38: ATRI 2023 average respondent total cost per mile by type of truck[167]

Transearch truck type	Equivalent ATRI truck type	Total cost per mile, $ reported by ATRI	Cost to dry van ratio
Tank – liquid bulk	Tanker	$3.87	1.33
Refrigerated	Refrigerated van	$3.41	1.17
Flatbed	Flatbed/oversize	$3.29	1.13
Bulk	Flatbed/oversize	$3.29	1.13
Dry van	Truckload dry van	$2.92	1.00

---

[166] See workpaper "Truck price per mile_vF.ipynb."
[167] Source: ATRI-Operational-Cost-of-Trucking-06-2024.pdf.

While ATRI reported total cost per mile information on most truck types, it did not report on automotive hauler cost per mile figures. As such, the ratio of automotive hauler cost to dry van cost is derived separately using 10-K filings from 2024 Proficient Auto Logistics ("PAL"), a publicly traded auto-hauler company that has one of the largest auto transportation fleets in North America.

Exhibit B-39: Proficient Auto Logistics reported 2023 miles driven and operating expenses[168]
10-K filings for the year ended Dec 31, 2024

Total operating expenses in 2023	Total # miles driven in 2023	Approximate total cost per mile	ATRI dry van total cost per mile	Automotive cost to dry van cost ratio
$125,402,539	10,000,000	$12.54	$2.92	4.30

The final step to calculate truck cost per ton-mile is as follows:

Truck cost per ton-mile = truck cost per-mile derived from DAT ÷ total truck tons in each county-to-county lane

Exhibit B-40 depicts the entire truck price estimation process, Exhibit B-41 shows summarized outputs of the truck price per mile by length of haul, and Exhibit B-42 shows summarized outputs of the truck price per ton-mile by length of haul.

168 Source: Form 10-K for Proficient Auto Logistics.pdf

Exhibit B-40: Process used to estimate truck price per ton-mile

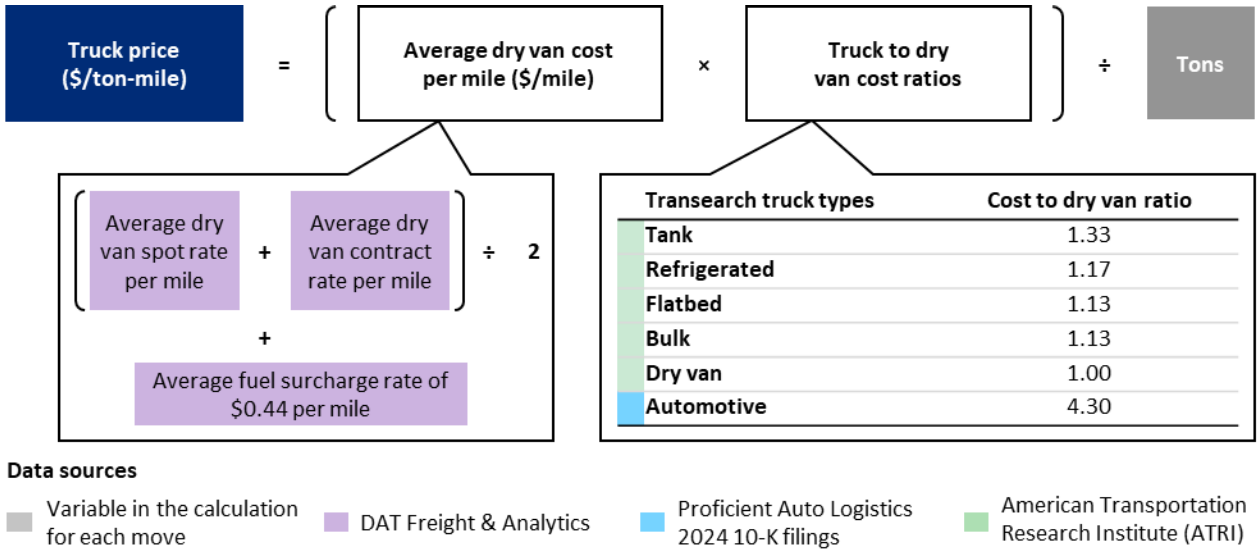


Exhibit B-41: Summary output for average truck price per mile by truck equipment type and length of haul for merchandise/bulk traffic[169]

LOH (miles)	Automotive	Bulk	Dry van	Flatbed	Refrigerated	Tank
250-499	13.98	5.94	3.97	4.63	4.57	5.24
500-749	10.16	2.56	2.28	2.54	2.68	3.00
750-999	9.89	2.41	2.16	2.39	2.57	2.84
1000-1499	9.10	2.28	2.02	2.23	2.43	2.66
1500-1999	8.35	2.19	1.93	2.17	2.29	2.58
2000+	7.62	2.00	1.76	1.97	2.09	2.34

Exhibit B-42: Summary output for average truck price per ton-mile by truck equipment type and length of haul for merchandise/bulk traffic[170]

LOH (miles)	Automotive	Bulk	Dry van	Flatbed	Refrigerated	Tank
250-499	1.01	0.30	0.17	0.24	0.20	0.30
500-749	0.73	0.12	0.10	0.14	0.12	0.19
750-999	0.71	0.11	0.10	0.14	0.11	0.18
1000-1499	0.66	0.11	0.10	0.13	0.11	0.16
1500-1999	0.60	0.11	0.10	0.13	0.10	0.15
2000+	0.55	0.09	0.08	0.11	0.09	0.13

[169] See workpaper "avg_truck_price_per_mile_by_eqip_type_VF.sql."
[170] See workpaper "avg_truck_price_per_ton_mile_merch_VF.sql."

B.8. Merchandise/Bulk Train Transit Time

Merchandise/bulk rail transit time is calculated as the customer pick up to customer drop off transit time for a given shipment. Rail transit time is estimated in hours for both pre- and post-merger scenarios, with the key assumption for weekly average car-miles per day taken from data reported publicly to the STB in Docket No. EP 770 (Sub-No. 1). This proceeding required all Class I rail carriers to temporarily submit two broad categories of data (rail service and employment) starting in 2022. The agency ended the service data reporting component after December 31, 2023.

We excluded CSXT data given the reported weekly average number of car-miles per day was abnormally low across all car ownership types when compared to other Class I railroads (Exhibit B-43). We also excluded any data reported as TTX-owned car types when calculating merchandise train velocity, given the TTX fleet consists primarily of intermodal railcars that travel at much faster speeds than merchandise railcars.

Exhibit B-43: Comparison of 2023 weekly average number of car-miles per day by railroad and car ownership type[171]

Ownership type	CSXT	Average across all other Class I's
Private	51	161
Railroad	80	166
TTX	114	217

Using this official data collected by the agency in 2023 across all railroads, excluding CSXT, we computed a weekly average of car miles per day for private and railroad-owned cars, weighted by weekly average number of cars per day in service with mileage, to arrive at an estimated 163 car-miles per day. While railroads have different methodologies to calculate

[171] See workpaper "EP770 and EP724 Summary.xlsx."

average car miles per day, this value typically represents an all-encompassing operating metric that takes into account the train speed from origination yard to destination yard, as well as the time that the railcar spends in a yard; this is comparable to the activities included in the truck transit time explained in Section B.5. Exhibit B-44 shows the detailed methodology for the weighted average calculation.

Exhibit B-44: Weighted average calculation of 2023 car-miles per day for all railroads[172]

Ownership type	Weekly average number of cars per day in service with mileage	% of total cars per day in service (excl. TTX)	Weekly average number of car-miles per day	Weighted average number of car-miles per day
Private	30,290	69%	161.39	(69% × 161.39 car miles/day) + (31% ×166.20 car miles/day) = 163 car miles/day
Railroad	13,604	31%	166.20	

Because the car-miles per day reported in EP770 (Sub-No. 1) already include all move dwell times (e.g., train reclassification, crew changes, block swapping), we did not add any further dwell time to transit duration. However, to more realistically capture terminal operations at the origin and destination, we added a two-hour warehouse handling time to every rail haul to reflect loading and unloading times, based on a commercial review with UP and NS.

For interline moves, additional interchange dwell must be accounted for at each junction. We therefore drew on railroad performance data reported to the Board under 49 CFR part 1250 (which requires Class I carriers to report specified service metrics) and applied the 2023 average system terminal dwell time of 22 hours (excluding cars on run-through trains) as the estimate of time spent at each interchange. Exhibit B-45 summarizes the key expert assumptions made when calculating merchandise train transit time, and Exhibit B-46 depicts the entire rail transit time

172 Ibid.

estimation process. Comparisons of the average rail transit times pre and post-merger are summarized in Exhibit B-47.

Exhibit B-45: Summary of Oliver Wyman expert assumptions when calculating merchandise train transit time[173]

Metric	Assumed value	Source
Merchandise railcar velocity	163 miles per day	2023 weighted average car-miles per day for all railroads (excluding CSXT and TTX car types) reported to the STB under EP770
Warehouse handling time[174]	2 hours	Assumption made from OW experience working with trucking carriers
Average dwell time per interchange	22 hours	2023 average system terminal dwell time (excluding cars on run-through trains) reported to the STB under 49 C.F.R part 1250

Exhibit B-46: Process used to estimate rail transit time pre and post-merger

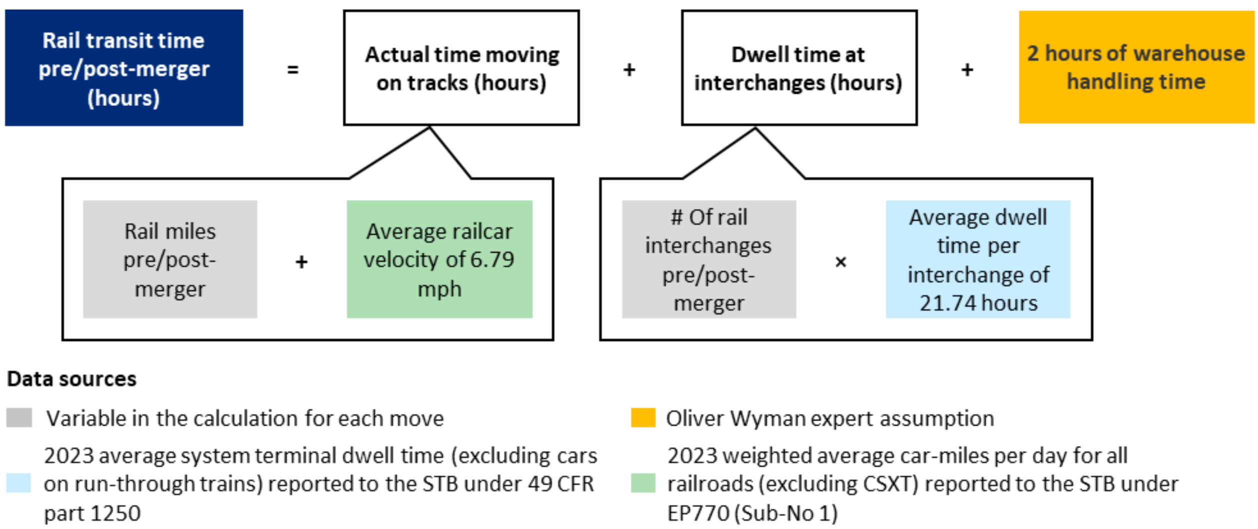


Exhibit B-47: Summary output for rail transit time pre-merger for merchandise/bulk traffic[175]

Rail length of haul (miles)	Average rail transit time pre-merger (hours)	
	Single Line	Interline
250-499	58	84
500-749	93	118
750-999	129	155
1000-1499	178	207
1500-1999	258	279
2000+	336	404

[173] Ibid.
[174] Includes total load/unload time.
[175] See workpaper "rail_transit_time_pre_by_LOH_VF.sql."

B.9. Truck Transit Time Assumptions

Truck transit time is calculated as a door-to-door transit time for a given shipment. We assumed that all truck types travel at an average velocity of 50 miles per hour based on industry experience for a single driver. This velocity assumption includes activities comparable to those included in rail transit velocity (see Section B.4, e.g., handling within the route). Beyond this velocity assumption, truck transit time has been estimated to comply with US Federal Motor Carrier Safety Administration's ("FMCSA") hours of service ("HOS") regulations for property-carrying drivers. We solely focused on the rules and regulations prescribed by the FMCSA, given it is the agency within the US Department of Transportation that regulates and enforces safety standards for commercial motor vehicles ("CMVs"), including large trucks and buses. FMCSA limits on daily driving hours introduce real-world constraints that affect truck transit time calculations:

- **11-hour driving limit:** drivers may drive a maximum of 11 hours after 10 consecutive hours off duty
- **30-minute driving break:** drivers must take a 30-minute break when they have driven for a period of 8 cumulative hours without at least a 30-minute interruption. The break may be satisfied by any non-driving period of 30 consecutive minutes (i.e., on-duty not driving, off-duty, sleeper berth, or any combination of these taken consecutively). We assumed that drivers will use this 30-minute break efficiently to refuel and will not need to make additional refueling stops at any other time.
- **14-hour limit:** Although there is a rule that drivers may not drive beyond the 14th consecutive hour after coming on duty, a simplifying assumption is made that the driver will

maximize the 11-hour driving limit in this 14-hour window and hence duty time will not be a limiting factor for truck transit time.

Similar to how rail transit time accounts for additional origin/destination dwell to reflect reality, we included a two-hour dwell to all truck transit times to reflect truck loading and unloading work required. Exhibit B-48 summarizes the key expert assumptions made when calculating truck transit time, Exhibit B-49 depicts the entire truck transit time estimation process, and Exhibit B-50 shows summarized outputs of average truck transit time in hours by truck length of haul.

Exhibit B-48: Summary of Oliver Wyman expert assumptions when calculating truck transit time

Metric	Assumed value	Source
Truck velocity for all truck types	50 miles per hour	Oliver Wyman experience working with large trucking carriers
Total load/unload time	2 hours	Oliver Wyman experience working with large trucking carriers
Consecutive driving time before required 30-min break	8 hours	FMCSA hours of service regulations for property-carrying drivers (Summary of Hours of Service Regulations, FMCSA)
Length of break after 8 hours of driving	0.5 hours	
Consecutive driving time allowed on duty	11 hours	
Length of rest after 11 consecutive hours of driving	10 hours	

Exhibit B-49: Process used to estimate truck transit time

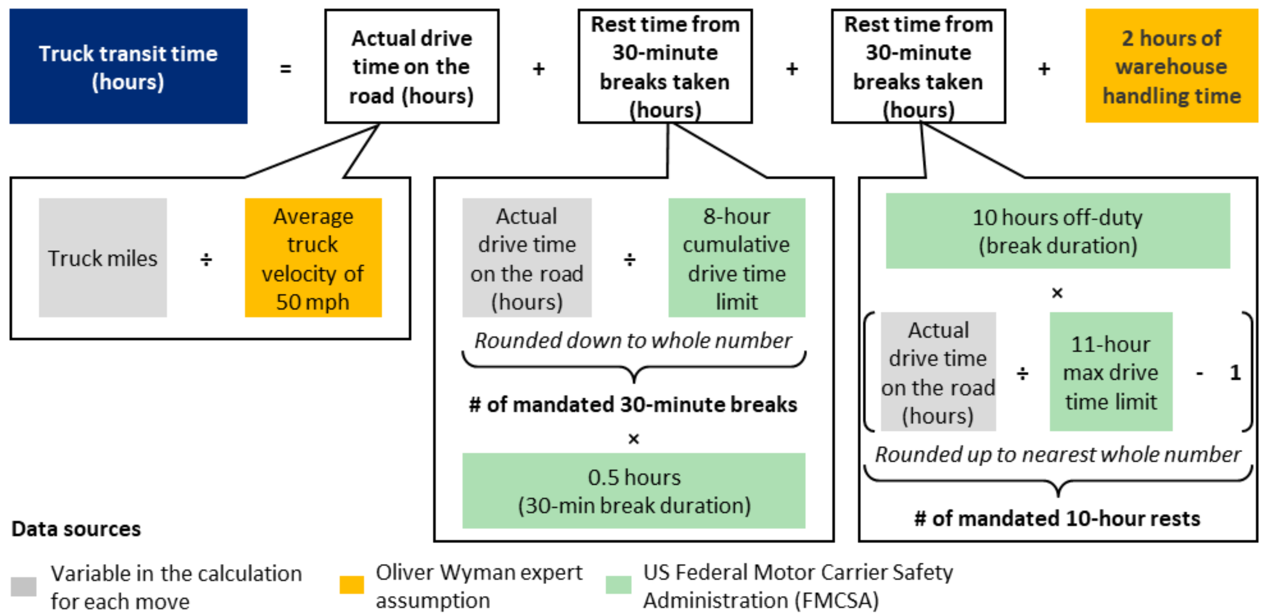


Exhibit B-50: Summarized output of average truck transit time by length of haul for merchandise/bulk traffic[176]

Truck length of haul (miles)	Average truck transit time (hours)
250-499	9
500-749	22
750-999	30
1000-1499	45
1500-1999	64
2000+	91

B.10. Assumptions for Transit Time Comparison

Exhibit B-51 summarizes the key assumptions made when calculating merchandise railcar and truck transit times.[177] Applying these assumption to an example lane between Minneapolis, MN and Columbus, OH, a single-line move can improve transit time by 17% over an interline

[176] See workpaper "avg_truck_transit_time_by_LOH_merch_VF.sql."
[177] Truck transit times are regulated by the US Federal Motor Carrier Safety Administration's ("FMCSA") hours of service ("HOS") regulations.

move (Exhibit B-52). While truck is still faster, a single-line rail service can narrow the transit time gap to improve rail's competitiveness.[178]

Exhibit B-51: Summary of assumptions for calculating transit times

Metric	Assumed value	Source
Merchandise railcar		
Merchandise car-miles per day	163 miles per day	2023 weighted average car-miles per day for all railroads (excluding CSXT and TTX car types) reported to the STB under EP770
Warehouse handling time[179]	2 hours	Assumption made by Oliver Wyman and validated with UP and NS
Handling time at an interchange	22 hours	2023 average system terminal dwell time (excluding cars on run-through trains) reported to the STB under 49 CFR part 1250
Truck		
Truck velocity for all truck types	50 miles per hour	Oliver Wyman experience working with large trucking carriers
Total load/unload time	2 hours	
Consecutive driving time before required 30-min break	8 hours	FMCSA hours of service regulations for property-carrying drivers (Summary of Hours of Service Regulations, FMCSA)
Length of break after 8 hours of driving	0.5 hours	
Consecutive driving time allowed on duty	11 hours	
Length of rest after 11 consecutive hours of driving	10 hours	

Exhibit B-52: Illustrative example of impact of railroad interchange on transit time, Minneapolis, MN-Columbus, OH[180]

	Rail interline	Rail single-line	Truck	Notes
Mileage	720	720	720	Use same mileage for this illustrative example
Mph	6.79	6.79	50	Average speed
Hours moving	106.0	106.0	14.4	Hours while train or truck is in motion
Hours not moving	22	0	10.5	Interchange for rail, mandatory rests for truck
Load/unload hours	2	2	2	Loading/unloading time
Total hours	129.8	108.0	26.9	Sum of hours in motion, stationery, at end points
Rail hrs/truck hrs	4.8	4.0		Rail hours relative to truck hours

178 (129.8 hours – 108.0 hours) / 129.8 hours = 17%.
179 Includes total load/unload time.
180 Example uses the sources listed in Exhibit B-51.

B.11. Top Diversion Lanes for Truck to Merchandise/Bulk

See Section 4.2.3 for an overview of estimated diversions by origin and destination lanes. Exhibits B-53 and B-54 below detail estimated carloads and top commodities diverted for top 10 origin and destination states.

Exhibit B-53: Top 10 states originating truck-to-rail merchandise diversions[181]

Origin state	Estimated diverted carloads	Top commodities diverted
TX	40,000	• Chemicals or allied products • Petroleum or coal products • Food and kindred products
LA	24,000	
IA	18,000	• Food and kindred products • Chemicals or allied products • Nonmetallic ores, minerals, excluding fuels
AR	11,000	• Food and kindred products • Lumber or wood products, excluding furniture • Petroleum or coal products
CA	11,000	• Food and kindred products • Petroleum or coal products • Clay, concrete, glass, or stone products
GA	6,000	• Food and kindred products • Chemicals or allied products • Clay, concrete, glass, or stone products
WI	6,000	• Food and kindred products • Nonmetallic ores, minerals, excluding fuels • Chemicals or allied products
NE	6,000	• Food and kindred products • Chemicals or allied products • Nonmetallic ores, minerals, excluding fuels
OH	5,000	• Chemicals or allied products • Food and kindred products • Clay, concrete, glass, or stone products
IL	5,000	• Food and kindred products • Chemicals or allied products • Clay, concrete, glass, or stone products
Top 10 total	**133,000**	
Grand total	**183,000**	
% of grand total	**73%**	

[181] See workpapers "All_Results_vF.xlsx."

Exhibit B-54: Top 10 states terminating truck-to-rail merchandise diversions[182]

Destination state	Estimated diverted carloads	Top commodities diverted
OH	18,000	• Chemicals or allied products • Food and kindred products • Petroleum or coal products
PA	15,000	• Food and kindred products • Chemicals or allied products • Petroleum or coal products
GA	14,000	• Food and kindred products • Chemicals or allied products • Lumber or wood products, excluding furniture
TX	12,000	• Food and kindred products • Chemicals or allied products • Nonmetallic ores, minerals, excluding fuels
CA	11,000	• Food and kindred products • Petroleum or coal products • Chemicals or allied products
NJ	10,000	• Food and kindred products • Chemicals or allied products • Petroleum or coal products
NC	9,000	
IN	9,000	
VA	9,000	
MI	8,000	
Top-10 total	**115,000**	
Grand total	**183,000**	
% of grand total	**63%**	

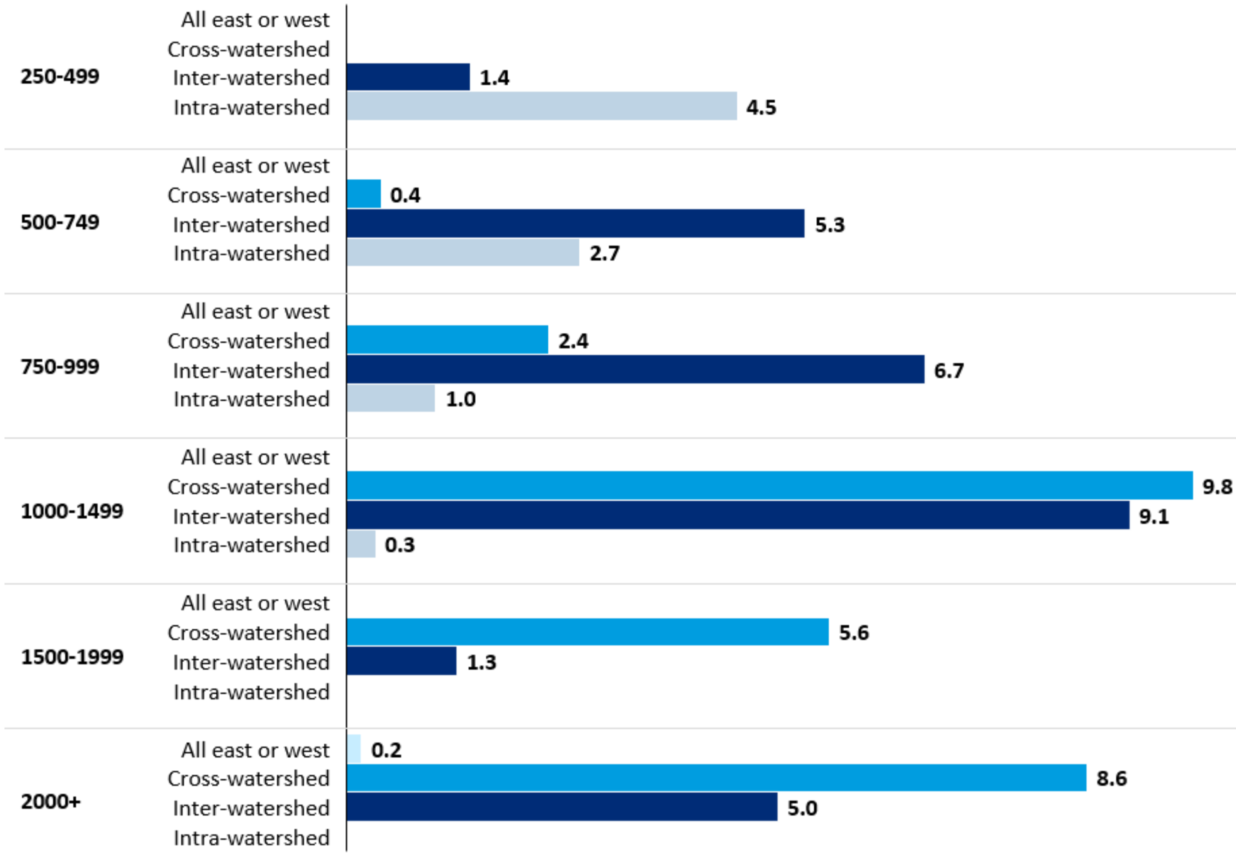
Commodity-specific truck-to-carload rail merchandise/bulk diversions

Exhibit B-55 shows the estimated diversions in rail carloads by distance band and by geography relative to the watershed region for food products. There are an estimated 65,000 carloads of diverted food products. Focusing on the 1000-1499 mileage band, the majority of carloads are cross-watershed or inter-watershed diversions. Cross-watershed moves include Iowa to eastern locations, such as Pennsylvania and New Jersey. Inter-watershed moves include lanes like Iowa to Indiana, which is one of the top 10 diverted lanes.

[182] See workpapers “All_Results_vF.xlsx.” and “Top 10 states terminating T2R merch diversions vF.sql.”

Exhibit B-55: Estimated truck-to-carload rail diversions of food products, by distance band and watershed region[183]

Thousands of rail carloads; total = 65,000 carloads

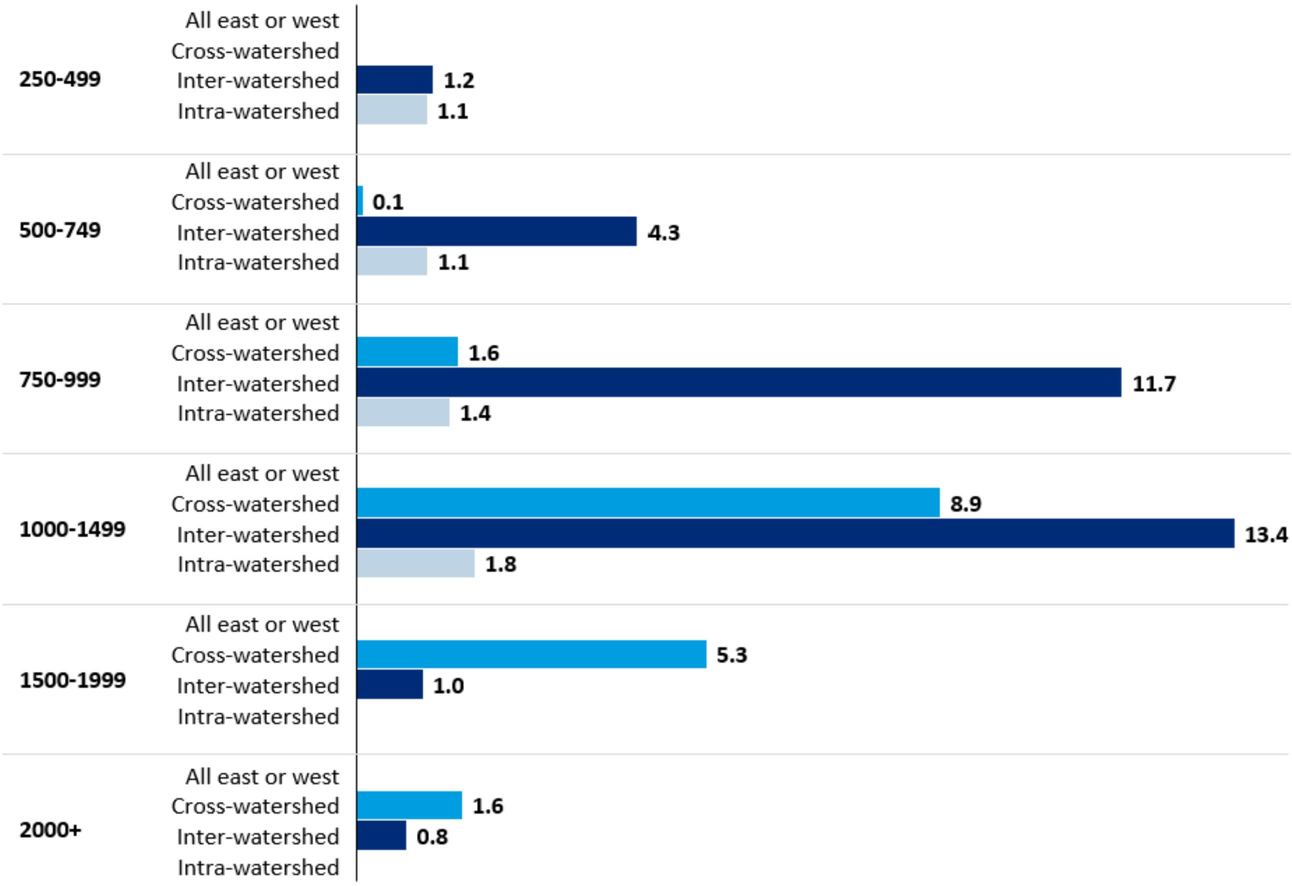


The estimated diversions for chemicals follow a similar pattern as food products, with most diversions occurring in the cross-watershed and inter-watershed regions (Exhibit B-56). Inter-watershed moves include lanes such as Texas to Pennsylvania and Texas to New Jersey. The largest category of chemical diversions is 13,000 carloads in the 1000-1499 distance band for inter-watershed moves.

[183] Food products = STCC 20. See workpaper "t2merch_watershed_summary_vF.ipynb."

Exhibit B-56: Estimated truck-to-carload rail diversions of chemicals, by distance band and watershed region[184]

Thousands of rail carloads; total = 55,000 carloads



We estimate that primary metals will be another large source of merchandise/bulk diversions from trucks, totaling 24,000 new rail carloads (Exhibit B-57 below). The top state-state lanes expected to see this majority of this new traffic are Ohio-Texas, Alabama-Texas, and Ohio-California. The top 15 lanes are expected to account for 58% of these diversions.

[184] Chemicals = STCC 28. See workpaper "t2merch_watershed_summary_vF.ipynb."

Exhibit B-57: Top Primary metal state-to-state diversions[185]

Carloads; total = 24,000

Lane	Diversions
OH-TX	2,800
AL-TX	1,700
OH-CA	1,600
IL-CA	1,200
IN-CA	1,200
IN-TX	1,100
MS-TX	1,000
IN-MN	600
PA-TX	500
OH-OK	500
AL-CA	500
IN-OR	500
AL-LA	400
IN-AR	400
IN-NE	300
Top 15 total	**14,300**
% of total diversions	**58%**

Origin State	Diversions
OH	7,000
IN	5,700
AL	3,400
IL	1,400
MS	1,200
PA	1,200
TN	800
TX	600
SC	600
MI	500
VA	500
NL	300
KY	300
CU	200
WI	100
Top 15 total	**23,8000**
% of total diversions	**97%**

B.12. Converting Diverted Carloads/Units Into Diverted Truckloads

To estimate the number of trucks diverted off the highway per railcar, we used the following methodology:

- For intermodal diversions, we assumed that one container equals one truckload, resulting in the same number of truckloads off the road as estimated truck to rail diverted intermodal units. Each intermodal unit will create two loaded local drayage moves. These were sized based on the average drayage miles for each lane. No empty repositioning miles are assumed for either the reduction in over-the-road trucking or the incremental drayage. For over-the-

185 Primary metals = STCC 33. Includes rail-to-rail and truck-to-rail diversions. See workpaper "All_Resulsts_vF.xlsx." and "Top primary metal state to state diversions vF.sql."

road trucking, industry leaders operate 14% empty miles.[186] For drayage, the number is higher as empty containers must be repositioned to a load or returned to the terminal.

- For finished vehicles, we estimated diversions in carloads, so calculated the tons per average carload carrying finished vehicles (STCC 3711) from the CCWS (20.5 tons/carload).[187] Then, we used Transearch to calculate the average tons/truckload for STCC 3711 (14.1 tons/truckload).[188] No empty repositioning miles are assumed. Empty miles for final mile automotive delivery, and most over-the-road lanes, will be close to 50% as it is rare for a dealership to also load cars.
- For merchandise/bulk, we calculated tons per truck unit by STCC2 commodity and truck equipment type from Transearch. We then used this ratio to convert the estimated diverted tons to truckloads off the highway. No empty repositioning miles are assumed. For dry van and flatbed traffic, the empty miles will be similar to general over-the-road trucking. This will increase to 50% for tanker and bulk trucks as these rarely have backhaul loads.

Exhibit B-58 shows the summary statistics for trucking diverted to rail. This shows that the drayage truck-miles and ton-miles created by converting from truck to intermodal is very small compared with the truck traffic removed from highways, excluding empty miles.

A GTM estimate for trucks is included, assuming a 15-ton tare weight for a tractor and semi-trailer (all types). This allows for comparison of GTMs removed from the highway with GTMs added to the railroad network. No empty miles for rail is included in the GTM calculation – this is loads versus loads. The GTMs are estimated using the shortest path mileage.

[186] 2023 Knight Swift annual report (14.2% empty miles) and Werner annual report (14.4%) for irregular route, for-hire trucking; see reference sources “Knight_Swift_2023_annual_report_VF.pdf” and “Werner_2023_annual_report_VF.pdf.” Note that empty miles percentages shown here are [empty miles] / ([loaded miles] + [empty miles])

[187] Confidential Carload Waybill Sample, op. cit.; see workpaper “finished_vehicle_tons_per_carload.sql.”

[188] Transearch, op. cit.; see workpaper “finished_vehicle_tons_per_truckload.sql.”

Exhibit B-58: Total truckloads and GTMs diverted to rail[189]

Trucks (thousands)	Diverted trucks	Drayage added back	Net impact
Truck to intermodal	(1,166)	2,333	1,166
Long-haul drayage	(67)	67	-
Intermodal subtotal	*(1,233)*	*2,400*	*1,166*
Merchandise	(797)		(797)
Auto	(7)		(7)
Total	(2,038)	2,400	362
Truck-miles (millions)	**Diverted trucks**	**Drayage added back**	**Net impact**
Truck to intermodal	(2,048)	136	(1,912)
Long-haul drayage	(18)	1	(18)
Intermodal subtotal	*(2,066)*	*137*	*(1,929)*
Merchandise	(1,015)		(1,015)
Auto	(14)		(14)
Total	(3,095)	137	(2,958)
Ton-miles (millions)	**Diverted trucks**	**Drayage added back**	**Net impact**
Truck to intermodal	(29,246)	1,946	(27,299)
Long-haul drayage	(261)	9	(252)
Intermodal subtotal	*(29,507)*	*1,956*	*(27,551)*
Merchandise	(22,261)		(22,261)
Auto	(233)		(233)
Total	(52,001)	1,956	(50,046)
Avg miles per unit	**Diverted trucks**	**Drayage added back**	**Net impact**
Truck to intermodal	1,756	58	1,697
Long-haul drayage	273	10	263
Intermodal subtotal	*1,675*	*57*	*1,618*
Merchandise	1,273		1,273
Auto	1,890		1,890
Total	*1,519*	*57*	*1,462*
Avg. laden tons per unit	**Diverted trucks**	**Drayage added back**	**Net impact**
Truck to intermodal	14.3	14.3	14.3
Long-haul drayage	14.3	14.3	14.3
Intermodal subtotal	*14.3*	*14.3*	*14.3*
Merchandise	21.9		21.9
Auto	17.1		17.1
Total	*16.8*	*14.3*	*16.9*
GTMs (millions)	**Diverted trucks**	**Drayage added back**	**Truck GTMs**
Truck to intermodal	(59,966)	3,991.0	(55,975)
Long-haul drayage	(535.6)	19.5	(516)
Intermodal subtotal	*(60,501.6)*	*4,010.4*	*(56,491)*
Merchandise	(37,485.4)		(37,485)
Auto	(437.6)		(438)
Total	*(98,424.5)*	*4,010.4*	(94,414)

[189] See workpaper “Trucks diverted from highway vF.xlsx.”

Rail GTMs (millions)	**Diverted freight**	**Extended haul offset**	**Rail GTMs**
Truck to intermodal	82,367		82,367
Long-haul drayage	4,527	(4,280)	247
Intermodal subtotal	*86,894.0*	*(4,280)*	*82,614*
Merchandise	34,211		34,211
Auto	794		794
Total	*121,899*	*(4,280)*	117,619

Difference	**Truck**	**Rail**	**Net**
Truck to intermodal	(55,975)	82,367	26,392
Long-haul drayage	(516)	247	(269)
Intermodal subtotal	*(56,491)*	*82,614*	*26,123*
Merchandise	(37,485)	34,211	(3,274)
Auto	(438)	794	357
Total	*(94,414)*	*117,619*	23,205

Appendix C. Diversion Model Application

C.1. Transition to Operating Plan

The processing of the diversion traffic to the operating plan was divided into three layers:

- **Rail-to-rail diversions**. This process removed some diversions, deleted many small flows in an 80-20 situation, and identified existing flows in the operating plan where a part of a diversion overlapped with that flow.
- **Truck-to-rail diversions**. Most of the diversions were small, but there were hundreds of thousands of them that needed to be consolidated for the operating plan, while ensuring that the operating plan would have valid volumes for blocks, trains, and yards.
- **Intermodal diversions**. The intermodal diversion traffic had been already screened to ensure there is sufficient density to offer service and matched to origin-destination terminals. No further adjustments were performed, other than the addition of empty flows to balance each terminal's growth.

C.1.0. Rail-to-Rail Diversions to the Operating Plan

After estimating merchandise/bulk and automotive rail-to-rail diversions, we applied selected adjustments to prepare and compress the data before inputting into MultiRail:[190]

- Removed diversions that experts from NS and UP thought were unlikely due to either physical network connectivity issues (such as the ability to reach the assembly location), existing long-term contracts with other railroads, or rail-on-waterway lanes. This impacted certain loaded auto (multilevel) moves detailed in Section A.7.3 above, and diversions from the CGR train ferry between Alabama and Mexico.
- Mapped all diverted traffic to MultiRail nodes.

[190] See workpaper "R2R_Diversions_2_MR_V2.ipynb."

- Restricted diversions to the ~3,300 nodes capable of originating or terminating blocks.
- Reassigned diversions to block-handling nodes within a 50 mile radius as needed. Diversion locations had SPLCs that needed to be translated into valid blocking locations.
- For automotive diversions, mapped traffic to nodes with auto ramps. Input from experts at UP-NS informed which locations are capable of handling additional automotive traffic.

• Rationalized the "long tail" of lanes with fractional annual diverted cars and grossed up diversions accordingly to preserve total cars. For example, the bulk diversions decreased by 2% when the "long tail" was removed, and the bulk car counts for each lane were increased by 102% (98% x 102% = 100%) to compensate. Auto traffic was had no gross-up – less than 0.5% of the traffic was rationalized and it felt important to align the loaded diversions with the empty multi-level logic.

• Examined the path of each diversion and compared it to the original path to see if the diversion was an extended haul, new diversion, or existing lane.
  - New diversion: If the original traffic flow was from AAA to BBB on BNSF and BBB to CCC on CSXT, and the diversion was AAA to CCC on the combined UP/NS railroad, this would be considered a new diversion.
  - Extended haul: If the original traffic flow was AAA to BBB on UP, and then BBB to CCC on CSXT, and the diversion was AAA to CCC on the combined railroad, this was considered an extended haul. That is, the original UP/NS flow was from AAA to BBB and then extended to CCC.
  - Existing lane**:** If the original traffic flow was AAA to BBB on UP, and then BBB to CCC on NS, and the diversion estimated that more traffic will be attracted to route, then the diversion is onto an existing UP/NS lane.

- In the output of this process, we recorded the origin/destination and railroad (UP or NS) of the extended hauls. How this is used is discussed in the next section.
- Modeled the movement of empty cars generated by the diverted traffic.
  - For merchandise and bulk, added empties on a one-to-one basis for rail-to-rail diversions.
  - For automotive, the empties were modeled based on the combined rail-to-rail and truck-to-rail diversions, plus the auto traffic from the 2023 base traffic. This was done to represent the more efficient industry wide movement of empty multilevels.
- Obtained representative net- weight, tare and length for the cars in a diversion lane. This was based on examining the traffic data in MultiRail (whose origins were waybills) to obtain appropriate average weights and lengths.

C.1.1. Rail-to-Rail Offsets to the Operating Plan

As described above, the rail-to-rail diversions were classified either as new, extended, or existing. For extended haul, it was important to back out the original traffic. For example, if the original traffic as AAA to BBB on UP and BBB to CCC on CSXT, and the diversion was 10 cars on the AAA to CCC on UP/NS, then we added that traffic record to the operating plan but had to identify existing traffic records in the operating plan that went from AAA to BBB and subtracted a total of 10 cars from them. A gross-up was applied in a small number of cases to ensure that any lanes where no traffic to offset in the compressed traffic file is available that kept the total car-miles to offset the same.

That identification was routine for most cases. We might find five traffic records from AAA to BBB with slightly different characteristics (such as the from/to railroad) with a total of 40 cars. We reduced the traffic by 25% for each of those five traffic records.

Due mostly to remapping waybill locations to MultiRail nodes, there were times when an exact lane could matching the extended how could not be found. A common situation was in Chicago with many nodes and the same SPLC. We could not always find the exact lane that matched the diversion route, so we used the MultiRail lane that was closest to it (the two end points of the diversion extended haul lane were close to the two end points of the MultiRail lane).

C.1.2. Truck-to-Rail Diversions to the Operating Plan

The truck-to-rail conversion to the MultiRail operating plan had the following steps:[191]

- Translated the FIPS codes that were used as origins and destinations of the diversions into the ~3,300 blocking locations in MultiRail.
- Reduced the traffic to a manageable set for inclusion into the operating plan.

Traffic reduction needed a different approach than what was used for rail-to-rail diversions, where a cutoff of 10 cars per year was used. In that case, a significant number of the lanes were kept, and the gross-up factors were not large. This approach was sufficient to ensure that the trains and the blocks in the operating plan would have reasonable volumes.

For truck-to-rail, a simple cutoff of, for example, 10 cars per year would result in using only 1.3% of traffic lanes. The concern was that a simple gross-up based on car counts might not reflect the varying distances of the diversion lanes, which would lead to inaccurate block and train volume estimates with the operating plan.

A different approach for grossing up was used – we maintained car-miles by STCC and car-type instead of car counts. Using car-miles better reflects the increases found in the diversion model and gave reasonable block and train volumes (which aggregate traffic to various levels). However, using car-miles does result in the number of cars changing.

[191] See workpaper "T2R_Diversions_2_MR.ipynb."

As a result of this compression, diverted carloads increased from ~183,000 to ~193,000 for truck-to-rail merchandise. Total diverted car-miles remained unchanged for all diversion types. Diverted finished vehicles were only in 36 lanes and there was no need to change that.

C.2. Adjustment for Refrigerated Railcars

Diversions for lanes originally classified as truck equipment type code "R," or refrigerated trucks, were reallocated AAR Car Types. After review with UP and NS subject matter experts, and consultation with Transearch, some of the commodities that Transearch classified to move in refrigerated trucks we determined would not need to move by refrigerated railcars ("R"). This is because the underlying commodities (e.g., 2046 – Wet Corn Milling or Milo) will move in refrigerated tanker trucks and other specialty trailers for food transportation. When these commodities move by rail, they do not do so in refrigerated boxcars ("R").

Therefore, we partially reallocated these refrigerated truck diversions to other AAR Car Types beyond refrigerator cars, specifically types equipped box cars ("A"), unequipped box cars ("B"), covered hopper cars ("C"), and tank cars ("T"). The re-allocation of diversion traffic between these 5 car types, including car type R, was determined based on a combination of the share of STCC4 commodities to be diverted on the given lane and the share of railcar types which a STCC4 commodity historically ships on.[192] Only STCC4 codes within STCC2 20 (food products) are considered for this analysis. The original refrigerated truck volume and revenue was re-allocated to other car types based on this calculated railcar share to retain the same car count, car-miles and gross-ton-miles (we assume minimal tare weight difference). This reallocation had no impact on the total revenue numbers since revenue is indifferent to equipment type (see Appendix C.3 for full revenue calculation).

[192] See workpaper "Reefer_railcar_vF.xlsx."

C.3. Revenue Calculation

We estimated the revenue impact from the diversion analysis output after we delivered the estimates to the operating plan to create a more realistic revenue estimate. The model estimates were compressed to flow over in the operating plan (see A.C.1 "Transition to Operating Plan"), and offsets from extended haul traffic were made during this step.[193]

To estimate the UP-NS revenue increase from rail-to-rail and truck-to-rail diversions, we used the following formulas:

Revenue = Diverted Net Tons × Miles on UPNS network × Revenue per Ton-Mile - Offset Revenue

For all traffic, we calculated revenue per ton-mile from the CCWS by plotting the data in Microsoft Excel and fitting a trendline, where a regression based on a power curve provided the best fit for the trendline (see Appendix B.6 for an explanation of the regression curve and the results). Three regressions were applied to estimate revenue per-ton-mile.[194]Merchandise and bulk traffic utilized a lookup table based on the regression analysis, adjusting for STCC2 commodity, junction frequency, and length of haul based on CCWS Service Type 1 (general merchandise) and 3 (bulk) traffic. Intermodal traffic utilized a lookup table based on the regression analysis of CCWS Service Type 2 (intermodal) traffic, adjusting for junction frequency and length of haul only, without an adjustment for the commodities of the goods traveling by container. Automotive traffic utilized a lookup table based on the regression analysis of CCWS finished vehicle (STCC 3711) traffic, adjusting for junction frequency and length of haul only.

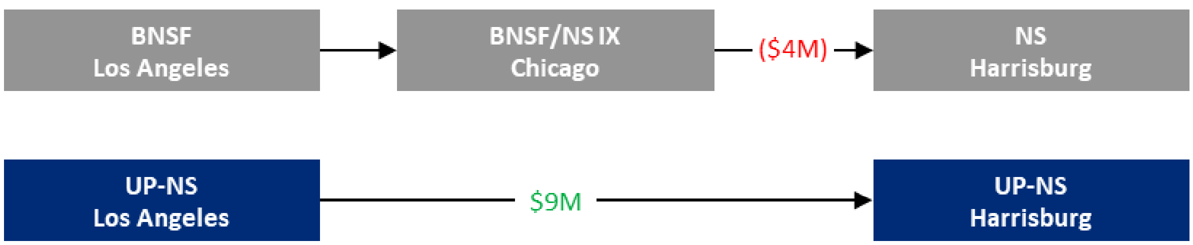
For the miles traveled on the UP-NS network, we use a shortest path distance as calculated in the Operating Plan, defined as the shortest distance between two points on the MultiRail

[193] See STB Finance Docket No. 3687, Operating Plan Verified Statement, op. cit.
[194] See workpaper "RevenuePerTM_Distance_JF.xlsx" for all revenue-per-ton mile calculations.

network. The shortest path distance, as opposed to the block distance, is selected for congruity with the revenue per ton-mile figures derived from the CCWS which is also based on a shortest path calculation performed by the Board.

We created a revenue offset to subtract revenue that was previously assigned to a routing when the same traffic was switched to a different route after a merger. This prevented double counting revenue. As an illustrative example, when Los Angeles-Chicago-Harrisburg traffic was moved from BNSF-NS to UP-NS, we removed the revenue currently recorded on the BNSF-NS routing (the offset) before assigning the revenue to the UP-NS routing (see Exhibit C-1).

Exhibit C-1: Revenue offset procedure (illustrative)



Offset removal steps:

1. Identify diverted traffic revenue to add ($5M+4M = $9M)
2. Subtract revenue from portion of original routing to avoid counting twice ($4M)
3. Result is that only net increases in diversion traffic contribute to revenue estimate ($5M)

Several merchandise diversions had offsets that were only found in the historical UP or NS bulk traffic data. This is due to the agency classifying certain traffic (e.g., frack sand) as merchandise, while the railroads consider this to be bulk traffic in their operating plans. We considered the diversions to UP-NS to be categorized as merchandise, while considering the offsets to be bulk traffic, leading to a negative revenue figure for bulk diversions after the offsets were applied.

Appendix D. Geographic Definitions

D.1. Intermodal BEAs With Adjustments

The intermodal catchment areas were defined based on where intermodal traffic terminates and originates in the CCWS. Each of these locations was grouped based on BEA or in some specific cases into a new intermodal catchment area. Each catchment area had a primary county (FIPS_gp – Exhibit D-1) which contained the most intermodal lifts (originations + terminating trailer container units. The counties identified in FIPS_gp represent terminals and were used in the truck to intermodal analysis for calculating the intermodal lane catchment areas. Similarly, for the rail-to-rail analysis, this list of groups was used to define the competitive set of FIPS and hence terminals in the CCWS.

There are BEAs that are sufficiently large as to represent multiple non-overlapping intermodal markets. These were broken apart as such and highlighted in the table below:

- BEA 10 – New York-No. New Jersey-Long Island, NY-NJ-CT-PA (CMSA-70) is split into "New Jersey" (Croxton- NS, ERail-NS, North Kearney-CSXT, North Bergen-CSXT terminals), Lehigh Valley (Bethlehem-NS, Taylor-NS) and moving two terminals into the Boston/New England market (Hartford-CSXT and Springfield-CSXT)
- BEA 134 – San Antonio, TX is split into San Antonio (SAIT) and Laredo, TX (Port Laredo-UP and Laredo-CPKC)

One group of BEAs is partially combined to more accurately capture the market dynamics of Detroit, MI and that the Detroit market is served from nearby terminals in Ohio (Toledo, OH and North Baltimore, OH). These terminal FIPS are grouped together into "Detroit and Toledo" to reflect how the market views these as competitive choices to serve the freight.

Exhibit D-1: BEA + additional intermodal terminal catchment areas[195]

BEA + additional intermodal terminal catchments	FIPS	FIPS_gp	BEA
Bangor, ME.	23011	23011	001
Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH.	25027	25027	003
Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH.	25017	25027	003
Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH.	25025	25027	003
Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH.	33011	25027	003
Albany-Schenectady-Troy, NY.	36001	36001	005
Albany-Schenectady-Troy, NY.	36091	36001	005
Syracuse, NY.	36067	36067	006
Syracuse, NY.	36045	36067	006
Rochester, NY.	36055	36055	007
Buffalo-Niagara Falls, NY.	36029	36029	008
Buffalo-Niagara Falls, NY.	36063	36029	008
Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH.	09001	25027	010
Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH.	25013	25027	010
New Jersey	34017	34017	010
New Jersey	34039	34017	010
New Jersey	34013	34017	010
New Jersey	36085	34017	010
Lehigh Valley	42095	42095	010
Lehigh Valley	42069	42095	010
Lehigh Valley	42025	42095	010
Harrisburg-Lebanon-Carlisle, PA.	42043	42043	011
Harrisburg-Lebanon-Carlisle, PA.	42041	42043	011
Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD (CMSA-77)	34015	42017	012
Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD (CMSA-77)	42017	42017	012
Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD (CMSA-77)	42101	42017	012
Washington-Baltimore, DC-MD-VA-WV (CMSA-97)	24510	24510	013
Harrisburg-Lebanon-Carlisle, PA.	42055	42043	013
Washington-Baltimore, DC-MD-VA-WV (CMSA-97)	51187	24510	013
Staunton, VA.	51660	51660	016
Greensboro-Winston-Salem-High Point, NC.	37081	37081	018
Raleigh-Durham-Chapel Hill, NC.	37065	37065	019
Norfolk-Virginia Beach-Newport News, VA-NC.	51710	51710	020
Norfolk-Virginia Beach-Newport News, VA-NC.	51740	51710	020
Charlotte-Gastonia-Rock Hill, NC-SC.	37119	37119	023

[195] Based on Oliver Wyman expert intermodal market knowledge.

BEA + additional intermodal terminal catchments	FIPS	FIPS_gp	BEA
Wilmington, NC.	37129	45033	025
Wilmington, NC.	37019	45033	025
Wilmington, NC.	45033	45033	025
Charleston-North Charleston, SC.	45019	45019	026
Charleston-North Charleston, SC.	45015	45019	026
Augusta-Aiken, GA-SC.	45011	45011	027
Savannah, GA.	13051	13051	028
Jacksonville, FL.	12031	12031	029
Jacksonville, FL.	13039	12031	029
Central Florida	12105	12105	030
Central Florida	12009	12105	030
Miami-Fort Lauderdale, FL (CMSA-56).	12086	12086	031
Miami-Fort Lauderdale, FL (CMSA-56).	12011	12086	031
Miami-Fort Lauderdale, FL (CMSA-56).	12099	12086	031
Miami-Fort Lauderdale, FL (CMSA-56).	12111	12086	031
Central Florida	12057	12105	034
Atlanta, GA.	13067	13121	040
Atlanta, GA.	13121	13121	040
Atlanta, GA.	13213	13121	040
Greenville-Spartanburg-Anderson, SC.	45045	45045	041
Greenville-Spartanburg-Anderson, SC.	45021	45045	041
Knoxville, TN.	47145	47145	044
Lexington, KY.	21209	21209	047
Lexington, KY.	21151	21209	047
Cincinnati-Hamilton, OH-KY-IN (CMSA-21).	39061	39061	049
Columbus, OH.	39049	39049	051
Columbus, OH.	39129	39049	051
Columbus, OH.	39131	39049	051
Pittsburgh, PA.	42003	42003	053
Pittsburgh, PA.	42129	42003	053
Cleveland-Akron, OH (CMSA-28).	39035	39035	055
Cleveland-Akron, OH (CMSA-28).	39029	39035	055
Detroit and Toledo	39173	26163	056
Detroit and Toledo	39095	26163	056
Detroit and Toledo	26163	26163	057
Detroit and Toledo	26125	26163	057
Detroit and Toledo	26161	26163	057

BEA + additional intermodal terminal catchments	FIPS	FIPS_gp	BEA
Detroit and Toledo	26147	26163	057
Green Bay, WI.	26109	26109	059
Milwaukee-Racine, WI (CMSA-63).	55079	55079	063
Chicago-Gary-Kenosha, IL-IN-WI (CMSA-14).	17031	17031	064
Chicago-Gary-Kenosha, IL-IN-WI (CMSA-14).	17197	17031	064
Indianapolis, IN.	18097	18097	067
Indianapolis, IN.	18023	18097	067
Indianapolis, IN.	18133	18097	067
Champaign-Urbana, IL.	17115	17115	068
Evansville-Henderson, IN-KY.	18101	18101	069
Louisville, KY-IN.	21111	21111	070
Nashville, TN.	21047	47037	071
Nashville, TN.	47037	47037	071
Memphis, TN-AR-MS.	05035	47157	073
Memphis, TN-AR-MS.	47157	47157	073
Memphis, TN-AR-MS.	47047	47157	073
Huntsville, AL.	01089	01089	074
Jackson, MS.	01063	28049	077
Jackson, MS.	28075	28049	077
Jackson, MS.	28049	28049	077
Jackson, MS.	28035	28049	077
Birmingham, AL.	01073	01073	078
Birmingham, AL.	01015	01073	078
Mobile, AL.	01097	01097	080
New Orleans, LA.	22071	22071	083
New Orleans, LA.	22051	22071	083
Baton Rouge, LA.	22047	22047	084
Lake Charles, LA.	22115	22115	086
Beaumont-Port Arthur, TX.	48245	48245	087
Shreveport-Bossier City, LA.	22017	22017	088
Monroe, LA.	22073	22073	089
Little Rock-North Little Rock, AR.	05019	05019	090
St. Louis, MO-IL.	17163	17163	096
St. Louis, MO-IL.	17121	17163	096
St. Louis, MO-IL.	29510	17163	096
Kansas City, MO-KS.	20091	29095	099

BEA + additional intermodal terminal catchments	FIPS	FIPS_gp	BEA
Kansas City, MO-KS.	20045	29095	099
Kansas City, MO-KS.	29095	29095	099
Des Moines, IA.	19023	19023	100
La Crosse, WI-MN.	55121	55121	105
Minneapolis-St. Paul, MN-WI.	27123	27123	107
Minneapolis-St. Paul, MN-WI.	27053	27123	107
Minneapolis-St. Paul, MN-WI.	55017	27123	107
Minneapolis-St. Paul, MN-WI.	55109	27123	107
Duluth-Superior, MN-WI.	27137	27137	109
Duluth-Superior, MN-WI.	27071	27137	109
Minot, ND.	38101	38101	111
Omaha, NE-IA.	19155	19155	118
Omaha, NE-IA.	31053	19155	118
Omaha, NE-IA.	31055	19155	118
Topeka, KS.	20061	20061	123
Tulsa, OK.	40121	40121	124
Western Oklahoma, OK.	40065	40065	126
Dallas-Fort Worth, TX (CMSA-31).	48439	48439	127
Dallas-Fort Worth, TX (CMSA-31).	48113	48439	127
Dallas-Fort Worth, TX (CMSA-31).	48085	48439	127
Houston-Galveston-Brazoria, TX (CMSA-42).	48201	48201	131
Houston-Galveston-Brazoria, TX (CMSA-42).	48157	48201	131
Corpus Christi, TX.	48355	48355	132
McAllen-Edinburg-Mission, TX.	48215	48215	133
McAllen-Edinburg-Mission, TX.	48061	48215	133
Laredo	48479	48479	134
San Antonio, TX.	48029	48029	134
Eagle Pass	48323	48323	134
Odessa-Midland, TX.	48475	48475	135
Lubbock, TX.	48303	48303	137
Amarillo, TX.	48381	48381	138
Denver-Boulder-Greeley, CO (CMSA-34).	08031	08031	141
Denver-Boulder-Greeley, CO (CMSA-34).	08041	08031	141
Denver-Boulder-Greeley, CO (CMSA-34).	08075	08031	141
Caster, WY.	16029	49009	143
Caster, WY.	49009	49009	143
Missoula, MT.	30093	30093	146

BEA + additional intermodal terminal catchments	FIPS	FIPS_gp	BEA
Spokane, WA.	16055	53063	147
Spokane, WA.	53063	53063	147
Idaho Falls, ID.	16005	16005	148
Idaho Falls, ID.	16077	16005	148
Reno, NV.	32031	32031	151
Reno, NV.	32007	32031	151
Reno, NV.	32013	32031	151
Salt Lake City-Ogden, UT.	49035	49035	152
Salt Lake City-Ogden, UT.	49045	49035	152
Las Vegas, NV-AZ.	32003	32003	153
Albuquerque, NM.	35001	35001	156
El Paso, TX.	35013	35013	157
El Paso, TX.	48141	35013	157
Phoenix-Mesa, AZ.	04013	04013	158
Tucson, AZ.	04019	04019	159
Tucson, AZ.	04023	04019	159
Los Angeles-Riverside-Orange County, CA (CMSA-49)	04012	06037	160
Los Angeles-Riverside-Orange County, CA (CMSA-49)	06037	06037	160
Los Angeles-Riverside-Orange County, CA (CMSA-49)	06071	06037	160
Los Angeles-Riverside-Orange County, CA (CMSA-49)	06025	06037	160
Fresno, CA.	06019	06019	162
San Francisco-Oakland-San Jose, CA (CMSA-84).	06077	06077	163
San Francisco-Oakland-San Jose, CA (CMSA-84).	06001	06077	163
San Francisco-Oakland-San Jose, CA (CMSA-84).	06013	06077	163
Portland-Salem, OR-WA (CMSA-79).	41051	41051	167
Portland-Salem, OR-WA (CMSA-79).	53039	41051	167
Pendleton, OR.	41021	41021	168
Pendleton, OR.	41049	41021	168
Seattle-Tacoma-Bremerton, WA (CMSA-91)	53033	53053	170
Seattle-Tacoma-Bremerton, WA (CMSA-91)	53053	53053	170
Seattle-Tacoma-Bremerton, WA (CMSA-91)	53061	53053	170
Seattle-Tacoma-Bremerton, WA (CMSA-91)	53041	53053	170
Seattle-Tacoma-Bremerton, WA (CMSA-91)	53035	53053	170
Seattle-Tacoma-Bremerton, WA (CMSA-91)	53073	53053	170
Seattle-Tacoma-Bremerton, WA (CMSA-91)	53057	53053	170

Appendix E. Witness Qualifications

David T. Hunt

Mr. Hunt, a Vice President in Oliver Wyman's Transportation practice, has over 40 years of experience in the areas of transportation operations and strategic planning, national and regional transportation policy, and network modeling and operations research. Mr. Hunt focuses on projects involving regulatory and policy analysis, strategic planning, and operational improvements. His projects include:

- Developed truck-to-rail and rail-to-rail diversion analyses for the merger of two Class I railroads, both for the entirety of the merged railroads and for a potential line spinoff.
- Developed a market share model that predicted truck/rail shares and volumes under various scenarios, including autonomous truck technologies and the potential responses by the rail industry.
- Prepared several policy white papers filed with the U.S. Department of Transportation, addressing issues such as positive train control, use of electronically controlled pneumatic brakes, single-person crews, and open access of the US rail network.
- Called as an expert witness in rail capacity modeling as part of an international arbitration case in South America.
- Participated in discussions with the Mexican government that led to a favorable ruling for the rail industry regarding proposed regulatory action to promote competition through expanded interconnection of rail services.
- Managed the design and development of BlueNet, a facility location model used in network design.
- Developed a simulation model that showed the benefits of operating a nationwide railcar pool, the results of which were used in a Surface Transportation Board proceeding to reauthorize the operation of the pool.
- Worked with a Class I North American railroad to explore opportunities and value of adopting predictive maintenance practices for their railcar fleet.

Prior to joining Oliver Wyman, Mr. Hunt was a Senior Associate at Cambridge Systematics (CS). Mr. Hunt was also a Vice President at ALK Associates where he participated in several Class I railroad mergers by estimating rail-to-rail traffic diversions using the Princeton Transportation Network Model Advanced Traffic Diversion software (PTNM-ATD).

Mr. Hunt is the 2025 president of the Institute for Operations Research and the Management Sciences (INFORMS), where he was the recipient of the 2017 INFORMS President's Award.

Mr. Hunt earned a BS in civil engineering from West Virginia University and a MSE from the Civil Engineering and Operations Research Department at Princeton University.

Matthew Schabas

Mr. Schabas is a Principal in Oliver Wyman's Transportation practice. He has over ten years of consulting experience with transportation operators, primarily across freight railroads, surface transportation, and airline commercial strategy.

Examples of prior work include:

- Demand forecasting and business planning for a Class I railroad's intermodal franchise, a large intermodal equipment provider, and a start-up intermodal operator
- Leading multiple projects for a Class I railroad during an operational efficiency transformation that included a rapid 10% reduction in cars on-line, implementing new local service strategies for car management, and locomotive shop footprint
- Leading multiple projects for a Class I railroad transforming its intermodal terminal and operations technology capabilities to support its roadmap for growth.
- Diagnostic of intermodal and merchandise train service performance for a Class I railroad, which identified root causes and proposed a roadmap for restoring service
- Diligence, synergy sizing and post-merger integration for a >$2 billion enterprise value acquisition of a freight forwarder by a strategic investor to combine with its North American LTL network.
- Post-merger integration for a >$1 billion revenue freight forwarder that had acquired a national LTL operator to insource North American domestic ground transportation.
- Inorganic growth strategy for a leading rail services and equipment provider.
- Locomotive mechanical footprint analysis for a Class I railroad that rationalized underutilized shops.
- Multiple due diligence projects in the intermodal, freight and logistics value chain for investors and operators.

Prior to joining Oliver Wyman, Mr. Schabas was a consultant at Seabury Aviation Consulting, a boutique advisory firm focused on airline commercial strategy, and as a researcher and teaching assistant in transportation policy while in graduate school. During his time as a researcher, he published several peer reviewed academic research papers including on the impact to competition from airline mergers in the United States.

Mr. Schabas holds a Masters in City Planning from the University of California, Berkeley in the transportation program, and a BA, MA (Cantab.) and M. Eng in civil engineering from the University of Cambridge, UK.

Appendix F. Glossary

Acronym	Definition
BEA	Bureau of Economic Area
CIF	Customer Identification File
CCWS	STB Confidential Carload Waybill Sample
CFS	Commodity Flow Survey
FAF	Freight Analysis Framework
FIPS	Federal Information Processing Standards
FMCSA	Federal Motor Carrier Safety Administration
FSAC	Freight Station Accounting Code
OEM	Original equipment manufacturer
PUWS	STB Public Use Waybill Sample
SCAC	Standard Carrier Alpha Code
SCRS	Serving Carrier Reciprocal Switching
SPLC	Standard Point Location Code
STCC	Standard Transportation Commodity Code

BEFORE THE
SURFACE TRANSPORTATION BOARD

DOCKET NO. FD 36873

UNION PACIFIC CORPORATION AND UNION PACIFIC RAILROAD COMPANY
—CONTROL—
NORFOLK SOUTHERN CORPORATION AND NORFOLK SOUTHERN RAILWAY COMPANY

OPERATING PLAN (EXHIBIT 13)

JOINT VERIFIED STATEMENT

OF

ERIC GEHRINGER AND JOHN F. ORR

Table of Contents

OPERATING PLAN (EXHIBIT 13)

JOINT VERIFIED STATEMENT

OF

ERIC GEHRINGER AND JOHN F. ORR

1. Introduction

1.1. Witness Qualifications

1. This Operating Plan is sponsored and verified by Eric Gehringer, Executive Vice President-Operations for Union Pacific Railroad Company ("UP") and John F. Orr, Executive Vice President and Chief Operating Officer for Norfolk Southern Railway Company ("NS"). We have been responsible for developing the Operating Plan (Exhibit 13 to the Application), which describes in detail how the merged UP/NS system will deliver faster, more reliable, more efficient service to customers and attract new business, providing increased competition to trucks and other rail carriers. We developed the Operating Plan with the assistance of numerous professionals from a variety of disciplines at both companies, each of whom contributed to the process of identifying opportunities to improve service and realize efficiencies by combining UP and NS routes, facilities, and strengths.

2. *Gehringer*: I have been employed by UP since 2006. I joined UP as a management trainee and have served in numerous positions during my tenure at the company, including Senior Vice President-Transportation and Chief Mechanical Officer and Chief Engineer in the Operating department. I was appointed to my present position in 2021. As Executive Vice President-Operations, I am responsible

for all aspects of UP's operations, including the Transportation, Engineering, Mechanical, Network Planning & Operations, Dispatching, Customer Care and Support, and Premium Operations functions. Before joining UP, I held positions at Northwest Airlines and DaimlerChrysler. I graduated St. Louis University with a Bachelors of Science in aerospace engineering, received an MBA from the University of Nebraska-Lincoln, and have completed the Advanced Management Program at Harvard University. I serve on the Board of Directors for the Children's Nebraska Foundation, and I am a member of the United States Strategic Command Council—a group of senior business and community leaders who advise the U.S. Strategic Command and support its initiatives.

3. *Orr*: I have been employed by NS since 2024. In my current position, I am responsible for leading NS's railway operations, including safety, transportation, network planning and operations, engineering, and equipment maintenance. Previously, I served as Executive Vice President and Chief Transformation Officer at Canadian Pacific Kansas City ("CPKC"), and before that, I was Executive Vice President of Operations at Kansas City Southern Railway. I began my career at Canadian National Railway, where I held various operating and network positions, including Chief Safety and Sustainability Officer and was ultimately promoted to Senior Vice President and Chief Transportation Officer. I received a Bachelor of Arts degree in environmental studies from the University of Waterloo and have completed the Advanced Management Program at Harvard University.

1.2. Purpose and Scope

4. This Operating Plan describes how a unified UP/NS system will operate to serve its customers and grow the amount of freight moving by rail. It encompasses three major functional areas: transportation, mechanical, and engineering. In each area, the Operating Plan shows how UP and NS will integrate activities, personnel, and facilities following consummation of the proposed transaction; the operational changes expected to result; and the gains in safety, service, operating efficiencies, and other benefits anticipated from the merger. The Operating Plan specifically addresses the effects of integration on patterns of service, yard activity, commuter and passenger services, equipment requirements and utilization, traffic density, and labor forces.

1.3. Overview

5. The merger of UP and NS will unite a western railroad with an eastern railroad to establish the first American transcontinental railroad. We know customers strongly prefer single line service because of the operating advantages it provides in terms of speed and reliability and the commercial advantages it provides in terms of ease of doing business. The end-to-end combination of UP and NS will establish new competitive rail services in lanes dominated by trucks and create significant opportunities to improve service and efficiency for traffic moving across the middle of the country.

6. By operating as one network, UP/NS will move traffic in seamless, single-line service that eliminates interchanges, reduces handlings, and optimizes traffic more efficiently and safely than is possible today. The merger will transform

thousand of lanes of traffic to single-line lanes. Applicants project implementation of their optimized plan will remove approximately 2,400 handlings of cars and containers per day and save approximately 60,000 car miles per day.[1] This translates into a savings of approximately 876,000 handlings per year and 21.9 million fewer car miles per year. In addition, UP/NS will combine UP and NS routes to create new, more efficient through routes and provide faster and more reliable service for customers from coast to coast—especially those in "watershed" markets where UP or NS would haul traffic less than 250 miles before or after interchange.

7. For example, UP/NS will combine UP's efficient route from Southern California to Kansas City with NS's efficient route from Kansas City to the Northeast to establish a new train pair carrying intermodal traffic between Southern California and the Northeast. The new route will eliminate the need to interchange in Chicago and will save approximately 17 hours of transit time on traffic moving eastbound from Southern California to the Ohio Valley, Pennsylvania, and New Jersey, and approximately 19 hours on traffic moving westbound between the same locations. As another example, by routing traffic via Shreveport and Meridian rather than via Memphis, UP/NS will save approximately 70 hours of transit time on traffic moving from Southern and Northern California to the Southeast, including Georgia, Florida, and North Carolina, and approximately 95 hours on traffic moving in the opposite direction.

---

[1] *See* Workpaper "C-251124 Operating Plan Metrics vF.xlsx," Tab "Growth Plan," Cells D17 and D25.

8. UP/NS will also implement new train and blocking plans that allow manifest traffic, including traffic moving to and from watershed areas, to move faster and more reliably with fewer handlings. For example, for traffic moving from the legacy UP's network west of Iowa to the Ohio Valley and Northeast, UP/NS will operate a new train through the Chicago terminal area without interchanging.

9. UP/NS will also introduce new trains to provide truck-competitive service in watershed areas. For example, UP/NS will operate a new train for traffic moving from Texas, Louisiana, and Arkansas to Michigan, Ohio, Pennsylvania, and New Jersey. UP/NS will also introduce new trains for traffic moving between Texas, Louisiana, Arkansas, and western points on the legacy UP system, and Kentucky, Alabama, Tennessee, and northeastern and southeastern points on legacy NS system.

10. Applicants' plan to improve service by combining UP's route to Kansas City with NS's route from Kansas City to Butler, Indiana, illustrates why the benefits of this transaction cannot be achieved without a merger. Although the possibility of avoiding interchanging traffic in Chicago could provide a motivation for voluntary cooperation, the economic incentives for two independent railroads to use their assets jointly are limited. As separate railroads, UP and NS naturally focus on maximizing their own revenues and minimizing their own costs, and each is understandably reluctant to invest substantial resources when realizing the returns depends on the future actions of the other. The same considerations create the "watershed" problem, in which railroads lack incentives to pursue interchange traffic originating or

terminating near gateways because they receive a low return on management and capital investment in short-hauls.

11. After merging, UP/NS will focus on outcomes for the combined company and its customers. A combined UP/NS will internalize all the costs and benefits of operating changes. It will not need to rely on a partner's continued motivation to perform and willingness to contribute resources to a joint activity. As a result, UP/NS not only will redesign transportation plans to combine UP and NS routes, but also plans to invest in two core mainline corridors that bridge the former UP and NS networks. Applicants expect to spend approximately $136.6 million to improve NS's line between Kansas City and Butler, and $172.3 million to improve NS's line between New Orleans and Atlanta.[2] Both of these planned mainline improvements will improve service for existing customers and provide additional capacity so customers can grow their businesses. In this Operating Plan, we describe the transportation plan changes and additional investments Applicants plan to make as they pursue a unified strategy to provide customers faster, more reliable, safer, and more competitive service.

12. In developing the Operating Plan, Applicants recognized that changes to their transportation plans will primarily affect traffic they currently interchange at gateways from Chicago to New Orleans. The Operating Plan describes those changes and shows how they will allow Applicants to improve existing services and

---

[2] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cells H32:H55.

establish new truck-competitive services while freeing capacity to accommodate growth at gateway locations. In addition, although most train operations on UP's routes in the West and NS's routes in the East will not change as a result of the merger, Applicants anticipate system-wide improvements in service reliability and efficiency and customer experience as the merged UP/NS adopts each company's best practices and takes advantage of the combined company's resources. The Operating Plan describes the merged company's plans to combine and coordinate services and facilities at current interchange points, integrate locomotive and car fleets, improve efficiency of mechanical and engineering services, and combine management and oversight of operations.

13. In Applicants' planning process, we carefully considered the capacity implications of planned operating changes for lines, yards and terminals, interchanges with other railroads, passenger and commuter operations, equipment supply, and the workforce. We identified infrastructure improvements necessary to achieve anticipated merger benefits and developed plans to complete the improvements. We took care to ensure the Operating Plan and anticipated traffic increases will not adversely affect existing interchanges with other railroads or Amtrak or other passenger service. We also took care to ensure UP/NS will have sufficient employees in the right locations to implement the plan and achieve the merger's service and efficiency benefits. Many of these issues are also addressed in the Application's Service Assurance Plan.

14. As described below, the Operating Plan is designed to improve operations and effectively accommodate growth at key points on the U.S. rail network. For example, UP/NS will improve operations in Chicago, the busiest gateway in the United States and the major point of interchange between UP and NS today. The Operating Plan will reduce the volume of trains that would otherwise move through Chicago and reduce drayage of intermodal containers between UP and NS facilities (called "rubber tire interchanges") in Chicago. Some trains that transit through Chicago will no longer require handlings or work events there, and operations at terminals and yards will be optimized to reduce complexity and improve fluidity. UP/NS will also improve operations in the St. Louis gateway, where today eastbound traffic interchanged between UP and NS moves first to the Alton & Southern Railway ("A&S") Gateway Yard, then is transferred to the Terminal Railroad Association of St. Louis ("TRRA"). Under the Operating Plan, eastbound cars will be blocked at Gateway Yard and launched from there into the legacy NS network, reducing handlings and transit time. The Kansas City gateway will also benefit from streamlined operations that will reduce the need for transfers between yards. And in New Orleans the Operating Plan will reduce congestion by reducing interchange activities on the NS Back Belt line. These optimizations will not only streamline UP/NS operations, they will also improve the overall U.S. rail network, improve service for customers, and ensure continued efficient operations for passenger and commuter providers hosted on UP/NS lines like Amtrak and Metra.

15. Developing the Operating Plan involved three steps, as further described below in Section 2. First, Applicants created a picture of the pre-transaction operations of UP and NS as independent companies, which we call the "Base Plan." Second, Applicants designed plans to optimize operations of UP and NS as a single, integrated network, but without the additional traffic an integrated UP/NS would attract. We call this the "Optimized Plan." Third, Applicants designed operations that would accommodate the traffic growth projected to be achieved by a fully integrated UP/NS three years after the transaction. We call this the "Growth Plan." As part of this three-step process, Applicants also calculated the operations-related costs and quantified some of the many operations-related public benefits of the merger.

16. The Operating Plan takes into account the phased realization of anticipated traffic growth over the first three years. Applicants assumed 40 percent of the traffic gains to UP/NS would be realized by the end of the first year of unified operations, 70 percent by the second year, and 100 percent by the third year. The Operating Plan also considers the impact of phased efficiency gains to account for the time required to complete planned infrastructure upgrades and other steps in the integration process. Applicants address the specific timing of capital expenditures for planned upgrades in their capital improvement plan and accompanying work papers, which are part of the accompanying Service Assurance Plan. But because we expect the traffic growth will be phased in, there is ample opportunity to phase in the necessary capital investment as well. This Operating Plan and the accompanying workpapers address the specific timing of expected efficiency improvements. In

computing savings and expenditures, revenues and costs were developed at 2023 levels.

17. The sections below show Applicants will safely provide faster, more reliable, more efficient services than UP and NS can offer today as independent companies and will provide new truck-competitive services where competitive rail options do not exist today. They also show Applicants will be able to generate significant operating efficiencies while accommodating the traffic growth anticipated from the merger and without adversely affecting customer service or the operations of other freight and passenger railroads.

2. Development of the Operating Plan

18. UP and NS today have well-designed operating plans that allow each railroad to provide safe, reliable, and efficient service. Today UP's operating plan is optimized for UP, and NS's operating plan is optimized for NS, accounting for traffic patterns resulting from commercial arrangements and the capital investments that each railroad has made in pursuing its individual interests. The combined UP/NS will have an optimized plan designed to serve the interest of the combined railroad, which will allow for efficiencies and public benefits even before the expected traffic growth from the proposed transaction.

19. While UP and NS each have internal planning systems that allow them to develop, deploy, and maintain operating plans for their separate systems, we had to create a new plan for the combined UP/NS. We also had to create metrics that could be used to quantify the impacts of the changes resulting from the merger for the Application. For this purpose, we and our teams used MultiRail, a well-established

software application used for rail service design planning. MultiRail simulates network plans against a designated set of traffic and allows service designers to adjust plan parameters (trains, blocks, main lines, yards) and compare outputs against the capacity of each to develop even more efficient plans. MultiRail has been used for more than 25 years to design operating plans in rail merger proceedings, including Canadian Pacific's recent acquisition of Kansas City Southern. Various railroads in the United States, Europe, and Asia use MultiRail for their day-to-day transportation planning. Both UP and NS have used MultiRail to design their own transportation plans. And both railroads have service design experts who are proficient in using service design tools, including the current version of MultiRail.

20. Developing the Operating Plan was a team effort that relied on both the expertise of experienced service design personnel from UP and NS and a team from Oliver Wyman, the firm that created and licenses MultiRail. The combined team validated the Base Plan and identified potential changes to train and yard operations for the Optimized Plan and Growth Plan. MultiRail was used to refine those changes and create metrics and comparisons that could be used to quantify the impacts of the changes.

21. The following sections describe in more detail how Applicants used MultiRail to develop the Base, Optimized, and Growth Plans. MultiRail also generated a series of system-wide and lane- and yard-specific outputs related to each plan, including train counts, gross ton-miles, running car-miles, handlings, crew changes, estimated lane transit times, and other operating statistics. The process

resulted in three feasible transportation plans for a UP/NS network, along with metrics that can be used to assess the operating impacts of the transaction.

2.1. The Base Plan

22. The first step in designing the Operating Plan for a combined UP/NS was to build the Base Plan, which serves as the baseline for comparison with post-merger operations.[3] Building the Base Plan required three basic components: (1) a MultiRail representation of the combined UP/NS network; (2) UP's and NS's July 2025 pre-merger operational designs—that is, their blocking and train plans; and (3) UP's and NS's 2023 pre-merger traffic.[4]

23. Applicants loaded MultiRail with detailed representations of each railroad's current physical networks and operating plans (blocks, trains, and train-to-train connections). We then flowed UP's and NS's traffic through MultiRail to simulate planned operations. We used traffic data from 2023 because it is consistent with the most recently available Confidential Waybill Sample Data, which is used to develop traffic diversion data used in the Growth Plan.[5] MultiRail traffic data has a

---

[3] *See generally* Workpaper "C Base Plan_vS.pdf."

[4] Dr. Elizabeth Bailey's team from Charles River Associates ("CRA") performed the work to create a combined 2023 traffic file. Appendix C to Dr. Bailey's Verified Statement describes CRA's methodology. Oliver Wyman used the combined traffic file to develop a compressed file for input into MultiRail. *See* Workpaper "Operating Plan Traffic Pipeline.pdf."

[5] We concluded that using 2023 UP and NS traffic, adjusted to account for new and idled facilities, with July 2025 UP and NS blocking and train plans, provided the most realistic and credible way to reflect current and projected operating conditions while using 2023 traffic that can be compared and validated against the most recent data from the Board's Confidential Waybill Sample.

"traffic category" assigned based on each railroad's existing classification, or the car type, commodity and, for hazmat, additional commodity data fields. This is derived from 2023 waybills. The traffic categories are intermodal, auto, bulk, hazmat, and manifest.

24. MultiRail initially generated separate network simulations for UP and NS. After each railroad validated its network simulation, the two networks and transportation plans were merged into the Base Plan. As shown in Table 1, which compares operating statistics reported in UP's Form R-1 and NS's Form R-1 with statistics from the stand-alone base scenarios and the Base Plan, MultiRail's Base Plan representation is an accurate representation of observed operations.

Table 1[6]
Actual Operating Statistics vs. MultiRail Base Plan

	UP+NS R-1	Base Plan	Variance %
Gross-Ton Miles (000s)	1,173,575,798	1,179,146,429	– %
Car-Miles (Loaded)	7,770,137	7,657,292	(1)%
Car-Miles (Empty)	5,293,491	5,068,753	(4)%

25. Statistics regarding Base Plan operations (segment-level train counts, traffic densities, yard activities) are reported in Electronic Appendices E and F and set forth in the workpapers accompanying this Operating Plan.[7]

[6] *See* Workpaper "Base_R1_Validation_Report 251125.xlsx," Tab "Updated Summary Sheet."

[7] *See* Workpaper "Line Segment Tables from Model vF.xlsx," Tab Line Segment Table_Base"; "Yard_Details_Report_T1_20251202_vF.xlsx," Tab "Yard_Output_T1."

2.2. The Optimized Plan

26. After ensuring the Base Plan accurately represents UP and NS pre-merger operations, the next phase in our planning process was to identify merger-related opportunities to improve service and efficiency.[8] Our service design experts developed new routing, train, and blocking plans based on how a single railroad would handle the 2023 UP and NS traffic. As part of that exercise, they adjusted certain traffic flows to reflect changes that included facility consolidations and reduced drayage of intermodal containers between UP and NS facilities (called "rubber tire interchanges"). The service designers constructed the new Optimized Plan in MultiRail, and flowed the traffic to simulate operations under the Optimized Plan. They then analyzed the model outputs to determine whether the plans were feasible given existing network constraints and to identify additional opportunities for improvement, iteratively revising the plans and rerunning the model until they were satisfied they had achieved the Optimized Plan.

27. The objective of the Optimized Plan was to identify operating changes Applicants could implement upon authorization of common control to improve service and efficiency on the combined network. We identified significant opportunities to route traffic more efficiently and change blocking plans so traffic could bypass intermediate handling in the traditional gateway cities. Reducing intermediate handlings improves service reliability for customers by eliminating events that introduce variability into the system and creates capacity in yards to accommodate

[8] *See generally* "C-Optimized Plan_vS.pdf."

traffic growth. In addition, reducing intermediate handlings improves operational safety for employees by limiting the exposure of personnel to the working environments in which most incidents occur. Finally, these routing changes and reductions in intermediate handlings allow locomotives and rail cars to cycle faster, which reduces the resources required to move traffic and generates savings for the railroads and private car fleet owners.

28. Changes to the blocking plan and train plans in the Optimized Plan relative to the Base Plan are shown in Electronic Appendices G and H and the workpapers accompanying this Operating Plan.[9]

29. The key metrics comparing the Optimized Plan with the Base Plan are shown below in Table 2.

Table 2[10]
Changes in Daily Operating Statistics Resulting from Optimized Plan

Description	Base Plan	Optimized Plan	Optimized vs Base Plan	Optimized vs. Base Plan
Gross ton-miles	3,239,413,267	3,233,425,065	(5,988,202)	(0.2)%
Car-miles	34,961,663	34,901,418	(60,245)	(0.2)%
Total Handlings	193,797	191,398	(2,400)	(1.2)%
Train miles (freight)	478,461	473,761	(4,700)	(1.0)%

[9] *See* Workpaper "T1_T2_T3_Block_Comparison.xlsx," Tab "New Blocks"; "T1_T2_T3_Train_Comparison.xlsx," Tab "T1 to T2 Train Changes."

[10] *See* Workpaper "C-251124 Operating Plan Metrics vF.xlsx," Tab "Growth Plan."

30. Statistics regarding Optimized Plan segment-level train counts, traffic densities, and yard activity are reported in Electronic Appendices I and J and set forth in the workpapers accompanying this Operating Plan.[11]

2.3. The Growth Plan

31. The Growth Plan reflects how the fully integrated UP/NS network would operate and accommodate the traffic Applicants expect to attract through the service improvements projected to result from merged operations and new services introduced.[12] The Growth Plan also incorporates Applicants' plans to invest in new capacity to serve the additional traffic, including track, terminal capacity, and modernized signal systems.[13]

32. Applicants used the Optimized Plan scenario in MultiRail to flow the pre-merger and growth traffic across the network. Service design experts from both railroads then modified the plan to accommodate the added traffic. Most of the additional traffic could be absorbed directly into the Optimized Plan's train and blocking plan without changes, except that trains and blocks become larger and more

---

[11] *See* Workpaper "Line Segment Tables from Model vF.xlsx," Tab "Line Segment Table_Optimized"; "Yard_Details_Report_T2_20251202_vF.xlsx," Tab "Yard_Output_T2."

[12] *See generally* Workpaper "Growth Plan_vS.pdf."

Applicants' merger-related traffic growth expectations are described in the Joint Verified Statement of David T. Hunt and Matthew Schabas. The Growth Plan also includes major changes in traffic volume that are expected to continue (*e.g.*, large new and lost contracts) from the Base Plan traffic. *See* Workpaper "Major Traffic Wins and Losses Since 2023.pdf."

[13] In addition, in developing the Growth Plan, Applicants accounted for returning to full operations several intermodal facilities that are idle in 2025.

efficient. In other instances, the additional volume required new train starts on existing routes. In still other instances, the additional traffic allowed for changes that further improve service. For example, projected traffic from Mexico and Texas to the Ohio Valley, Southeast, and Northeast created a lane density opportunity to introduce a new train pair. As another example, Applicants project that increased demand for service will support a new intermodal train service between Northern California and the Northeastern United States.

33. In designing the Growth Plan, we recognized that transaction-related growth will not precisely follow the predicted pattern. Transportation markets are dynamic and highly competitive, and changes affecting the demand for rail transportation will occur between the filing of this Application and the full integration of UP/NS. Because UP/NS will compete aggressively for all available customer traffic and our competitor railroads and trucking providers will do so as well, it is impossible to predict the outcome of all the customer decisions made in the new competitive environment that the proposed transaction will unlock. But Applicants have made their best estimates of anticipated traffic growth, and the Growth Plan shows how UP/NS operations would be structured to handle those best estimates. The Growth Plan was designed to ensure that the proposed operations of the combined railroad are realistic and practical, and UP/NS will have the resources needed to adjust to a changing world as the transaction is implemented.

34. Changes made in the Growth Plan's blocking plan and train plans relative to the Optimized Plan are shown in Electronic Appendices K and L and set forth in the workpapers accompanying this Operating Plan.[14]

35. The following table summarizes the operational effects of incorporating merger-related traffic changes into the Growth Plan.

Table 3[15]
Changes in Daily Operating Statistics Incorporating the Growth Plan

Description	Base Plan	Optimized Plan	Optimized vs. Base Plan	Growth Plan	Growth vs. Optimized Plan
Gross ton-miles	3,239,413,267	3,233,425,065	(0.2)%	3,801,942,247	17.6%
Car-miles	34,961,663	34,901,418	(0.2)%	39,998,653	14.6%
Total Handlings	193,797	191,398	(1.2)%	214,610	12.1%
Train-miles (freight)	478,461	473,761	(1.0)%	512,606	8.2%

36. Details regarding Growth Plan segment-level train counts, traffic densities, and yard activity are reported in Electronic Appendices M and N and set forth in the workpapers accompanying this Operating Plan.[16]

---

[14] *See* Workpaper "T1_T2_T3_Block_Comparison.xlsx," Tab "New Blocks"; "T1_T2_T3_Train_Comparison.xlsx," Tab "T2 to T3 Train Changes."

[15] *See* Workpaper"C-251124 Operating Plan Metrics vF.xlsx," Tab "Growth Plan."

[16] *See* Workpaper "Line Segment Tables from Model vF.xlsx," Tab "Line Segment Table_Growth;" "Yard_Details_Report_T3_20251202_vF.xlsx."

In reviewing the Operating Plan workpapers, Applicants noted that certain blocks and trains were shown in the MultiRail model as using track segments they would not actually use. The issue affected less than 0.04% of GTMs. The issue did not affect the planning process or comparisons of operating statistics because the service design team knew which segments the trains use, and trains were routed consistently across different versions of the Operating Plan. Applicants corrected the train counts and density data on affected corridors outside of the MultiRail model. *See* Workpaper "Line Segment Tables from Model vF.xlsx," Tab "Changes Log."

3. Patterns of Service

37. The maps submitted as Exhibit 1 to the Application and the density charts submitted as Exhibit 14 and as Electronic Appendices C and D show the principal rail lines and routes of UP and NS. The routes are also shown in the Geospatial Information System ("GIS") map files included in Applicants' workpapers.[17] Below, we describe these routes in more detail.

3.1. Principal Routes – UP

38. UP operates approximately 32,880 route miles in 23 states in the western two-thirds of the United States. Information regarding traffic density and numbers of trains on all main and secondary lines on UP's system is provided in the density charts submitted as Exhibit 14 and the workpapers relating to the Base Plan.[18]

39. UP operates across 13 units, organized into two regions. UP's Northern Region includes the following service units:

- Chicago—covers parts of Illinois and Wisconsin with connections to Iowa and includes the Chicago gateway;
- Great Lakes—connects Nebraska, Iowa, Minnesota, and Wisconsin;
- Heartland—spans New Mexico, Texas, Kansas, and Missouri with connections to Oklahoma, Illinois, Nebraska, and includes the Kansas City gateway;
- Great Plains—connects Northeastern Kansas, Nebraska, Eastern Wyoming, through Colorado and into central Utah;

---

[17] *See* Workpaper "GIS Shape Files."

[18] *See* Workpaper "Line Segment Tables from Model vF.xlsx," Tab "Line Segment Table_Base."

- Rocky Mountain—includes parts of Montana, East-Central Idaho, Utah, Southern Nevada, and Wyoming with connections into Southern California;
- Northern California—spans Central and Northern California through Northern Nevada; and
- Pacific Northwest—covers Washington, Oregon, and Western Idaho, and includes the international gateway at Eastport, Idaho.

The Southern Region includes the following service units:

- Mid-America—spans parts of Illinois, Missouri, Kentucky, and Tennessee through Arkansas and into East Texas and North Louisiana, and includes the gateways at Shreveport and Memphis;
- Gulf Coast—covers Louisiana with a connection to East Texas and includes the gateway at New Orleans;
- Houston—spans parts of Texas including the greater Houston area with connections towards Dallas and Longview, including the gateway at Brownsville;
- South Texas—includes parts of Texas with connections between Alpine, Taylor, and Hearne through San Antonio, including gateways at Eagle Pass and Laredo;
- Texoma—spans parts of Oklahoma and Texas from the greater Dallas/Fort Worth area through West Texas, including the gateway at El Paso; and
- Los Angeles—covers Southern California, Arizona and into New Mexico, including the gateways at Nogales and Calexico.

40. UP has eight principal routes. Three routes are anchored in Chicago and include UP's main line between Chicago and Granger, Wyoming, before branching to the ports and terminals of Seattle and Portland in the Pacific Northwest ("Chicago-Pacific Northwest"); Oakland in Northern California ("Chicago-Northern California"); and Los Angeles in Southern California ("Chicago-Salt Lake City/Southern California"). UP also has three routes anchored in Los Angeles that

include UP's main line between Los Angeles and El Paso, Texas, before branching to Chicago via Kansas City and St. Louis ("Southern California-Kansas City/St. Louis/Chicago"); Memphis via Central Texas and Shreveport ("Southern California-Central Texas/Shreveport/Memphis"); and New Orleans via South Texas ("Southern California-South Texas/New Orleans"). UP also has a route between border crossings in Mexico and Chicago via Memphis and St. Louis ("Mexico/Texas-Memphis/St. Louis/Chicago"), and a route between Seattle and Los Angeles ("Pacific Northwest-Southern California").

41. UP has 64 network, regional, and local yards with various capacities and functions. UP also has 31 intermodal facilities (27 of which UP owns and four of which are private or publicly owned), and serves 31 automotive ramps (26 of which UP owns and five of which are privately owned). UP serves approximately 60 ports, including ocean, river, and inland ports, and seven border crossings. UP also connects with more than 190 short lines.[19] UP also serves major gateways in Minneapolis-St. Paul, Chicago, St. Louis, Kansas City, Memphis, Shreveport, and New Orleans, where it interchanges with other Class I railroads and significant belt or terminal railroads, such as Belt Railway of Chicago ("BRC"), Indiana Harbor Belt Railway ("IHB"), and the TRRA. A list of locations at which UP interchanges more than 2000 cars annually is provided in Electronic Appendix O and in the workpapers accompanying this Operating Plan.[20]

---

[19] *See* Workpaper "UP Locations_Auto-Port-Intermodal-Yards-Border-Mech-ShortLine.xlsx."

[20] *See* Workpaper "Consolidated Interchange Counts FY 2024.xlsx."

3.1.1. Chicago-Pacific Northwest Route

42. UP's Chicago-Pacific Northwest route extends between Chicago and Seattle via North Platte, Granger, and Portland. From Chicago to Granger, in Southwestern Wyoming, where the Central Corridor branches to the Northwest, Northern California, and Southern California, UP's route boasts a double-track high-capacity line with segments of triple-track along the Geneva Subdivision in Chicago and between Gibbon and O'Fallons in Central Nebraska. The route and other lines connecting with the route are shown below in Figure 1 and in the GIS map files provided in Applicants' workpapers.

Figure 1: Chicago-Pacific Northwest Route

3.1.1.1. Chicago-Pacific Northwest Route Products

43. General categories of traffic moving over UP's Chicago-Pacific Northwest route and lines connecting to the route primarily include bulk (coal, fertilizer, food products, and grain), industrial (soda ash, forest products, and metals), and premium (international and domestic intermodal, finished vehicles, auto parts).

3.1.1.2. Chicago-Pacific Northwest Route Connections to Short Lines, Ports, and Border Crossings

44. UP's Chicago-Pacific Northwest route and lines connecting to the route connect with several short lines, including two Chicago-area belt railroads (BRC and IHB), Nebraska Central Railroad ("NCRC"), and Eastern Idaho Railroad. Applicants' workpapers include a table showing UP-connecting short lines by state.[21] The GIS map files provided in Applicants' workpapers show UP's connections with short lines.

45. UP's Chicago-Pacific Northwest route and lines connecting to the route also provide access to ports in the Pacific Northwest, including the Port of Seattle and the Port of Tacoma. Applicants' workpapers include a table showing the ports served by UP.[22] The GIS map files provided in Applicants' workpapers also show the ports served by UP.

46. UP's Chicago-Pacific Northwest route does not connect directly to any international border crossing, but lines connecting to the route extend to the border crossings at Eastport, Idaho, where UP connects with CPKC. Applicants' workpapers

---

[21] *See* Workpaper "UP Locations_Auto-Port-Intermodal-Yards-Border-Mech-ShortLine.xlsx," Tab "Short Lines."

[22] *See id.*, Tab "Port Locations."

include a table showing border crossings served by UP.[23] The GIS map files provided in Applicants' workpapers also show the border crossings served by UP.

3.1.1.3. Chicago-Pacific Northwest Route Yards and Major Repair Facilities

47. UP supports rail operations on its Chicago-Pacific Northwest route, and lines connecting to the route, with several manifest terminals and repair facilities, including Proviso in Illinois, Council Bluffs in Iowa, North Platte in Nebraska, Pocatello in Idaho, and Hinkle and Albina in Oregon. Applicants' workpapers include a table showing UP's network and regional yards,[24] as well as its major locomotive and car shops.[25] The GIS map files provided in Applicants' workpapers also show yard and shop locations on UP.

3.1.1.4. Chicago-Pacific Northwest Route Intermodal and Automotive Ramps

48. UP has several intermodal and automotive facilities on its Chicago-Pacific Northwest route and lines connecting to the route. Intermodal ramps include Global 2 and Global 4 in Chicago, Brooklyn in Portland, Tacsim in Tacoma, and Argo in Seattle. Auto facilities include West Chicago, Belvidere, Council Bluffs, Portland (Barnes), and Seattle (Kent). Applicants' workpapers include a table showing UP's intermodal and automotive ramps. The GIS map files provided in Applicants' workpapers also show intermodal and automotive ramps on UP.

[23] *See id.*, Tab "Border Crossings."

[24] *See id.*, Tab "Yard Locations."

[25] *See id.*, Tab "Mechanical Facility Locations."

3.1.2. Chicago-Northern California Route

49. UP's Chicago-Northern California route extends between Chicago and Northern California via North Platte, Granger, and Sacramento. At Granger, the Chicago-Northern California route connects to UP's Central Corridor and continues as a double-track, high-capacity route to Ogden, Utah. From Ogden/Salt Lake City, the route includes parallel main lines to Sacramento acquired through prior mergers with Western Pacific Railroad and Southern Pacific Railroad. The dual routes between Ogden/Salt Lake City and Northern California enable UP's premium products to traverse the more direct route via Donner Pass, while loaded bulk shipments can leverage the former Western Pacific Feather River Canyon route to take advantage of more advantageous grades crossing the Sierra Nevada mountain range. The Chicago-Northern California route and other lines connecting with the route are shown below in Figure 2 and in the GIS map files provided in Applicants' workpapers.

Figure 2: Chicago-Northern California Route

3.1.2.1. Chicago-Northern California Route Products

50. General categories of traffic moving over UP's Chicago-Northern California route and lines connecting to the route include bulk (coal, food and beverage, grain products), industrial (construction products, metals, forest products), and premium (domestic intermodal, international intermodal, finished vehicles).

3.1.2.2. Chicago-Northern California Route Connections to Short Lines, Ports, and Border Crossings

51. UP's Chicago-Northern California route and lines connecting to the route connect with several short lines, including BRC, IHB, NCRC, Salt Lake Garfield and Western Railway ("SLGW"), and California Northern Railroad. Applicants' workpapers include a table showing UP connecting short lines by state.

The UP GIS map files provided in Applicants' workpapers show UP's connections with short lines.

52. UP's Chicago-Northern California route and lines connecting to the route also provide access to ports in Northern California, including the Port of Oakland, the Port of Stockton, and the Port of Benicia. The GIS map files provided in Applicants' workpapers show the ports served by UP.

53. UP's Chicago-Northern California route does not connect to any international border crossing.

3.1.2.3. Chicago-Northern California Route Yards and Major Repair Facilities

54. UP supports its rail operations on the Chicago-Northern California route and lines connecting to the route with several manifest terminals and repair facilities, including Proviso, Council Bluffs, North Platte, Ogden, Roper (Salt Lake) in Utah, and Roseville, California. The GIS map files provided in Applicants' workpapers show yard and shop locations on UP.

3.1.2.4. Chicago-Northern California Route Intermodal and Automotive Ramps

55. UP has several intermodal and automotive facilities on its Chicago-Northern California route and lines connecting to the route. Western intermodal locations along this route include Salt Lake ("SLCIT"), Sparks, Nevada, and Oakland, California. In addition, the route serves auto facilities in the west including Roper as well as Benicia and Milpitas (both in the greater San Francisco area). The GIS map files provided in Applicants' workpapers show intermodal and automotive ramps on UP.

3.1.3. Chicago-Southern California Route

56. UP's Chicago-Southern California route extends between Chicago and Southern California via North Platte, Granger, Ogden, Las Vegas, and Los Angeles. Connecting to UP's Central Corridor at Granger, the Chicago-Southern California route provides access to the Utah Valley and Las Vegas markets and is one of two ways in which UP connects Southern California to Chicago markets. The route and other lines connecting with the route are shown below in Figure 3 and in the GIS map provided in Applicants' workpapers.

Figure 3: Chicago-Southern California Route

3.1.3.1. Chicago-Southern California Route Products

57. General categories of traffic moving over UP's Chicago-Southern California route and lines connecting to the route include bulk (coal, food and

beverage), industrial (construction products, metals), and a large volume of premium traffic (international and domestic intermodal, auto parts, finished vehicles).

3.1.3.2. Chicago-Southern California Route Connections to Short Lines, Ports, and Border Crossings

58. UP's Chicago-Southern California route and lines connecting to the route connect with several short lines, including BRC, IHB, NCRC, SLGW, and Pacific Harbor Line ("PHL"). Applicants' workpapers include a table showing UP-connecting short lines by state. The GIS map files provided in Applicants' workpapers show UP's connections with short lines.

59. UP's Chicago-Southern California route and lines connecting to the route also provide access to several ports in Southern California, including the Port of Los Angeles and the Port of Long Beach. The GIS map files provided in Applicants' workpapers show the ports served by UP.

60. UP's Chicago-Southern California route does not connect to any international border crossing.

3.1.3.3. Chicago-Southern California Route Yards and Major Repair Facilities

61. UP supports its rail operations on the Chicago-Southern California route and lines connecting to the route with several manifest terminals and repair facilities, including Proviso, Council Bluffs, North Platte, Ogden, Roper, and West Colton, California. The GIS map files provided in Applicants' workpapers show yard and shop locations on UP.

3.1.3.4. Chicago-Southern California Route Intermodal and Automotive Ramps

62. UP has several intermodal and automotive facilities on its Chicago-Southern California route and lines connecting to the route, including the previously mentioned Chicago facilities, an intermodal ramp in Las Vegas, and five intermodal facilities in the greater Los Angeles area: City of Industry, East Los Angeles ("Commerce"), Inland Empire Intermodal Terminal ("IEIT"), Intermodal Container Transfer Facility ("ICTF"), and Los Angeles Transportation Center ("LATC"). A major auto destination on this route is Mira Loma, California. The GIS map files provided in Applicants' workpapers show intermodal and automotive ramps on UP.

3.1.4. Southern California-Kansas City/St. Louis/Chicago Route

63. UP's Southern California-Kansas City/St. Louis/Chicago route extends between Southern California and Chicago via El Paso and Kansas City. The portion from Southern California to El Paso, along the legacy Southern Pacific Sunset route, is a high-capacity line that enables efficient transit for premium freight to and from Southern California markets. At El Paso, the Sunset route runs East while the Kansas City/St. Louis/Chicago route continues along UP's Golden State route to Kansas City, a streamlined route connecting El Paso to Kansas City by cutting diagonally across New Mexico, the Texas and Oklahoma panhandles, and Kansas. A substantial portion of UP's route between Kansas City and Chicago includes trackage rights over BNSF Railway ("BNSF") lines between Hutchinson, Kansas, and Nerska, Illinois; however, UP can also access Chicago through St. Louis where two routing options to Chicago exist or via Council Bluffs and the Central Corridor towards

Chicago. The route and other lines connecting with the route are shown in Figure 4 below and the GIS map files provided in Applicants' workpapers.

Figure 4: Southern California-Kansas City/St. Louis/Chicago Route

3.1.4.1. Southern California-Kansas City/St. Louis/Chicago Route Products

64. General categories of traffic moving over UP's Southern California-Kansas City/St. Louis/Chicago route and lines connecting to the route include bulk (grain, grain products, beverages), industrial (construction, metals, government shipments), and large volumes of premium (international and domestic intermodal).

3.1.4.2. Southern California-Kansas City/St. Louis/Chicago Route Connections to Short Lines, Ports, and Border Crossings

65. UP's Southern California-Kansas City/St. Louis/Chicago route and lines connecting to the route connect with several short lines, including PHL, Kansas City Terminal Railway ("KCT"), the A&S and TRRA terminal railroads in the St. Louis area, and BRC and IHB in the Chicago area. The GIS map files provided in Applicants' workpapers show UP's connections with short lines.

66. UP's Southern California-Kansas City/St. Louis/Chicago route and lines connecting to the route provide access to several ports in Southern California, including the Port of Los Angeles and the Port of Long Beach. The GIS map files provided in Applicants' workpapers show the ports served by UP.

67. UP's Southern California-Kansas City/St. Louis/Chicago route and lines connecting to the route connect to international border crossings at Calexico, Nogales, and El Paso.

3.1.4.3. Southern California-Kansas City/St. Louis/Chicago Route Yards and Major Repair Facilities

68. UP supports its rail operations on the Southern California-Kansas City/St. Louis/Chicago route and lines connecting to the route with several manifest terminals and repair facilities, including West Colton, Tucson, Alfalfa (El Paso), and Kansas City 18th Street. The GIS map files provided in Applicants' workpapers show yard and shop locations on UP.

3.1.4.4. Southern California-Kansas City/St. Louis/Chicago Route Intermodal and Automotive Ramps

69. UP has several intermodal and automotive facilities on its Southern California-Kansas City/St. Louis/Chicago route and lines connecting to the route. While also serving Los Angeles-area facilities, this route includes intermodal facilities in Phoenix, Santa Teresa (west of El Paso), Kansas City, St. Louis (Dupo), and Chicago (Global 4 and Global 2), and automotive facilities in Mira Loma, Santa Rosa, New Mexico, Kansas City (Muncie and Fairfax), and Chicago (Chicago Heights, West Chicago, and Belvidere). The GIS map files provided in Applicants' workpapers show intermodal and automotive ramps on UP.

3.1.5. Southern California-Central Texas/Shreveport/Memphis Route

70. UP's Southern California-Central Texas/Shreveport/Memphis route extends between Southern California and Shreveport/Memphis via El Paso and Dallas/Fort Worth. From Southern California to El Paso, this route follows the legacy Southern Pacific Sunset route. From El Paso, the route continues in an easterly direction across the route of the former Texas and Pacific Railway ("T&P") to the Dallas/Fort Worth metroplex. Continuing along the legacy T&P track east of Dallas/Ft. Worth, the route then follows the north/south high capacity directional running routes of the former Southern Pacific and Missouri Pacific to/from North Little Rock and Pine Bluff, Arkansas. At Memphis, the route provides connections to BNSF, Canadian National Railway ("CN"), CSX Transportation ("CSXT"), and NS.

The route and other lines connecting with the route are shown below in Figure 5 and in the GIS map files provided in Applicants' workpapers.

Figure 5: Southern California-Central Texas/Shreveport/Memphis Route

3.1.5.1. Southern California-Central Texas/Shreveport/Memphis Route Products

71. General categories of traffic moving over UP's Southern California-Central Texas/Shreveport/Memphis route and lines connecting to the route include bulk (food and beverage), industrial (construction materials, plastics, industrial chemicals, paper products), and premium (international and domestic intermodal, auto parts, finished vehicles).

3.1.5.2. Southern California-Central Texas/Shreveport/Memphis Route Connections to Short Lines, Ports, and Border Crossings

72. UP's Southern California-Central Texas/Shreveport/Memphis route and lines connecting to the route connect with several short lines, including PHL, the Dallas, Garland & Northeastern Railroad, Fort Worth & Western Railroad, and Santa Teresa Southern ("STS"). The GIS map files provided in Applicants' workpapers show UP's connections with short lines.

73. UP's Southern California-Central Texas/Shreveport/Memphis route and lines connecting to the route provide access to several ports in Southern California, including the Port of Los Angeles and the Port of Long Beach, as well as the Port of Little Rock operated by Little Rock Port Railroad. The GIS map files provided in Applicants' workpapers show the ports served by UP.

74. UP's Southern California-Central Texas/Shreveport/Memphis route and lines connecting to the route connect to international border crossings at Calexico, Nogales, and El Paso.

3.1.5.3. Southern California-Central Texas/Shreveport/Memphis Route Yards and Major Repair Facilities

75. UP supports operations on its Southern California-Central Texas/Shreveport/Memphis route and lines connecting to the route with several manifest terminals and repair facilities, including West Colton, Tucson, Alfalfa, Fort Worth, North Little Rock, and Pine Bluff. The GIS map files provided in Applicants' workpapers show yard and shop locations on UP.

3.1.5.4. Southern California-Central Texas/Shreveport/Memphis Route Intermodal and Automotive Ramps

76. UP has several intermodal and automotive facilities on its Southern California-Central Texas/Shreveport/Memphis route and lines connecting to the route. In addition to serving Los Angeles-area facilities, this route serves major auto and intermodal markets in the Dallas area (Arlington and Mesquite) and Shreveport area (Reisor). The GIS map files provided in Applicants' workpapers show intermodal and automotive ramps on UP.

3.1.6. Southern California-South Texas/New Orleans Route

77. UP's Southern California-South Texas/New Orleans route extends between Southern California and New Orleans via El Paso, San Antonio, and Houston. At El Paso, the Sunset route runs to the southeast toward San Antonio and then directly east to Houston across the Glidden Subdivision. From Houston, paired routes continue through Beaumont and then diverge. The Southern California-South Texas/New Orleans routes continues to DeQuincy, Louisiana, on track owned by CPKC, then through Kinder and Livonia, Louisiana, to New Orleans on track owned by UP. The southerly route continues from Beaumont to Iowa Junction, Louisiana, where it splits to the northeast toward Kinder, and east towards New Orleans on a line UP jointly owns with BNSF. The route and other lines connecting with the route are shown in Figure 6 and the GIS map files provided in Applicants' workpapers.

Figure 6: Southern California-South Texas/New Orleans Route

3.1.6.1. Southern California-South Texas/New Orleans Route Products

78. General categories of traffic moving over UP's Southern California-South Texas/New Orleans route and lines connecting to the route include large quantities of industrial products (plastics, chemicals, petroleum products, metals, construction products) and premium (international and domestic intermodal).

3.1.6.2. Southern California-South Texas/New Orleans Connections to Short Lines, Ports, and Border Crossings

79. UP's Southern California-South Texas/New Orleans route and lines connecting to the route connect with several short lines, including PHL, STS, Port Terminal Railroad Association, and the New Orleans Public Belt Railroad ("NOPB").

The GIS map files provided in Applicants' workpapers show UP's connections with short lines.

80. UP's Southern California-South Texas/New Orleans route and lines connecting to the route provide access to several ports in Southern California, including the Port of Los Angeles and the Port of Long Beach, as well ports on the Gulf Coast, including the Port of Houston, and the Port of Beaumont. The GIS map files provided in Applicants' workpapers show the ports served by UP.

81. UP's Southern California-South Texas/New Orleans route and lines connecting to the route connect to international border crossings at Calexico, Nogales, El Paso, Eagle Pass, Laredo, and Brownsville.

3.1.6.3. Southern California-South Texas/New Orleans Route Yards and Major Repair Facilities

82. UP supports its rail operations on its Southern California-South Texas/New Orleans route and lines connecting to the route with several manifest terminals and repair facilities, including West Colton, Tucson, Alfalfa, San Antonio, Englewood and Settegast in Houston, and Livonia. The GIS map files provided in Applicants' workpapers show yard and shop locations on UP.

3.1.6.4. Southern California-South Texas/New Orleans Route Intermodal and Automotive Ramps

83. UP's Southern California-South Texas/New Orleans route and lines connecting to the route serve several intermodal and automotive facilities. In addition to facilities in the Los Angeles area, this route serves automotive and intermodal

facilities in San Antonio, Houston, and Southern Louisiana. The GIS map files provided in Applicants' workpapers show intermodal and automotive ramps on UP.

3.1.7. Mexico/Texas-Memphis/St. Louis/Chicago Route

84. UP's Mexico/Texas-Memphis/St. Louis/Chicago route extends between Eagle Pass/Laredo, Texas, and Chicago via San Antonio and Little Rock/Pine Bluff. This north/south route connects the Chicago and St. Louis markets and gateways with Mexico, Texas, and Arkansas via international connection points at Laredo (CPKC) and Eagle Pass (Ferromex). The route leverages UP's route network in Texas, bolstered by UP's bidirectional running capability from Texas through North Little Rock and Pine Bluff to Dexter, Missouri. At Gorham, Illinois, the Mt. Vernon and Salem Subdivisions provide a route that bypasses the St. Louis gateway and enables future connectivity to the NS system at Sidney, Illinois. The route and other lines connecting with the route are shown in Figure 7 and the GIS map files provided in Applicants' workpapers.

Figure 7: Mexico/Texas-Memphis/St. Louis/Chicago Route

3.1.7.1. Mexico/Texas-Memphis/St. Louis/Chicago Route Products

85. General categories of traffic moving over UP's Mexico/Texas-Memphis/St. Louis/Chicago route and lines connecting to the route include bulk (beverages, grain), industrial (metals, construction materials), and premium (auto parts, finished vehicles, domestic intermodal).

3.1.7.2. Mexico/Texas-Memphis/St. Louis/Chicago Route Connections to Short Lines, Ports, and Border Crossings

86. UP's Mexico/Texas-Memphis/St. Louis/Chicago route and lines connecting to the route connect with several short lines, including A&S and TRRA in St. Louis, BRC and IHB in Chicago, Arkansas Midland Railroad, and Missouri & Northern Arkansas Railroad. The GIS map files provided in Applicants' workpapers show UP's connections with short lines.

87. UP's Mexico/Texas-Memphis/St. Louis/Chicago route and lines connecting to the route also provide access to the Port of Little Rock, operated by the Little Rock Port Railroad.

88. UP's Mexico/Texas-Memphis/St. Louis/Chicago route and lines connecting to the route connect to international border crossings at Eagle Pass, Laredo, and Brownsville.

3.1.7.3. Mexico/Texas-Memphis/St. Louis/Chicago Route Yards and Major Repair Facilities

89. UP supports its rail operations on its Mexico/Texas-Memphis/St. Louis/Chicago route and lines connecting to the route with several manifest terminals and repair facilities including San Antonio, North Little Rock, Pine Bluff, and Chicago (Yard Center). The GIS map files provided in Applicants' workpapers show yard and shop locations on UP.

3.1.7.4. Mexico/Texas-Memphis/St. Louis/Chicago Route Intermodal and Automotive Ramps

90. There are several intermodal and automotive facilities on UP's Mexico/Texas-Memphis/St. Louis/Chicago route and lines connecting to the route.

Intermodal facilities are located in Laredo, San Antonio, St. Louis (Dupo), Marion, Arkansas, and Chicago. Automotive facilities are located in San Antonio, Taylor, Texas, Memphis (Gavin), St. Louis (Centerville), and Chicago. The GIS map files provided in Applicants' workpapers show intermodal and automotive ramps on UP.

3.1.8. Pacific Northwest-Southern California Route

91. UP's Pacific Northwest-Southern California route extends between Seattle and Los Angeles and is also called the "I-5" route. The I-5 route connects Pacific Northwest customers, ports, and markets, as well as markets accessible using UP's I-5 Agreement with BNSF and a connection with CPKC at Eastport, with Northern and Southern California markets. While Applicants' proposed merger does not directly impact this north-south route, the I-5 route is an important component of UP's franchise, connecting shippers in California, Oregon, Washington, Idaho and Canada. The route and other lines connecting with the route are shown in Figure 8 and the GIS map files provided in Applicants' workpapers.

Figure 8: Pacific Northwest-Southern California Route

3.1.8.1. Pacific Northwest-Southern California Route Products

92. General categories of traffic moving over UP's Pacific Northwest-Southern California route and lines connecting to the route include bulk (fertilizer, food products, grain products), industrial (construction products, forest products, metals) and premium (international and domestic intermodal).

3.1.8.2. Pacific Northwest-Southern California Route Connections to Short Lines, Ports, and Border Crossings

93. UP's Pacific Northwest-Southern California route and lines connecting to the route connect with several short lines, including Central Oregon & Pacific Railroad, Portland & Western Railroad, and San Joaquin Valley Railroad. The GIS map files provided in Applicants' workpapers show UP's connections with short lines.

94. UP's Pacific Northwest-Southern California route and lines connecting to the route also provide access to several ports in the Pacific Northwest (including the Port of Seattle and the Port of Tacoma), Northern California (including the Port of Stockton), and Southern California (including the Ports of Los Angeles and Long Beach). The GIS map files provided in Applicants' workpapers show the ports served by UP.

95. UP's Pacific Northwest-Southern California route and lines connecting to the route connect to the international border crossing at Calexico, California.

3.1.8.3. Pacific Northwest-Southern California Route Yards and Major Repair Facilities

96. UP supports operations on its Pacific Northwest-Southern California route and lines connecting to the route with several manifest terminals and repair facilities including Albina (Portland), Roseville, and West Colton. The GIS map files provided in Applicants' workpapers show yard and shop locations on UP.

3.1.8.4. Pacific Northwest-Southern California Route Intermodal and Automotive Ramps

97. There are many intermodal and automotive facilities on the Pacific Northwest-Southern California route and lines connecting to the route. The route

primarily serves intermodal markets in the major West Coast cities. The GIS map files provided in Applicants' workpapers show intermodal and automotive ramps on UP.

3.1.9. Secondary Routes and Feeder Lines

98. UP has secondary routes between Denver and Salt Lake City, Denver and Kansas City, and Minnesota/Iowa and Texas. UP also has a network of feeder lines in Northern Iowa, Minnesota, and Wisconsin, and feeder lines in Idaho and Montana, including a line to the Canadian border at Eastport. These routes and lines are shown in the GIS map files provided in Applicants' workpapers.

3.2. Principal Routes – NS

99. Norfolk Southern operates approximately 19,200 route miles in 22 eastern states and the District of Columbia. The density charts submitted as Exhibit 14 and the workpapers related to the Base Plan provide information about traffic density and numbers of trains on all main and secondary lines on NS's system.[26] NS operates across six divisions organized into two regions. The Northern Region includes the following divisions:

- Great Lakes—connects Northern Ohio, Michigan, Northern Indiana and Chicago and other parts of Northern Illinois;
- Keystone—runs through parts of Virginia, Maryland, and West Virginia, as well as Eastern Ohio and across Pennsylvania and into New Jersey and New York; and
- Midwest—stretches from Kentucky and Southern Ohio through Southern Indiana, Southern Illinois, Missouri, and Iowa.

---

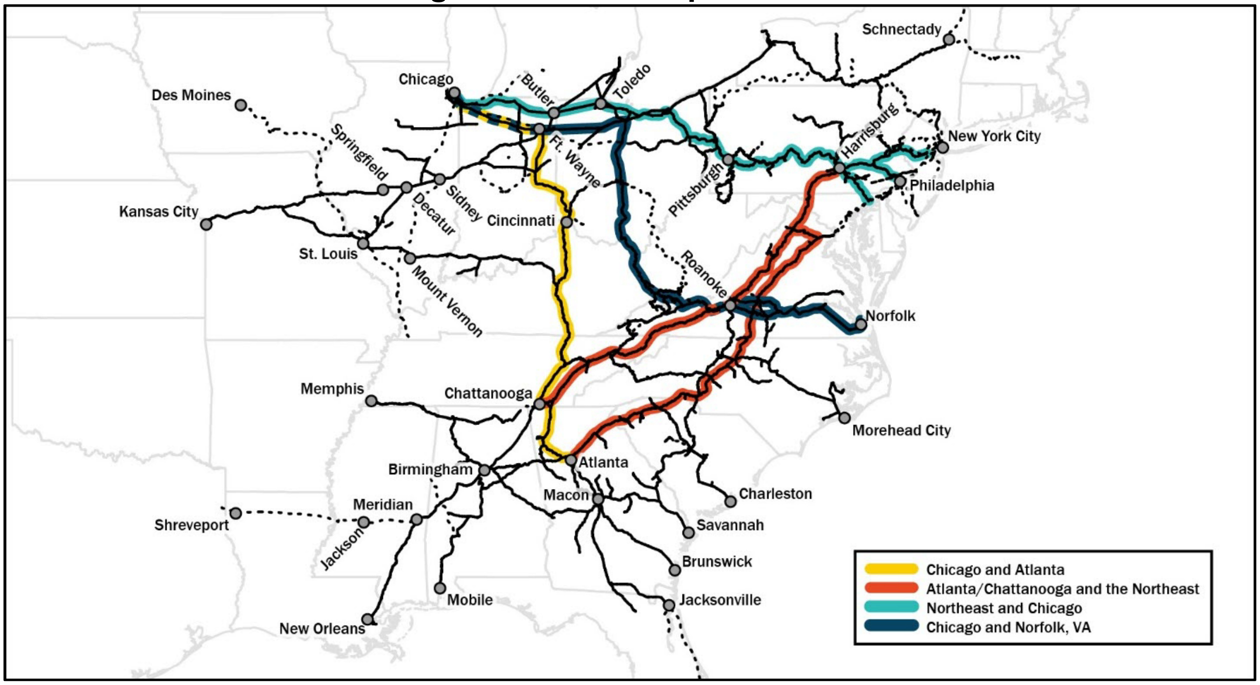
[26] *See* Workpaper "Line Segment Tables from Model vF.xlsx," Tab "Line Segment Table_Base."

NS's Southern Region includes these divisions:

- Blue Ridge—connects North Carolina, most of NS's Virginia lines, parts of West Virginia, and Southern Ohio;
- Gulf—includes Louisiana, Alabama, Mississippi, Tennessee, and small sections in North Carolina and Kentucky; and
- Coastal—covers the Carolinas, Georgia, and Florida.

100. Four principal routes comprise the core of NS's network, as displayed in Figure 9 below. The first three routes form a triangle covering the eastern United States. These three routes run between Chicago and Atlanta; Atlanta/Chattanooga and the Northeast; and the Northeast and Chicago. The fourth route runs from Chicago to Norfolk, Virginia. Most of the core network is double tracked, with all of it equipped for double stacking intermodal containers. Outside of these core routes, most of the network is single track with passing sidings. NS also serves several gateways that connect to these core routes, as well as feeder routes that serve significant origins or destinations.

Figure 9: NS Principal Routes



101. NS has 28 hump, system, and region flat manifest yards of various sizes across its network. Six are currently operated as hump yards.[27] NS has the most extensive intermodal network in the Eastern United States and provides service to 41 active intermodal facilities, 29 of which it owns and 12 of which are private or publicly owned port facilities.[28] NS also serves 40 auto terminals that unload and load finished vehicles to and from railcars.

102. NS interchanges traffic with over 250 short line railroads (some of which are indirectly connected). NS also interchanges in gateway cities and ports with several significant belt or terminal railroads such as Conrail, BRC, IHB, and TRRA.

[27] *See* Workpaper "NS Locations_Auto-Port-Intermodal-Yards-Mech-Shortline.xlsx."

[28] NS's expanded reach is 56 intermodal markets when including access via a short line partner and intermodal markets where NS currently has no active intermodal terminal.

A list of locations at which NS interchanges more than 2000 cars annually is provided in Electronic Appendix P.[29]

103. Chicago serves as the western anchor for three of the core NS routes and has the highest total density of trains on NS's network with well over 80 trains operating on these routes on any given day. In Chicago, NS owns six intermodal facilities to support the core routes. The largest by volume is Chicago 47th Street, which largely feeds the Chicago to Northeast route. Chicago 63rd Street supplements Chicago 47th Street and primarily handles domestic freight. Calumet is the primary terminal serving the Chicago to Southeast route. Landers is the primary terminal for NS's East Coast port services. Ashland Avenue Yard in Chicago and Colehour Yard in Hammond, Indiana, support most of NS's steel wheel intermodal interchanges with other railroads.

104. Chicago is also the primary interchange location for NS's non-intermodal traffic. Just about every commodity handled by NS moves through Chicago, including coal, grain, ethanol, oil, automobiles, steel, food and other general merchandise. Interchanges between NS and the other five Class I railroads, as well as many short lines, are accommodated through direct interchanges between the carriers or through one of two intermediate switching carriers in Chicago: BRC and IHB. In addition, the Gary Railway Company and South Chicago & Indiana Harbor Railroad ("SCIH") short lines play a major role in servicing key customers in the Chicago market. While Chicago is the primary terminus on NS's Great Lakes

[29] *See* Workpaper "Consolidated Interchange Counts FY 2024.xlsx."

Division, the railroad extends further west on the Kankakee and Streator Lines, with the furthest western point being Hennepin, Illinois.

3.2.1. Chicago to Southeast Route

105. The Chicago to Southeast route extends approximately 785 miles between Chicago and Atlanta. The route proceeds east out of Chicago on the former Nickel Plate line to Fort Wayne, Indiana. At that point, the route turns south and connects with the Cincinnati, New Orleans & Texas Pacific Railway ("CNO&TP") between Cincinnati and Chattanooga. This line had been owned by the City of Cincinnati—but operated by NS and its predecessors—for over 150 years until NS purchased the line in 2024. South of Chattanooga, the line continues past Austell, Georgia, and into Atlanta.

106. NS also has trackage rights between Gary, Indiana, and Bucyrus, Ohio, on the Chicago, Fort Wayne & Eastern Railroad. Although the route is not currently heavily used, it creates some flexibility and redundancy for NS operations.

107. The Chicago to Southeast route and other lines connecting with the route are shown in Figure 10 and the GIS map files provided in Applicants' workpapers.[30]

[30] *See* Workpaper "GIS Shape Files."

Figure 10: Chicago to Southeast Route

3.2.1.1. Chicago to Southeast Route Products

108. As discussed above, the Chicago to Southeast Route hosts a considerable amount of intermodal freight, with eight to ten intermodal trains per day moving on some or all of the route. While every commodity type NS ships can be found on the route, NS sees significant volumes of agricultural products moving from the Midwest to the Southeast, particularly feed and grains moving to the Southeast poultry

markets and some export traffic moving through Southeast and Gulf ports, as well as ethanol and fertilizer. There is also a considerable amount of steel products moving from the Midwest to processing centers in the Southeast to support the automotive and construction industries. Finally, NS has significant finished vehicle shipments on this line, both from manufacturers that are located on or near this route, as well as shipments from Midwest manufacturers to southeast markets.

3.2.1.2. Chicago to Southeast Route Connections to Short Lines, Ports, and Border Crossings

109. The Chicago to Southeast route serves numerous short lines, including Gary Railway Company and SCIH, and the two area belt railroads, BRC and IHB. Each of these is a significant participant on the route. While this route does not have any direct border crossings, it does handle Canadian freight interchanged to NS in Chicago. There are no significant port facilities on this route.

3.2.1.3. Chicago to Southeast Route Yards and Major Repair Facilities

110. Decatur, Illinois Yard, East Wayne Yard in Indiana, DeButts Yard in Chattanooga, and Inman Yard in Atlanta all support the Chicago to Southeast Route. There are significant locomotive shops in Atlanta (Inman), and Chattanooga, Tennessee. Small repairs can also be done at shops in Chicago and Fort Wayne, Indiana. Major terminals with car repair facilities include Atlanta (Inman) and Chattanooga.

3.2.1.4. Chicago to Southeast Route Intermodal and Automotive Ramps

111. Auto ramps served by this route include those in Chicago; Georgetown, Kentucky; Commerce, Georgia; and Atlanta (Hapeville at Poole Creek). Calumet is the primary Chicago area intermodal terminal serving this route with terminals from north to south in Sharonville, Ohio; Cincinnati; Georgetown; Austell, Georgia; and Atlanta (Inman).

3.2.2. Northeast to Southeast Route

112. The second portion of the core triangle of the NS network runs between the Northeast region—including the New York, New Jersey, and eastern Pennsylvania area—and two separate legs in the Southeast that respectively reach Atlanta, and Knoxville and Chattanooga, Tennessee. The route and other lines connecting with the route are shown in Figure 11 and the GIS map files provided in Applicants' workpapers.

Figure 11: Northeast to Southeast Route

113. From Atlanta, the route extends approximately 785 miles to Harrisburg, Pennsylvania. Starting in Atlanta on the former Southern Mainline the route runs northeast through Georgia, South Carolina, North Carolina, and to Northern Virginia. The route crosses from the Coastal Division to the Blue Ridge Division as it enters Virginia, and it crosses the Blue Ridge Mountains on the B-Line west of Manassas, Virginia.

114. From Chattanooga, the line runs approximately 705 miles to Harrisburg through Knoxville, via the A Line. From Knoxville, the route continues northeast through Bristol, Tennessee to Roanoke, Virginia, then up the Shenandoah Valley to Front Royal, Virginia, on the H Line where it connects to the B Line. This route connects the Gulf Division to the Blue Ridge Division.

115. These two branches meet at Front Royal and use the H-Line into Hagerstown, Maryland. North of Hagerstown, traffic traverses former Conrail lines to reach major terminal facilities at Harrisburg. Cars moving deeper into the Northeast use the routes detailed in the subsequent Chicago to Northeast section.

3.2.2.1. Northeast to Southeast Route Products

116. As discussed above, the Northeast to Southeast route also hosts a considerable amount of intermodal freight, with 10 to 12 intermodal trains per day moving on some or all of the route. While every commodity type NS ships touches this route, NS sees considerable shipments of waste move from the Northeast to landfills in Alabama and Virginia; Forest Products from the Southeast to Northeast markets; and Chemicals moving from the Gulf and Mid Atlantic to Southeast destination.

3.2.2.2. Northeast to Southeast Route Connections to Short Lines, Ports, and Border Crossings

117. This route includes short line interchanges such as Lancaster and Chester Railroad outside of Charlotte; Buckingham Branch Railroad connecting in Charlottesville, Virginia; and Palmetto Railways' connecting locations in South Carolina. The route does not have any border crossings.

3.2.2.3. Northeast to the Southeast Route Yards and Major Repair Facilities

118. Of NS's significant yards, only Inman Yard in Atlanta and DeButts Yard in Chattanooga directly serve the route. Major mechanical facilities include Chattanooga and Shaffers Crossing in Roanoke.

3.2.2.4. Northeast to Southeast Route Intermodal and Automotive Ramps

119. Significant intermodal terminals in Atlanta; Greer, South Carolina; Charlotte; Greensboro; Virginia Inland Port in Front Royal; and Rutherford, Pennsylvania support this route from South to North. Winston-Salem, North Carolina, has an automotive terminal that supports traffic moving over this route.

3.2.3. Chicago to Northeast Route

120. The third portion of the NS core triangle, sometimes referred to as the Premier Corridor, runs between the northeastern United States and Chicago. The route runs 900 miles between Chicago and Northern New Jersey, starting along the Chicago Line or old Nickel Plate Line, to Cleveland. From there, the former Pennsylvania Railroad Mainline brings this route through Pittsburgh into Harrisburg. NS reaches deeper into the Mid-Atlantic on former Conrail routes to reach Newark, Philadelphia, Wilmington, and Baltimore. This route also includes the former Nickel Plate, Conrail, and Delaware and Hudson Railway lines connecting Cleveland to Schenectady, New York. Finally, these lines provide connections to the Detroit industrial centers—including automotive traffic coming from Detroit to eastern locations such as Wilmington and Doremus, New Jersey—as well as the Monongahela coal mining region south of Pittsburgh. The Chicago to Northeast Route

includes the highest density line segments on NS's system. The route and other lines connecting with the route are shown in Figure 12 and the GIS map files provided in Applicants' workpapers.

Figure 12: Chicago to Northeast Route

3.2.3.1. Chicago to Northeast Route Products

121. The Chicago to Northeast route hosts the greatest intermodal volume on NS's network by far, with up to 30 intermodal trains per day touching a portion of

this corridor. Every commodity NS ships can be found on this route, with some of the most notable volumes including coal entering the NS network in Chicago and heading to Detroit Edison, as well as coal from the Monongahela region to export and utility facilities in the east. NS sees a considerable amount of fuel inputs on this line including agrifuels, crude oil and liquid gasses supporting the refineries in the east. Raw materials for steel as well as finished steel are prevalent on this route, as well as significant shipments of vehicles from Midwest plants to the Northeast market. Finally, NS carries considerable shipments of fracking sand for the Marcellus shale region along this route.

3.2.3.2. Chicago to Northeast Route Connections to Short Lines, Ports, and Border Crossings

122. The Chicago to Northeast Route includes the greatest concentration of short line connections on NS's network. In addition to the four Chicago area short lines, NS connects to Conrail in Detroit, Northern New Jersey, and the Philadelphia (South Jersey) area. Conrail is a large switching railroad that is owned by NS and CSXT, with Shared Asset Areas that were created to ensure that competitive shipping options are available to customers in these three key markets. While Conrail is NS's largest short line connection by volume, other major connecting carriers along different parts of the route include Pan Am Southern ("PAS," another joint venture owned by NS and CSXT and operated by the Berkshire & Eastern Railroad); Columbus & Ohio River Railroad; Wheeling & Lake Erie Railroad; Reading, Blue Mountain & Northern Railroad; and Delmarva Central Railroad Company.

123. This route represents NS's highest concentration of port facilities including the major east coast ports of New York/New Jersey, Philadelphia, Wilmington, and Baltimore, as well as Great Lake Ports in Indiana, Toledo, Cleveland, and Sandusky, Ohio.

124. Finally, this route supports three border crossings including interchanges on the US side of the border with CPKC at Detroit, Buffalo, and Rouses Point, New York, and on the Canadian side of the border with CN in Fort Erie, Ontario.

3.2.3.3. Chicago to Northeast Route Yards and Major Repair Facilities

125. There are several significant NS yards between Chicago and the Northeast. Moving west to east, these include Elkhart and Fort Wayne, Indiana, Conway, Pennsylvania (near Pittsburgh), and Enola Yard near Harrisburg. Moorman Yard in Bellevue, Ohio, also serves this route as well as the Chicago to Norfolk route. Other key yards include Oakwood outside of Detroit and Binghamton, New York.

126. The most significant mechanical facility along this route is Juniata, NS's largest locomotive mechanical facility, located in Altoona, Pennsylvania. There are smaller mechanical facilities in Fort Wayne, Elkhart, Bellevue, Harrisburg, and Enola.

3.2.3.4. Chicago to Northeast Route Intermodal and Automotive Ramps

127. NS has its highest concentration of intermodal assets on this route. Anchored by the Chicago 47th Street, Chicago 63rd Street, Ashland Avenue (Chicago), and Colehour (Hammond, Indiana) yards in the west, NS serves major

markets headed east including Toledo, Detroit, Cleveland (Maple Heights), Pittsburgh (Pitcairn), Harrisburg (through ramps at Harrisburg and Rutherford), Trenton, New Jersey (Morrisville, Pennsylvania), Bethlehem, Pennsylvania, Croxton, New Jersey, and finally Northern New Jersey. In Northern New Jersey, NS serves three major intermodal container terminals at the Port of New York and New Jersey. Moving east of Cleveland, NS also serves Buffalo, Scranton, Pennsylvania, Albany (Mechanicville, New York), and Boston (Ayer, Massachusetts).

128. There are auto ramps in Chicago, Elkhart, Fostoria, Ohio, and Jefferson Terminal in Detroit. Melvindale, Michigan, is the major automotive terminal serving Detroit to the north. Conrail's Doremus automotive terminal serves as NS's primary ramp in the Mid-Atlantic region. East of Cleveland, NS has vehicle unloading facilities in Buffalo, Mechanicville (Albany), and Ayer (Boston).

3.2.4. Chicago to Norfolk Route

129. The fourth and final core route of NS's network is Chicago to Norfolk, Virginia. This route extends over 1000 miles from Chicago through Fort Wayne and Bellevue on the former Nickel Plate then south through Columbus, Roanoke, Petersburg, Virginia, and Norfolk on the former Norfolk & Western line. This route is sometimes referred to as the "Heartland Corridor." In 2009, NS in conjunction with federal and state agencies, completed a double-stack clearance project on this route allowing for direct, double-stack access between Norfolk and the Midwest. As part of this project, NS also constructed a major new intermodal terminal at Rickenbacker Airport just south of Columbus, Ohio. The route and other lines connecting with the

route are shown in Figure 13 below and the GIS map files provided in Applicants' workpapers.

Figure 13: Chicago to Norfolk Route

3.2.4.1. Chicago to Norfolk Route Products

130. The Chicago to Norfolk route hosts considerable intermodal traffic, with up to 10 intermodal trains per day touching all or a portion of this corridor. The route has historically served to connect rich coal mining regions in Virginia, West Virginia,

and Kentucky to global markets through NS's Lamberts Point coal export facility in Norfolk. Other key commodities that travel on the Chicago to Norfolk route include feed and corn going to southeast feeders and processors, as well as occasional export moves through Chesapeake, Virginia. Finally, the route carries vehicle traffic going to large distribution centers in North Carolina and Virginia.

3.2.4.2. Chicago to Norfolk Route Connections to Short Lines, Ports, and Border Crossings

131. The Chicago to Norfolk route includes a connection to one of NS's largest short line partners, the Kanawha River Railroad connecting in Columbus, Ohio, and Deepwater Creek, West Virginia. Other connections include Columbus & Ohio River Rail Road near Columbus, Commonwealth Railway in Portsmouth, Virginia, and Norfolk & Portsmouth Belt Line Railroad ("NPBL") in Chesapeake.

132. NS's Lamberts Point facility currently handles 12 to 18 million tons of export coal per year, including almost 140,000 export carloads in 2024. In addition, NS services two major Virginia Port Authority container terminals: Virginia International Gateway in Portsmouth and Norfolk International Terminals in Norfolk. NS also serves the Purdue export facility via the NPBL in Chesapeake, VA, as well as a rail to barge riverport in Wheelersburg, Ohio.

133. This route does not directly support any border crossings.

3.2.4.3. Chicago to Norfolk Yards and Major Repair Facilities

134. There are several significant yards between Chicago and Norfolk, including Bellevue (Moorman Yard) and Portsmouth in Ohio; Bluefield, West Virginia; and Roanoke, Crewe, Portlock, and Lamberts Point in Virginia. Portsmouth,

Bluefield, and Lamberts Point primarily support coal while the other yards support a larger portfolio of shipments.

135. A string of mechanical facilities are also located along the route. The most significant is Shaffer's Crossing in Roanoke, with other shops in Bellevue and Portsmouth, Ohio.

3.2.4.4. Chicago to Norfolk Route Intermodal and Automotive Ramps

136. This route is anchored by the Landers Intermodal terminal in Chicago. Moving east, NS has intermodal terminals in Columbus, Ohio (Rickenbacker) and Norfolk, Virginia (Portlock). In addition, as noted above, NS serves Virginia Port Authority's Virginia International Gateway and Norfolk International Terminals.

137. NS's automotive footprint includes terminals in Petersburg, Virginia, and Winston Salem, North Carolina.

3.2.5. Gateway Routes

138. NS also has many key gateway routes that connect to its core routes.

139. *Kansas City/St. Louis*. Traffic that runs south of Chicago or west from Indiana via Decatur Yard to St. Louis and west from Louisville to St. Louis can then run west to Kansas City, all on NS's Midwest Division along the lines of the old Wabash Railroad. Traffic can also run east/west between St. Louis and Kentucky on the W Line.

140. St. Louis hosts its own lift facility and is also served by Class I rail carriers BNSF, CPKC, CSXT, and UP. NS and the other Class I carriers each own minority shares of TRRA. Currently, UP and NS engage in directional interchange.

UP traffic bound for NS is interchanged via A&S then TRRA, while NS traffic bound for UP is interchanged via A&S. There are also automotive ramps at Wentzville, Missouri, and Kansas City. On the W Line, in addition to Kansas City, there are significant automotive terminals in Princeton, Indiana, Shelbyville, Kentucky, and Georgetown, Kentucky.

141. Kansas City also has Class I railroad access to BNSF, CPKC, and UP. KCT serves the city and NS owns a minority share in the terminal railroad, the remaining shares of which are owned by other Class I railroads.

142. Just further north, NS has haulage rights on BNSF and the Iowa Interstate Railroad to access Des Moines, Iowa, where NS owns a small amount of track which it uses for local service.

143. *Memphis*. NS hosts interchanges with BNSF, CN, CSXT, and UP at Memphis. Traffic from the other Class I railroads is then forwarded to interior parts of NS's network. Yards at Sheffield, Alabama, and Chattanooga, Tennessee, support classification work for cars moving through the Memphis gateway. The intermodal facilities at Rossville, Tennessee, and Huntsville, Alabama, serve the Memphis and northern Alabama local markets, respectively.

144. *Meridian/New Orleans*. Meridian, Mississippi, is the eastern terminus of the Meridian Speedway, a joint venture between CPKC and NS from Meridian to Shreveport. NS has haulage rights on the Meridian Speedway for intermodal traffic to and from points in the West. NS and CPKC also use the Meridian Speedway to

support interline services between Dallas and Mexico in the West-Southeast markets on NS.

145. New Orleans is another significant gateway for NS, with both port traffic and Class I carriers serving points west. Among other products, there is significant chemical traffic along the Gulf of America. The New Orleans gateway receives service from Class I railroads BNSF, CN, CPKC, and UP.

146. Norris Yard in Birmingham, Alabama, handles most of the traffic in this area. Traffic from New Orleans and Meridian headed northeast is routed through DeButts Yard in Chattanooga. In addition, Oliver Yard in New Orleans handles a significant amount of interchange traffic in the gateway.

147. *Jacksonville*. NS's Coastal Division runs south from Atlanta to Jacksonville, Florida. From there, NS interchanges intermodal, automotive, and merchandise traffic to the Florida East Coast Railway for forwarding to central and southern Florida. In addition to several Florida east coast ports, there are auto terminals in Titusville and Jacksonville. Jacksonville also has one of the largest intermodal terminals and one of the most significant auto lifts (Westlake) in the NS system. The NS yard at Macon, Georgia, facilitates the sorting of merchandise traffic moving to and from Jacksonville and other Florida markets.

148. *New England*. NS enters upstate New York on the old Delaware & Hudson South Line. Now part of NS's Keystone Division, the line connects to the Albany area (Schenectady and Mechanicville, New York) and is NS's gateway to New England. The Albany area is the site of intermodal and automotive ramps. NS's New

England intermodal traffic funnels through an intermodal terminal in Ayer, Massachusetts, via PAS or alternatively via trackage rights on CSXT to Worcester, Massachusetts. The trackage rights route avoids height restrictions and allows for double stacked containers into Boston. New England automotive traffic goes over PAS to a ramp in Ayer.

3.2.6. Feeder Routes

149. As explained below, NS also has what it sometimes refers to as "feeder routes" in and out of the core network.

150. *Birmingham/Mobile*. NS connects to the Port of Mobile via Birmingham (Norris Yard). Terminal Railway Alabama State Docks is the terminal railroad for the Port of Mobile, and Mobile is also served by CN and CSXT. The route between Mobile and Birmingham serves myriad merchandise customers whose traffic enters the core network at Birmingham.

151. *Southeast to Charleston and Savannah*. NS also connects to ports in the Southeastern United States including Brunswick and Savannah, Georgia, and Charleston, South Carolina. Brunswick is served via the Brosnan Yard in Macon and has a significant auto lift. Golden Isles Terminal Railroad is the port's terminal railroad. Savannah is similarly served via the Brosnan Yard. Savannah Port Terminal Railroad is the local short line. NS has direct access to Savannah's main port facilities, including the Mason Mega Rail Terminal for international intermodal lifts. NS also interchanges with both Georgia Central Railway and Georgia Southern Railway in the area. Charleston is home to both a port and an intermodal terminal.

Charleston is served via Columbia, South Carolina, site of an NS Thoroughbred Bulk Transfer Terminal transload facility.

3.3. Current UP/NS Patterns of Service

152. UP and NS currently interchange traffic at the mid-continent gateways of Chicago, St. Louis, Kansas City, Memphis, Shreveport, and New Orleans. In 2023, the two railroads interchanged approximately 1,637 cars of manifest traffic, 1,648 containers of intermodal traffic, and 122 cars of bulk shipments per day.[31] In the following sections, Applicants describe current patterns of service for traffic UP and NS interchange using each gateway.

3.3.1. Chicago

153. Chicago is the busiest gateway in the United States. It is the major point of interchange for traffic moving between UP and NS. In 2023, UP and NS interchanged approximately 454 cars of manifest traffic and 1,139 containers of intermodal traffic per day in Chicago.[32] They interchanged approximately 243 of the cars and all containers directly and via rubber tire interchange.[33] UP and NS interchanged the remaining railcars using BRC and IHB.

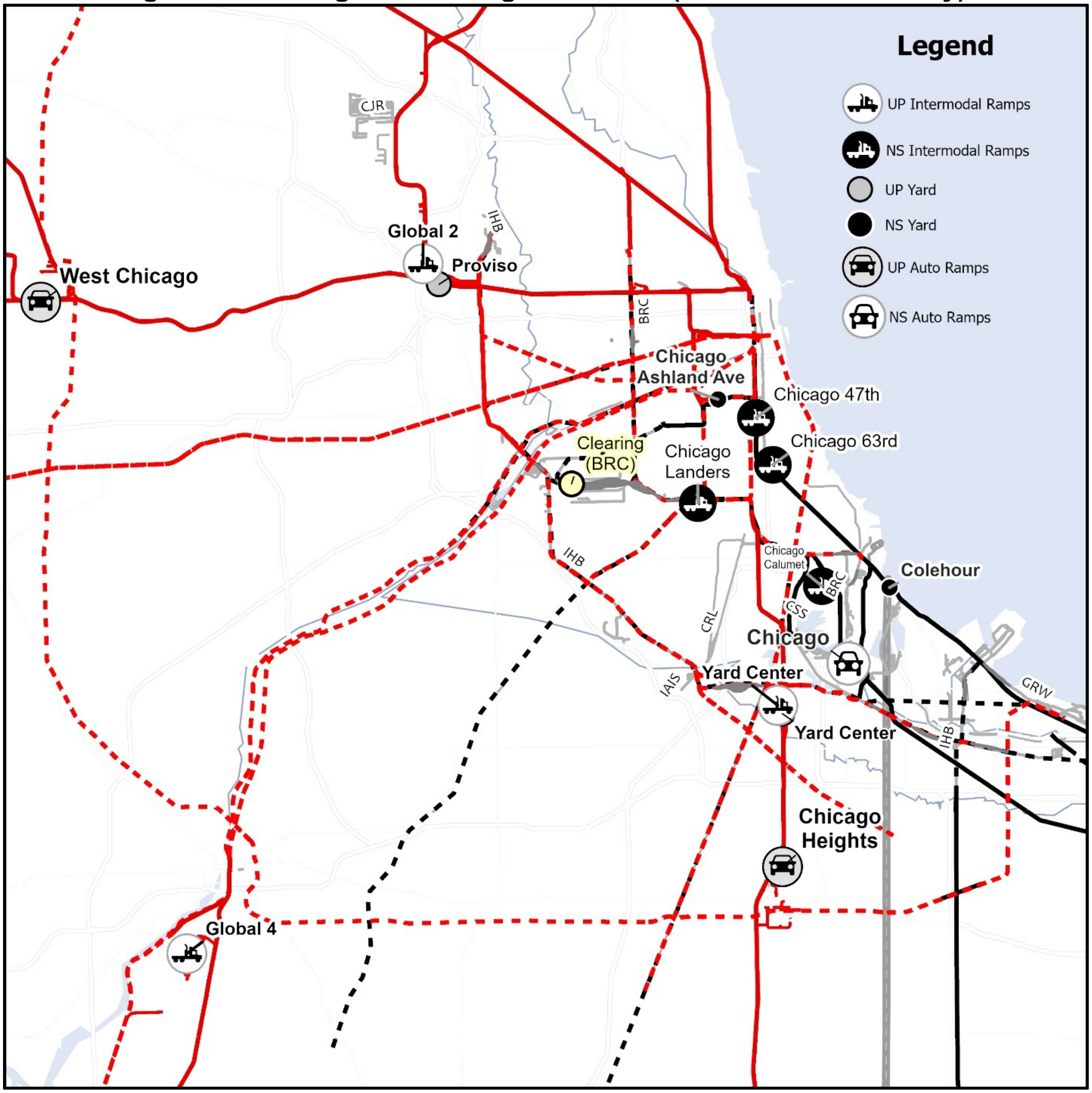
---

[31] *See* Workpaper "251120 NS-UP Interchange Summary by Gateway vShare.xlsx," Tab "Summary," Cells D31, D32, and D36.

[32] *See id.*, Cells D7, D8, and D9.

[33] *See id.*, Cell K7.

Figure 14: Chicago Interchange Overview (UP and NS lines only)



3.3.1.1. Chicago – Intermodal Operations

154. UP has intermodal ramps in three yards in Chicago: Global 2, Global 4, and Yard Center. UP uses Global 2 for domestic traffic, Global 4 for domestic and international traffic, and Yard Center primarily for traffic moving to and from Texas

and Mexico. UP also uses Global 3 to interchange intermodal traffic with CSX and NS.[34]

155. NS has intermodal ramps in four yards in Chicago: 47th Street, 63rd Street, Calumet Yard, and Landers Yard. NS uses 47th Street for domestic service to the Northeast, 63rd Street for domestic service to New England and the Northeast, Calumet for domestic service to the South, and Landers for domestic and international to Columbus and East Coast ports. NS also uses Ashland Avenue Yard in Chicago and Colehour Yard in Indiana to interchange intermodal traffic with UP and BNSF.

156. UP brings most NS-bound intermodal traffic into Global 3, routing trains from the Pacific Northwest, Northern California, and Southern California to that yard. At Global 3, UP builds two trains for NS: one with blocks for locations in the Ohio Valley and Northeast, and one with blocks for locations in Columbus, Cincinnati, and the South. UP delivers the Ohio Valley/Northeast blocks to Ashland Avenue and the Columbus/Cincinnati/South blocks to Calumet.

157. UP brings NS-bound domestic intermodal traffic from lower density lanes into Global 2, Global 4, and Yard Center. UP deramps this traffic, which is then drayed to NS terminals in Chicago in a "rubber tire interchange."

158. NS brings most UP-bound domestic intermodal traffic from the Northeast to Global 2. NS brings UP-bound domestic intermodal traffic from lower

---

[34] UP consolidated Global 1 operations into Global 2 in June 2023.

density lanes into 47th Street, 63rd Street, Calumet, and Landers. NS deramps this traffic, which is then drayed to UP terminals in Chicago.

159. NS brings UP-bound international traffic from the Northeast and the Ohio Valley to Colehour, where it builds a train for Global 4. A UP crew brings the train from Colehour to Global 4.

3.3.1.2. Chicago – Manifest Operations

160. UP uses three Chicago yards to support manifest operations: Proviso Yard, Yard Center, and West Chicago Yard. Most manifest traffic interchanged with NS flows through Proviso. UP also interchanges manifest traffic to NS via BRC's Clearing Yard.

161. NS primarily relies on its Elkhart Yard in Indiana and BRC's Clearing Yard to support its manifest operations in Chicago.

162. UP brings most NS-bound manifest traffic originating west of North Platte, Nebraska, into UP's North Platte Yard, where it builds an Elkhart block and launches it on a train to Proviso. At Proviso, UP builds a train that picks up additional Elkhart blocks with NS-bound traffic from Wisconsin and Minnesota and continues to Ashland Avenue. UP brings some NS-bound automotive traffic from Texas into Yard Center, and a local train operating from Yard Center sets out a Baltimore block for NS at Ashland Avenue. UP also uses intermediate carriers to interchange manifest traffic with NS in Chicago. UP routes traffic originating in the upper Midwest to Clearing Yard, where BRC builds trains for NS. UP also uses IHB to transfer automotive traffic to NS within Chicago.

163. NS routes traffic destined to UP locations west of North Platte to Elkhart, where it builds a North Platte block that it delivers to Proviso/Global 2. NS delivers all other UP-bound manifest traffic to Clearing, where BRC builds trains for UP. NS also delivers automotive traffic, excluding destinations west of North Platte, through IHB.

3.3.2. St. Louis

164. Although UP and NS do not interchange intermodal traffic over the St. Louis gateway, both railroads have intermodal ramps in St. Louis. UP provides intermodal service from its Dupo Intermodal Terminal. NS provides intermodal service from its St. Louis Intermodal Facility.

165. In 2023, UP and NS interchanged approximately 382 cars of manifest traffic per day in St. Louis.[35] UP routes NS-bound manifest traffic originating primarily in Texas, Louisiana, and Arkansas, as well as automotive traffic originating in Texas and Mexico and destined primarily to the Ohio Valley and Northeast, to NS via A&S. Three times a day, A&S transfers the NS-bound traffic to TRRA, which builds trains for NS. Therefore, all this UP-NS traffic is handled twice in St. Louis—once by A&S and once by TRRA. In 2023, UP and NS interchanged approximately 206 cars per day that were handled by both A&S and TRRA in St. Louis.[36]

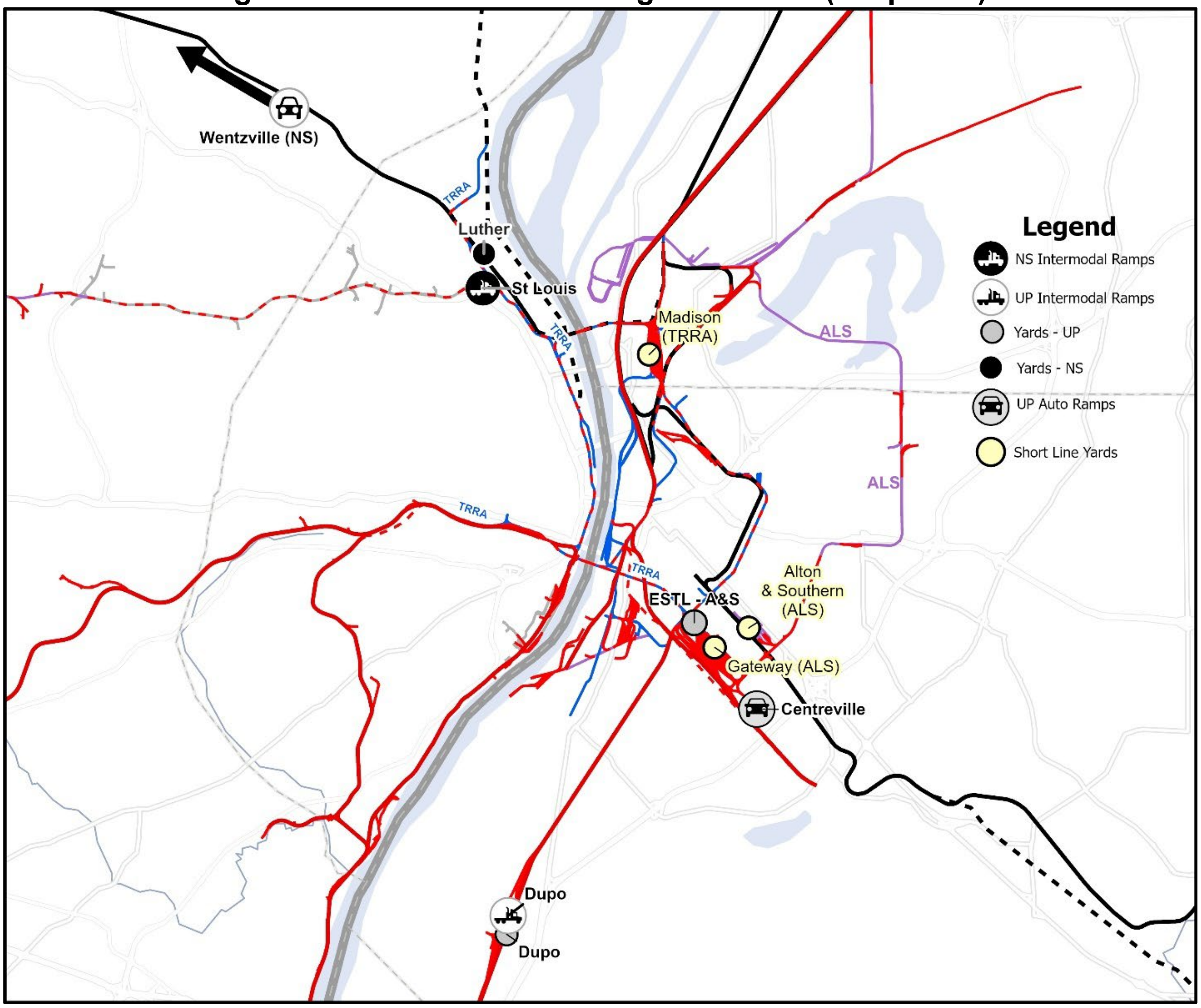
---

[35] *See* Workpaper "251120 NS-UP Interchange Summary by Gateway vShare.xlsx," Tab "Summary," Cell D12.

[36] *See id.*, Cell B12.

166. NS routes UP-bound manifest traffic—originating primarily in the Ohio Valley and the Northeast and destined primarily to Texas and the Gulf Coast—via A&S, which builds trains for UP.

Figure 15: St. Louis Interchange Overview (simplified)



3.3.3. Kansas City

167. UP and NS both have intermodal ramps in Kansas City. UP recently relocated its intermodal operations from Neff Yard, a repurposed hump yard, to its new Kansas City Intermodal Terminal ("KCIT"). NS conducts intermodal operations out of Voltz Yard. The only intermodal traffic UP and NS interchange over the Kansas

City gateway is traffic moving from UP's West Coast ramps to Louisville, Kentucky, which is deramped in KCIT and drayed to Voltz.

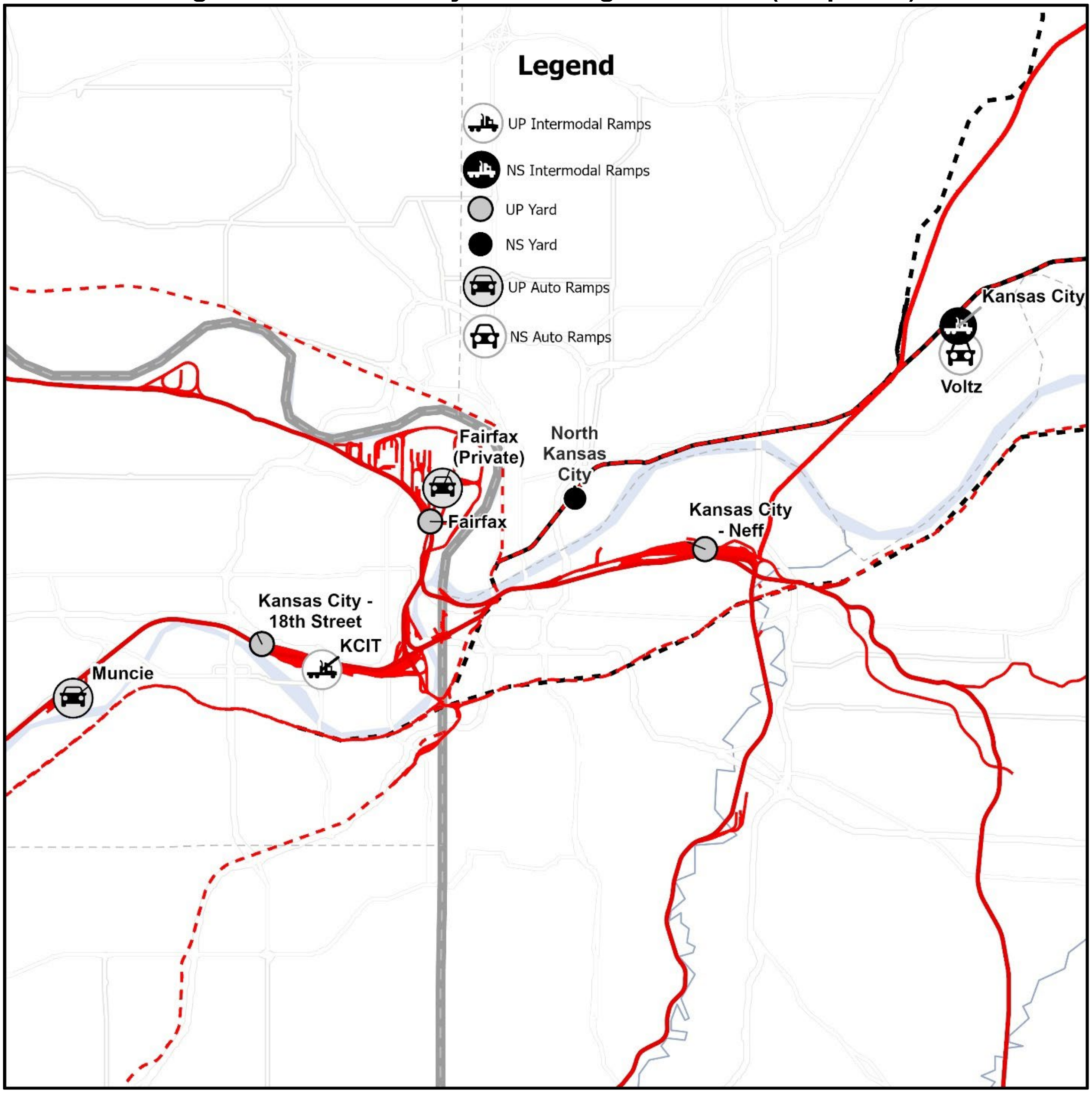
168. In 2023, UP and NS interchanged approximately 196 cars of manifest traffic per day over the Kansas City gateway.[37] UP and NS interchanged all this traffic directly. UP's primary manifest yard in Kansas City is its 18th Street Yard. NS's primary manifest yard is its North Kansas City Yard.

169. UP interchanges NS-bound traffic by building a train for NS in Topeka, Kansas. In North Platte, UP builds NS and Topeka blocks that consolidate traffic from the western portion of its network that is destined to Kansas City or interchange with NS in Kansas City. In Topeka, UP adds Kansas City-area cars that it first moved west for classification in Topeka, typically including automotive traffic from its Fairfax Automotive Facility, then launches the interchange train. The train sets out cars in UP's 18th Street Yard before terminating in NS's North Kansas City Yard.

170. NS interchanges UP-bound traffic using a train that originates in Cincinnati and picks up additional traffic as it passes through Kentucky, Indiana, and Missouri. The NS train carries a variety of traffic, including automobiles destined to UP's Mira Loma Automotive Facility in California. NS brings this traffic to UP's 18th Street Yard, where UP builds several blocks, including a Mira Loma block that rides an intermodal train toward California.

[37] *See* Workpaper "251120 NS-UP Interchange Summary by Gateway vShare.xlsx," Tab "Summary," Cell D16.

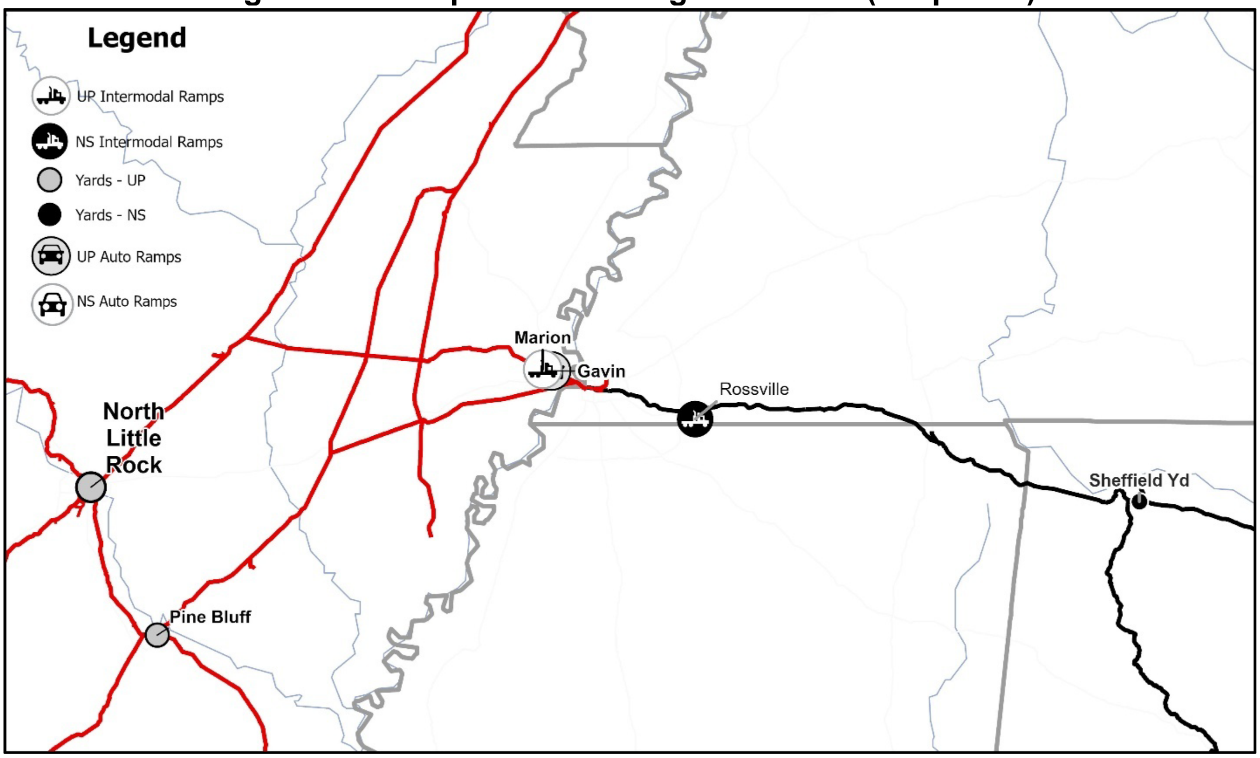
Figure 16: Kansas City Interchange Overview (simplified)



3.3.4. Memphis

171. In 2023, UP and NS interchanged approximately 275 cars of manifest traffic and 139 containers of intermodal traffic per day in Memphis.[38] They interchanged all of this traffic directly.

Figure 17: Memphis Interchange Overview (simplified)



3.3.4.1. Memphis – Intermodal Operations

172. UP and NS both have intermodal ramps in Memphis. UP's facility is the Marion Intermodal Terminal, located in Marion, Arkansas. NS's facility is in Rossville, Tennessee. UP and NS operate daily transfer trains between the two facilities. UP uses the Memphis gateway for traffic from Northern and Southern California and Laredo, Texas, moving to NS-served locations in the Southeast.

---

[38] *See* Workpaper "251120 NS-UP Interchange Summary by Gateway vShare.xlsx," Tab "Summary," Cells D20 and D21.

Conversely, NS uses the Memphis gateway for traffic moving between the Southeast and UP-served locations in Northern and Southern California.

3.3.4.2. Memphis – Manifest Operations

173. UP manifest traffic moving over the Memphis gateway to NS runs through UP's yard in North Little Rock. UP combines traffic moving from the western part of its network through North Platte and the southern part of its network through Fort Worth, and builds a train it launches to NS's yard in Sheffield, Alabama. At Sheffield, NS builds blocks for destinations deeper in the NS system, including a substantial block for Chattanooga. UP also has a small yard in Memphis called Sargent Yard, but it does not use the yard for interchange operations with NS.

174. NS manifest traffic moving over the Memphis gateway to UP flows in the reverse. NS builds a train at Sheffield by combining traffic from Sheffield, Chattanooga, and Birmingham, and launches the train to North Little Rock. At North Little Rock, UP reclassifies the traffic for movement deeper into its network. NS uses its Rossville facility to conduct local operations in Memphis.

3.3.5. Shreveport/Meridian

175. In 2023, UP and NS interchanged approximately 363 containers per day of intermodal traffic using the Shreveport/Meridian gateway.[39] Under a longstanding agreement with Kansas City Southern (now CPKC), NS has rights to use the Meridian Speedway, which connects with UP in Shreveport and NS in Meridian.

---

[39] *See* Workpaper "251120 NS-UP Interchange Summary by Gateway vShare.xlsx," Tab "Summary," Cell D25.

Under the agreement, UP and NS can commercially interchange intermodal traffic at Shreveport, with CPKC providing the transportation between Shreveport and Meridian. UP uses the Meridian gateway for intermodal traffic originating in Northern and Southern California and destined to NS-served locations in Atlanta, Charlotte, and Jacksonville. NS uses the Meridian gateway for intermodal traffic moving in the opposite direction to UP.

3.3.6. New Orleans

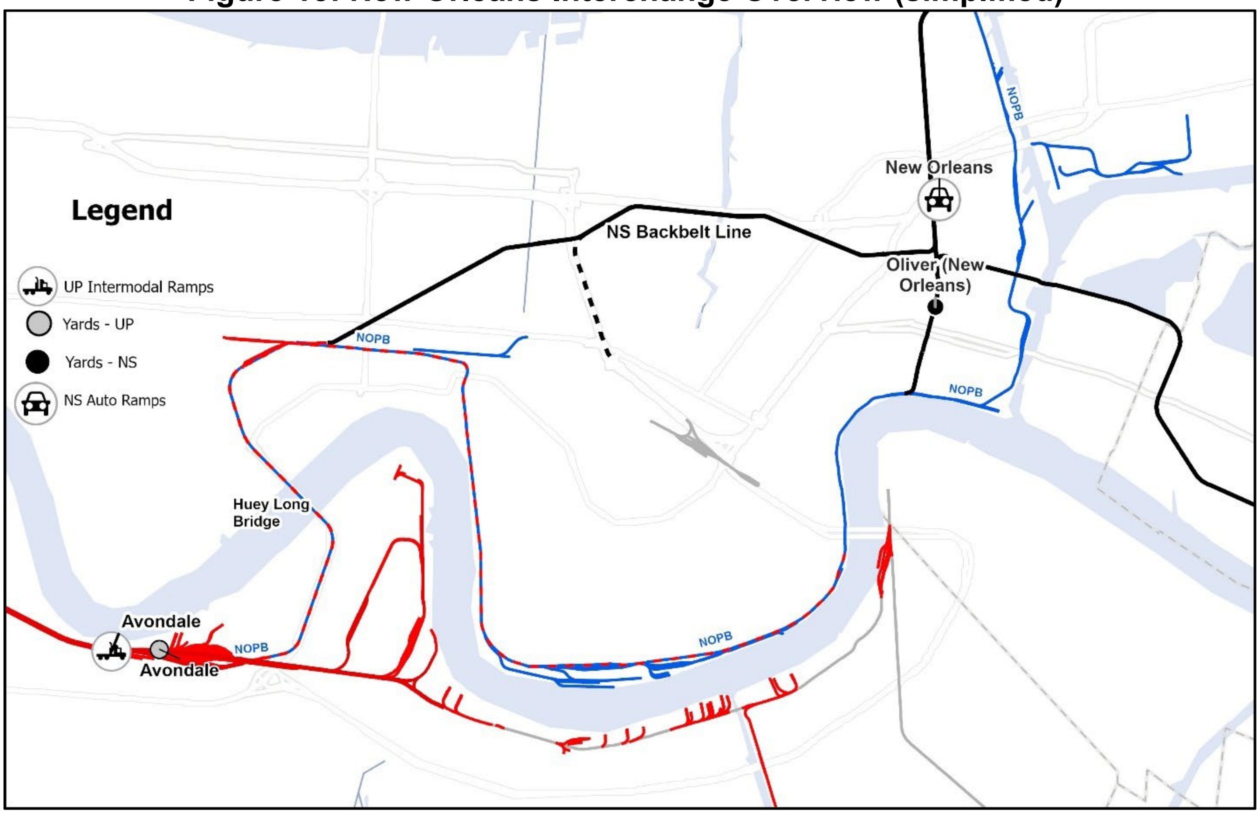
176. UP and NS do not interchange intermodal traffic over the New Orleans gateway. Although UP has a small intermodal ramp in New Orleans, NS does not have a New Orleans ramp.

177. In 2023, UP and NS interchanged approximately 330 cars of manifest traffic per day in New Orleans.[40] Manifest traffic moving over the New Orleans gateway from UP to NS primarily originates in Southern California, Texas, and Louisiana. UP uses two trains to move manifest traffic over the New Orleans gateway to NS: one is destined to Birmingham, while the other train is destined for Chattanooga, including a block for East Point, Georgia. UP launches both trains from its yard in Livonia, Louisiana. UP crews take the trains over the NOPB's Huey P. Long Bridge to NS's Back Belt Line and stage them for NS. NS crews board the trains and work them in NS's Oliver Yard before departing to Birmingham or Chattanooga.

[40] *See* Workpaper "251120 NS-UP Interchange Summary by Gateway vShare.xlsx," Tab "Summary," Cell D28.

178. NS uses the New Orleans gateway for manifest traffic moving to UP destinations in Texas, Louisiana, and the southern part of the UP network. NS moves the traffic in two trains: one destined to UP's Englewood yard in Houston, and the other destined to Livonia. NS launches one train from Chattanooga and one from Birmingham. NS moves the trains into New Orleans and stages them on its Back Belt Line for interchange with UP.

Figure 18: New Orleans Interchange Overview (simplified)



4. Description of Combined Network – Optimized Plan

4.1. Optimized Plan – Principal Routes

179. Because UP and NS meet end-to-end at mid-continent gateways, their merger will not fundamentally alter the principal routes currently operated by UP or NS. The combined system will continue using UP's and NS's principal routes to serve

customers on either side of the gateways and move traffic to and from the gateways. At the same time, the UP/NS merger offers major opportunities to improve service and efficiency by eliminating interchanges between the two railroads and safely implementing train and blocking plans that allow traffic to move faster and more reliably. Applicants will achieve these improvements by implementing a unified transportation plan designed to optimize outcomes for the merged UP/NS, rather than separate plans designed to maximize outcomes separately for UP and NS. Applicants project that implementation of their optimized plan will avoid approximately 2,400 handlings per day and save approximately 60,000 car miles per day.[41]

180. Optimizing UP/NS's transportation plan will begin producing significant public benefits almost immediately upon consummation of the merger. That is, benefits will begin to accrue even before UP/NS attract new traffic through the single-line service offerings and one-stop shopping that will make the merged railroad a stronger competitor to trucks and other railroads. Once new train and blocking plans are in place, customers of both railroads will experience faster, more reliable service on shipments across mid-continent gateways, which translates into lower customer inventory costs and savings in equipment ownership costs.

181. Applicants' plans to move traffic more efficiently involve changes to how and where traffic currently interchanged at mid-continent interchange locations will

[41] *See* Workpaper "C-251124 Operating Plan Metrics vF.xlsx," Tab "Growth Plan," Cells D17 and D25.

be handled in the future. At the same time, UP/NS will keep open all existing gateways, both commercially and operationally. In addition, Applicants expect that UP/NS will continue interchanging substantial volumes of traffic with other railroads at those gateways. Applicants have taken care in the planning process to ensure their operational changes will not degrade the operations of connecting freight and passenger railroads.

4.2. Optimized Plan – Consolidation of Main-Line Operations

182. Applicants are not planning to change UP's or NS's principal routes or to abandon or divest any lines as a result of the consolidation. Rather, the combined UP/NS will be positioned to improve service for traffic currently interchanged between UP and NS. Eliminating interchanges at mid-continent gateways will immediately improve transit times for this traffic.

183. In addition, Applicants will change the way traffic currently flows through current interchanges to implement more efficient train and blocking concepts they have developed in the planning process. Applicants' development of these more efficient plans helps show why the benefits of this merger could not be achieved through cooperative agreements. Railroads, including UP and NS, often cooperate to make their own operations more efficient. One common example is classifying blocks of cars for interchange: one railroad sorts cars destined to a common location on the receiving railroad's lines and moves them in one group. This type of arrangement allows the receiving railroad to move the cars further on its network before sorting the cars again. However, railroads require such efforts to be reciprocated: a railroad will not take on an unequal amount of extra blocking work,

even when doing so would be more efficient overall for shippers and the receiving railroad. With a merger, there is no "us" and "them"—no balance to maintain—the objective is to optimize outcomes for customers and the merged system.

184. The planned changes to current traffic flows centrally involve creating new trains with deeper network blocking while optimizing movements through mid-continent gateways. The new trains do not increase the total number of trains moving over the combined network, but instead follow more efficient routes and implement more efficient train and blocking plans for moving the same traffic between the same points. We discuss these planned new trains below, and Appendix A provides additional details regarding the Optimized Plan train changes.[42]

185. *Southern California-Northeast Intermodal* (ZLCCX/ZHBLC). Applicants intend to introduce a new intermodal train pair between Southern California and the Northeast via Kansas City, Springfield, and Sidney, Illinois, leveraging UP's efficient routing from Southern California to Kansas City and NS's efficient routing from Kansas City to the Northeast. The new routes will be as much as 252 miles shorter than the current interline routing[43] and will save approximately 17 hours of transit time eastbound and 19 hours westbound[44] for approximately 435 containers per day.[45] The new trains are shown in Figures 19 and 20.

---

[42] *See* Workpaper "T2 T3 New Train Plans Final.xlsx."

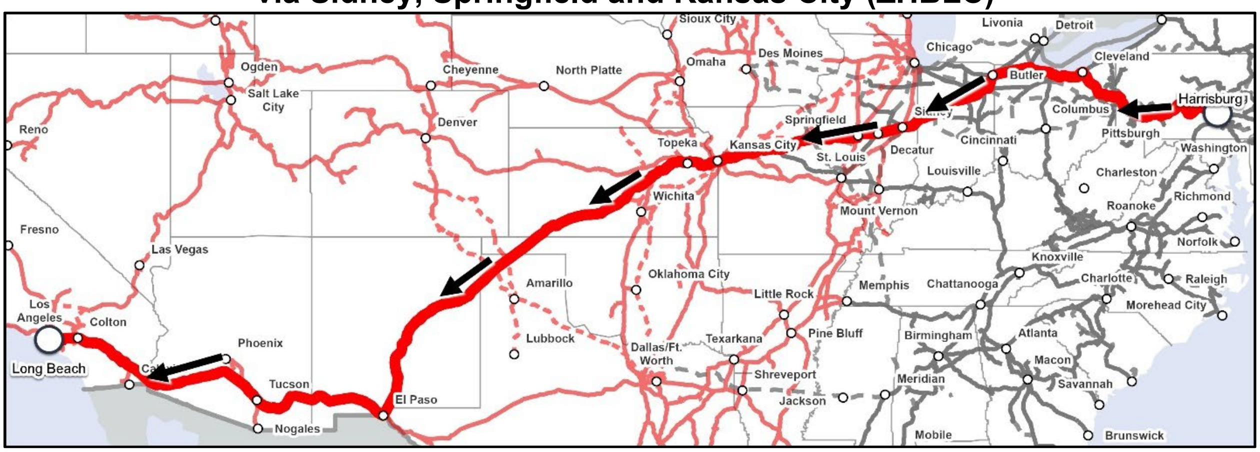
[43] *See* Workpaper "Intermodal Route Mileage Comparisons.xlsx," Cell E9.

[44] *See* Workpaper "Transcon Lane Level Transit Time & Comps.xlsx," Tab "Transit Times," Cells N4 and N14.

[45] *See* Workpaper "Intermodal T1 vs T2 111925.xlsx," Tab "ZLCCX ZHBLC Detail.xlsx," Cell G26.

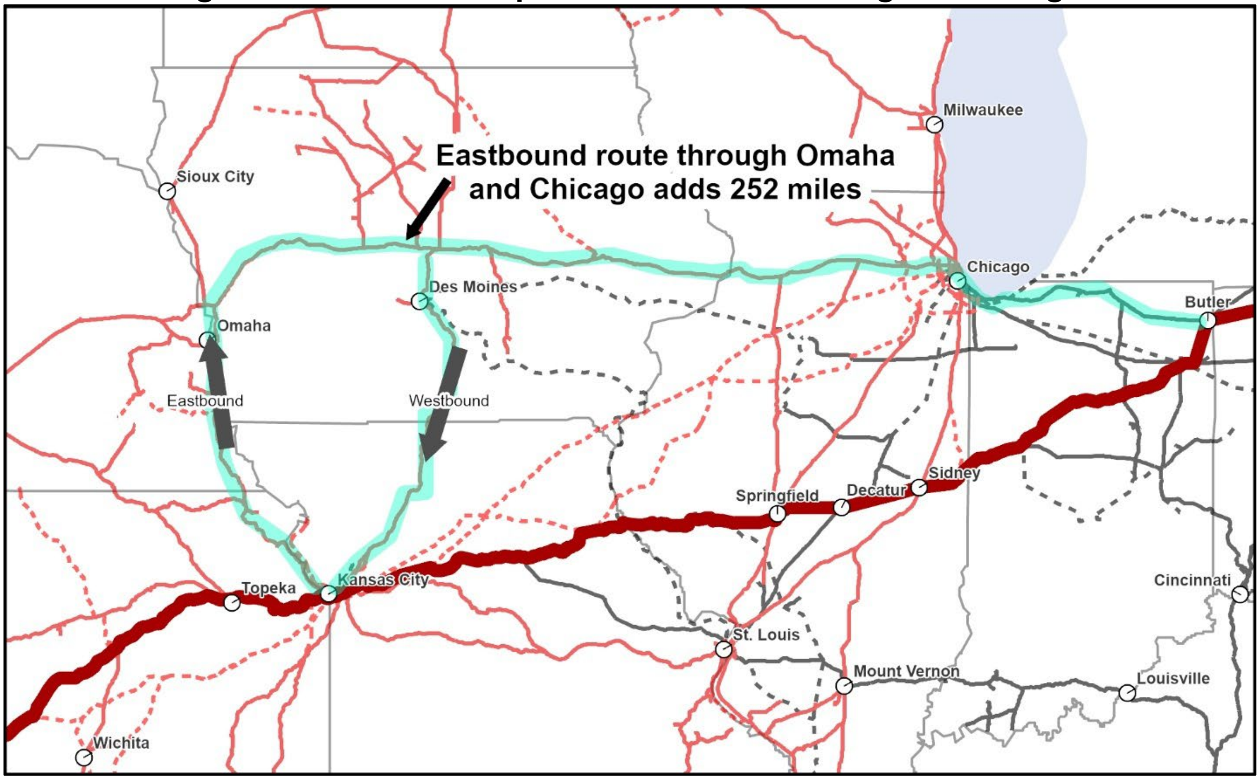
Figure 19: Southern California-Northeast Intermodal via Kansas City, Springfield, and Sidney (ZLCCX)

Figure 20: Northeast-Southern California via Sidney, Springfield and Kansas City (ZHBLC)



186. Figure 21 illustrates how, compared to current routing through Chicago, the new trains will make trips shorter and faster.

Figure 21: ZLCCX Compared to Current Routing via Chicago



187. By carrying traffic that UP and NS otherwise would interchange in Chicago, UP/NS's new Southern California-Northeast trains will bring broader benefits, too. These new trains should improve other railroads' Chicago-area operations by reducing train movements in the terminal. The new trains will also remove current traffic from Chicago area commuter routes and Amtrak routes between Chicago and Porter, Indiana, and Chicago and Butler, Indiana.

188. In addition, some traffic the new train will carry is traffic UP and NS currently interchange in Chicago by truck. Currently, UP and NS interchange approximately 532 containers per day by draying them between UP and NS

intermodal terminals in Chicago.[46] Applicants project approximately 92 of those containers will ride the new train, entirely avoiding Chicago and Chicago roadways, which will benefit roadway users in Chicago and the condition of the roads themselves.[47] Overall, this operating change and other operational improvements enabled by the merger will eliminate approximately 350 rubber tire interchanges per day in Chicago.[48]

189. *Southern California-Southeast Intermodal* (ZLBAT/ZCTLB). To improve a current route via Memphis, UP/NS will route a new intermodal train pair between Southern California and the Southeast via the Meridian Speedway. The new route will be 123 miles shorter than the current route[49] and will save 70 to 95 hours of transit time[50] for approximately 400 containers per day.[51] The new trains are shown in Figures 22 and 23.

---

[46] *See* Workpaper "251120 NS-UP Interchange Summary by Gateway vShare.xlsx," Tab "Summary," Cell D9.

[47] *See* Workpaper "251120 NS-UP Interchange Summary by Gateway vShare.xlsx," Tab "RIC ZLCCX ZHBLC," Cell A5.

[48] *See* Workpaper "251120 NS-UP Interchange Summary by Gateway vShare.xlsx," Tab "Chicago v. Not Breakdown," Cell C24.

[49] *See* Workpaper "Intermodal Route Mileage Comparisons.xlsx," Cell E5.

[50] *See* Workpaper "Transcon Lane Level Transit Time & Comps.xlsx," Tab "Transit Times," Cells N5 and N15.

[51] *See* Workpaper "Intermodal T1 vs T2 111925.xlsx," Tab "ZCTLB ZLBAT Detail," Cell G14.

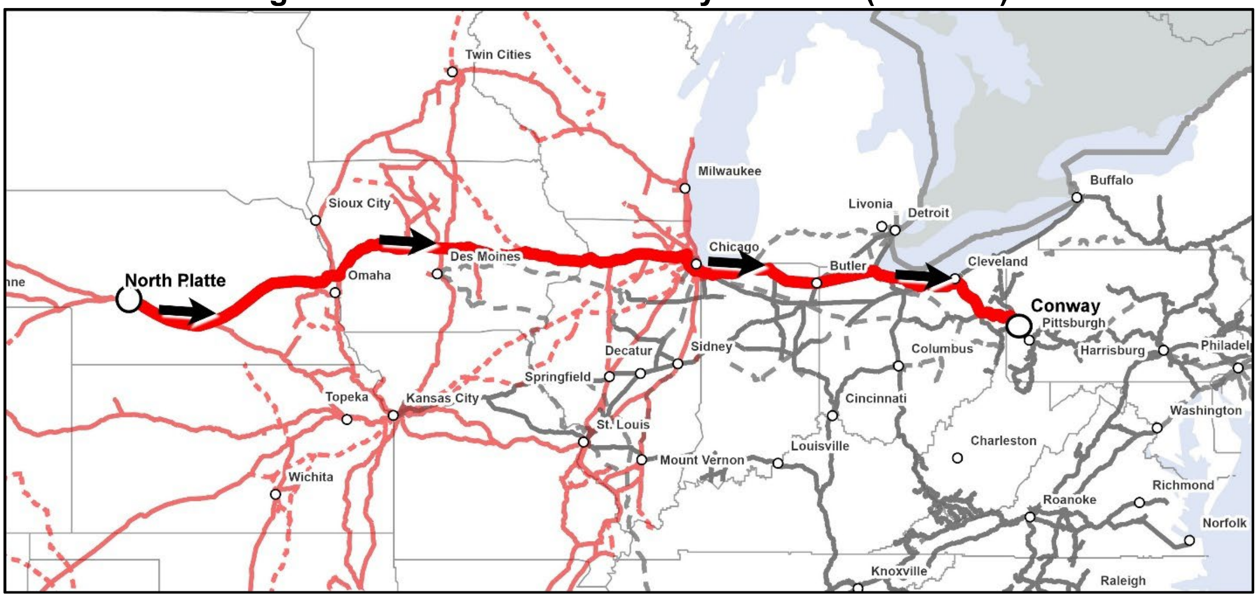
Figure 22: Southern California-Southeast Intermodal via Meridian (ZLBAT)

Figure 23: Southeast-Southern California Intermodal via Meridian (ZCTLB)

190. *North Platte-Conway Manifest* (MNPCW). UP/NS will operate a new manifest train from North Platte to Conway, Pennsylvania, with blocks for Elkhart, Indiana, Bellevue, Ohio, and Conway, Pennsylvania, that will remove car handlings in Chicago and at Elkhart Yard. The new train, which will carry traffic moving from UP's network west of North Platte and Iowa to the Ohio Valley and Northeast, will

eliminate 220 handlings per day.[52] The route of the new train is shown in Figure 24. The MNPCW will improve traffic flow compared to UP's and NS's current independent operations, and benefit Chicago's Metra commuter rail system and Amtrak.

Figure 24: North Platte-Conway Manifest (MNPCW)



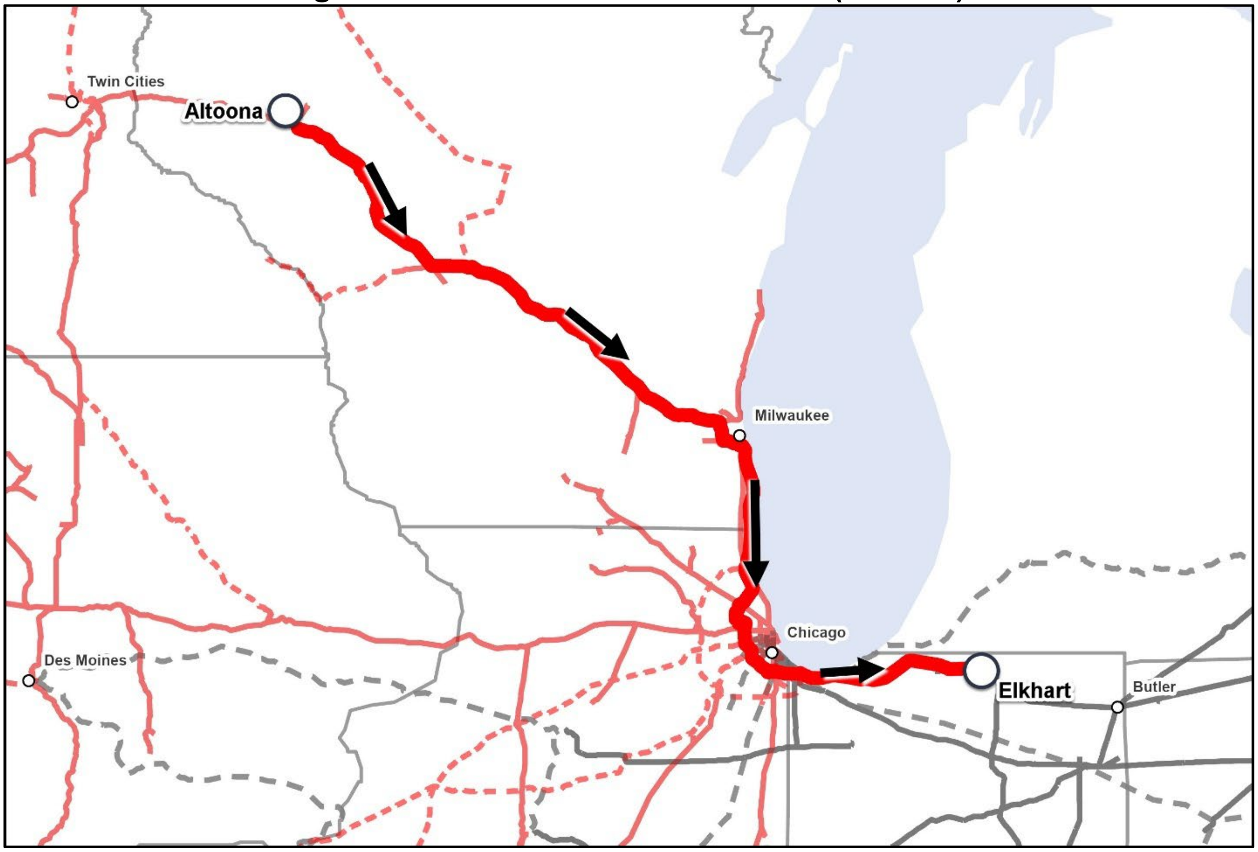
191. *Altoona-Elkhart Manifest* (MALEK). UP/NS will operate a new manifest train from Altoona, Wisconsin, to Elkhart, with blocks for Elkhart, Conway, and Corning, New York. The new train—which will carry traffic moving from Wisconsin and Minnesota to Indiana, Ohio, Michigan, Virginia, Pennsylvania, and New York—will remove the need for 151 handlings per day, including a block swap and reduced switching in Elkhart.[53] The new train's route is shown in Figure 25.

---

[52] *See* Workpaper "Manifest T1 vs T2 111825.xlsx," Tab "MNPCW," Cell I10.

[53] *See* Workpaper "Manifest T1 vs T2 111825.xlsx," Tab "MALEK," Cell I21.

Figure 25: Altoona-Elkhart Manifest (MALEK)



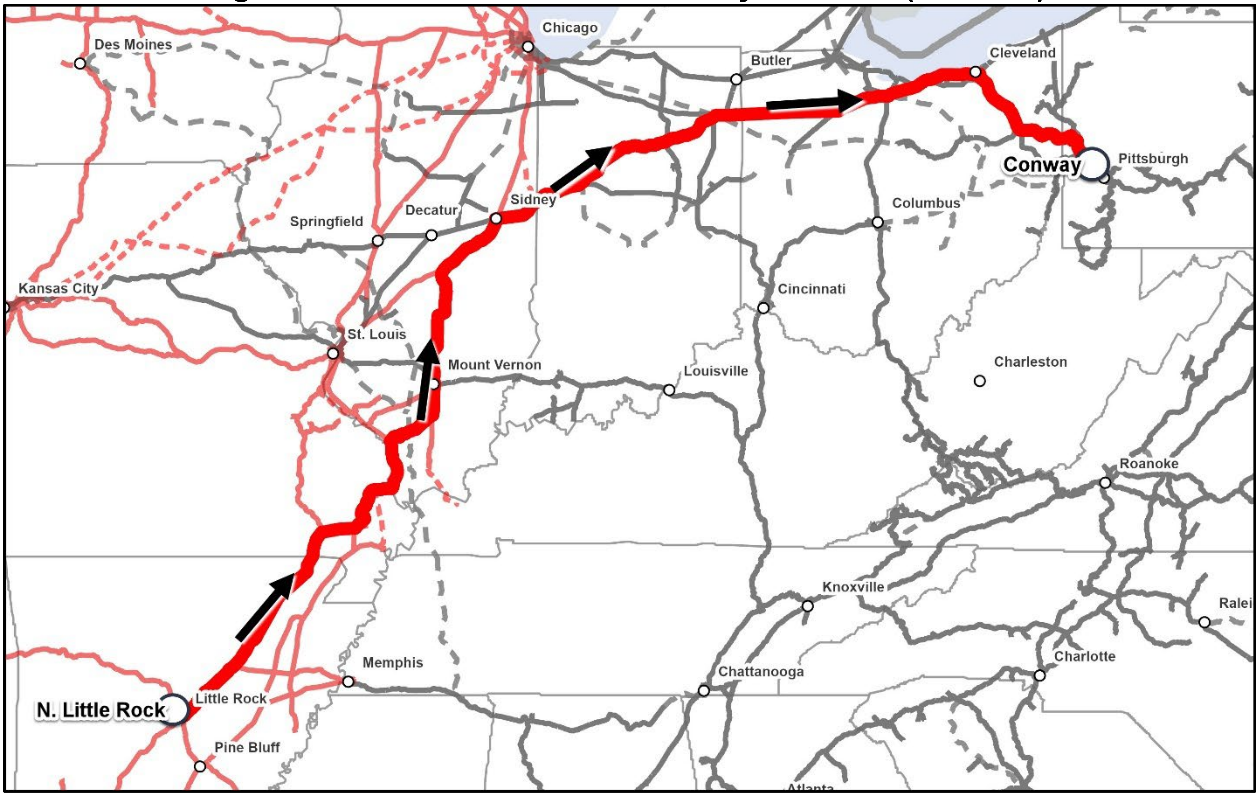
192. *Conway-Altoona Manifest* (MCWAL). UP/NS will operate a new manifest train from Conway to Altoona that will pick up blocks for Adams and Altoona, Wisconsin, at Bellevue and Elkhart. Building blocks at Corning, Conway, and Elkhart will enable traffic to go deeper across the Applicant's combined network. The new train will reduce switching demand at the BRC on approximately 110 cars daily for traffic moving from New York, Pennsylvania, Ohio, and Virginia to Illinois, Wisconsin, and Minnesota.[54] The new train is shown in Figure 26.

[54] *See* Workpaper "Manifest T1 vs T2 111825.xlsx," Tab "MCWAL," Cell H23.

Figure 26: Conway-Altoona Manifest (MCWAL)

193. *North Little Rock-Conway Manifest* (MNLCW). Using UP's line via Salem, Illinois, and NS's line via Sidney, Illinois, UP/NS will operate a new manifest train from North Little Rock to Conway, with blocks for Detroit, Bellevue, and Conway. The new train is shown in Figure 27.

Figure 27: North Little Rock-Conway Manifest (MNLCW)



194. The new route will be approximately 41 miles shorter than the current interline route from North Little Rock to Conway through East St. Louis and, each day, reduce one or two handlings on approximately 80 cars launched out of North Little Rock.[55] In addition, the new train will eliminate multiple car touches in the St. Louis gateway. In total, the North Little Rock-Conway train will help reduce approximately 144 daily handlings for traffic moving from Texas, Louisiana, and Arkansas to Michigan, Ohio, Pennsylvania, and New Jersey for traffic that UP and NS currently interchange in East St. Louis.[56] The new route also should benefit other railroads that rely on TRRA for intermediate switching in St. Louis, because it will

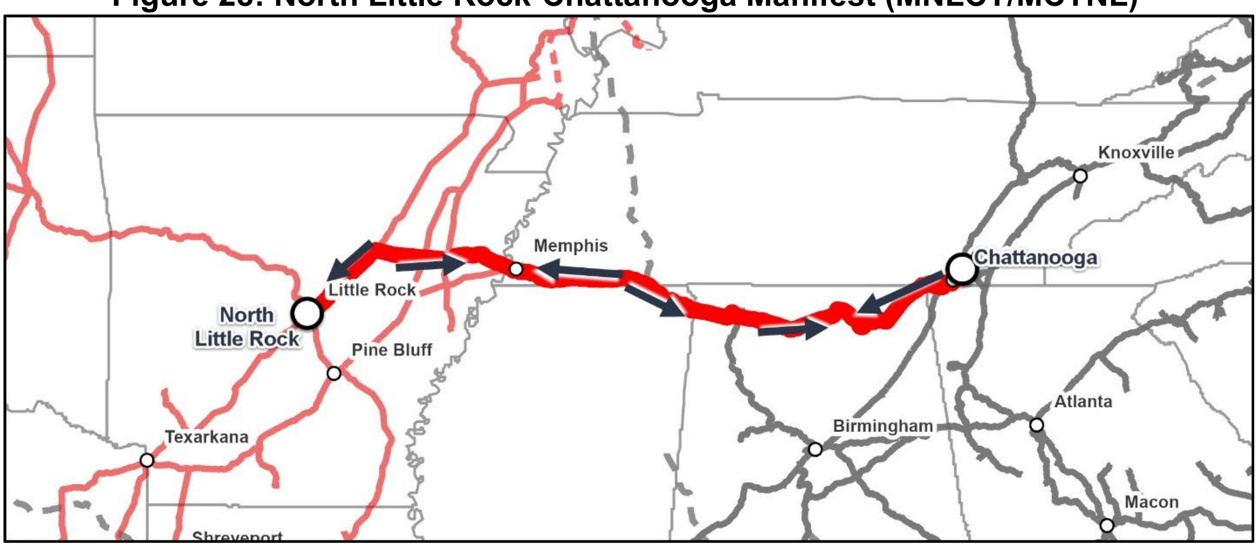
[55] *See* Workpaper "Manifest T1 vs T2 111825.xlsx," Tab "MNLCW," Cell F6.

[56] *See* Workpaper "Manifest T1 vs T2 111825.xlsx," Tab "MNLCW," Cell I6.

help reduce switching and transfer moves where northbound and eastbound traffic interchanged between UP and NS first moves through A&S and then TRRA.

195. *North Little Rock-Chattanooga Manifest* (MNLCT/MCTNL). UP/NS will operate a new manifest train pair between North Little Rock and Chattanooga, with blocks for Sheffield, Birmingham, and Chattanooga. The North Little Rock-Chattanooga train will carry traffic moving between Texas, Louisiana, Arkansas, and western points on UP, on the one hand, and Kentucky, Alabama, Tennessee, and northeastern and southeastern points on NS, on the other hand. The new train pair will eliminate car handlings at Sheffield for eastbound traffic moving to Birmingham and Chattanooga and a block swap at Sheffield for westbound traffic moving to North Little Rock, eliminating 124 handlings per day on traffic moving between North Little Rock and Chattanooga.[57] The new train pair is shown in Figure 28.

Figure 28: North Little Rock-Chattanooga Manifest (MNLCT/MCTNL)



[57] *See* Workpaper "Manifest T1 vs T2 111825.xlsx," Tab "MNLCT.MCTNL," Cell I15.

196. As discussed below in Section 7, Applicants' planning process has ensured affected lines will have capacity to accommodate the new trains. Most of these trains replace existing trains, using more efficient train and blocking plans. In net, the Optimized Plan will eliminate approximately 25 daily through freight crew starts and 4,700 daily train miles.[58] Applicants' planning process also ensured the changes would not have detrimental impacts on other freight or passenger railroads.

4.3. Yard and Terminal Activity Changes

197. Applicants' optimization of an integrated UP/NS system will affect the role of UP and NS manifest yards and intermodal terminals at gateways and locations deeper in the combined system. As discussed below, Applicants will consolidate some yard and terminal operations at gateways, making more efficient use of available capacity. Additionally, as traffic moves on new trains and new, longer-distance blocks, the number of cars per day going into yards will change, with some experiencing higher volumes while others experiencing reductions in workloads.

198. Tables 4 and 5 list key manifest yards and intermodal terminals expected to experience a change in workload of at least 25 cars or containers processed per day between the Base Plan and the Optimized Plan. The full list of

---

[58] *See* Workpaper "C-251124 Operating Plan Metrics vF.xlsx," Tab "Growth Plan," Cells D22 and D23.

anticipated processing changes at yards and terminals is provided in our workpapers.[59]

Table 4[60]
Anticipated Manifest Yard Workload (+/-25)
Base Plan to Optimized Plan

Manifest Yard	Base Plan Cars/Day	Optimized Plan Cars/Day	Difference
DeButts (Chattanooga), TN	1,671	1,825	154
18th St (Kansas City), KS	705	851	147
Toledo Airline, OH	183	268	86
North Little Rock, AR	2,264	2,346	81
Livonia, LA	1,813	1,892	79
Sevier (Knoxville), TN	288	331	43
Ashland Ave (Chicago), IL	151	176	25
Mitchell, IL	129	101	(28)
South San Antonio, TX	702	674	(28)
Granite City, IL	247	218	(28)
Global 3 (Rochelle), IL	211	181	(30)
North Platte West, NE	1,406	1,374	(32)
Danville, KY	306	272	(34)
Yard Center (Chicago), IL	486	449	(37)
Moorman (Bellevue), OH	1,811	1,774	(37)
Englewood (Houston), TX	2,040	2,000	(40)
Elkhart, IN	2,349	2,307	(42)
NKC (Kansas City), MO	322	275	(48)
Lafayette South, IN	166	110	(56)
Dallas Yard, TX	324	263	(62)
Birmingham, AL	1,651	1,589	(63)
Alfalfa (El Paso), TX	710	625	(85)
Topeka, KS	353	265	(87)
Spring (Houston), TX	448	360	(88)
Ft. Worth, TX	1,655	1,565	(90)
Calumet (Chicago), IL	476	383	(93)

[59] *See* Workpaper "Consolidated Terminal Data.xlsx," Tabs "C.1.d Man T1vT2 WP" and "C.1.d. Intm T1vT2 WP."

[60] *See* Workpaper "Consolidated Terminal Data.xlsx," Tab "C.1.d Man T1vT2."

Manifest Yard	Base Plan Cars/Day	Optimized Plan Cars/Day	Difference
Oakwood (Detroit), MI	719	623	(97)
West Colton (Los Angeles), CA	1,085	982	(103)
Oliver (New Orleans), LA	467	358	(109)
Sheffield, AL	671	536	(135)
Decatur (Incl. East Decatur), IL	1,164	1,003	(161)
Proviso (Chicago), IL	1,079	882	(197)
Luther (St Louis), MO	374	88	(287)

Table 5[61]
Anticipated Intermodal Terminal Workload (+/-25)
Base Plan to Optimized Plan

Intermodal Terminal	Base Plan Lifts/Day	Optimized Plan Lifts/Day	Difference
Marion (Memphis), AR	651	1,154	503
Global 2 (Chicago), IL	1,381	1,780	399
47th St (Chicago), IL	1,269	1,464	195
Toledo Airline, OH	137	295	158
Rutherford (Harrisburg), PA	770	813	43
Landers (Chicago), IL	876	844	(32)
Harrisburg, PA	953	910	(43)
Mesquite (Dallas), TX	821	737	(84)
Global 4 (Chicago), IL	1,945	1,779	(166)
Yard Center (Chicago), IL	376	0	(376)
Rossville (Memphis), TN	503	0	(503)
63rd St (Chicago), IL	707	0	(707)

199. The increases and decreases in cars and containers processed per day in manifest yards and intermodal terminals under the Optimized Plan result from the routing changes described above in Section 4.2 as well as the yard and terminal rationalizations and changes to blocking plans described in this Section 4.3. For

[61] *See* Workpaper "Consolidated Terminal Data.xlsx," Tab "C.1.d Intm T1vT2."

example, the increase in cars processed at Chattanooga is the result of originating and terminating more trains and blocks deeper in the merged network. The increases in cars processed at Gateway Yard and North Little Rock are primarily the result of routing cars to North Little Rock for block creation, driving cars deeper into the present day NS network and removing handlings from the St. Louis gateway. The increase in cars processed at 18th Street is largely the result of the consolidating operations at North Kansas City into 18th Street. The increase in cars processed at Livonia is driven by building deeper eastbound blocking (*i.e.*, Macon) and supporting the New Orleans gateway through interchange optimization.

200. On the intermodal side, the increase in lifts per day at 47th Street Yard is largely the result of consolidating Yard Center's intermodal operations into 47th Street. Similarly, the increases at Marion and Global 2 reflect the consolidation of 63rd Street Yard into Global 2 and the rebalancing of Rossville and Marion traffic.[62] Harrisburg's reduced lift counts are offset by an increase in lift counts at Rutherford, as in the combined UP/NS network North Texas to Northeast traffic will likely be routed via Atlanta to the Northeast, reducing steel wheel and rubber tire connections in Chicago.

201. In the following subsections, we first discuss how Applicants' optimization plans will change yard and terminal operations in locations where UP and NS currently interchange traffic. We then briefly explain why Applicants'

[62] Applicants are continuing to evaluate plans for rebalancing Rossville and Marion, but for purposes of developing the Operating Plan, Applicants have assumed Rossville would be consolidated into Marion.

optimization plans change yard and terminal workloads in certain other locations identified in Tables 4 and 5. Applicants have ensured affected yards and terminals have capacity to accommodate additional activity, as discussed below in Section 7.2. Applicants' planning also has protected against detrimental impacts on other freight railroads as explained throughout the following discussion, or passenger railroads as discussed in Section 8.

4.3.1. Chicago-Area Yards and Terminals

202. Applicants' integration of UP and NS will reduce the overall level of manifest yard and intermodal terminal activity in Chicago, before accounting for merger-related traffic growth.

203. For intermodal traffic, UP/NS will shift UP's intermodal operations at Yard Center to NS's 47th Street intermodal terminal. The operational change will reduce duplicative operating expenses, create additional capacity to accommodate manifest traffic growth at Yard Center, reduce train and vehicle congestion around Dolton Tower/Yard Center, and help create surge manifest capacity in the Chicago gateway. NS's 47th Street Yard has sufficient capacity to absorb Yard Center's intermodal operations without capital improvements. UP currently interchanges some of the intermodal traffic it brings to Yard Center with CN via Markham, Illinois, and UP/NS will continue this interchange. The operational change will slightly increase freight operations (by one train pair) on Metra's Southwest line between 74th Street and 59th Street (a portion of the line owned by NS but leased to Metra and operated using retained trackage rights), but the line is double track and has ample capacity to accommodate the additional train pair.

204. UP/NS also will shift NS's intermodal operations in 63rd Street Yard to UP's Global 2. The operational change will reduce duplicative operating expenses, and Global 2 has sufficient capacity to absorb the additional operations. As a result of the change, which involves an extension of service from 63rd Street Yard to Global 2 , two additional intermodal train pairs per day will move over a small portion of UP's Geneva Subdivision that is also used by Metra, but that recently-improved triple-track segment has provided a minimum of 25 trains per day of slack capacity which will enable the route to accommodate the additional traffic. The change will also eliminate approximately 130 rubber tire interchanges per day that currently occur in the Chicago complex, which will benefit Chicago-area motorists.[63]

205. In addition, as discussed in Section 4.1, UP/NS will reduce yard activity in Chicago by routing a Southern California-Northeast intermodal train via Kansas City, Springfield, and Sidney, which will reduce eastbound traffic moving between Global 3 and Ashland Avenue and westbound traffic moving between Colehour and Global 2 and Colehour and Global 4.

206. For manifest traffic, Applicants' yards will retain their same basic functions. However, UP/NS will change the UP and NS blocking plans to reduce car handlings and allow trains to move through gateways without interchanging. As discussed above in connection with UP/NS's new North Platte-Conway train, rather than create just an Elkhart block at North Platte that is block swapped at Proviso

[63] *See* Workpaper "251120 NS-UP Interchange Summary by Gateway vShare.xlsx," Tab "RIC 63rd into G2," Cell A5.

and then interchanged at Ashland Avenue, UP/NS will also build blocks for Bellevue and Conway, which will reduce the need for switching at Elkhart. As another example, rather than deliver certain trains for BRC to build blocks at Clearing Yard for other traffic moving through Chicago on the combined UP/NS network, UP/NS will build its own efficient blocks outside the Chicago area, namely in Iowa, Wisconsin, Elkhart, Corning, and Conway, that do not require classification in Chicago.

207. UP/NS also will reduce complexity and consolidate automotive shipment distribution by shifting operations from UP's Chicago Heights automotive facility into NS's Hegewisch automotive facility, eliminating intermediate handlings between the two facilities.

208. These changes to UP's and NS's Chicago-area operations will not affect interchanges with other carriers in Chicago. Applicants plan to continue to interchange with other carriers in Chicago just as UP and NS interchange with those carriers today.

209. In particular, BRC and IHB will continue to play important roles in the Chicago area, performing local operations and handling traffic interchanged in Chicago between UP/NS and other Class I railroads. Applicants anticipate reducing intermediate switching demand by approximately 200 cars daily at the BRC as a

result of the transaction.[64] By rationalizing handling of UP/NS traffic, the UP/NS merger will increase BRC's and IHB's capacity to serve other railroads in Chicago.

4.3.2. St. Louis-Area Yards and Terminals

210. Applicants' integration of UP and NS will reduce the overall level of yard classification activity in St. Louis, before accounting for merger-related traffic growth.

211. NS's Luther Yard will be maintained as an intermodal terminal and a local manifest serving yard to ensure continuance of high levels of local service to existing NS customers in the St. Louis complex. Intermediate manifest switching performed at Luther will be transferred to A&S's Gateway Yard, allowing the cars to be blocked deeper into the NS network.

212. For manifest traffic, UP/NS will reduce overall yard activity by building blocks for eastbound traffic using A&S, which has capacity to accommodate the additional activity, rather than having A&S transfer eastbound traffic to TRRA for blocking. In addition, UP/NS will offset some of the additional work being performed by A&S by building blocks in North Little Rock and Bellevue that travel deeper into the combined network, thus reducing classification demand at A&S.

213. Finally, UP/NS will leverage latent capacity at UP's Centreville automotive facility in St. Louis to unload traffic destined to NS's Wentzville automotive facility. Balancing automotive unloading capability in the St. Louis

---

[64] *See* Workpaper "251120 NS-UP Interchange Summary by Gateway vShare.xlsx," Tab "Summary," Cell K6.

complex will enable future automotive growth and improve cycle times for empty autoracks.

214. These changes to UP/NS's St. Louis-area operations will not affect interchanges with other carriers in St. Louis. Applicants plan to continue to interchange with other carriers in St. Louis just as UP and NS interchange with those carriers today.

215. TRRA also will not be significantly affected by changes in Applicant's St. Louis-area operations. TRRA will continue to play an important role in the St. Louis area in performing local operations and handling traffic interchanged in St. Louis between UP/NS and other carriers. By rationalizing the handling of UP/NS traffic, the UP/NS merger will increase TRRA's capacity to serve other railroads in St. Louis.

4.3.3. Kansas City-Area Yards and Terminals

216. Applicants' integration of UP and NS will streamline yard activity in Kansas City.

217. For intermodal traffic, UP/NS will use UP's Kansas City Intermodal Terminal and NS's Voltz Yard primarily for separating domestic and international shipments. Additionally, Voltz will be used as an entry and exit point for traffic connecting between Southern California/West Coast and Lower Ohio Valley terminals. This will facilitate UP/NS's creation of a new intermodal route between Southern California and the Ohio Valley via Kansas City.

218. For manifest traffic, UP/NS will consolidate NS's North Kansas City Yard into UP's 18th Street Yard. UP's 18th Street Yard has sufficient capacity to

accommodate the work being done at North Kansas City. As a result, eastbound and westbound trains will no longer need to stop at North Kansas City. However, UP/NS will continue operating local trains out of North Kansas City with traffic shuttled between 18th Street Yard and North Kansas City. UP/NS will also reduce switching that currently occurs after NS delivers westbound automotive traffic to 18th Street by pre-blocking rail cars destined for Mira Loma, California, and setting them out at Voltz, where they will be picked up by originating UP's current Kansas City-Long Beach intermodal train at Voltz with the Mira Loma block.

219. Finally, Applicants will consolidate UP's Muncie automotive facility into Voltz Yard, which also has an automotive facility. Removing the need to work the Muncie automotive facility will reduce congestion on the west side of the Kansas City complex. UP/NS interchanges with CPKC, BNSF, Missouri & Northern Arkansas Railroad, and KCT will be adjusted in accordance with the terminal consolidations described above. This will reduce interchange moves and congestion in the Kansas City gateway. Applicants will continue to serve all existing interchange partners. These changes will not affect Amtrak, which moves though the Kansas City terminal on triple track controlled by KCT.

4.3.4. Memphis-Area Yards and Terminals

220. Applicants' integration of UP and NS will streamline intermodal activities in Memphis. UP/NS plan to rebalance intermodal operations between NS's Rossville Yard and UP's Marion Intermodal Terminal, which has sufficient capacity to accommodate the additional activity. UP/NS will start a second local train from

UP's Sargent Yard or a new local train from NS's yard in Sheffield to serve customers previously served by an NS local operating out of Rossville.

221. These changes to Applicants' Memphis-area operations will not affect interchanges with other carriers. Applicants plan to continue to interchange with other carriers in Memphis just as UP and NS interchange with those carriers today.

222. The changes in operations will not impact Amtrak, which interacts with UP in Memphis only at a crossing directly south of Amtrak's station. The consolidation of UP and NS operations will maintain similar frequency of freight train density through the Memphis complex.

4.3.5. New Orleans-Area Yards and Terminals

223. Applicants' integration of UP and NS will streamline activity in New Orleans and free capacity currently consumed when UP and BNSF interchange trains with NS.

224. Currently, operations in the New Orleans area can become congested as a result of interchange activities between UP and NS and BNSF and NS. UP and NS interchange four trains each day on NS's Back Belt Line. UP moves eastbound trains across the Huey P. Long Bridge and interchanges them with NS on the Back Belt near Interstate 10. NS moves westbound trains to the Back Belt and interchanges them with UP near 17th Street. BNSF and NS interchange traffic in NS's Oliver Yard. BNSF moves eastbound trains across the Huey P. Long Bridge to Oliver Yard, and BNSF crews board westbound trains in Oliver Yard and return to BNSF's terminal at Avondale.

225. The merger will free capacity on the Back Belt by reducing the quantity of interchange moves between UP, NS, and other connecting carriers. This change will improve operational fluidity on the Back Belt and over the Huey P. Long Bridge. In addition, UP/NS will shift BNSF's interchange with NS from Oliver Yard to a UP/NS-BNSF interchange at UP's Avondale Yard. This change will further improve operational fluidity in New Orleans by reducing the need for NS-BNSF interchange traffic to move over the Huey P. Long Bridge and the Black Belt.

226. These changes to UP/NS's New Orleans-area operations will not negatively affect interchanges with other carriers in New Orleans. Applicants plan to continue using Oliver Yard to support interchange operations with CN, CPKC, and NOPB, but there will be additional opportunities to streamline New Orleans-area operations by shifting NS's current interchanges with CN and CPKC through Livonia to Baton Rouge, which will further reduce congestion in New Orleans.

227. Amtrak will benefit from these changes to Applicants' operations in New Orleans. In particular, increased operational fluidity on the Back Belt will benefit Amtrak's Crescent and Mardi Gras trains when they enter and depart the Union Passenger Terminal in New Orleans. Amtrak will also benefit from planned pre-merger capital improvements on the Back Belt.

4.3.6. Other Yards and Terminals with Notable Changes

228. In addition to the terminal changes described above, Applicants expect train routing in the Optimized Plan will result in increased activity of 50 cars or more per day at three additional terminals. Chattanooga and North Little Rock will experience increased traffic as Applicants route traffic into those large hump yards

to remove connections in smaller terminals and build deeper overhead blocks across the integrated network. Livonia will see more traffic to create greater density for deeper eastbound blocking and to help support terminal consolidations in the New Orleans gateway.

229. Finally, Applicants plan to consolidate NS's operations in Des Moines, Iowa, into UP's Short Line Yard in Des Moines. Currently, NS reaches Des Moines using haulage rights over BNSF. After the merger, traffic to Des Moines-area customers served by the legacy NS will instead move over UP's lines and through UP's Short Line Yard. Local customers will continue receiving the same service they receive today.

4.3.7. Blocking Plan Changes

230. As discussed above, significant improvements in service and efficiency from optimizing UP and NS operations are created by building new blocks that travel deeper into the network of the combined railroad. Two notable additions to the many examples provide above are:

- UP/NS will improve transit time for finished automobiles moving from Georgetown, Kentucky, to Mira Loma, California, by routing the traffic to Kansas City rather than via Chattanooga and Memphis, which removes handlings at Chattanooga. This strategy also allows Applicants to build a Mira Loma block from automotive traffic originating in Kentucky, Indiana, and Missouri, removing handlings at 18th Street Yard in Kansas City. This enhancement will save approximately one handling on each of 36 daily cars.[65]
- UP/NS will enhance blocking on a manifest train operating from Elkhart to North Platte (MEKNP/39E). At Elkhart, Applicants will build a new Green River block that will be set out at Global 3 and picked up by a

[65] *See* Workpaper "Mira Loma Kansas City 112025.xlsx," Tab "ML KC," Cell J8.

different train (IG4SE) for movement to Green River, eliminating handlings at North Platte, and also a new Boone block, eliminating handlings by BRC. These new blocking plans will eliminate a classification event for 22 cars moving to Green River and eliminate a handling for 34 cars moving to Iowa in the Boone block.[66]

231. Table 6 below lists UP/NS yards that will build more blocks under the Optimized Plan, as compared to the Base Plan. Complete details of changes to blocks can be found in Electronic Appendix G.

Table 6[67]
Additional Long Distance Blocks by Yard
Base Plan to Optimized Plan

Yard	Additional Blocks
Elkhart, IN	5
Gateway Yard (St Louis), IL	5
Moorman (Bellevue), OH	3
North Little Rock, AR	3
Bellevue, OH	2
Avondale, LA	2
18th Street (Kansas City), KS	2
Beverly, IA	1

4.4. Optimized Plan – Automotive Service

232. Applicants' integration of UP and NS will allow implementation of a streamlined service that optimizes routing of loaded automotive shipments from OEMs on the legacy NS system to UP's Mira Loma auto facility in Southern California.

---

[66] *See* Workpaper "MEKNP 39E Blocks Elkhart 111925.xlsx," Tab "Summary," Cells C5 and C6.

[67] *See* Workpaper "T1_T2_T3_Block_Comparison.xlsx," Tab "Block Change by Terminal," Cells B3:B9.

233. Mira Loma auto traffic from Georgetown, Kentucky, Princeton, Indiana, Shelbyville, Kentucky, and other points on the NS system will be blocked before flowing into the Kansas City complex and connect directly to UP's current ZKCLB and IKCLB trains, which will now originate at Voltz terminal, eliminating 36 terminal handlings per day in Kansas City.[68]

234. Additionally, UP/NS will route some finished automobiles originating in Michigan and destined to Mira Loma through the IHB in Chicago to connect to UP's ZG2LC. This new routing will avoid connections in Decatur, Illinois, and Kansas City and eliminate 9 terminal handlings per day in Kansas City.

4.5. Optimized Plan – Local Train Service

235. Applicants' optimization of an integrated UP/NS system will result in changes to local train service. Applicants currently plan to continue operating local services from yards that are being consolidated into other yards, with the exception of NS's Rossville (Memphis) local that will be shifted to Sargent or operated out of Sheffield. In addition, a reduction of interchange transfer jobs between UP and NS (*e.g.*, elimination of IG3CL and MPRAH in Chicago) will reduce freight train activity at gateways, especially Chicago. Applicants will continue to look for opportunities to adjust local assignments to improve customer service as we integrate and refine our operating plans to provide transit times, service timing, and service frequency that meet customer needs and allow us to achieve the benefits of the merger.

---

[68] *See* Workpaper "Mira Loma Kansas City 112025.xlsx," Tab "ML KC," Cell J8.

5. Description of Combined Network – Growth Plan

5.1. Growth Plan – Principal Routes

236. Combining UP and NS into a unified network provides tremendous opportunities to offer existing and new customers single-line service products that deliver faster, more reliable, more efficient service than currently exists in the marketplace. As described in the Joint Verified Statement of Kenny Rocker and Ed Elkins and the Joint Verified Statement of David T. Hunt and Matthew Schabas, by offering improved service products, UP/NS is projected to attract substantial volumes of traffic currently moved by other railroads or in trucks.

237. In developing the Growth Plan, we began with the Optimized Plan and then considered additional operational changes that could drive and accommodate growth. In other words, marketing analyses identified opportunities that exist if we can provide the service, and we designed train services to realize those opportunities. In many cases, that meant adding volume to trains already in the Optimized Plan or adding train starts on existing routes. In other cases, additional growth allowed us to develop new trains that will further improve service, as we discuss below.

238. Accommodating projected growth will not fundamentally alter the principal routes currently operated by UP or NS. UP and NS will continue using their principal routes to serve customers shipping traffic within the east and the west and between eastern points and western points. However, the merged UP/NS will significantly improve the service offered over their east-west routes, which will attract traffic and thus build densities to support both new and improved services.

239. In developing the Growth Plan, we carefully considered whether UP and NS main lines, yards, and terminals have sufficient capacity to accommodate projected growth without negatively affecting service to existing customers, passenger railroads, or connections to other freight railroads. Where we determined additional capacity might be needed, we developed capital investment plans, as discussed in Part IV of the accompanying Service Assurance Plan. We reviewed these investment plans with Mr. Rocker and Mr. Elkins to ensure alignment between projected traffic growth and the ability to accommodate the growth and provide the level of service we offer the customer.

5.2. Growth Plan – Proposed Operations – Through Train Service

240. Applicants provide a full list of all trains added and removed between the Optimized Plan and the Growth Plan in Electronic Appendix L and the workpapers accompanying this Operating Plan.[69] Many of the additional trains in the Growth Plan accommodate incremental traffic volumes Applicants anticipate attracting by improving service on existing routes. Other Growth Plan trains respond to opportunities the merger creates to grow rail traffic by offering services on new routes. We briefly describe the new routes below in Sections 5.2.1 (intermodal trains) and 5.2.2 (manifest trains) and provide additional details in Appendix B.[70] Applicants anticipate implementation of additional interdivisional services in future years and

---

[69] *See* Workpaper "T1_T2_T3_Train_Comparison.xlsx," Tab "T2 to T3 Train Changes."

[70] *See* Workpaper "T2 T3 New Train Plans Final.xlsx."

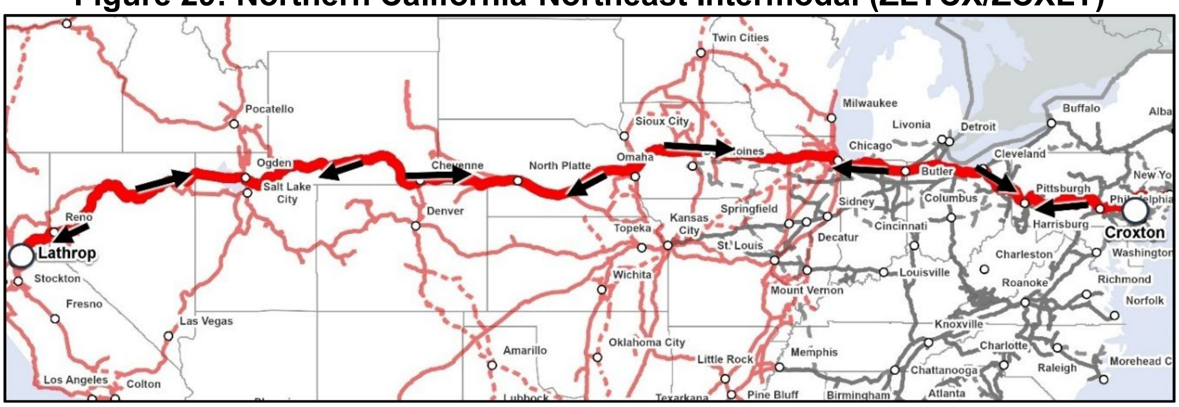
will obtain agreements to implement those services through established collective bargaining processes.

5.2.1. New Intermodal Trains

241. The combined railroad's improved service offerings are expected to induce significant new demand for long-haul intermodal service across the integrated network. Based on projected traffic flows, Applicants have designed six new intermodal train pairs to attract and accommodate this demand. These train pairs will run seven days a week carrying domestic intermodal freight across the country.

242. *Northern California-Northeast* (ZLTCX/ZCXLT). Applicants plan to route a new intermodal train pair between Lathrop, California, and Croxton, New Jersey, via Chicago. This new train responds to projected demand for a direct route between Northern California and the Northeast.

Figure 29: Northern California-Northeast Intermodal (ZLTCX/ZCXLT)

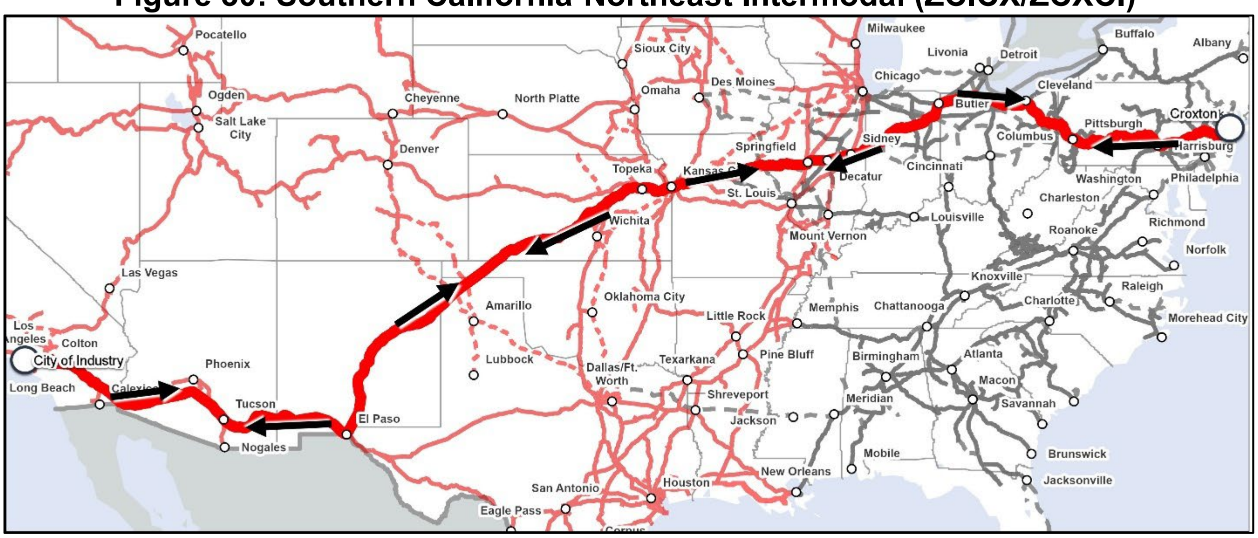


243. Eastbound, ZLTCX will depart from Lathrop and move via North Platte and Chicago to Croxton. ZLTCX has no planned work event in Chicago, only a crew change, which will help minimize congestion in the busiest freight rail hub in North America. From Chicago, the train will continue east towards Croxton, setting out

blocks at Toledo and Harrisburg. Westbound, ZCXLT will follow the same route in reverse, picking up blocks in Harrisburg, Toledo, and Colehour, and setting out blocks at Colehour and Sparks, Nevada before arriving at Lathrop.

244. *Southern California-Northeast* (ZCICX/ZCXCI). Applicants plan to route a new train pair between City of Industry (Los Angeles) and Croxton, via Kansas City, Springfield, and Sidney. This new train responds to projected increased demand for an additional efficient, direct route for traffic moving between Southern California and the Northeast.[71] This train pair replaces the ZLCCX/ZHBLC train pair introduced in the Optimized Plan as new growth opportunities from Southern California to the Northeast enable segregation of traffic moving to the Ohio Valley traffic, producing improved service levels for both groups of traffic. (See the discussion below of ZLCDT/ZDTLC.)

Figure 30: Southern California-Northeast Intermodal (ZCICX/ZCXCI)



---

[71] Applicants' Optimized Plan includes a train between LATC and the Northeast that also takes advantage of the same new route via Kansas City, Springfield, and Sidney.

245. Eastbound, ZCICX will depart from City of Industry and move via El Paso and Kansas City and then route via the legacy NS through Moberly, Decatur, Peru, Sandusky, and Conway. The train's first work event will be at Harrisburg, where it will set out Harrisburg, Bethlehem, and Morrisville traffic. After departing Harrisburg, the train will continue on to make a set-out at E-Rail before terminating at Croxton. Westbound, ZCXCI will follow the same route in reverse, departing Croxton and picking up blocks at E-Rail, Harrisburg, and Sandusky for Southern California destination terminals.

246. *Southern California-Ohio Valley/Detroit* (ZLCDT/ZDTLC). Applicants plan to route a new train pair between LATC and Livernois (Detroit) via Kansas City, Springfield, and Sidney. This new train will provide an efficient, direct route for traffic moving between Southern California and the Ohio Valley/Detroit markets.

Figure 31: Southern California-Ohio Valley/Detroit Intermodal (ZLCDT/ZDTLC)

247. Eastbound, ZLCDT will depart from LATC and move via El Paso (Santa Teresa) to Kansas City. At Santa Teresa, ZLCDT will pick up Detroit and Ohio Valley blocks and while at Voltz, ZLCDT will set out blocks for Kansas City, Norfolk, and destinations in the lower Ohio Valley, including Louisville, Cincinnati, and Columbus. ZLCDT will then continue to Detroit with blocks for Detroit and Cleveland. Westbound, ZDTLC will follow the same route in reverse, picking up LATC and Nogales blocks at Voltz then setting out the Nogales block in Tucson before terminating at LATC in Southern California.

248. *Southern California-Southeast* (ZIEJX/ZCTLB). Applicants plan to run a new train pair between Southern California and the Southeast via the Meridian Speedway. This new train pair responds to projected demand for an efficient route for traffic moving between California and Southeast markets.

Figure 32: Southern California-Southeast (ZIEJX)

Figure 33: Southeast-Southern California (ZCTLB)

249. Eastbound, ZIEJX will depart from Inland Empire and move via El Paso and Forth Worth to Shreveport. In Shreveport, the ZIEJX might be split into a second train (ZSHAT) as a result of a CPKC-imposed train-length restriction on the Meridian Speedway. The Growth Pan's ZIEJX replaces the ZLBAT introduced in the Optimized Plan. Both trains will follow identical routes via the Meridian Speedway to Birmingham and then Atlanta. At Atlanta, the trains will set out traffic bound for Greencastle, Greensboro, and Charlotte before continuing to Jacksonville. Westbound, ZCTLB will depart from Charlotte and move to Atlanta, where it will set out a block and may be split into a second train (ZATSH) also as a result of the Meridian Speedway length restriction. At Shreveport, the two trains would be recombined and continue to Southern California.

250. *Texas/Mexico-Northeast* (ZMXCX/ZCXMX). Applicants plan to route a new train pair between Port Laredo and Croxton via New Orleans. This new train responds to projected demand for an efficient route for traffic moving between Mexico and Texas and the Ohio Valley, Southeast, and Northeast.

Figure 34:Texas/Mexico-Northeast (ZMXCX/ZCXMX)

251. Eastbound, ZMXCX will depart from Port Laredo with blocks for Croxton, Atlanta, Charlotte, Columbus (Rickenbacker), and Cincinnati (Sharonville), enabling service from Mexico and Texas to the watershed markets of the Ohio Valley, the Southeast, and the Northeast. At San Antonio, the train will pick up blocks for Croxton, Atlanta, and Greencastle. At Houston, the train will pick up blocks for Greencastle, Morrisville, and Charlotte before continuing to Atlanta, where it will set out blocks destined to the Southeast and Ohio Valley and pick up blocks destined to the Northeast. From Atlanta, ZMXCX will continue north, setting out and picking up traffic at Greencastle and Rutherford before terminating at Croxton. Westbound, the

ZCXMX will follow the same route in reverse, picking up and setting out traffic along the way.

252. *Houston-Atlanta* (ZHOAT/ZATHO). Applicants plan to run a new train pair between Houston and Atlanta via New Orleans. This new train responds to projected demand for an efficient route between Houston, on the one hand, and the Southern Ohio Valley, the Southeast, and the Northeast, on the other hand. The ZHOAT/ZATHO train pair will also help to offset projected demand that would have operated on the ZCXMX/ZMXCX train pair.

Figure 35: Houston-Atlanta (ZHOAT/ZATHO)

253. Eastbound, ZHOAT will depart from Houston for Atlanta with blocks for destinations in the Southern Ohio Valley, Southeast, and Northeast. In Atlanta, the Northeast blocks will picked up by ZMXCX, while blocks to serve the watershed markets of the Southern Ohio Valley will leverage current Atlanta originating train capacity. Westbound, ZATHO will carry traffic from the Northeast to Houston that

arrives in Atlanta on the ZCXMX, as well as traffic from the Southern Ohio Valley and Southeast to Houston that arrives in Atlanta on other trains.

5.2.2. New Manifest Trains

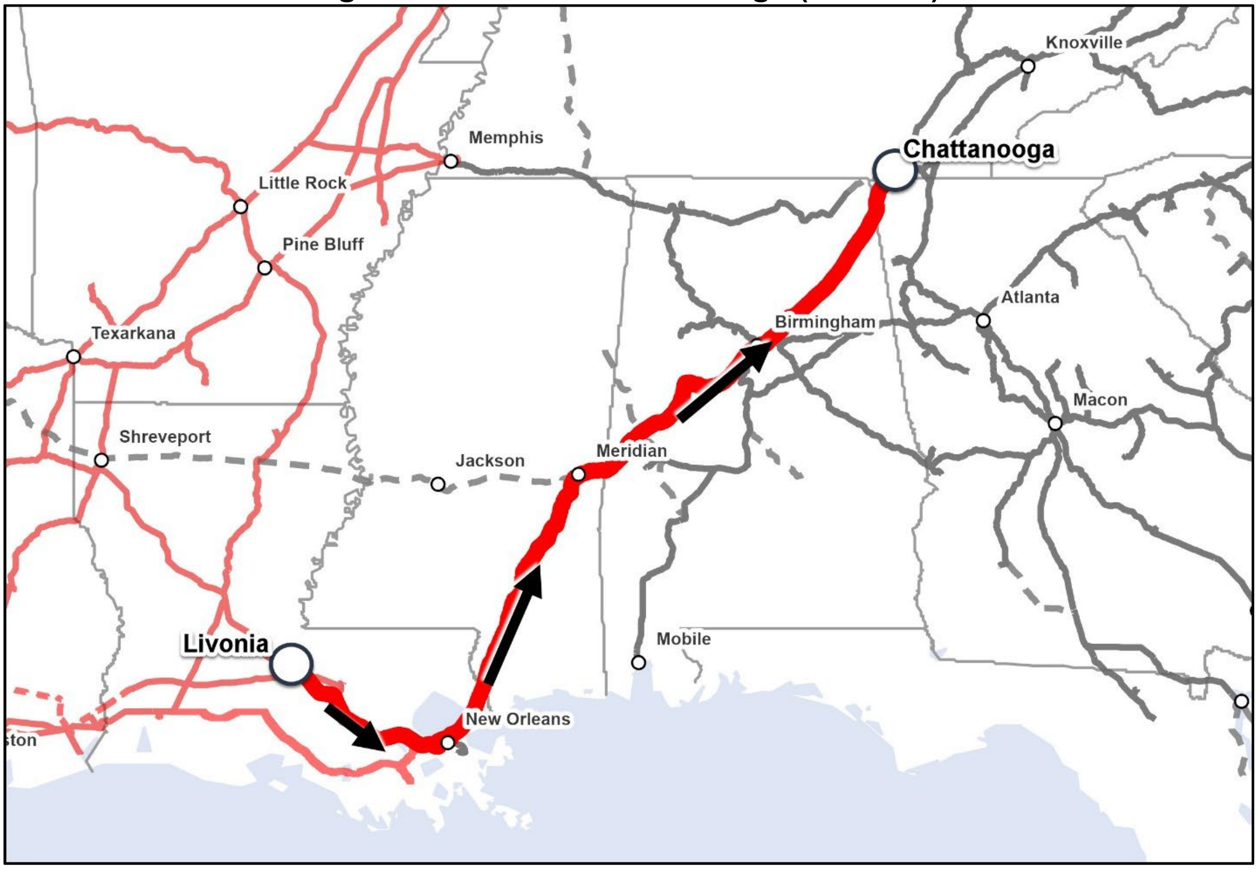
254. Applicants project their service offerings will produce manifest traffic growth throughout their combined network. To adequately serve this growth while delivering high-quality service for existing customers, Applicants plan to add six new trains, including two train pairs, that will move traffic between locations on legacy UP and legacy NS, and twelve new trains that will operate within the current footprint of either UP or NS.[72] Below, we briefly describe the six new trains that combining UP and NS will directly enable.

255. *Livonia-Chattanooga* (MLINSC). To accommodate projected growth in manifest traffic moving from the Gulf Coast to the Ohio Valley and Northeast, Applicants plan to add an incremental train from Livonia to Chattanooga seven days a week. The train will pick up and set out traffic at New Orleans, set out traffic at Meridian, and terminate at Chattanooga, where the remaining traffic will be classified and dispersed on trains heading to the Ohio Valley, Northeast, and other locations on the NS network.

---

[72] Two of the 12 new trains operating inside the legacy UP or legacy NS system will replace existing trains, producing a net increase of 16 new manifest trains.

Figure 36: Livonia-Chattanooga (MLINSC)



256. *Elkhart-Boone* (MEKBO/MNPEK). In the Growth Plan, the current train running from Elkhart to North Platte will be oversubscribed. To improve the routing of traffic from the NS network destined for Iowa and traffic from Iowa heading east, and to reduce handlings in Chicago, Applicants plan to add a westbound train launching from Elkhart to Boone that will be paired with an incremental train running from North Platte to Elkhart. Traffic destined to points further east will continue to operate on a train from North Platte to Conway (MNPCW), while traffic destined to further points west will continue to be carried on the Elkhart to North Platte train.

Figure 37: Elkhart-Boone (MEKBO)

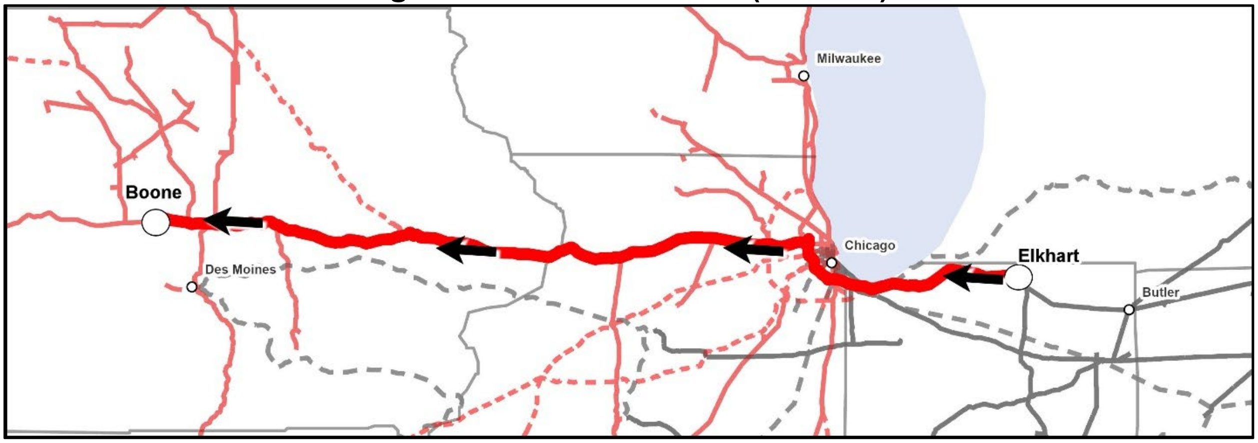
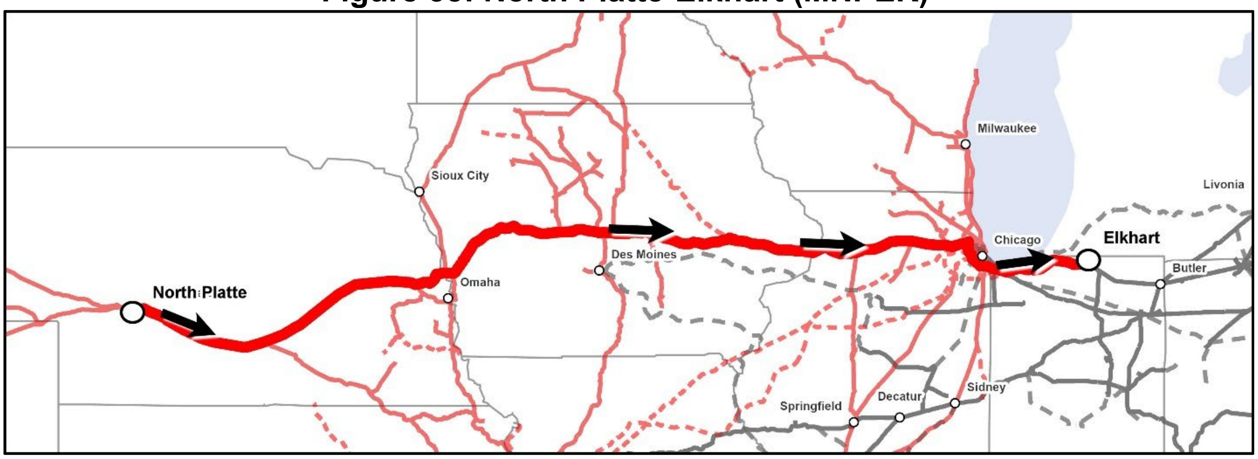
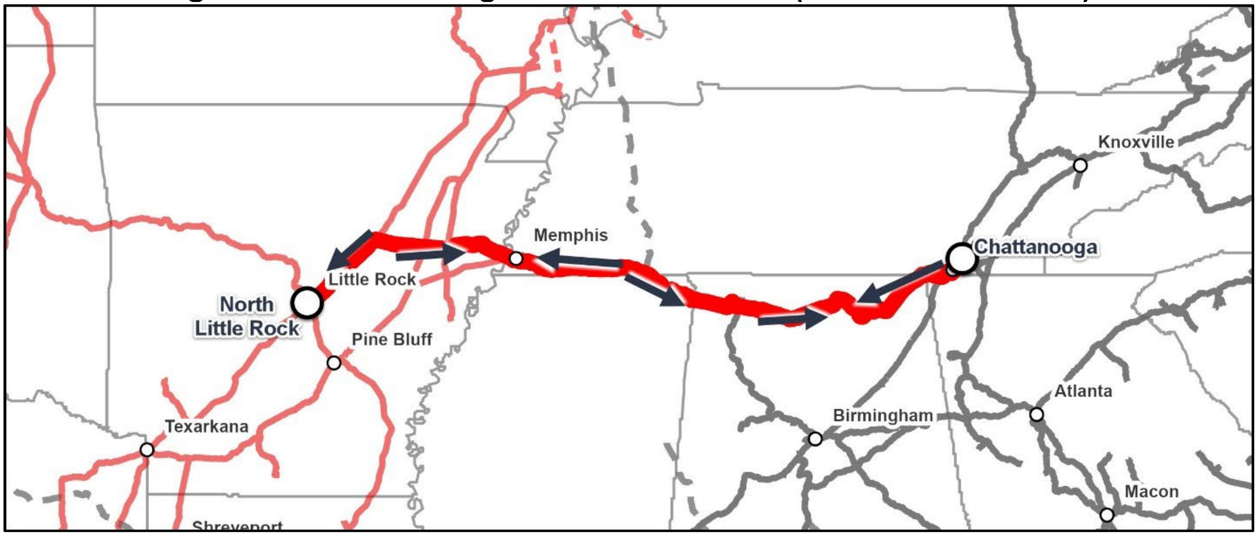


Figure 38: North Platte-Elkhart (MNPEK)



257. *Chattanooga-North Little Rock* (MNLCTB/MCTNLB). To accommodate growth in traffic traveling across the southeast, Applicants plan to add a new manifest train pair running between Chattanooga and North Little Rock.

Figure 39: Chattanooga-North Little Rock (MNLCTB/MCTNLB)



258. *Birmingham-Englewood* (MBHEW). To accommodate increased demand for traffic originating in the East and destined to the Texas Gulf Coast via Houston, Applicants plan to add a train running between Birmingham and Englewood yard via the New Orleans gateway. All traffic on the train will be destined for points in Texas and the Gulf Coast.

Figure 40: Birmingham-Englewood (MBHEW)

5.3. Growth Plan – Proposed Operations – Local Train Service

259. Applicants have no specific plans to change local train services as part of their Growth Plan. However, Applicants will look for opportunities to adjust local assignments to achieve further improvements in service to customers and additional efficiencies in operations as the two railroads integrate and refine their plans in light of customer demand. The proposed transaction will remove barriers that currently limit local capacity and efficiency. This in turn will allow the combined UP/NS to capitalize on opportunities to capture watershed traffic by maintaining or improving existing service levels while handling expanded traffic volumes.

5.4. Growth Plan – Yard and Terminal Activity Changes

260. Applicants have no specific plans to fundamentally alter yard and terminal operations as part of their Growth Plan. However, Applicants will look for opportunities to rationalize yard functions to achieve further improvements in service to customers and additional efficiencies in operations as the two railroads integrate and refine their plans in light of customer demand.

261. In addition, as discussed in Section IV.B.2.a of the Service Assurance Plan, Applicants plan to expand the capacity of certain intermodal terminals to accommodate projected increases in demand. Tables 7 and 8 below show yards and terminals with more than 300 handlings per day that have an increase in activity greater than 20 percent between the Base Plan and the Growth Plan. All yards and terminals experiencing a projected increase in activity over 20 percent are reported in Electronic Appendices Q and R and in the workpapers accompanying this Operating Plan.[73]

---

[73] *See* Workpaper "Consolidated Terminal Data.xlsx," Tabs "Manifest Growth ALL" and "Intermodal Growth ALL."

Table 7[74]
Anticipated Manifest Yard Workload (+20%)
Base Plan to Growth Plan (>300 Cars/Day in Growth Plan)

Yard	Base Plan Cars/Day	Growth Plan Cars/Day	Difference	% Difference
DeButts (Chattanooga), TN	1,671	2,244	573	34%
Livonia, LA	1,813	2,311	499	28%
Birmingham, AL	1,651	2,030	378	23%
Decatur (Incl. East Decatur), IL	1,164	1,493	329	28%
18th St (Kansas City), KS	705	929	224	32%
Toledo Airline, OH	183	373	190	104%
Sevier (Knoxville), TN	288	475	187	65%
Clinton, IA	174	328	154	88%
Abrams (Philadelphia), PA	378	500	122	32%
Savannah, GA	349	447	98	28%
Boone, IA	378	468	90	24%
Louisville, KY	354	431	77	22%
Allentown, PA	331	401	69	21%
Marshalltown, IA	270	329	59	22%

[74] *See* Workpaper "Consolidated Terminal Data.xlsx," Tabs "C.1.e Man Growth."

Table 8[75]
Anticipated Intermodal Terminal Workload (+20%)
Base Plan to Growth Plan (>300 Lifts/Day in Growth Plan)

Yard	Base Plan Lifts/Day	Growth Plan Lifts/Day	Difference	% Difference
IEIT (Los Angeles), CA	209	1,043	835	400%
Settegast (Houston), TX	293	877	584	199%
Croxton (New York City), NJ	839	1,405	566	67%
Lathrop, CA	745	1,294	549	74%
Toledo Airline, OH	137	624	487	357%
Marion (Memphis), AR	651	1,131	480	74%
Charlotte, NC	538	947	409	76%
LATC (Los Angeles), CA	492	866	374	76%
Global 2 (Chicago), IL	1,381	1,752	371	27%
Sharonville (Cincinnati), OH	165	534	369	223%
Port Laredo, TX	299	638	340	114%
Livernois (Detroit), MI	268	601	333	125%
Ayer, MA	107	402	295	275%
Austell (Atlanta), GA	1,237	1,531	294	24%
Council Bluffs, IA	163	430	267	163%
Maple Heights (Cleveland), OH	301	526	224	74%
Rickenbacker (Columbus), OH	704	901	197	28%
Morrisville (Philadelphia), PA	327	514	187	57%
Appliance Park (Louisville), KY	227	398	171	75%
Inman (Atlanta), GA	729	886	158	22%
SAIT (San Antonio), TX	198	346	148	74%
City of Industry (Los Angeles), CA	683	825	142	21%
TACSIM (Tacoma), WA	271	390	119	44%

5.4.1. Impact on Other Railroads and Ports

262. Applicants' Growth Plan will not affect interchanges with other carriers beyond the changes described in connection with the Optimized Plan. As discussed in connection with the Optimized Plan, the combination of UP and NS will make

[75] *See* Workpaper "Consolidated Terminal Data.xlsx," Tabs "C.1.e Intm Growth."

interchanges with other carriers, including both Class I railroads and short lines, more efficient overall by optimizing operations at existing gateways, particularly Chicago, St. Louis, and New Orleans.

263. Applicants' plans do not include any operational changes to connections with UP's and NS's many current short line partners, other than the connections in Chicago and St. Louis discussed above in Section 4.3. UP and NS highly value their relationships with short line partners. A substantial share of UP and NS manifest traffic originates and terminates on short lines. The merged UP/NS will look for opportunities to develop even more efficient connections with short lines to take advantage of the many opportunities created by the merger to attract new business to rail.

264. Applicants' plans do not include any operational changes to connections with the many ports served by UP and NS. Applicants project that their combination will increase traffic moving to ports as businesses take advantage of single-line service improvements and efficiencies to become more competitive in international markets.

6. Impacts on Traffic Density and Mix

6.1. Impacts on Traffic Density

265. As discussed in connection with the Optimized Plan, the merger will allow UP/NS to handle the same traffic levels as the two railroads handled before using fewer, more efficient trains than UP and NS use today. As the combined carrier attracts new business, it will add new train services to support growth. The pro forma density charts contained in Electronic Appendices S and T and the workpapers

accompanying this Operating Plan show the projected change in traffic density on the network between the Base Plan, the Optimized Plan, and the Growth Plan.[76] In addition, Electronic Appendices U and V show the projected changes in train counts between Base Plan, Optimized Plan, and Growth Plan.[77]

6.2. Impact on Traffic Mix

266. The merger is not projected to significantly change the traffic mix carried by UP and NS when comparing the Base Plan to the Growth Plan.

6.2.1. Manifest

267. Manifest traffic is projected to comprise approximately 41 percent of carloads handled by the combined UP/NS, compared with 42 percent of total carloads for the pre-merger UP and NS.[78]

6.2.2. Intermodal

268. Intermodal traffic is projected to comprise approximately 37 percent of carloads handled by the combined UP/NS, compared with 34 percent of total carloads for the pre-merger UP and NS.[79]

---

[76] *See* Workpaper "Line Segment Tables from Model vF.xlsx," Tabs "UP Tonnage Change" and "NS Tonnage Change."

[77] *See* Workpaper "Line Segment Tables from Model vF.xlsx," Tabs "UP Train Change" and "NS Train Change."

[78] *See* Workpaper "20251124_Market share calculations.xlsx," Tab "Summary of UPNS Traffic," Cells B50:E50.

[79] *See id.*, Cells B48:E48.

6.2.3. Bulk

269. Bulk traffic is projected to comprise approximately 22 percent of carloads handled by the combined UP/NS, compared with 24 percent of total carloads for the pre-merger UP and NS.[80]

7. Capacity Needs of the UP/NS System

270. Applicants anticipate that the combined railroad will invest in main line, yard, and terminal capacity to accommodate the substantial traffic growth projected to result from the merger and to deliver on the improved service levels described in this Operating Plan. Applicants evaluated existing capacity on the main lines and in the yards and terminals expected to experience significant merger-related increases in activity to (1) ensure sufficient capacity presently exists to implement operating changes that will optimize current traffic flows, and (2) develop a capital improvement plan for timely funding of capacity improvements to accommodate projected growth. Applicants provide a more detailed description of their identification of potential infrastructure impediments and the solutions they have formulated in the Service Assurance Plan.

271. Applicants provide an overview of the capacity planning process below because operating plan design and capacity planning go hand-in-hand: operating plans must account for capacity constraints and plans to increase capacity. In total, Applicants' plan includes investment of approximately $1,023 million to increase

[80] *See id.*, Cells B49:E49.

capacity and make other improvements on main lines and in yards and terminals to integrate UP and NS operations.[81]

272. Applicants have engaged in a careful, thorough, analytical process in developing the Operating Plan and the capital improvement plan within the Service Assurance Plan. They recognize, however, that the plans provided in this Application reflect results of modeling activities intended in substantial part to satisfy regulatory standards that require projecting future operations using data from the past. Applicants are fully aware that traffic patterns fluctuate and change over time, driven by changes in market supply and demand conditions that can be unpredictable. Traffic growth will not necessarily occur in the amounts or locations where it is now expected. Applicants recognize the combined railroad's actual investment needs may prove to be greater or less or otherwise different than the results of their modeling show. In everyday operations, Applicants face similar challenges in planning for an uncertain future. They must engage in long-term planning, so they do not set their capacity investment plans in stone, but rather

[81] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cells H80 and H81. Applicants' capital investment plans discussed here and in the "Infrastructure Improvements" section of their Service Assurance Plan reflect Applicants' current plans based on traffic levels and flows projected in their Application. The combined railroad's plans may change as circumstances change. UP/NS actual investments may be lower than planned if market conditions shift and overall traffic volumes decline, or if shifts in supply and demand patterns allow the combined railroad to route traffic using main lines, yards, and terminals that have excess capacity, or if productivity improvements or changes in technology allow UP/NS to accommodate more traffic with a lower level of investment or different investments. The combined railroad's actual investments may be higher than planned if market conditions or supply and demand conditions shift in the opposite direction.

develop plans that can be calibrated and adapted to meet demand. For example, UP engages in a robust, cross-functional business planning process at least twice each year to review and revise its forecasts and thus its plans for hiring, locomotive and freight car purchases, investment in terminal and line of road capacity, and more. Applicants' plans in this proceeding show how they would address the traffic they modeled, but Applicants expect that the combined railroad will invest the capital required to meet the demand created by the new single-line services created following the merger.

7.1. Main Line Capacity

273. Applicants systematically evaluated whether UP and NS main lines currently have sufficient capacity to accommodate projected traffic levels. They then developed plans as necessary to address capacity shortfalls.

274. Applicants' analyses show the Optimized Plan will not significantly change train counts on UP or NS main lines, and the main lines on which train counts would increase could readily accommodate the increase.[82]

275. To accommodate projected merger-related traffic growth reflected in the Growth Plan, Applicants anticipate that the combined railroad will invest approximately $507 million on main lines where train counts are projected to increase.[83]

---

[82] *See* Workpaper "UP Line-Of-Road Volume-Capacity Summary.xlsx"; Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx."

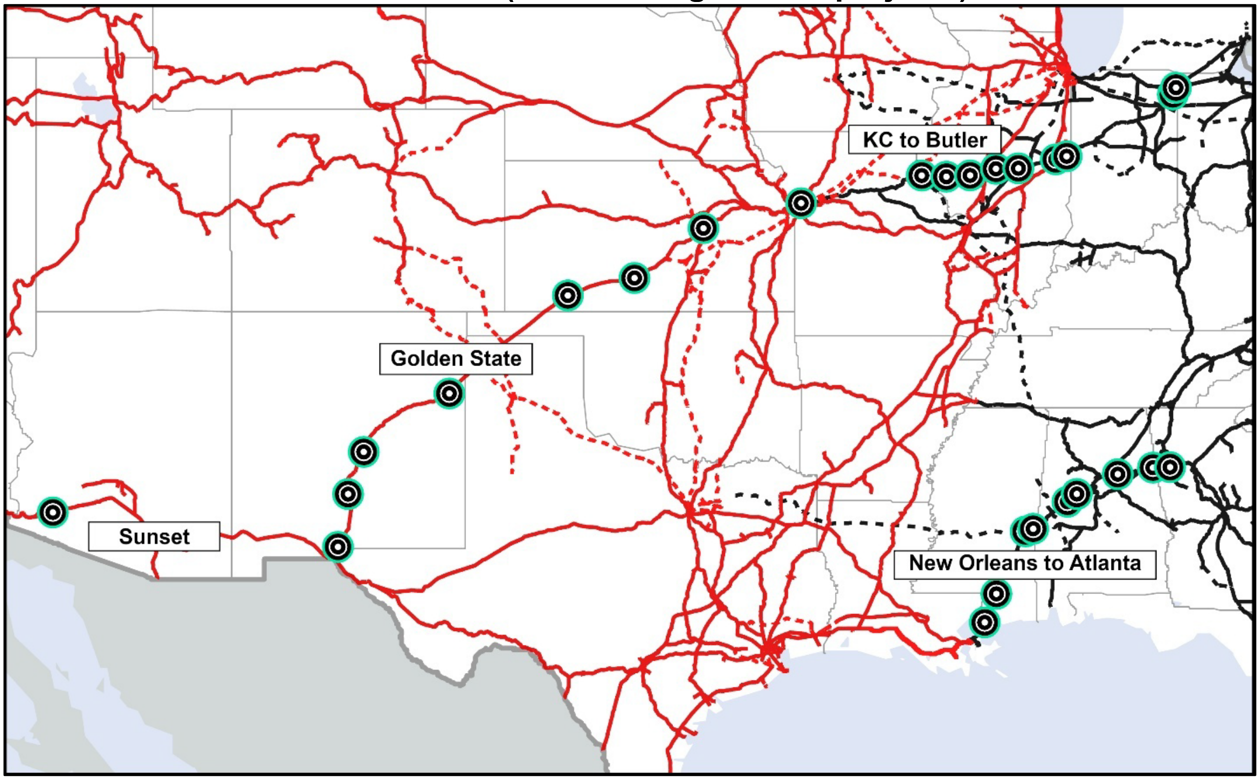
[83] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H83.

276. Where Applicants project merger-related traffic growth will produce train counts in excess of a line's current capacity, Applicants have plans in place for the combined railroad to increase capacity ahead of projected traffic growth. In some instances, Applicants recognized UP or NS had made pre-merger commitments to projects that would close or begin closing the capacity gap. Those investments are not included in the capital investment figure submitted in this Application. Where Applicants' operating plan anticipates increasing train lengths to make operations more efficient, Applicants developed investment plans for lines requiring additional capacity to accommodate the longer trains. These investments are included in the capital investment figure submitted with the Application. In all instances, Applicants identified the additional infrastructure required to ensure the lines will continue to operate fluidly.[84]

277. The locations of anticipated merger-related investments in main line capacity are shown below in Figure 41.

[84] *See* Workpaper "UP Capacity Investment Summary.xlsx"; Workpaper "NS Infrastructure Planned Table.xlsx," Tab "Line Capacity Projects."

Figure 41: Locations of Planned Investments on Main Lines (excludes signal/PTC projects)



278. Additional information regarding anticipated investments to increase main line capacity are provided below in Table 9.

Table 9[85]
Planned Investments on Main Lines (2023 dollars)

Location	Project	Investment ($000's)
Sunset: Mohawk – Stovall	Second mainline	34,102
Golden State: Otero	Siding extension	11,241
Golden State: Missler	Siding extension	18,870
Golden State: Herington yard bypass	Yard bypass	19,696
Golden State: Pratt	Siding extension	13,278
Golden State: Mater	Siding extension	10,142
Golden State: Newman	Siding extension	8,302
Golden State: Tecolote	Siding extension	11,177

85 *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cells H16:H23, H32:H55, and H63:H64.

Location	Project	Investment ($000's)
Kansas City to Butler: UP connection to West MC (Voltz)	Connection	6,766
Kansas City to Butler: PTC Installation WB to Bluffs	PTC	19,460
Kansas City to Butler: Hannibal bridge speed upgrade	Bridge, Track	2,420
Kansas City to Butler: Griggsville	Siding extension	11,626
Kansas City to Butler: Hannel	Siding extension	10,577
Kansas City to Butler: Dawson	Siding extension	10,103
Kansas City to Butler: Decatur	Second mainline	11,908
Kansas City to Butler: CP Brush Phase II	Track	16,889
Kansas City to Butler: Vance	Siding extension	15,770
Kansas City to Butler: Eldon to Ross Lane (Tilton yard)	CTC	4,195
Kansas City to Butler: Tilton	Crossover	6,020
Kansas City to Butler: Coburn	Siding extension	16,314
Kansas City to Butler: CP-358	Crossover	4,598
New Orleans to Atlanta: Pearl River	Siding extension	19,440
New Orleans to Atlanta: Lumberton	Siding extension	22,001
New Orleans to Atlanta: North End Meridian	Second mainline	28,616
New Orleans to Atlanta: Toomsuba	Siding extension	23,322
New Orleans to Atlanta: Moundville	Siding extension	20,711
New Orleans to Atlanta: Fleming	Siding extension	15,982
New Orleans to Atlanta: Holt	Siding extension	17,726
New Orleans to Atlanta: Foster	Siding extension	13,128
New Orleans to Atlanta: Taylor	Siding extension	11,414
Cleveland to Conway	Signal	34,283
Conway to Harrisburg	Signal	37,308
	Total	**$507,385**

279. Applicants discuss their specific plans for investing in main line capacity in more detail in the Infrastructure Improvements section of the Service Assurance Plan (Section IV.B.1).

7.2. Yard and Terminal Capacity

280. Applicants also systematically evaluated whether projected yard and terminal activity levels would increase beyond the current capacity of their yards and

terminals.[86] They then developed plans as necessary to address capacity shortfalls either by investment to increase capacity or modification of transportation plans as new traffic materializes.

281. The Optimized Plan will result in additional activity at 46 manifest yards, six of which will see activity increase by more than 25 cars per day: Chattanooga, 18th Street (Kansas City), Toledo Airline, Livonia, and Sevier (Knoxville).[87] Five intermodal terminals will see activity increases of more than 25 lifts per day: Marion, Global 2, 47th Street (Chicago), Toledo Airline, and Rutherford (Pennsylvania).[88] And there will be additional activity at three automotive terminals: Hegewisch (Chicago), Centreville (St. Louis), and Voltz (Kanas City).[89] No merger-related investments will be needed to accommodate the additional yard and terminal activity reflected in the Optimized Plan. NS's Shelbyville, Kentucky, automotive

[86] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx"; Workpaper "NS Manifest Yard Capacity Calculations.xlsx"; Workpaper "NS IM Auto Terminal Capacity Calculations.xlsx."

[87] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Manifest"; Workpaper "NS Terminal Volume Review.xlsx," Tab "Manifest."

[88] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Intermodal"; Workpaper "NS Terminal Volume Review.xlsx," Tab "Intermodal."

[89] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Auto"; Workpaper "NS Terminal Volume Review.xlsx," Tab "Auto."

facility is projected to experience activity levels above its current capacity, but NS has a pre-merger plan in place to expand capacity at Shelbyville.[90]

282. To accommodate projected merger-related growth reflected in the Growth Plan, Applicants anticipate that the combined railroad will invest approximately $516 million to expand yard and terminal capacity where the projected activity levels exceed existing capacity.[91]

283. Where Applicants project merger-related growth will create capacity demands in a yard or terminal that exceeds the facility's current capacity, Applicants have a plan in place for the combined railroad to address the issue ahead of projected traffic growth. In some instances, Applicants recognized UP or NS had made pre-merger commitments to investments that would close or narrow the capacity gap. Those investments are not included in the capital investment figure submitted in this Application. In other instances, Applicants recognized that projected capacity shortfalls could be addressed through changes to operating plans. In all instances, Applicants identified the additional infrastructure or plan changes required to ensure that yard and terminal facilities will continue operating fluidly.

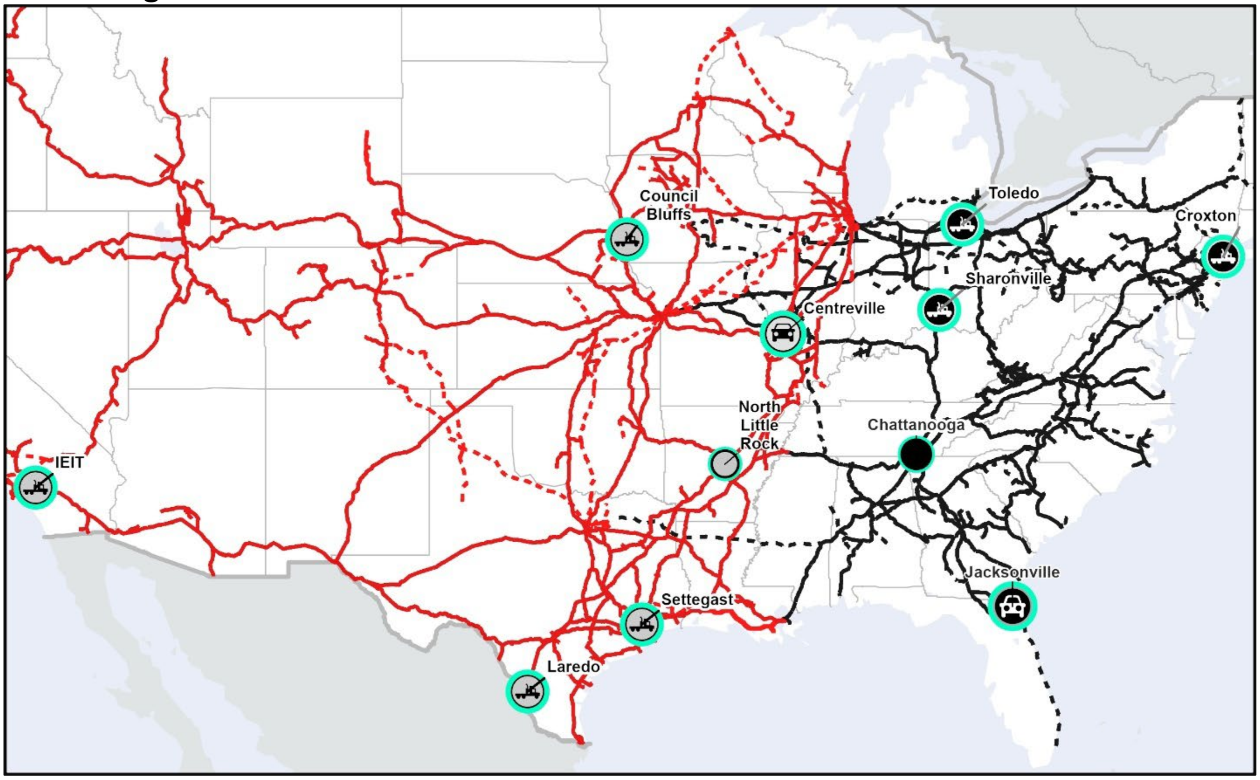
284. Locations of anticipated merger-related investments in yard and terminal capacity are shown below in Figure 42.

---

[90] *See* Workpaper "NS IM Auto Terminal Capacity Calculations.xlsx," Tab "Automotive Terminal Inputs," Row 24.

[91] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cells H87:H88.

Figure 42: Location of Planned Investments in Yards and Terminals



285. Additional details regarding anticipated merger-related investments in yard and terminal capacity are provided below in Table 10.

Table 10[92]
Planned Investment in Yards and Terminals (2023 dollars)

Project	Facility Type	Location	Investment ($000's)
North Little Rock Yard Expansion	Manifest	Little Rock, AR	30,441
Settegast Yard Expansion	Intermodal	Houston, TX	102,467
Council Bluffs Yard (Greenfield)	Intermodal	Council Bluffs, IA	75,419
Port Laredo Yard	Intermodal	Laredo, TX	63,691
Inland Empire Intermodal Terminal ("IEIT") Yard Expansion	Intermodal	Colton, CA	58,059
Lift Equipment (UP and NS yards)	Intermodal	Various	70,027
Ramp Equipment (UP and NS yards)	Autos	Various	2,521
Centreville Yard Expansion	Autos	Centreville, IL	2,116
Croxton Yard Expansion	Intermodal	Croxton, NJ	7,361
Sharonville Yard Expansion	Intermodal	Sharonville, PA	26,216
Toledo Parking Expansion	Intermodal	Toledo, OH	36,299
Jacksonville Yard Expansion	Auto	Jacksonville, FL	24,300
Chattanooga Yard Expansion	Manifest	Chattanooga, TN	17,141
		Total	**516,059**

286. Applicants discuss their specific plans for investing in yard and terminal capacity in more detail in the Infrastructure Improvements section of the Service Assurance Plan (Section D.1.d.).

287. Below, Applicants discuss the yards and terminals for which they anticipate that the projected demand for capacity reflected in the Growth Plan would be resolved through means other than additional investment in capacity.

7.2.1. Intermodal and automotive terminal capacity

288. In a handful of locations, Applicants' Growth Plan projects activity levels at intermodal and automotive terminals that are slightly above the calculated

92 *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cells H24:H31 and H56:H62.

capacities of those facilities. In those instances, Applicants have identified solutions that do not require additional infrastructure, though these plans could change as conditions change.

289. *Brooklyn (Portland, Oregon).* UP/NS would likely address the projected capacity shortfall (approximately 13 lifts per day) by reducing block swaps at Brooklyn. UP/NS could accomplish this by creating an overhead train with blocks of traffic destined to Chicago, Kansas City, and the Midwest.

290. *TCIT (Minneapolis, Minnesota).* UP/NS would likely address the projected capacity shortfall (approximately 20 lifts per day) by engaging with customers to minimize container dwell. UP/NS could also explore off-site parking solutions.

291. *Tacsim (Tacoma, Washington).* UP/NS would likely address the projected capacity shortfall (approximately 5 lifts per day) by engaging with the facility owner to increase terminal operating hours.

292. In addition, NS has several idled intermodal terminals that UP/NS will begin using for intermodal service, as follows.

293. *McCalla (Birmingham, Alabama).* McCalla currently supports only automotive distribution, having idled intermodal operations several years ago. To accommodate merger-related intermodal growth, Applicants anticipate that UP/NS will reintroduce intermodal service at McCalla. Applicants expect that UP/NS will collocate intermodal and automotive operations at the ramp without requiring

additional capital investment. Reintroducing intermodal operations at McCalla will provide 78,000 annual lifts of capacity, exceeding projected post-merger demand.

294. *E-Rail (Elizabeth, New Jersey).* E-Rail is a currently idle intermodal terminal. To support merger-related growth in the New York/New Jersey market, Applicants anticipate that the combined railroad will reintroduce intermodal service at E-Rail in the Growth Plan. While UP/NS will undertake necessary terminal maintenance and crane procurement to restart operations,[93] Applicants do not anticipate that the combined railroad will make additional capital investments in E-Rail. The terminal's existing infrastructure provides an annual capacity of 174,000 lifts, which is more than sufficient to meet projected post-merger demand.

295. *Greencastle (Pennsylvania).* The NS intermodal terminal in Greencastle, Pennsylvania, is currently idle. To support merger-related growth in the Eastern Pennsylvania market, Applicants anticipate that the combined railroad will reintroduce intermodal service at Greencastle in the Growth Plan. While UP/NS will undertake necessary terminal maintenance and crane procurement to restart operations, Applicants do not anticipate that the combined railroad will make additional capital investments in Greencastle.[94] The terminal's existing infrastructure provides an annual capacity of 133,000 lifts, which is more than sufficient to meet projected post-merger demand.

---

[93] *See* Workpaper "NS Crane Capacity Calculations.xlsx," Tab" Intermodal Crane Inputs," Row 21.

[94] *See id.*, Row 19.

7.2.2. Manifest Yard Capacity

296. In a number of cases across the expansive networks of UP and NS, Applicants' Growth Plan projects activity levels at manifest terminals that are above the calculated capacities of those facilities, but where a solution would not involve additional infrastructure, though these plans could change as conditions change.

297. *Alfalfa (El Paso, Texas).* UP/NS would likely address the projected capacity shortfall (28 cars/day) by using excess capacity at Dallas Yard, where activity is projected to decrease below pre-merger levels. UP/NS could also use Davidson Yard to build blocks that overhead Alfalfa.

298. *Coady (Baytown, Texas).* UP/NS would likely have sufficient capacity to absorb the projected capacity shortfall (3 cars/day) without altering its operations, but it could also address the shortfall by using excess capacity created by a UP pre-merger project at Robinson Yard in Dayton, which is described in Section IV.B.2 of the Service Assurance Plan.

299. *Boone (Iowa).* UP/NS would likely have sufficient capacity to absorb the projected capacity shortfall (8 cars/day) without altering its operations, but it could also address the shortfall by running an intermodal train directly from Chicago to East Minneapolis to avoid a block swap that consumes capacity in Boone.

300. *Elkhart (Indiana).* UP/NS would likely address the projected capacity shortfall that remains after completion of a pre-merger investment project described in Section IV.B.2 of the Service Assurance Plan (127 cars/day) by developing Yard Center blocks at Bellevue and Conway Yards and operating a train from Bellevue directly to Yard Center.

301. *Gateway Yard (A&S) (E. St. Louis, Illinois).* UP/NS would likely address the projected capacity shortfall that remains after completion of a pre-merger investment project described in Section IV.B.2 of the Service Assurance Plan (20 cars/day) by setting out Chicago-bound and CSX interchange blocks at Dupo Yard before they reach Gateway Yard so they can overhead Gateway Yard.

302. *Lake Charles (Louisiana).* UP/NS would likely address the projected capacity shortfall (24 cars/day) by using excess capacity created by a UP pre-merger project at Frances Yard in Orange, Texas, as described in Section IV.B.2 of the Service Assurance Plan.

303. *Livonia (Louisiana).* UP/NS would likely address the projected capacity shortfall that remains after completion of a pre-merger investment project described in Section IV.B.2 of the Service Assurance Plan (271 cars/day) by using excess capacity at nearby yards in Alexandria and Addis. UP/NS could use Alexandria and Addis to build northbound blocks for North Little Rock, Conway, Bellevue, and other traffic so they can overhead Livonia.

304. *North Little Rock (Arkansas).* UP/NS would likely address the projected capacity shortfall that remains after completion of a merger-related investment project described in Section IV.B.2 of the Service Assurance Plan (322 cars/day) by using excess capacity at Pine Bluff Yard. Specifically, UP/NS would reintroduce southbound blocking operations at Pine Bluff for traffic heading to Texas, Mexico, and the Gulf Coast to alleviate pressure on North Little Rock. Pine Bluff and NS's yard in Sheffield, Alabama, would have sufficient capacity combined to absorb the

North Little Rock traffic without compromising existing capacity thresholds at either terminal.

305. *South St. Paul (Minnesota).* UP/NS would likely address the projected capacity shortfall (12 cars/day) by running a train directly from Chicago to East Minneapolis intermodal terminal to avoid a block swap that consumes capacity in South St. Paul.

306. *18th St. Yard (Kansas City, Kansas).* UP/NS would likely address the projected capacity shortfall (59 cars/day) by using idled capacity at the nearby Neff or North Kansas City facilities, each of which could independently absorb the additional traffic.

8. Impacts on Passenger Operations

307. The UP/NS merger will not result in any adverse impact to passenger operations. Where Applicants host passenger operations on lines expected to experience merger-related traffic growth, Applicants have ensured the lines will have sufficient capacity to abide by their contractual commitments and legal obligations to passenger carriers.

308. In the sections below, Applicants systematically review passenger operations they host and explain why the merger will not harm those operations. In the Service Assurance Plan, Applicants explain how they will continue to facilitate those operations so as to fulfill their existing performance agreements, and how their established operating protocols will ensure effective communications to minimize any potential transaction-related negative impacts.

8.1. Amtrak Operations

309. UP and NS host Amtrak trains under agreements entered pursuant to 49 U.S.C. § 24308(a) and statutes providing Amtrak preference over freight transportation in using a rail line, junction or crossing, *see* 49 U.S.C. § 24308(c).

8.1.1. Amtrak Operations on UP lines

8.1.1.1. California Zephyr

310. Amtrak's California Zephyr service operates a daily train in each direction between Chicago, and San Francisco. UP hosts these trains for 1,377 miles between Denver and Emeryville, California.

311. Merger Impact: UP/NS plan to add one train pair to the Zephyr's route between Sacramento, and Alazon, Nevada, as part of a new intermodal service between Northern California and the Northeast. UP's line between Sacramento and Alazon has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[95]

8.1.1.2. Capitol Corridor

312. Amtrak's Capitol Corridor service is a state-supported service sponsored by the California Department of Transportation ("CalTrans") and overseen by the Capitol Corridor Joint Powers Authority ("CCJPA") that operates 28 daily trains in each direction between San Jose, and Auburn, California. UP hosts these trains for 161 miles between Santa Clara and Auburn.

---

[95] *See* Workpaper "UP Line-Of-Road Volume-Capacity Summary.xlsx," Tab "Summary," Segment 785-02.

313. Merger Impact: Applicants' plan to institute a new intermodal service between Northern California and the Northeast would add one train pair to the Capitol Corridor route between Sacramento and Auburn. UP's line between Sacramento and Auburn has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[96]

8.1.1.3. Cascade

314. Amtrak's Cascade service is a state-supported service sponsored by the Washington and Oregon Departments of Transportation that operates twice daily in each direction between Seattle and Eugene. UP hosts these trains for 123 miles between Portland and Eugene.

315. Merger Impact: Applicants do not expect that the merger will add trains to the Cascade route.

8.1.1.4. Coast Starlight

316. Amtrak's Coast Starlight service operates a daily train in each direction between Los Angeles and Seattle. UP hosts these trains for 1,147 miles between Moorpark, California, and Portland.

317. Merger Impact: Applicants do not expect that the merger will add trains to the Coast Starlight route.

---

[96] *See* Workpaper "UP Line-Of-Road Volume-Capacity Summary.xlsx," Tab "Summary," Segment 845-02.

8.1.1.5. Gold Runner

318. Amtrak's Gold Runner[97] service is a CalTrans-funded service that operates seven times daily in each direction between Bakersfield and Stockton, California, with five trains connecting to Oakland and two to Sacramento. UP hosts the Oakland trains for 41 miles between Port Chicago, California, and Oakland, and the Sacramento trains for 50 miles between Stockton and Sacramento.

319. Merger Impact: Applicants plan to institute a new intermodal service between Northern California and the Northeast that would add one train pair to the Gold Runner route between Stockton and Sacramento. UP's line between Stockton and Sacramento has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[98]

8.1.1.6. Lincoln (Illinois)

320. Amtrak's Lincoln (Illinois) service operates three trains per day in each direction between Chicago and St. Louis. UP hosts these trains for 241.5 miles between Wann, Illinois, and Joliet.

321. Merger Impact: Applicants' plan to route a westbound train via Butler to Kansas City would remove one freight train per day from the Lincoln (Illinois) route.

---

[97] The Gold Runner is a recently rebranded service previously known as San Joaquins.

[98] *See* Workpaper "UP Line-Of-Road Volume-Capacity Summary.xlsx," Tab "Summary," Segment 938-01.

8.1.1.7. Missouri River Runner and Lincoln/Missouri River Runner

322. Amtrak's Missouri River Runner operates one train daily in each direction between St. Louis and Rock Creek, Missouri. UP hosts these trains for 271 miles (out of the service's 283 total miles) between St. Louis and Rock Creek.

323. The full Lincoln/Missouri River Runner service runs the combined route of the Lincoln (Illinois) and Missouri River Runner (see below) services between Chicago and Kansas City once daily in each direction. It operates on Union Pacific lines for 512.5 out of 567 total miles.

324. Merger Impact: Applicants' plan to route a westbound train via Butler to Kansas City would remove one freight train per day from the Missouri River Runner and Lincoln/Missouri routes.

8.1.1.8. Pacific Surfliner

325. Amtrak's Pacific Surfliner service is a CalTrans-funded service, operated by the Los Angeles-San Diego-San Luis Obispo Rail Corridor Agency ("LOSSAN"), that operates ten times daily in each direction between San Luis Obispo and San Diego. UP hosts these trains for 174.4 miles between San Luis Obispo and Las Posas, California (out of the service's 350 total miles).

326. Merger Impact: Applicants do not expect that the merger will add trains to the Pacific Surfliner route.

8.1.1.9. Sunset Limited

327. Amtrak's Sunset Limited service operates three trains per week each way between Los Angeles and New Orleans. UP hosts these trains for 1,774.4 miles

between Iowa Junction, Louisiana, and El Monte, California (out of the service's 1,995 total miles).

328. Merger Impact: Applicants' plan to grow intermodal service to and from Southern California would add two trains per day between El Monte and City of Industry, California, four trains per day between City of Industry, California and West Colton, California, six trains per day between West Colton and El Paso, two trains per day between El Paso, and Sierra Blanca, Texas, two trains per day between San Antonio and Houston, two trains per day between Houston and Beaumont, Texas directionally traveling east on the Beaumont Subdivision and four trains per day between Houston and Beaumont directionally traveling west on the Houston Subdivision.[99] As discussed in Section 7.1 above and in Section IV.B.1 of the accompanying Service Assurance Plan, Applicants plan to invest approximately $34 million to increase capacity along the Sunset route to accommodate merger-related growth.[100] In addition, UP is currently investing to double-track portions of the route, which will expand capacity ahead of expected merger-related growth.[101] UP's lines between El Paso and Sierra Blanca and between San Antonio and Houston have sufficient capacity to accommodate the two additional trains per day projected to move across those segments.[102] In addition, as discussed in Section 4.3.5, Applicants'

---

[99] *See* Workpaper "UP Line-Of-Road Volume-Capacity Summary.xlsx," Tab "Summary," Segment 675-02.

[100] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H16.

[101] *See* Workpaper "UP Sunset Corridor Capacity Projects.pdf."

[102] *See* Workpaper "Line capacity.xlsx."

rationalization of operations in New Orleans will reduce congestion associated with current interchanges between UP and BNSF and NS.

8.1.1.10. Texas Eagle

329. Amtrak's Texas Eagle service operates a daily train in each direction between Chicago and San Antonio. UP hosts these trains for 1,086 miles between Joliet and San Antonio, although the Union Pacific trackage is not contiguous.

330. Merger Impact: Applicants' plans would reduce one train per day between Joliet and Gorham, Illinois, and would add three trains per day between Bald Knob, Arkansas, and North Little Rock, Arkansas, add on average one to two trains per day between Marshall, Texas and Dallas, and add one train per day between Ajax, Texas and San Antonio. The route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[103]

8.1.1.11. Winter Park (Ski Train)

331. Amtrak's Winter Park (Ski Train) service is a seasonal service that operates between three and five round trips per week between Denver and Fraser, Colorado. UP hosts these trains for almost their entire 62.2-mile route.

332. Merger impact. Applicants do not expect that the merger will add trains to the Ski Train route.

---

[103] *See* Workpaper "UP Line-Of-Road Volume-Capacity Summary.xlsx," Tab "Summary," Segment 400-01.

8.1.2. Amtrak Operations on NS lines.

8.1.2.1. Blue Water

333. Amtrak's Blue Water service operates between Chicago and Port Huron, Michigan, a distance of 319 miles. The service is sponsored by the Michigan Department of Transportation ("MDOT") and runs daily in both directions. The service runs over NS lines, consisting of a combination of double and triple track mainline between Chicago (21st Street) and Porter, Indiana, covering a distance of 38.9 miles.

334. Merger Impact: Applicants' plan would increase the number of freight trains on the Blue Water route. Applicants expect the merger would add one to two trains per day between Chicago and Porter. The route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[104]

8.1.2.2. Cardinal

335. The Cardinal is an Amtrak long distance route from Chicago to New York's Penn Station, via Washington, DC, a distance of 1,145 miles.[105] The service runs three times a week in each direction. On NS, the service runs on several separate segments. First, between Chicago (21st Street) and Chicago (CP 518), consisting of a combination of a double and triple track mainline, a distance of 2.6 miles. The Cardinal also operates on NS between Manassas, Virginia, and Orange, Virginia,

---

[104] *See* Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx," Tab "NS 251119-01," Segments 55 and 56.

[105] The Cardinal also operates on UP lines for a short distance, 6.7 miles, in Chicago.

consisting of a combination of single and double track mainline (depending on the segment), a distance of 52.1 miles. NS dispatches the Virginia Passenger Rail Authority ("VPRA") owned lines between Alexandria and Manassas, a distance of 23.5 miles, consisting of a double track mainline. NS partnered with the VPRA in 2022 to implement future infrastructure improvements, including the Nokesville to Calverton double track project, related to the Roanoke Passenger Service, which operates on the same corridor between Manassas and Orange.

336. Merger Impact: Applicants' plan would increase the number of freight trains on the Cardinal route. Applicants expect the merger would add two to three trains per day between Orange and Manassas. The route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels. Cardinal trains will also benefit from the planned infrastructure improvements being undertaken to advance VPRA's passenger service objectives.[106]

8.1.2.3. Carolinian

337. The Carolinian is a daily roundtrip Amtrak operated and North Carolina Department of Transportation ("NCDOT") sponsored service between Charlotte and New York's Penn Station, a 497 mile distance. The NS portion of the route is 203.77 miles between Charlotte and Selma, North Carolina, consisting of a combination of a double track mainline and a single track mainline with passing sidings. NS partnered with the North Carolina Railroad ("NCRR") and NCDOT in

---

[106] *See* Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx," Tab "NS 251119-01," Segment 147.

2024 to implement future infrastructure improvements between Greensboro and Raleigh, including the Clegg to Cary siding extension, Hillsborough Curve realignment, Cornwallis Drive grade separation and curve realignment, Elon siding, and Hillsborough siding projects, each related to the Carolinian and Piedmont passenger services.

338. Merger Impact: Applicants' plan would, on balance, increase the number of freight trains on a portion of the Carolinian route. Applicants expect the merger will add two to three trains per day between Charlotte and Greensboro, and will not add trains between Greensboro and Selma. The route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[107]

8.1.2.4. Crescent

339. The long distance Amtrak Crescent train runs between New York's Penn Station and New Orleans on a daily basis, covering 1,367 miles. On NS, the Crescent runs for 1,116.2 miles between Manassas and East City Junction, Louisiana, consisting of a combination of single and double track mainline and a single track mainline with passing sidings. NS dispatches the entire route, although CPKC controls a key interlocking at Meridian, Mississippi and CSXT controls the interlocking at Howell in Atlanta. As noted in the discussion on the Cardinal Service, NS dispatches the VPRA owned line between Manassas and Alexandria, and

---

[107] *See* Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx," Tab NS 251119-01, Segments 49, 142 and 191.

partnered with the VPRA in 2022 to implement future infrastructure improvements, including the Nokesville to Calverton double track project, related to the Roanoke Passenger Service, which operates on the same corridor between Manassas and Lynchburg, Virginia. In addition, NS is coordinating with Amtrak to implement future infrastructure improvements related to the Mardi Gras Service, which operates on the same corridor near New Orleans. Specifically, new crossovers on the Back Belt in the New Orleans terminal will allow Amtrak trains to enter and exit the terminal more efficiently and improve the overall fluidity of the Back Belt.[108]

340. Merger Impact: Applicants' plan would increase the number of freight trains on the Crescent route. Applicants expect the merger would add three to four trains per day on the Crescent's route between New Orleans and Meridian, as well as nine to ten trains per day between Meridian and Atlanta, and two to three trains per day between Atlanta and Manassas. To support the projected freight volumes, UP/NS will implement targeted infrastructure enhancements at key locations on the Crescent's route, primarily focused on the corridor between New Orleans and Atlanta, ensuring continued compliance with existing passenger service obligations. An anticipated infrastructure improvement investment planned near Meridian could also provide operational benefits for the Crescent route. Similarly, infrastructure improvements between Lumberton, Mississippi, and Taylor, Georgia, may also

---

[108] These investments, which NS will partially fund, are described in the FRA Consolidated Rail Infrastructure and Safety Improvements ("CRISI") grant application submitted by Amtrak. *See* Application for Federal Assistance, https://www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/foia/Submitted-Core-Application-Gulf-Coast.pdf.

provide operational benefits to the Crescent on that segment.[109] Additionally, all trains on the Crescent route will benefit from the above-mentioned Nokesville-Calverton double tracking project, as well as the Back Belt crossover projects, all of which will improve fluidity on this key passenger route. With the addition of the planned merger-related infrastructure improvements between New Orleans and Atlanta, the route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.

8.1.2.5. Floridian (Combination of Capitol Limited and Silver Star Services)

341. The Floridian is a temporary Amtrak long distance train that runs daily round trip from Chicago to Miami via Washington, DC while planned rehabilitation work of New York's East River Tunnels takes place. The Floridian is operating over the routes of two currently suspended Amtrak services: The Capitol Limited (Chicago to Washington, DC) and Silver Star (New York's Penn Station to Miami). The NS portion of the 2,065 mile Floridian route is in two segments: Chicago (21st Street) to Pittsburgh (489.9 miles), consisting of a combination of double and triple track mainline and Selma, North Carolina to Cary, North Carolina (37.6 miles), consisting of single track mainline with passing sidings.

342. Merger Impact: Applicants expect to add one to two trains per day on the Lake Shore Limited's route between Chicago and Toledo, Ohio, and two to three

[109] *See* Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx," Tab "NS 251119-01," Segments 6, 14, 19, 23, 30–31, 36, 46, 49, 120–121, 141–142, 147, 162–164, 191, and 200.

trains per day between Toledo and Cleveland. The route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[110]

8.1.2.6. Lake Shore Limited

343. The Lake Shore Limited is an Amtrak long distance train from Chicagoto Boston and New York, a 1,018 and 959 mile route, respectively, traveled round trip daily. The NS portion of the route is from Chicago (21st Street) to Cleveland, 339.6 miles, consisting of a combination of double and triple track mainline.

344. Merger Impact: Applicants' plan would increase the number of freight trains on the Lake Shore Limited Route. Applicants expect to add one to two trains per day on the Lake Shore Limited's route between Chicago and Toledo and two to three trains per day between Toledo and Cleveland. The route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[111]

8.1.2.7. Mardi Gras

345. The Mardi Gras is a new—as of August 2025—state supported service funded by the Southern Rail Commission running two round-trip daily trains between Mobile, Alabama, and New Orleans. The NS portion of the 144-mile route is

---

[110] *See* Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx," Tab "NS 251119-01," Segments 8, 55–57, 80–82, 95, and 212.

[111] *See* Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx," Tab "NS 251119-01," Segments 55–57, 95, and 212.

just 3.7 miles between East City Junction, Louisiana, and Elysian Fields, Louisiana, in New Orleans, consisting of double track mainline. NS is coordinating with Amtrak to implement future infrastructure improvements related to the Mardi Gras Service. As referenced in the discussion of the Crescent, anticipated improvements include three new crossovers that will improve the efficiency of Amtrak train movements.

346. Merger Impact: Applicants' plan would increase the number of freight trains on the Mardi Gras Route. Applicants expect the merger will add three to four trains per day on the Mardi Gras route between East City Junction and Elysian Fields, Louisiana, in New Orleans. The route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[112]

8.1.2.8. Pennsylvanian

347. The Pennsylvanian is a state sponsored service funded by the Pennsylvania Department of Transportation ("PennDOT"). It runs a daily round trip for 444 miles between Pittsburgh and New York's Penn Station. The NS segment is 248.5 miles between Pittsburgh and Harrisburg, Pennsylvania, consisting of a combination of double and triple track mainline. NS partnered with the PennDOT in 2023 to implement future infrastructure improvements, including the Harrisburg third mainline, Enola 3rd mainline, Lemoyne connection, Camp Hill connection, Mifflin crossovers, Hawstone crossovers, Altoona 3rd main, control point 'C' reconfiguration, Johnstown crossovers, control point 'Home' connection, and the

[112] *See* Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx," Tab "NS 251119-01," Segment 163.

Pittsburgh station additional main projects. Following completion of certain infrastructure projects, PennDOT will add an additional round trip for this service.

348. Merger Impact: Applicants' plan would increase the number of freight trains on the Pennsylvanian route. Applicants expect the merger will add four to five trains per day between Pittsburgh and Harrisburg. The route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels (which can be increased once certain passenger-specific infrastructure projects are complete).[113]

8.1.2.9. Pere Marquette

349. Amtrak's Pere Marquette service operates between Chicago and Grand Rapids, Michigan, a distance of 174 miles. The service is sponsored by the Michigan Department of Transportation and runs daily in both directions. The service runs over NS lines, consisting of a combination of double and triple track mainline between Chicago, IL (21st Street) and Porter, Indiana, covering a distance of 38.9 miles.

350. Merger Impact: Applicants' plan would increase the number of freight trains on the Pere Marquette route. Applicants expect the merger would add one to two trains per day between Chicago and Porter. The route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[114]

---

[113] *See* Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx," Tab "NS 251119-01," Segments 80 and 101.

[114] *See* Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx," Tab "NS 251119-01," Segments 55–56.

8.1.2.10. Piedmont

351. The Piedmont is a state supported service sponsored by NCDOT and operated by Amtrak between Charlotte, NC, and Raleigh, NC for 173 miles. The four daily round trips operate entirely on NS's tracks, consisting of a combination of a double track mainline and a single track mainline with passing sidings. As noted in the discussion on the Carolinian, NS partnered with NCRR and NCDOT in 2024 to implement future infrastructure improvements, including the Clegg to Cary siding extension, Hillsborough Curve realignment, Cornwallis Drive grade separation and curve realignment, Elon siding, and Hillsborough siding projects, related to the Carolinian and Piedmont passenger services.

352. Merger Impact: Applicants' plan would, on balance, increase the number of trains on the Piedmont route. Applicants expect the merger will add two to three trains per day between Charlotte and Greensboro, North Carolina, and will not add trains between Greensboro and Raleigh. The route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[115]

8.1.2.11. Richmond/Newport News/Norfolk

353. The Richmond/Newport News/Norfolk service is supported by the Commonwealth of Virginia through VPRA and operated by Amtrak. It operates a minimum of three daily round trips between Boston and Norfolk. NS hosts 81.2 of the

[115] *See* Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx," Tab "NS 251119-01," Segments 49, 142 and 191.

689 total miles between Norfolk and the North Collier Yard near Petersburg, Virginia, consisting of a double track mainline.

354. Merger Impact: Applicants' plan would increase the number of trains on the Norfolk route. The Applicants expect the merger will add one train per day between Petersburg and Norfolk. The route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[116]

8.1.2.12. Roanoke Service

355. The Roanoke service, another Virginia-supported service that is operated by Amtrak, runs twice daily between Roanoke, Virginia, and Boston, a distance of 735 miles. The NS portion of the route is 237.6 miles between Roanoke, and Manassas, consisting of a combination of single and double track mainline. As noted elsewhere, NS dispatches the VPRA-owned line between Manassas and Alexandria. NS also partnered with the VPRA in 2022 to implement future infrastructure improvements, including the Nokesville to Calverton double track project, related to the Roanoke Passenger Service. Further, NS and VPRA have agreed to a series of improvements that will allow VPRA to expand the service to Christiansburg, Virginia in the New River Valley in 2027.

356. Merger Impact: Applicants' plan would increase the number of freight trains on the Roanoke service's route. Applicants expect the merger will add one train per day between Roanoke and Lynchburg, Virginia, and two to three trains per day

[116] *See* Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx," Tab "NS 251119-01," Segments 130, 176 and 207.

between Lynchburg and Manassas. The route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels, which can increase with the future, passenger-specific infrastructure projects.[117]

8.1.2.13. Wolverine

357. Amtrak's Wolverine service operates between Chicago and Pontiac, Michigan, a distance of 299 miles. The service is sponsored by Michigan Department of Transportation and runs three daily round trips. The service runs over NS lines, consisting of a combination of double and triple track mainline between Chicago (21st Street) to Porter, Indiana, covering a distance of 38.9 miles.

358. Merger Impact: Applicants' plan would increase the number of freight trains on the Wolverine route. Applicants expect the merger would add one to two trains per day between Chicago and Porter. The route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[118]

8.1.3. Other Existing Passenger Operations on UP Lines

8.1.3.1. ACE

359. Altamont Corridor Express ("ACE") commuter service operates eight daily trains in each direction on weekdays over its 87-mile route between El Pinal

---

[117] *See* Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx," Tab "NS 251119-01," Segments 6, 144, 174, 187, and 189.

[118] *See* Workpaper "NS Line-Of-Road Volume-Capacity Summary.xlsx," Tab "NS 251119-01," Segments 55–56.

ACE, in Stockton, California, and CP Coast in Santa Clara. These trains operate on UP from origin to destination.

360. Merger Impact: Applicants' plan to institute a new intermodal service between Northern California and the Northeast would add one daily train pair to the Altamont Corridor express route for the short distance between Lathrop Intermodal Ramp and Stockton. The corridor's existing configuration supports the projected freight increase while maintaining the current passenger service levels.[119]

8.1.3.2. CalTrain

361. CalTrain commuter service in California is hosted by UP between CP Lick and Gilroy. CalTrain runs 22 trains on weekdays over the UP segment.

362. Merger Impact: Applicants do not expect the merger will increase the number of trains operating over the lines used by CalTrain.

8.1.3.3. Metra

363. Metra commuter service operates over three UP-owned lines in and around Chicago. Metra currently operates 35 daily weekday trains and 15 daily weekend trains in each direction on the UP-North line over approximately 50 miles of UP line between Chicago to Kenosha, Wisconsin; 39 daily weekday trains, 17 Saturday trains, and 11 Sunday trains in each direction on the UP-Northwest line over approximately 63 miles of UP line between Chicago and Harvard, Illinois; and 39 daily trains, ten Saturday trains, and nine Sunday trains in each direction on the

[119] *See* Workpaper "UP Line-Of-Road Volume-Capacity Summary.xlsx," Tab "Summary," Segment 900-01.

UP-West line over approximately 44 miles of UP line between Chicago and Elburn, Illinois.

364. Merger Impact: Applicants expect the merger will add 12 trains per day to UP's line between Proviso and Kedzie on the UP-West line and 4 trains per day between Proviso and Elburn. UP's route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[120]

8.1.3.4. Metrolink

365. Metrolink's commuter service in California provides service to multiple different origin-destination combinations. Metrolink is operated by the Southern California Regional Rail Authority ("SCRRA")—a joint powers authority representing various county transportation commissions—serving several counties in California and runs three round trips each weekday and two round trips per weekend on UP's line between Moorpark, California, and North Montalvo, California, a distance of 23.51 miles. Metrolink also has rights to run special trains an additional 5.6 miles from North Montalvo to the Ventura Fairgrounds. Metrolink also operates five round trips each weekday on UP's line between West Riverside, California, and Soto Street Junction, California, a distance of 54.77 miles.

366. Merger impact: Applicants expect the merger will add on average two trains per day only between City of Industry, California, and Soto St. Jct, California.

[120] *See* Workpaper "UP Line-Of-Road Volume-Capacity Summary.xlsx," Tab "Summary," Segment 001-03.

UP's route has sufficient capacity to support the projected freight increase while maintaining the current passenger service levels.[121]

8.1.3.5. Trinity Railway Express

367. Trinity Railway Express ("TRE") operates commuter rail service between Dallas and Fort Worth. TRE operates approximately 384 trains each week (Monday through Saturday)—not including special event trains—on an hourly or half-hourly schedule. The Dallas Area Rapid Transit Authority and Trinity Metro are the owners of the rail corridor, over which UP also operates via a trackage rights agreement. TRE also operates through CP T-217 (JFK Junction) on UP's Dallas Subdivision to reach EBJ Union Station.

368. Merger Impact: Applicants do not expect the merger will increase the number of trains operating over the lines used by TRE.

8.1.3.6. Rocky Mountaineer

369. The Rocky Mountaineer is a privately-owned seasonal train owned and operated by American Rocky Mountaineer that runs on UP lines. It operates approximately April through November from Denver, to Moab, Utah, as a leisure train for tourists. During its active season, the service makes 1-2 round trips per week (with each round trip taking place over three days). The entire route trip is 840 miles (Days 1 and 3 are 225 miles, Day 2 is 390 miles).

---

[121] *See* Workpaper "UP Line-Of-Road Volume-Capacity Summary.xlsx," Tab "Summary," Segment 965-07.

370. Merger Impact: Applicants do not expect the merger will increase the number of trains operating over the lines used by the Rocky Mountaineer.

8.1.4. Other Existing Passenger Operations on NS lines

371. NS is host to two commuter rail operations subject to contractual agreements, discussed further below.

8.1.4.1. Metra

372. In the Chicago area, NS hosts Metra for a small segment of its SouthWest (SWS) service, consisting of a combination of double and triple track mainline, with 15 daily trips in both directions between Chicago (21st Street) and Chicago (CP 518). Metra's SWS service also runs on tracks leased from NS between Landers and Manhattan, Illinois (32.9 miles). NS maintains dispatching authority for the line. Fifteen trains run in each direction on weekdays and there is no weekend service.

373. Merger Impact: Applicants' plan does not anticipate addition of trains to the Metra route.[122]

8.1.4.2. Virginia Railway Express (VRE)

374. Virginia Railway Express' ("VRE") Manassas service operates between Washington, DC, and Broad Run, Virginia, a distance of 35 miles. The service runs eight round trips, Monday through Friday. The service runs over NS lines, consisting

---

[122] NS also has freight easement rights to operate on the Metra SouthWest Service line between 75th Street and 47th Street in Chicago, a distance of 3.7 miles. The easement includes operating restrictions to avoid conflicts with peak commuter service. An intermodal train pair (ZEGYC and ZYCEG) will be extended to reach NS's 47th Street intermodal terminal and will operate over the easement to do so.

of a double track mainline between Broad Run and Manassas, covering a distance of 3.48 miles. NS has worked cooperatively with VPRA to support additional VRE weekend services in future years as part of selling to VPRA a portion of the NS Manassas Line between Alexandria and Manassas, which NS continues to dispatch.

375. Merger Impact: Applicants' plans do not anticipate addition of trains to the VRE route.

9. Equipment Requirements and Utilization

9.1. Locomotives

9.1.1. Current Locomotive Fleets and Post-Merger Utilization

376. As shown below in Table 11, UP currently—as of October 9, 2025—owns or leases 6,985 locomotives, including 5,537 for road freight service and 1,448 for yard and local switching service. UP has significant excess locomotive capacity, with 1,524 of its locomotives in storage as of October 9, 2025.

377. Also as shown in Table 11, NS owns 3,255 locomotives, including 2,108 for road freight service and 1,147 for yard and local switching service. NS also has significant excess locomotive capacity with 867 of its locomotives in storage as of October 9, 2025.

Table 11[123]
UP and NS Locomotive Inventory

UP	Owned	Leased	Total
Freight	4,342	1,195	5,537
Switching	1,448	-	1,448
Total	5,790	1,195	6,985

NS	Owned	Leased	Total
Freight	2,108	-	2,108
Switching	1,147	-	1,147
Total	3,255	-	3,255

Combined UP & NS	Owned	Leased	Total
Freight	6,450	1,195	7,645
Switching	2,595	-	2,595
Total	9,045	1,195	10,240

378. The UP and NS fleets are largely compatible across model types and horsepower ratings, which will allow the combined railroad to seamlessly integrate its locomotive stock.

379. The combination of the UP and NS networks will enable improved locomotive utilization, creating excess locomotive capacity from the legacy fleets. The operating plan for the combined network optimizes train routing and reduces interchanges and yard touches. In addition, Applicants anticipate reduced locomotive dwell across the legacy UP and NS yards as homogenous treatment of the combined fleet eliminates inefficient return trip scheduling. From a switching perspective, bringing the legacy NS yard and local network to the higher UP efficiency levels

[123] *See* Workpaper "UP and NS Locomotive Rosters 10-9-25.xlsx," Tab "Locomotive Summary."

would reduce the switching locomotive demand in the Optimized Plan. Applicants identified the switching efficiency based on the ratio of daily people starts to car volume for production and industry jobs respectively. The change in daily people starts was translated to locomotives by adjusting for the historical NS people per job, planned locomotives per job, and planned power shares between one, two, or three jobs. Applicants expect that these synergies will reduce the locomotive needs of the combined railroad in the Optimized Plan by 58 freight locomotives and 159 switching locomotives.[124]

380. The combined railroad's ability to optimize locomotive assignments across a combined fleet will also create a sufficient buffer such that it will have an opportunity to remanufacture older locomotives to meet future demands. UP/NS will store the majority of excess locomotives, which will provide a low-cost solution to support future growth as well as defer future asset replacements. UP/NS may sell some older locomotive models based on market conditions.

9.1.2. Post-Merger Locomotive Needs

381. Applicants expect the existing locomotive stock of the two railroads will be sufficient to effectively handle the anticipated volume of traffic for the combined UP/NS network. They also expect that the merger of the two railroads and their fleets will improve efficiencies in equipment use.

[124] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Loco Fleet Impact," Cells F12 and F18.

382. The combined UP/NS network will drive additional service growth as explained in the Growth Plan, increasing locomotive needs in the years following the merger. Applicants calculated Growth Plan locomotive needs based on the increased gross ton mile demand for freight and increased daily yard volume for switching locomotives, relative to the Optimized active fleet size. Under the Growth Plan, the combined railroad is expected to need 1,096 more locomotives in active service by Year 3.[125]

383. Specifically, Applicants expect that the merged railroad will need 890 more active freight locomotives and 206 more active switching locomotives in Year 3.[126] As shown in Table 12 below, Applicants expect that their combined current locomotive inventory is sufficient to address those needs.

Table 12[127]
UP/NS Locomotive Needs

Service Type	Current Active	Optimized Active	Growth Active	Total Fleet
Road Freight	5,121	5,063	5,953	7,645
Switching	1,858	1,699	1,905	2,595
Total Fleet	6,979	6,762	7,858	10,240

384. To satisfy projected demand, Applicants anticipate that the combined railroad will utilize the excess locomotive capacity created by the locomotive optimization discussed above, including repair of stored serviceable and stored

[125] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "ThruFreight Fleet Plan," Cell E35.

[126] *See id.*, Cell E8; *id.*, Tab "Switching Fleet Plan," Cell E7.

[127] *See id.*, Tab "ThruFreight Fleet Plan," Cells C16:E16 and C20; *id.*, Tab "Switching Fleet Plan," Cells C32:E32 and C35.

unserviceable units.[128] Even factoring in the expected merger-related and other growth reflected in the Growth Plan, Applicants expect that no locomotive acquisitions will be necessary for UP/NS to handle the volumes projected by the end of Year 3.

385. Applicants do not plan that the combined railroad will retire any locomotives.

9.1.3. Locomotive Maintenance

386. UP's Mechanical Department performs locomotive maintenance at shops and yards throughout its network. Thousands of UP employees focus on locomotive inspection, maintenance, and repair. The following Table 13 lists UP inspection, maintenance, and repair locations with more than 20 employees. For each location, the table lists total employees and specifies how many employees are locomotive craftsmen and rail car craftsmen performing the inspection, maintenance, and repair work, and the non-agreement employees who oversee that work.

[128] For an accounting of expected locomotive repair costs, *see* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Implementation Expense," Cells D4:G4.

Table 13[129]
UP Mechanical Locations With More Than 20 Employees

Location	Employees			
	Locomotive	Rail Car	Non-Agreement	Total
Albina (Portland, OR)	14	26	5	45
Council Bluffs, IA	19	22	5	46
Commerce, CA	42	43	5	90
De Soto, MO	-	179	15	194
Denver, CO	21	1	1	23
Dolores (Carson, CA)	41	-	5	46
Dupo, IL	6	17	2	25
Englewood (Houston, TX)	53	-	8	61
Fort Worth, TX	176	45	23	244
Hinkle (Stanfield, OR)	57	15	6	78
Houston, TX	1	77	7	85
Kansas City, MO	32	14	4	50
Laredo, TX	25	-	1	26
Livonia, LA	50	42	7	99
North Little Rock, AR	375	62	41	478
North Platte, NE	404	162	52	618
Ogden, UT	3	18	3	24
Pine Bluff, AR	39	13	2	54
Pocatello, Idaho	11	42	4	57
Proviso (Melrose Park, IL)	120	39	13	172
Roseville, CA	147	37	16	200
Salt Lake, UT	13	8	2	23
San Antonio, TX	50	28	6	84
Santa Teresa, NM	-	28	2	30
Settegast (Houston, TX)	112	-	9	121
Stockton, CA	8	12	2	22
Tucson, AZ	11	24	2	37
West Colton, CA	195	44	24	263
Total	**2,025**	**998**	**272**	**3,295**

129 *See* Workpaper "Mechanical Locations Over 20 Employees.xlsx," Tab "UP Locations."

387. NS's Mechanical Department performs locomotive maintenance and equipment repair at shops and yards across its network. NS has over 1,300 craft employees focused on locomotive inspection, maintenance, and repair. Table 14 below summarizes NS's mechanical shops with more than 20 employees. For each location, the table lists total employees and specifies how many employees are locomotive craftsmen and rail car craftsmen performing the inspection, maintenance, and repair work, and the non-agreement employees who oversee that work.

Table 14[130]
NS Mechanical Locations With More Than 20 Employees

Location	Employees			
	Locomotive	Rail Car	Non-Agreement	Total
Bellevue, OH	55	59	15	129
Birmingham, AL	64	65	15	144
Bluefield, WV	7	11	3	21
Chattanooga, TN	129	51	20	200
Chicago, IL (Calumet)	37	32	11	80
Cincinnati, OH	4	14	4	22
Cleveland, OH	4	15	2	21
Conway, PA	101	48	17	166
Decatur, IL	43	38	12	93
Detroit, MI	7	26	2	35
Elkhart, IN	66	65	16	147
Enola, PA	89	23	14	126
Ft. Wayne, IN	9	21	3	33
Inman (Atlanta, GA)	53	26	11	90
Juniata (Altoona, PA)	435	9	23	467
Kansas City, MO	14	8	2	24
Lamberts Point (Norfolk, VA)	14	38	7	59
Linwood, NC	5	17	1	23
Louisville, KY	10	21	2	33
Macon, GA	23	47	7	77
Portsmouth, OH	2	33	3	38
Shaffers (Roanoke, VA)	92	18	14	124
Sheffield, AL (Muscle Shoals, AL)	14	21	3	38
St. Louis, MO	4	16	2	22
Total	**1,281**	**722**	**209**	**2,212**

130 *See* Workpaper "Mechanical Locations Over 20 Employees.xlsx," Tab "NS Locations."

388. In addition to the mechanical work undertaken at NS's locomotive shops, NS has mechanical personnel at over 15 other locations available for servicing or running repairs to minimize locomotive down time.

389. Following the merger, UP/NS will evaluate the mechanical needs of the combined network, during which time the combined railroad will continue maintenance operations at most existing locations. The combined railroad's evaluation of mechanical needs will be based on operational flow, and could result in additional consolidation or rationalization of existing mechanical facilities to best support the combined railroad's traffic service.

390. The increased traffic flow on the combined network may result in the need for additional locomotive maintenance. If this occurs, existing facilities on the UP and NS networks are expected to have sufficient capacity to address these needs.

391. UP and NS also intend to reduce potential redundancies at existing interchange locations where UP and NS currently operate independent facilities, including in areas around Chicago, Kansas City, New Orleans, and St. Louis. By consolidating maintenance operations and eliminating redundancies, UP and NS anticipate they will improve fluidity and run-through at current interchange locations. This is expected to result in fewer locomotive stops for repair and inspection at interchange gateways.

392. UP and NS also anticipate that the redesign of the network will allow for other mechanical synergies. These and other anticipated mechanical synergies are discussed in greater detail in Section 10.3.2, below.

9.2. Rolling Stock

9.2.1. Current Rolling Stock Inventory

393. As provided in Table 15 below, as of September 3, 2025, UP had 144,830 total railcars of varying types and NS had 95,897 total railcars of varying types. This includes owned, leased, and allocated TTX railcars. Like other railroads, UP and NS also move significant private railcar traffic across their networks.

Table 15[131]
UP and NS Railcar Inventory

Car Type	UP	NS	Total Fleet
Automotive Racks	14,660	10,380	25,040
Boxcars	17,267	9,036	26,303
Refrigerated Boxcars	2,902	-	2,902
Covered Hoppers	23,498	5,312	28,810
Flatcars	9,565	3,359	12,924
Gondolas	11,251	12,427	23,678
Intermodal Double Stacks	57,383	36,397	93,780
Intermodal Conventional	3,489	3,289	6,778
Open Top Hoppers	4,815	15,697	20,512
Total	**144,830**	**95,897**	**240,727**

9.2.2. Post-Merger Rolling Stock Needs

394. The Optimized operating plan improves railcar utilization through more single-line service, decreased handlings and yard work, reduced dwell time, and optimized movements including increased train speeds.

395. The merger will improve the efficiency of freight car distribution and create new opportunities to triangulate railcar usage. For example, the merger should

131 *See* Workpaper "Railcar Fleet Exhibits.xlsx," Tab "Railcar Fleet Plan," Columns E, H, and K.

result in reduced empty car miles as fewer cars will be reverse-routed to the origin carrier. The benefit of reduced empty car miles was calculated for gondola, covered hopper, flatcar, and open top hopper fleets. Applicants did not calculate incremental empty mileage savings for railcars that currently operate in national pools, such as intermodal wells, autoracks, and boxcars. Applicants also anticipate that the combined railroad will have improved ability to provide shippers with the empty railcars they require for loading.

396. These efficiencies will result in improved cycle times, allowing the combined system to handle the same volume of freight traffic (and provide improved service levels) with fewer railcars. The combined UP/NS system is estimated to need 198,722 railcars, a reduction of 468 from current stock levels.[132] Table 16 below shows the expected needs by car type and current stock.

Table 16[133]
Optimized Plan Rolling Stock

Car Type	Current Active	Optimized Active	Difference	Total Fleet
Automotive Racks	22,505	22,505	-	25,040
Boxcars	19,941	19,941	-	26,303
Refrigerated Boxcars	1,737	1,737	-	2,902
Covered Hoppers	20,394	20,294	(100)	28,810
Flatcars	9,186	9,146	(40)	12,924
Gondolas	17,289	17,069	(220)	23,678
Intermodal Double Stacks	89,375	89,278	(98)	93,780
Intermodal Conventional	4,230	4,230	-	6,778
Open Top Hoppers	14,533	14,523	(10)	20,512
Total Fleet	**199,190**	**198,722**	**(468)**	**240,727**

[132] *See* Workpaper "Railcar Fleet Exhibits.xlsx," Tab "Railcar Fleet Plan," Cells V13:W13.

[133] *See id.*, Columns I, K, and V:W.

397. The combined railroad will reduce the size of the UP/NS fleet following the merger. Applicants anticipate that UP/NS will retire the older, less efficient cars, which should improve the average quality of the fleet's cars across the network.

398. The anticipated traffic growth resulting from the merger will require an increased active fleet in certain types of railcars by Year 3. For example, intermodal traffic growth will increase the demand for intermodal stack cars across the combined network. As another example, finished vehicle traffic growth will increase the demand for autoracks.

399. Table 17 below shows the forecasted active fleet size by car type, along with the remaining stored counts, in the Growth Plan.

Table 17[134]
Growth Plan Rolling Stock

Car Type	Current Active	Growth Active	Difference	Total Fleet
Automotive Racks	22,505	23,855	1,350	25,040
Boxcars	19,941	20,102	161	26,303
Refrigerated Boxcars	1,737	2,727	990	2,902
Covered Hoppers	20,394	21,512	1,118	28,810
Flatcars	9,186	9,748	562	12,924
Gondolas	17,289	17,091	(198)	23,678
Intermodal Double Stacks	89,375	90,538	1,163	93,780
Intermodal Conventional	4,230	4,230	-	6,778
Open Top Hoppers	14,533	15,182	649	20,512
Total Fleet	**199,190**	**204,985**	**5,795**	**240,727**

[134] *See* Workpaper "Railcar Fleet Exhibits.xlsx," Tab "Railcar Fleet Plan," Columns I, K, and Z.

400. Based on the UP/NS growth plan and current rolling stock fleet of the two railroads, Applicants do not anticipate future acquisitions of rolling stock. Instead, the increased demand will be served by bringing inactive cars in the fleet into service. For example, the combined railroad will fill increased demand for refrigerated boxcars by investing $35 million in refrigerated unit replacements to return stored refrigerated boxcars back into the active fleet.[135]

9.2.3. Railcar Maintenance

401. UP's Mechanical Department has over 1,000 employees focused on railcar inspection and repair. UP conducts railcar maintenance at shops throughout its network, including its backshop in De Soto, Missouri, as shown above in Table 13. De Soto focuses on autorack rebuilds and heavy damage repair. In addition to the internal network of 23 car facilities, UP participates in eleven TTX-operated repair locations. UP also has mechanical personnel available at locations throughout its network for spot repairs to avoid time off the line.

402. NS's mechanical department has over 900 employees devoted to freight car inspection and repair. NS operates two system program shops in Norfolk, Virginia, and Portsmouth, Ohio. Norfolk handles cross brace repairs on coal cars while Portsmouth handles all other work. NS also has 10 car shops at major terminals. NS further participates in 15 TTX-operated intermodal repair shops and

---

[135] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H10.

has mechanical personnel available around the network for spot repairs to avoid time off the line.

403. Following the merger, the combined railroad will insource autorack rebuilds at its De Soto, Missouri, facility. This will require the addition of 19 craft employees by the end of Year 3.[136] Additionally, Applicants anticipate that UP/NS will rationalize the legacy NS car backshop at Portsmouth, Ohio, by leveraging capacity at other facilities across the combined network. By leveraging existing capacity, the combined railroad should be able to eliminate overhead and realize cost efficiencies. *See* Section 10.3.2.4 below for additional detail.[137]

404. UP and NS expect that integration of the two railroads will create additional synergies and unlock efficiencies related to certain equipment and policies. These and other anticipated mechanical synergies are discussed in greater detail in Section 10.3.2, below.

9.3. Maintenance of Way (MOW) Equipment and Practices

9.3.1. Current Inventory of MOW Equipment

405. Both NS and UP use a variety of owned and leased MOW equipment, each piece critical to ensuring safe and efficient rail operations. Applicants' MOW equipment inventories include:

[136] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Autoracks Capital," Cell H37.

[137] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Car Backshop," Cell E21.

406. *Track Geometry Vehicles*. Applicants use track geometry vehicles to collect detailed information about track infrastructure and analyze track conditions to maintain overall infrastructure reliability. NS uses locomotive-based automated systems, track geometry trucks and railcars, along with an in-house, proprietary process for collecting, reporting, and maintaining track data. Over the last five years, UP increased its fleet of manual and autonomous geometry testing equipment. The increase resulted in a nearly 10x increase in miles tested. In that time, UP has recorded an 85 percent drop in geometry-related defects—evidence the railroad's data-driven approach promotes lasting, quality repairs. UP continues to expand its geometry testing fleet each year, and is now operating 15 autonomous systems across its network.

407. *Rail Flaw Detection*. Applicants use the latest technology to identify internal rail flaws. This technology—referred to as non-stop rail flaw detection—allows UP and NS to operate at a higher speed while leveraging AI and analytics to detect defects. Today, UP's fleet of 13 trucks minimizes Engineering's on-track footprint while increasing safety and reducing overall variability. UP employees operate these trucks, while NS uses contractor-operated units.

408. *Automated Tie Unloaders*. UP uses these machines to autonomously distribute crossties throughout its network, reducing unloading time by 75 percent per tie car while nearly eliminating internal and external safety risks. NS does not currently have this technology.

409. *Automated Rail Unloader*. UP uses this machine to autonomously unload rail within existing traffic windows. The automated rail unloader, which debuted in May 2025, unloads rail 50 percent faster than traditional technologies. It offers 24/7 unloading capabilities and drastically reduces internal and external safety risks. The construction of three additional automated rail unloading units is underway. Two of the additional units are expected to be in operation in 2026, and the third additional unit in 2027.

410. *GPS Automated Ballast Unloading Train*. UP uses six Global Positioning System ("GPS") belly dump ballast-unloading trains, each equipped with 75 to 100 cars, to unload ballast at precisely identified locations via GPS, while moving at speeds of up to 15 miles per hour. This technology has the ability to operate 24/7 and entirely eliminates the need for Track Laborers to physically supervise the process, drastically reducing personal injury risk. NS utilizes three GPS belly dump trains.

411. *Tampers*. Applicants use surfacing equipment, including tampers, which are machines featuring hydraulic jacks to "tamp" the ballast. This levels the stone around and underneath the ties for proper support.

412. *Regulators*. Applicants use regulators, another type of surfacing equipment, to ensure ballast is evenly arranged across the right of way. These machines clear the stone from the ties and angle the ballast to restore proper drainage.

413. *Spike Driver*. Applicants use spike drivers, which are machines that utilize hydraulics to quickly drive spikes down, holding the tie plate and rail to the tie.

414. *Spike Puller*. Applicants use spike pullers, which are machines that utilize hydraulics to pull spikes from each side of the rail simultaneously.

415. *Rail Grinders*. Applicants use large production high speed rail grinders, which are machines that grind the rail surface to reduce friction and wear, prolonging track life and protecting rolling stock.

416. *Anchor Spreader and Squeezer*. Applicants use an anchor spreader and squeezer, which is a machine that seamlessly spreads anchors once a tie has been removed, allowing for installation of a new tie. Following tie installation, the squeezer effectively reinstalls the anchors to prevent longitudinal movement of the rail.

417. *Undercutter*. Applicants use undercutting equipment, which removes mud and fouled ballast from the right-of-way, renewing roadbed conditions.

418. *Automatic Conveyor Train*. UP leases automatic belt-fed conveyor trains, which allow UP to expeditiously unload bulk aggregate material, reducing track time and overall resource requirements. The four consists, each with 30 cars, are essential for quickly restoring infrastructure during weather-related outages (*i.e.*, washouts). NS also uses this technology.

419. *Water Car Fleet*. UP uses a fleet of 50 strategically staged water tank cars across its network ready to be deployed day or night. Each car is capable of holding between 7,000 and 23,000 gallons of water and is equipped with nozzles that

can spray up to 75 feet. UP deploys this fleet to protect railroad infrastructure and communities from the devastating effects of wildfires across primarily the western United States. During Northern California's Lava and Dixie Fires in 2021, for example, UP was able to douse spot fires and protect the infrastructure with water cannons. UP also assisted federal, state and local first responders on the ground by hauling water into remote sections of the National Forest to fill water tank trucks, saving firefighters valuable time.

9.3.2. Acquisition and Retirement of MOW Equipment

420. Both UP and NS base their acquisitions and retirements on the useful life of the MOW equipment and capital program requirements. NS categorizes over 3,800 pieces of MOW equipment across 145 categories, while UP's inventory exceeds 5,000.[138] Both railroads track manufacturer year and build date to ensure the fleet's optimal performance.

421. Applicants anticipate that the combined railroad's MOW inventory will be sufficient to satisfy the maintenance and renewal needs of the combined network in the immediate future.

422. UP/NS will operate a combined legacy fleet in the short-term, ensuring qualified operators and maintenance practices remain intact. Looking ahead, Applicants anticipate that the combined railroad will right-size the combined MOW equipment inventory through a combination of purchased, leased and rented equipment sized according to operational demand.

---

[138] *See* Workpaper "UP_NS MOW Equipment Inventory.xslx."

9.3.3. Equipment Inventory Management

423. UP and NS meticulously track work equipment, minimizing downtime and maximizing production. UP's tracks equipment via GPS and measures productivity via gang production reporting. UP tracks downtime and spend through work orders submitted through SAP, which account for every maintenance event exceeding five minutes.

424. NS uses a centralized system for inventory management, in which decisions are made by the Director of Engineering Equipment, who reports up to the Chief Engineer Program Maintenance, who oversees the age, condition, and needs for the MOW fleet. NS tracks downtime and spend for each piece of NS MOW equipment through work orders submitted through SAP. The Engineering Department has a budget, and the Vice President-Engineering grants final approval.

425. Both UP and NS maintain centralized work equipment shops that leverage data to plan equipment maintenance, repair, and replacement: UP's shop in Adams City, Colorado, and NS's shop in Charlotte, North Carolina. While both railroads' MOW equipment is similar, some key components—such as operating systems—differ. Eventually, the combined railroad will transition to comparable equipment, with established training programs to support personnel systemwide.

426. Following the merger, the combined railroad will right-size MOW equipment counts according to operational need and equipment condition while optimizing each shop's capacity, geographic location, access to suppliers, technology, and manpower. Applicants continue to evaluate opportunities to consolidate operations among the existing shops at Adams City and Charlotte.

9.3.4. Track Evaluation

427. Both UP and NS collect track geometry and overall infrastructure assessment data via physical observation and autonomous technology to analyze potential track defects, prioritize repairs, plan maintenance activities, and build long-term capital investment strategies. As discussed above, both railroads harness technologically-advanced equipment that allows them to monitor track geometry, while adhering to Federal Railroad Administration rules regarding visual track inspection.

428. NS's autonomous fleet includes a combination of geometry trucks, ATGMS (Automated Track Geometry Measurement System)-equipped locomotives, and survey trucks, some of which are supported via contracted field services.

429. UP maintains its own geometry testing fleet, including ATGMS-equipped locomotives and boxcars, in addition to manned inspection cars.

430. UP/NS will adopt NS's industry leading in-house testing capabilities across the combined UP/NS network. This will enable more frequent and consistent infrastructure assessments, supporting improved safety, reliability, and strategic investment planning.

9.4. Deferred Maintenance or Delayed Capital Improvements

431. The full integration of the legacy UP and NS networks will not result in any routes being downgraded or made redundant. Applicants anticipate that the combined railroad will keep MOW activity consistent across the system, with no deferral of maintenance tasks or postponement of capital improvement projects due to the consolidation.

432. Bringing together the operational strengths of UP and NS presents a unique opportunity to unify and enhance maintenance practices. For example, Applicants anticipate they will be able to improve the execution of infrastructure work by leveraging the combined railroad's extensive fleet of company-owned MOW equipment, enabling Applicants to deploy maintenance equipment and complete maintenance tasks more quickly and more efficiently.

10. Consolidation of Other Facilities/Functions

10.1. Transportation

10.1.1. Transportation Operations

433. UP and NS each operate complex transportation systems. Every day UP and NS make countless decisions designed to maximize output from people and equipment while maintaining safe and effective performance. Following the merger, the combined UP/NS will leverage the diverse strengths of both systems to optimize transportation operations even further.

10.1.2. Post-Merger Coordination and Synergies

10.1.2.1. Thru Freight/Road Expense Reduction

434. Applicants plan that UP/NS will increase train lengths of legacy NS trains, which will reduce crew costs by reducing the number of first starts. A first start refers to the first train crew to begin work for a specific train's journey, as defined by its origin and destination.

435. Applicants project that the use of UP processes, technology, and asset utilization philosophy will result in the same percentage improvement in train length on the legacy NS network as when these processes, technology, and philosophy were

applied on the UP network. Applicants translated the resulting reduction in first starts into crew savings based on the ratio of aggregate train Car Miles to Thru Freight First Starts.[139] Using 2024 data, Applicants determined that closing the train length gap on the NS network would reduce annual first starts by approximately 7.6 percent, beyond the crew start savings associated with the Optimized Plan.[140]

436. Applicants plan that following integration the combined railroad will implement the UP deadhead/heldaway optimization program across the legacy NS network. Deadhead/heldaway expenses occur when crews must be compensated for time spent away from their home base, and when they are transported on trains they do not crew. UP currently manages these situations more efficiently, and the combined railroad will apply best practices to the legacy NS network.[141]

437. Applicants project total annual synergies from these steps of $41.6 million.[142]

10.1.2.2. Yard and Local Efficiency Gains

438. Applicants plan that the combined railroad will apply UP's Yard and Local Mapping processes to NS's legacy operations, which will optimize work assignments and scheduling. As a result of projected improved efficiencies, the

---

[139] Applicants assessed several other metrics, but the one they have chosen showed the smallest change relative to the status quo. *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Train Length," Cells J40, J46, and J48.

[140] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Train Length Synergy," Cell M33.

[141] *See id.*, Cells G35:I35 and G38:I38.

[142] *See id.*, Cell K50.

combined railroad will have a reduced number of yard and local people starts within the legacy NS network, and bring productivity of these starts in line with UP's productivity levels. To quantify this expected improvement, UP compared its productivity to that of NS. Specifically, for each company UP compared workloads (*i.e.*, cars handled) to TE&Y people starts for production and local jobs. A "production" job was defined as a yard or terminal assignment that did not perform any transfer or local work. A "local" job was an assignment performing industry work and issuing a work order over 50 percent of the time. Workload for a production job was defined as cars switched, excluding block swaps. Workload for local jobs was defined as cars spotted or pulled from a customer facility.[143] Production workloads were based on the Base Plan MultiRail modeling. Local workloads were based on car counts from each respective roads local service measurement system.

439. Once these variables were defined, Applicants estimated savings of $35.4 million annually by multiplying the anticipated reduction in NS people starts by the NS cost per people start, reduced by a factor of 50 percent to create an appropriate estimate.[144] Savings to these metrics from institution of Remote Control Operations and SwitchPro eNtry eXit technology were excluded, and are discussed in the next section.

---

[143] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tabs "Yard and Local," "Yard and Local Volumes," "Oliver Wyman T1 Detail," "UP and NS Job Support," and "UP Job Support."

[144] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Yard and Local," Cells B48 and B42.

10.1.2.3. Remote Control Locomotive Operations (RCO) and the SwitchPro eNtry eXit (NX) System

440. The combined railroad will expand the use of two technologies, Remote Control Operations ("RCO") and SwitchPro eNtry eXit ("NX") at select legacy NS terminals. Introduction of each technology will enhance safety and efficiency. RCO allows employees to operate a locomotive with a wireless remote control device. NX automates remote switching operations and car inventory updates and integrates field equipment, back-office systems, handheld devices, and digital displays. It eliminates the need for yard conductors to walk the line and manually operate switches, and allows a single operator to efficiently classify cars. Applicants estimate annual savings of $20.4 million from applying these two technologies to selected legacy NS terminals.[145]

10.1.2.4. Crew Transportation

441. Applicants expect that the combined railroad will generate $6.0 million in annual savings by implementing UP's crew transportation strategy on the NS legacy network.[146] UP and NS both currently use Uber as a supplemental supplier for crew transportation needs. In 2024, UP implemented an improved Uber transportation strategy in key service units. By working with Uber to expand pickup and dropoff opportunities at GPS-pinned UP locations outside of traditionally-

---

[145] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "RCO NX," Cell P47.

[146] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Crew Transportation Uber," Cell D25.

available addresses, UP saved 19 percent (inflation-adjusted) on crew transportation costs across its Houston and Chicago service units.[147] NS's existing Uber usage does not have UP's expanded functionality. Applicants estimate that the combined railroad will capture 50 percent of the annual crew transportation savings UP has realized since deployment of its Uber strategy.[148]

10.1.2.5. Crew Lodging

442. UP/NS will reduce crew lodging costs by implementing UP's primary lodging vendor and more efficient lodging processes across the legacy NS system. UP's processes identify opportunities to shift lodging locations to minimize base payments, tax spend, and guaranteed expenditures. In total, UP saved 6.4 percent on lodging following implementation of these strategies.[149] Applicants project a reduction of 2.5 percent on legacy NS lodging costs in the first year and 6.4 percent in normal year savings by leveraging these strategies.[150] Following full implementation, Applicants project ongoing annual savings of $2.2 million.[151]

10.1.2.6. Terminal Command Center

443. UP/NS will implement Terminal Command Center at all legacy NS manifest terminals as part of the broader suite of operating technology

---

[147] *See id.*, Cell E53.

[148] *See id.*, Cells A12 and D22:D25.

[149] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Lodging Wave," Cell F17.

[150] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Lodging WAVE," Cells F26:F27.

[151] *See id.*, Cell E27.

improvements. Terminal Command Center is a digital platform that gives real-time visibility into terminal operations, including crew productivity and car movement information. Terminal Command Center will enable more efficient operations and create personnel efficiencies.

444. UP was able to reduce the number of yard controllers it utilized after implementing Terminal Command Center,[152] and the combined railroad should realize the same percentage reduction on the legacy NS network. Applicants estimate that additional use of Terminal Command Center will generate labor savings of $5.2 million annually.[153]

10.1.2.7. Train Dispatchers

445. As discussed in more detail in the IT section of the Service Assurance Plan, UP/NS will implement NetControl, its transportation management system, and CADx, its dispatching software, on the legacy NS network. Efficiencies from these technologies will reduce the number of positions needed to collectively cover a 24 hour a day, 7 day a week role—referred to as an employee "wheel"—and expand the territory that some dispatching groups can oversee. Overall, Applicants believe NS wheel and territory sizes can be brought in line with those of UP, in accordance with the applicable collective bargaining agreement. The combined railroad will realize

---

[152] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "NS YC Planning," Cell C8.

[153] *See id.*, Cell L8.

these reductions through attrition. Applicants estimate that the combined railroad will realize normal year savings totaling $5.8 million from the reductions.[154]

446. To maintain continuity in train dispatching, Applicants plan that the combined railroad will maintain separate dispatching centers for legacy UP and NS operations following approval of the proposed transition, until such time as UP/NS can transition dispatching safely and seamlessly to a unified dispatching system. When UP/NS decides to combine dispatching functions, it will serve the appropriate notice under Section 4 of the *New York Dock* conditions and obtain any necessary implementing agreements.

10.1.2.8. Crew Dispatchers

447. UP/NS will implement UP's crew calling system on the legacy NS network. This system offers efficiencies that are not available with NS's current process, reducing personnel needs. The combined railroad will realize the reductions through attrition. Applicants estimate annual savings of $1.6 million from these reductions.[155]

10.1.2.9. Precision Gate Technology

448. The combined railroad will also install Precision Gating Technology ("PGT") at 14 of 29 total legacy NS-operated yards and centralize the corresponding

---

[154] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "HDC Personnel," Cell S12.

[155] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "HDC Personnel," Cell S6.

legacy NS gate problem resolution function.[156] PGT uses high resolution cameras and an associated online application to improve truck fluidity and automatically track asset damage at UP gate locations. This will reduce maintenance and contractor costs associated with operating manual and automated gates. Centralized problem resolution operations are more efficient, also reducing costs. Applicants expect $6.6 million in annual savings, informed by UP's own savings after it began to implement PGT across its network in 2021.[157]

10.1.2.10. Leveraging UP Personal Safety Processes

449. UP's industry-leading safety processes have enabled it to substantially reduce its injury rate relative to its peers, including NS. UP/NS will adopt UP's processes across the legacy NS network. Applicants expect that in doing so UP/NS will reduce the gap between NS's and UP's injury rates. Applicants project that once the combined railroad completes systemwide adoption of UP's processes in Year 3, it will realize annual savings of $5.6 million.[158]

10.1.2.11. Leveraging NS Derailment Safety Processes

450. NS has invested heavily in developing an industry-leading derailment safety process. Post-merger, UP/NS will implement the NS derailment safety process across the legacy UP network. Applicants project that implementation of the NS

---

[156] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "PGT," Cells C11, C20, and C28.

[157] *See id.*, Cell I37.

[158] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Personal Injury Derailment," Cell H16.

process will reduce the derailment rate gap between UP and NS. Applicants project annual savings of $10.0 million from this reduction in the derailment rate.[159]

10.1.2.12. Procurement Savings

451. UP/NS will implement UP's proprietary set of procurement principles and practices across NS's legacy procurement portfolio, resulting in reduced operating costs stemming from third party contracts. Applicants analyzed category spend based on the R1 Schedule 410 (operating expenses) and Schedule 330 (capital improvements) to identify the categories to exclude where they do not expect that the combined railroad will realize any synergies in that category or any potential synergy was quantified in a separate analysis. Applicants anticipate significant savings opportunities involving material contracts with locomotive parts suppliers, brush cutting contract management, and first call contracts. Applicants estimate the annual savings opportunity from extending the UP procurement practices to the legacy NS portfolio is $104.8 million.[160] Applicants expect to realize 85 percent of that opportunity, resulting in normal year savings of $89.8 million.[161]

10.1.2.13. Rubber Tire Interchange

452. The merger will result in more efficient routing, reducing the need to use trucks to transfer intermodal containers from legacy UP facilities to legacy NS facilities, a practice known as "rubber tire interchanges." Applicants estimated the

---

[159] *See id.*, Cell Q15.

[160] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "WAVE Capital Summary," Cell G9.

[161] *See id.*, Cells G10:G11.

incremental cost of trucking containers from one ramp to another by applying the cost per move, by origin / destination pair, multiplied by the number of moves eliminated in each lane.[162] Applicants estimate annual savings from eliminating such interchanges to be $26.4 million annually.[163]

10.1.2.14. Terminal Switch Fee Reductions

453. Improved routing as a result of the merger will also reduce fees primarily paid by NS related to terminal activity, specifically terminal switch fees paid to intermediate carriers such as BRC and TRRA. To estimate savings, Applicants applied the 2023 actual NS unit costs to the change in activity, by terminal and type of handling. Applicants estimate annual savings of $6.7 million from reduction of these fees.[164]

10.1.2.15. Fuel

454. The merger will create fuel savings on the legacy NS network for several reasons. The combined UP/NS network will need fewer high horsepower locomotives to haul the same amount of freight, leading to a corresponding reduction in fuel usage. As a result of the more efficient yard and local operations discussed in 10.1.2.2, Applicants anticipate reduced usage of switch locomotives, which will likewise reduce

---

[162] In their Verified Statement, Boyles and Mathur use URCS to quantify other savings from reduced rubber tire interchanges—for example, those stemming from related yard operations—not the cost of trucking to transport the intermodal boxes themselves. *See* Boyles/Mathur VS, ¶¶ 38, 39.

[163] *See* Workpaper “Synergies Transportation - Operating.xlsx,” Tab “Rubber Tire Savings,” Cell AB70.

[164] *See* Janke VS Workpaper, “Synergies Transportation - Operating.xlsx,” Tab “Third Party Fees,” Cell L38

fuel usage. UP/NS will also increase train length of legacy NS trains without increasing the number of locomotives per train, resulting in more efficient trips overall. Finally, UP/NS will implement processes at legacy NS facilities to reduce the duration of engine component load tests. Collectively, Applicants estimate these changes will result in $46.5 million of annual savings.[165]

10.2. Engineering

10.2.1. Engineering Operations

455. Both UP and NS employ safe, efficient, and effective practices for maintaining and replacing capital assets in a wide range of operating environments. As explained above, both have extensive maintenance-of-way departments and sizable fleets of equipment for testing, inspecting, and maintaining their tracks. Both have invested in refining their MOW procedures and developing innovative technologies to improve their practices.

456. As noted above, the UP Engineering Department employs more than 10,000 managers and craft professionals who design, maintain, inspect and replace critical infrastructure across the railroad's nearly 33,000-mile mainline network. Operating more than 5,000 pieces of MOW equipment, the team oversees 42,000 miles of track, over 113 million ties, over 15,000 rail bridges, 34,000 miles of fiber optic cable, and over 7,000 wayside detectors generating more than 72 million daily

---

[165] *See* Janke VS Workpaper, "Synergies Transportation - Operating.xlsx," Tab "Fuel Use Merger Initiatives," Cell C67.

"reads" that communicate overall network health.[166] Likewise, the NS Engineering Department's more than 5,000 managers and craft professionals design, maintain, inspect and replace critical infrastructure across the company's 19,200-mile mainline network. The workforce currently operates over 3,800 pieces of MOW equipment critical to overall infrastructure reliability and safety. The team oversees 28,000 miles of track, over 9,500 bridges, and over 2,700 wayside detectors generating over 10 million data points daily that communicate overall network health.[167] A combined UP/NS Engineering Department will assume the same number of track miles, bridges, signals and crossings, thus Applicants expect that the combined current MOW equipment inventory of UP and NS is sufficient to appropriately maintain and repair the combined network.

457. The merger provides significant opportunities to make more efficient use of each company's existing resources, and to more broadly deploy each company's best practices and most advanced technologies to make UP/NS the industry leader in safe, efficient, effective maintenance-of-way practices. These maintenance synergies will result in better and more reliable service and cost savings.

458. UP and NS continuously innovate their engineering procedures, practices, and technologies to increase the safety of the railroad and its workers. Applicants intend that the combined railroad will take the best of both legacy networks to further increase engineering safety on the integrated network. For

---

[166] *See* Workpaper "Engineering Network Stats.xlsx," Tabs "Summary" and "Wayside Detectors."

[167] *See* Workpaper "Engineering Network Stats.xlsx," Tab "Summary."

example, Applicants continue to explore leveraging the following UP- or NS-specific programs across the integrated network: (1) UP's advanced welding strategy that minimizes the total number of mainline joints on the network; (2) NS's leading process for broken rail prevention; and (3) NS's in-house vision-based track assessment solution.

459. In addition to the quantified synergies described below, Applicants expect to identify further operational efficiencies during the integration of the UP and NS engineering departments. For example, Applicants continue to explore the following efficiency opportunities: (1) deploying UP's next-generation automated wood tie unloading process on the legacy NS network to reduce contractor spend for that network; (2) applying UP's concrete tie strategy to the legacy NS network to improve tie durability and reduce total cost of ownership; (3) leveraging UP's industry-standard bridge maintenance and replacement system on the legacy NS network; (4) consolidating preplated-panel turnout manufacturing facilities at Little Rock (UP) and Roanoke (NS); and (5) reorganizing or consolidating signal operations centers in Omaha (UP) and Atlanta (NS).

10.2.2. MOW Equipment Maintenance and Operation

460. As described in Section 9.3.3. above, both UP and NS follow a centralized approach for MOW equipment inventory management and leverage centralized work equipment shops or "hubs."

10.2.3. Post-Merger Coordination and Synergies

10.2.3.1. Yard Curtailment

461. In a merged environment, certain network switching yards at key interchange locations will become redundant. Applicants plan that the combined railroad will relocate non-local work from the following six yards into other yards with sufficient capacity to handle both operations: (1) New Orleans Oliver; (2) St. Louis Luther; (3) Chicago 63rd; (4) Des Moines; (5) North Kansas City; and (6) Wentzville. Based on costing data provided by NS, Applicants project total annual savings of $1.8 million per year as a result of these yard rationalizations.[168] Applicants project that the rationalizations will yield only 50 percent of the non-labor savings because these yards will continue to perform local work.[169] Of the total savings, $1.4 million comes from a reduction in labor and $373,000 comes from reduced material and overhead costs at idled facilities.[170]

10.2.3.2. Vegetation Management

462. UP has developed highly efficient proprietary on-track vegetation spray equipment which can spray a broad area with a small footprint. The equipment can be used 24 hours a day with back-to-back scheduling, but currently runs only one shift daily to cover UP territory. NS currently contracts for vegetation management equipment, paying contract fees that exceed the costs UP incurs for its internal

---

[168] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Yard Curtailment," Cell H34.

[169] *See id.*, Cell H30.

[170] *See id.*, Cells H32:H33.

vegetation management program. The combined railroad will add a seasonal shift to allow UP's vegetation management equipment to cover a portion of the legacy NS's seasonal vegetation needs, reducing associated contract spend. The operation will target core routes where timing and reduced track occupancy are critical to the service product. The combined railroad will add six more craft employees to enable the additional shifts needed to cover the legacy NS territory.[171] Applying UP's historical savings rate to the NS workload, Applicants project that deployment of UP spray equipment to the NS network will generate $833,000 in net annual operating savings.[172]

10.2.3.3. Wood Tie Pick Up

463. UP utilizes a scrap material recovery team (SMRT) consist to perform wood tie pickup. The SMRT consists have reduced UP's average tie pickup cost over the past three years and increased the speed of tie pickup. UP currently picks up approximately 2.5 million wood ties per year.[173] NS uses contractors to remove old ties from its right of way, which is more costly and less efficient. Post-merger, UP/NS plan to invest $66.8 million to construct additional SMRT consists for deployment across the legacy NS network.[174] This will allow the combined railroad to reduce reliance on contractors and insource up to 30 craft positions.[175] Applicants expect

---

[171] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Spray," Cell E32.

[172] *See id.*, Cell E29.

[173] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "SMRT," Cell C25.

[174] *See id.,* Cell C46.

[175] *See id.*, Cell E61.

deployment of the SMRT system across the legacy NS network to generate annual operating savings of $12.9 million.[176]

10.2.3.4. Vehicle Rationalization

464. UP and NS each maintain a robust vehicle fleet to support Engineering operations. Applicants compared a ratio of Engineering employees to Engineering vehicles for UP and NS as a measure of overall fleet efficiency. UP's recent efforts to reduce its overall fleet size based on usage while maintaining steady operations resulted in a more efficient operation as compared to NS. UP/NS will implement the same type of fleet reduction initiative to the legacy NS vehicle fleet. Applicants expect that the combined railroad will save $40.3 million annually due to these vehicle reduction efforts.[177] That figure includes both recurring operating savings of $24.8 million and annual depreciation savings of $15.5 million associated with the vehicle fleet reductions.[178]

10.2.3.5. Track Geometry

465. UP and NS each maintain and operate separate systems to house track geometry and projected usage data. UP relies heavily on outside vendors to measure and process track geometry data. NS utilizes an in-house, proprietary process for collecting, reporting, and maintaining track data. Following integration, UP/NS will fully implement NS's in-house track geometry system on the UP network by Year 3.

---

[176] *See id.*, Cell E51.

[177] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Eng Vehicles," Cell I47.

[178] *See id.*, Cells I45:I46.

Applicants expect that using the NS system to collect, process, and store track data will allow the combined railroad to save $1.2 million per year on operating expenses by eliminating the need for contract services.[179]

10.3. Mechanical

10.3.1. Mechanical Operations

466. UP and NS both employ safe, efficient, and effective practices in maintaining, refurbishing, and repairing locomotives and rail cars. As Sections 9.1.3. and 9.2.3. above describe, both railroads have extensive mechanical departments with a broad network of shops to inspect and repair locomotives and rolling stock. Both have invested in refining their mechanical operations and developing innovative technologies to improve the reliability and performance of locomotives and rolling stock, thereby ensuring safe and efficient railroads.

467. Applicants expect the UP/NS merger to provide significant opportunities to make more efficient use of each company's existing resources, and to deploy each company's best practices and most advanced technologies across the combined network. Applicants expect that as a result the combined UP/NS will be the industry leader in safe, efficient, effective locomotive and rolling stock inspection and repair practices. These synergies will result in better and more reliable service and cost savings.

468. Beyond the quantified synergies below, the combined railroad will seek to identify additional efficiencies during the integration process.

---

[179] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Track Data," Cell I27.

10.3.2. Post-Merger Coordination and Synergies

10.3.2.1. Curtailment of Locomotive Facilities

469. Applicants anticipate that the redesign of the network will create mechanical operations efficiencies as work is relocated. In total, UP/NS will relocate positions from four locomotive shops where operations will be idled, consolidated, or reduced: (1) Decatur, Illinois; (2) Ft. Wayne, Indiana; (3) Inman (Atlanta, Georgia); and (4) Louisville, Kentucky. By curtailing these four facilities, the combined railroad can eliminate the associated overhead, partially offset by an increase in overhead at the facilities to which the employees are relocated. Applicants project that the operations reductions at the four locomotive shops will generate $4.6 million in annual operating savings.[180]

10.3.2.2. Shop Consolidation & Rationalization

470. As explained above, UP and NS each independently operate mechanical shops at key points throughout their networks, with UP operating 28 mechanical shops, and NS operating 24 mechanical shops. Nine of these shops are located at interchange points between the UP and NS networks. These nine shops currently employ 534 mechanical employees.

471. The combined network will improve fluidity and provide additional run-through traffic, which will yield benefits associated with fewer locomotives stopping and requiring repairs and inspections at interchange gateways. Savings associated

[180] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Shop Curtailment," Cell N37.

with interchange areas around Chicago, Kansas City, St. Louis, and New Orleans include reduction in shop facility overhead.

472. Specifically, Applicants expect that following the merger, the combined railroad will consolidate mechanical facilities and operations in Chicago, Kansas City, New Orleans, and St. Louis, resulting in the need for fewer positions in these areas. As a result of this consolidation, Applicants expect that the combined railroad will save $27.2 million annually.[181] That figure includes annual savings of $6.2 million in reduced overhead expenses and $21.0 million from position reductions at interchange locations.[182]

10.3.2.3. Locomotive Fleet Impact

473. Applicants expect that the integration of UP and NS's networks will unlock new scale and routing efficiencies. In addition, there will be opportunities to reduce the size of the fleet for the legacy NS yard and local network to align with the yard and local crew start reductions described in Section 10.1.2.2. These efficiencies will enable UP/NS to maximize locomotive utilization and operate with fewer active locomotives. In addition to locomotive reductions addressed in the Boyles/Mathur Verified Statement, Applicants calculate that the locomotive synergies will result in an incremental fleet reduction of 152 locomotives.[183] Applicants project that this fleet

---

[181] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Mech Intchg," Cell T52.

[182] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Mech Intchg," Cells P52 and R52.

[183] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Loco Fleet Impact," Cell F22.

reduction will result in ongoing non-labor repair and material cost savings of $5.3 million annually.[184]

10.3.2.4. Rationalization of Portsmouth Car Backshop Operations

474. NS's car backshop in Portsmouth, Ohio, performs certain "heavy" repair work, employing 16 mechanical workers.[185] There will be sufficient capacity at other facilities on the combined network to absorb the work currently performed at Portsmouth. Post-merger, UP/NS plan to idle Portsmouth's car backshop operations and rationalize the backshop's work across the combined network. Following the consolidation, UP/NS will transfer the 16 positions at Portsmouth to realign the workforce to better fit the combined rail network. Idling operations at Portsmouth will eliminate the associated overhead, generating annual operating savings of $1.0 million.[186]

10.3.2.5. Vehicle Reduction

475. UP and NS each maintain a fleet of SUVs and wheel trucks to support maintenance management operations. UP's recent efforts to reduce its overall fleet size based on usage while maintaining steady operations resulted in a more efficient ratio of mechanical workers to vehicles as compared to NS. The combined railroad will apply these same efforts to the legacy NS vehicles. Applicants examined existing

---

[184] *See id.*, Cell F28.

[185] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Car Backshop," Cell E11.

[186] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Car Backshop," Cell E26.

NS mechanical vehicle counts and identified opportunities for the combined railroad to right-size the fleet following the merger. Applicants expect that UP/NS will save $1.9 million annually due to these vehicle rationalizations.[187] That figure includes both recurring operating expenses and a reduction in annual depreciation resulting from the reduction in number of vehicles.

10.3.2.6. Optimizing Utilization of End of Train Devices

476. Both UP and NS rely on End of Train ("EOT") devices to perform essential monitoring functions. An EOT device is an electronic device mounted on the end of a freight train that flashes to mark the end of the train and collects and transmits data on the train's status. Railroads either utilize their own stock of EOT devices, or pay rent to use other railroads' units that are placed on interchange trains. EOT devices often go missing or get damaged with frequent handlings. Applicants anticipate that following the merger the optimized network will result in fewer interchanges, thereby reducing EOT handlings across the network. With fewer handlings, EOTs will have a longer useful life and the combined railroad will be able to reduce annual purchasing needs for replacement stock. Based on UP purchasing history from 2021 to 2024, Applicants anticipate that the combined railroad will reduce annual spend on EOT devices by approximately 25 percent.[188] The anticipated reduction in EOT device spend is expected to generate annual cost savings of

---

[187] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Mech Veh," Cell F21.

[188] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "EOTs," Cell E19.

$339,000.[189] This is a estimate and does not account for anticipated annual savings from reduction of NS's EOT rental costs.

10.3.2.7. Reduction of Freight Car Lease Expense

477. UP currently leases certain cars to fulfill its network needs. NS currently has stored cars of the same type that UP leases. Following integration, UP/NS will leverage stored legacy NS freight car fleets to enable return of the legacy UP's leased cars upon lease termination. Applicants expect that UP/NS can meet 75 percent of the total lease reduction opportunity from utilizing stored legacy NS cars.[190] Applicants project annual savings of $5.5 million from reduction of freight car lease expense after full integration.[191]

10.3.2.8. Insource Wheel Set Assembly Expense

478. Both UP and NS currently contract with third parties for wheelset assembly services. UP, however, has premerger capital plans to increase capacity at its Jenks facility, which will enable insourcing of UP's contracted wheel set volume. With an additional $17.2 million capital investment,[192] UP/NS can create enough capacity at Jenks to also insource a portion of the legacy NS wheel set volume. The combined railroad will require additional positions to enable this synergy. After

---

[189] *See id.*, Cell H25.

[190] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Car Leases," Cells M28:P28.

[191] *See id.*, Cell P29.

[192] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Row 8; Workpaper "Mech_Eng Synergies.xlsx," Tab "Wheelset," Cell F32.

accounting for incremental labor and overhead costs, Applicants project net annual operating savings of $7.7 million due to insourcing legacy NS wheelset assembly at Jenks versus continuing to use a contractor.[193]

11. Projected Territory Changes Required for the Operating Plan

479. The Operating Plan shows how a combined UP/NS system will take advantage of the end-to-end connection of UP and NS to provide new and improved rail services and to make more efficient use of rail capacity and investments. In addition to the planned changes to the workforce as indicated in the Operating Plan and Employee Impact Exhibit, consolidation will also require changes to train crew districts and terminal limits to align the work performed with new and more efficient operating patterns. These changes will be necessary to integrate operations, maximize capacity, and realize both improved service and other intended benefits from this Operating Plan and the underlying transaction.

480. For example, it will be necessary to create a new 246-mile district between UP-Salem, Illinois and NS-Peru, Indiana for trains using the Sidney, Illinois, connection to support the additional train pairs between Southern California and the Northeast described in Section 4.2 of the Operating Plan. Applicants expect that during network integration UP/NS will develop additional district optimizations that further improve service and achieve other intended benefits from the operating plan and transaction. Further, the combined railroad will seek implementing

---

[193] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Wheelset," Cell H29.

agreements, as necessary, to permit the establishment of additional districts as the need arises during the network integration process.

481. The strategy reflected in the Operating Plan will also require certain changes in terminal switching to integrate legacy UP and NS operations, maximize terminal and yard capacity, and realize both improved service and other intended benefits from this Operating Plan and the underlying transaction. In particular, it will be necessary to change or expand certain terminal switching limits in Kansas City to include the legacy NS's Voltz facility and in Chicago to include the legacy UP's Global 4 facility. Applicants expect that during network integration, UP/NS could seek additional changes to terminal switching limits that further improve service and achieve other intended benefits from the Operating Plan and transaction. UP/NS will seek implementing agreements, as necessary, for additional changes that will be needed as network integration proceeds.

12. Conclusion

482. The Operating Plan set forth above describes how a unified UP/NS system will operate to serve its customers and grow the amount of freight moving by rail. It shows how UP and NS will integrate activities, personnel, and facilities following consummation of the proposed transaction; the operational changes expected to result; and the gains in safety, service, operating efficiencies, and other benefits anticipated from the merger. The combination of UP and NS will deliver faster, more reliable, more efficient service to customers and attract new business, providing increased competition to trucks and other rail carriers and benefiting American manufacturers and consumers.

VERIFICATION

I, Eric J. Gehringer, declare under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this statement.

Executed this 17th day of December, 2025.

VERIFICATION

I, John F. Orr, declare under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this statement.

Executed this 17th day of December, 2025.

John F. Orr
Executive Vice President & Chief Operating Officer
Norfolk Southern Railway Company

APPENDIX A

OPTIMIZED PLAN TRAINS

Appendix A – Optimized Plan Trains

ZLCCX
Optimized Plan
Train Miles: 3,074
Avg Length: 6,384
Max Length: 8,260

Station	Activity	Blocks Picked-up	Blocks Set-Out
LATC, CA	Origin	Croxton, Harrisburg, Morrisville, Kearny	
City of Industry, CA	Work Event	Croxton, Harrisburg	
Yuma, CA	Crew Change		
Tucson, AZ	Crew Change		
Santa Teresa, NM	Crew Change, Work Event, Fuel & Inspect	Rickenbacker, Cleveland, Detroit, Cincinnati, Appliance Park, Georgetown	Kearny
Vaugh, NM	Crew Change		
Dalhart, TX	Crew Change, Fuel		
Pratt, KS	Crew Change		
Herington, KS	Crew Change		
Kansas City, MO	Crew Change, Fuel & Inspect		Cincinnati, Appliance Park, Georgetown
Moberly, MO	Crew Change		
Decatur, IL	Crew Change		
Peru, IN	Crew Change		
Toledo Airline, OH	Crew Change		
Sandusky, OH	Work Event, Fuel & Inspect		Rickenbacker, Cleveland, Detroit
Conway, PA	Crew Change		
Harrisburg, PA	Crew Change & Work Event		Harrisburg, Morrisville
Croxton, NJ	Termination		Croxton
Train Transit Time			**95 hrs**

ZHBLC
Optimized Plan
Train Miles: 2,899
Avg Length: 4,654
Max Length: 7,186

Station	Activity	Blocks Picked-up	Blocks Set-Out
Harrisburg, PA	Origin	LATC, City of Industry	
Conway, PA	Crew Change		
Sandusky, OH	Work Event, Fuel & Inspect	ICTF	
Toledo Airline	Crew Change		
Peru, IN	Crew Change		
Decatur, IL	Crew Change		
Moberly, MO	Crew Change		
Kansas City, MO	Crew Change, Work Event, Fuel & Inspect	City of Industry, ICTF	
Herington, KS	Crew Change		
Pratt, KS	Crew Change		
Dalhart, KS	Crew Change, Partial Fuel		
Vaughn, KS	Crew Change		
Santa Teresa, NM	Crew Change, Fuel & Inspect		ICTF
Tucson, AZ	Crew Change		
Yuma, AZ	Crew Change		
City of Industry, CA	Work Event		City of Industry
LATC, CA	Termination		LATC
Train Transit Time			**93 hrs**

ZLBAT Optimized Plan Train Miles: Avg Length: Max Length:	 2,279 8,157 10,743		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
ICTF Los Angeles, CA Yuma, AZ Tucson, AZ Santa Teresa, NM Pecos, TX Sweetwater, TX Mesquite, TX Greggton, TX Shreveport, TX	Origin Work Event Crew Change Crew Change Crew Change, Fuel & Inspect Crew Change Crew Change Crew Change Work Event Crew Change	Atlanta, Austell, Marion, Dupo Jacksonville	 Marion, Dupo
Meridian, MS Norris, Jct, AL Atlanta, GA	Crew Change, Fuel Crew Change Termination		 Atlanta, Jacksonville, Austell
Train Transit Time			**74 hrs**

ZCTLB Optimized Plan Train Miles: Avg Length: Max Length:	 2,530 5,493 5,909		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Charlotte, NC Atlanta, GA Norris Jct, AL Meridian, MS	Origin Work Event, Crew Change & Inspect Crew Change Crew Change	ICTF, Tucson, Lathrop, Los Angeles, Bowden Yard, Atlanta, Garden City, Meridian ICTF, Tucson, Los Angeles	 Bowden Yard, Atlanta, Garden City, Meridian
Shreveport, LA Scottdale, TX Sweetwater, TX Pecos, TX Santa Teresa, NM Tucson, AZ Yuma, CA Los Angeles, CA ICTF, CA	Crew Change & Fuel Crew Change Crew Change Crew Change Crew Change, Fuel & Inspect Work Event & Crew Change Crew Change Work Event Termination		 Tucson Los Angeles, Lathrop ICTF
Train Transit Time			**83 hrs**

MNPCW			
Optimized Plan			
Train Miles:	1,196		
Avg Length:	9,416		
Max Length:	14,444		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
North Platte East, NE	Origin	Conway, Bellevue, Elkhart, CN, Proviso, West Chicago	
Missouri Valley, IA	Crew Change		
Beverly, IA	Work Event	Bellevue	
Clinton, IA	Crew Change		
Global 3, IL	Work Event	Elkhart	
Proviso, IL	Crew Change & Work Event	Elkhart	CN, Proviso, West Chicago
Elkhart, IN	Crew Change, Work Event, Fuel & Inspect		Elkhart
Toledo Airline, OH	Crew Change & Work Event		Bellevue
Conway, PA	Termination		Conway

MALEK			
Optimized Plan			
Train Miles:	450		
Avg Length:	7,083		
Max Length:	8,132		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Altoona, WI	Origin	Proviso, Clearing, Adams, Elkhart	
Adams, WI	Crew Change & Work Event	Butler, Proviso, Conway	Adams
Butler, WI	Crew Change & Work Event	Proviso, Clearing, North Platte, Conway	Butler
Proviso, IL	Crew Change & Work Event	Elkhart	Proviso, Clearing, North Platte
Chicago Ashland Ave, IL	Work Event	Elkhart	
Elkhart, IN	Termination		Elkhart, Conway

MCWAL			
Optimized Plan			
Train Miles:	814		
Avg Length:	5,949		
Max Length:	9,627		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Conway, PA	Origin	Adams, Clearing	
Bellevue, OH	Crew Change & Work Event	Clearing	
Elkhart, IN	Crew Change & Work Event	Altoona, Adams	Clearing
Proviso, IL	Crew Change, Work Event & Inspection	Altoona, Adams, Butler	
Butler, WI	Crew Change & Work Event	Altoona, Adams	Butlter
North Lowell, WI	Work Event	Altoona	
Adams, WI	Crew Change & Work Event		Adams
Altoona, WI	Termination		Altoona

MNLCW			
Optimized Plan			
Train Miles:	984		
Avg Length:	4,840		
Max Length:	5,517		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
North Little Rock, AR	Origin	Conway, Bellevue, Detroit	
North Dexter, MO	Crew change		
Salem, IL	Crew change		
Peru, IN	Crew change		
Bellevue, OH	Crew change & Work Event		Bellevue, Detroit
Conway, PA	Termination		Conway

MNLCT			
Optimized Plan			
Train Miles:	463		
Avg Length:	12,816		
Max Length:	13,444		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
North Little Rock, AR	Origin	Chattanooga, Sheffield, Birmingham	
Memphis, TN	Crew change		
Sheffield, AL	Crew change & Work Event	Chattanooga	Sheffield, Birmingham
Chattanooga, TN	Termination		Chattanooga

MCTNL			
Optimized Plan			
Train Miles:	463		
Avg Length:	10,609		
Max Length:	11,537		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Chattanooga, TN	Origin	North Little Rock, Sheffield	
Sheffield, AL	Crew Change & Work Event	North Little Rock, Longview	Sheffield
Memphis, TN	Crew Change		
North Little Rock, AR	Termination		North Little Rock, Longview

APPENDIX B

GROWTH PLAN TRAINS

Appendix B – Growth Plan Trains

ZLTCX			
Growth Plan			
Train Miles:	3,123		
Avg Length:	10,932		
Max Length:	11,788		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Lathrop, CA	Origin	Croxton, Morrisville, Toledo Airline, Harrisburg, Bethlehem Imdl, Greencastle, Ayer*	
Sparks, NV	Crew Change		
Elko, NV	Crew Change, Partial Fuel		
Ogden, UT	Crew Change		
Green River, WY	Crew Change		
Cheyenne, WY	Crew Change		
North Platte East RT, NE	Crew Change, Fuel & Inspect		
Missouri Valley, IA	Crew Change		
Clinton, IA	Crew Change		
Global 2, IL	Crew Change		
Elkhart, IN	Fuel		
Toledo Airline, OH	Crew Change & Work Event		Toledo Airline
Conway, PA	Crew Change		
Harrisburg, PA	Crew Change, Work Event & Inspection		Harrisburg, Bethlehem Imdl, Greencastle, Morrisville
Croxton, NJ	Termination		Croxton
Train Transit Time			**83 hrs**

ZCXLT			
Growth Plan			
Train Miles:	3,114		
Avg Length:	9,302		
Max Length:	10,421		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Croxton, NJ	Origin	Lathrop, Chicago 47th St	
Harrisburg, PA	Crew Change, Work Event & Inspect	Lathrop, Sparks	
Conway, PA	Crew Change		
Toledo Airline, OH	Crew Change & Work Event	Lathrop	
Elkhart, IN	Fuel		
Colehour, IL	Work Event & Inspect	Lathrop	Chicago 47th St
Global 2, IL	Crew Change		
Clinton, IA	Crew Change		
Missouri Valley, IA	Crew Change		
North Platte Blend, NE	Crew Change, Fuel & Inspect		
Cheyenne, WY	Crew Change		
Green River, WY	Crew Change		
Ogden, UT	Crew Change		
Elko, NV	Crew Change, Fuel		
Sparks, NV	Crew Change		Sparks
Lathrop, CA	Termination		Lathrop
Train Transit Time			**85 hrs**

ZCICX			
Growth Plan			
Train Miles:	3,071		
Avg Length:	15,954		
Max Length:	16,371		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
City of Industry, CA	Origin	Harrisburg, Bethlehem Intermodal, Erail, Morrisville	
Yuma, CA	Crew Change		
Tucson, AZ	Crew Change		
Santa Teresa, NM	Crew Change, Fuel & Inspect		
Vaugh, NM	Crew Change		
Dalhart, TX	Crew Change, Fuel		
Pratt, KS	Crew Change		
Herington, KS	Crew Change		
Kansas City, MO	Crew Change, Fuel & Inspect		
Moberly, MO	Crew Change		
Decatur, IL	Crew Change		
Peru, IN	Crew Change		
Sandusky, OH	Crew Change, Work Event, Fuel & Inspect		
Conway, PA	Crew Change		
Harrisburg, PA	Crew Change & Work Event		Harrisburg, Bethlehem Intermodal, Morrisville
Erail, NJ	Work event	McCalla	Erail NJ
Croxton, NJ	Termination		Croxton, McCalla
Train Transit Time			**95 hrs**

ZCXCI			
Growth Plan			
Train Miles:	3,114		
Avg Length:	9,302		
Max Length:	10,421		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Croxton, NJ	Origin	IEIT	
Erail, NJ	Work Event	City of Industry, Atlanta, Austell	
Harrisburg, PA	Crew Change, Work Event, Fuel & Inspect	City of Industry, Maple Heights	Atlanta, Austell
Conway, PA	Crew Change		
Sandusky	Work Event	ICTF	Maple Heights
Toledo Airline, OH	Crew Change & Work Event		
Swanton, OH	Work Event	LATC	*LATC block from Norfolk will alternatively be routed on 279 to Voltz
Peru, IN	Crew Change		
Decatur, IL	Crew Change		
Moberly, MO	Crew Change		
Voltz, MO	Work Event		LATC
Kansas City, MO	Crew Change, Work Event, Fuel & Inspect	ICTF	
Herington, KS	Crew Change		
Pratt, KS	Crew Change		
Dalhart, KS	Crew Change		
Vaughn, NM	Crew Change		
Santa Teresa, NM	Crew Change, Work Event, Fuel & Inspect		ICTF
Tucson, AZ	Crew Change		
Yuma, AZ	Crew Change		
IEIT, CA	Work Event		IEIT
City of Industry, CA	Work Event		City of Industry
Train Transit Time			**99 hrs**

ZLCDT			
Growth Plan			
Train Miles:	2,455		
Avg Length:	13,920		
Max Length:	15,631		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
LATC, CA	Origin	Detroit, Voltz, Appliance Park, Rickenbacker, Sharonville, Norfolk	
Yuma, CA	Crew Change		
Tucson, AZ	Crew Change		
Santa Teresa, NM	Crew Change, Work Event, Fuel & Inspect	Appliance Park, Georgetown, Detroit, Cleveland	
Vaugh, NM	Crew Change		
Dalhart, TX	Crew Change, Partial Fuel		
Pratt, KS	Crew Change		
Herington, KS	Crew Change		
Voltz, MO	Crew Changk, Work Event, Fuel & Inspect	Detroit	Voltz, Appliance Park, Rickenbacker, Sharonville, Norfolk, Georgetown
Moberly, MO	Crew Change		
Decatur, IL	Crew Change		
Peru, IN	Crew Change		
Livernois, MI	Termination		Detroit, Cleveland
Train Transit Time			**73 hrs**

ZDTLC			
Growth Plan			
Train Miles:	2,899		
Avg Length:	10,201		
Max Length:	10,458		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Livernois, MI	Origin	LATC	
Peru, IN	Crew Change		
Decatur, IL	Crew Change		
Moberly, MO	Crew Change		
Voltz, MO	Crew Change, Work Event, Fuel & Inspect	LATC, Nogales	
Herrington, KS	Crew Change		
Pratt, KS	Crew Change		
Dalhart, KS	Crew Change		
Vaughn, KS	Crew Change		
Santa Teresa, NM	Crew Change, Work Event, Fuel & Inspect		
Tucson, AZ	Crew Change & Work Event		Nogales
Yuma, AZ	Crew Change		
LATC, CA	Termination		LATC
Train Transit Time			**80 hrs**

ZIEJX			
Growth Plan			
Train Miles:	2,565		
Avg Length:	10,898		
Max Length:	14,825		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
IEIT, CA	Origin	Jacksonville, Charlotte, Greencastle	
Yuma, AZ	Crew Change		
Tucson	Crew Change		
Santa Teresa, NM	Crew Change, Fuel & Inspect		
Pecos, TX	Crew Change		
Sweetwater, TX	Crew Change		
Mesquite, TX	Crew Change		
Shreveport, LA	Crew Change & Work Event		Charlotte Intermodal, Greencastle (Traffic in excess of length restriction to ride ZSHAT)
Meridian, MS	Crew Change, Fuel		
Norris Jct, AL	Crew Change		
Atlanta, GA	Crew Change, Work Event, Fuel & Inspect		Charlotte, Greencastle
Macon, GA	Crew Change		
Jacksonville, FL	Termination		Jacksonville
Train Transit Time			**83 hrs**

ZCTLB			
Growth Plan			
Train Miles:	2,530		
Avg Length:	11,079		
Max Length:	13,961		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Charlotte Inter, NC	Origin	ICTF, IEIT, Tucson, Lathrop, Los Angeles, Bowden Yard, Atlanta, Garden City, Meridian	
Atlanta, GA	Work Event, Crew Change & Inspect	McCalla	Bowden Yard, Atlanta, Garden City, Meridian
Norris Jct, AL	Crew Change		
McCalla	Work Event	Los Angeles	McCalla
Meridian, MS	Crew Change		
Shreveport, LA	Crew Change & Fuel		
Scottdale, TX	Crew Change		
Sweetwater, TX	Crew Change		
Pecos, TX	Crew Change		
Santa Teresa, NM	Crew Change, Fuel & Inspect		
Tucson, AZ	Work Event & Crew Change		Tucson
Yuma, CA	Crew Change		
IEIT, CA	Work Event		IEIT
Los Angeles, CA	Work Event		Los Angeles, Lathrop
ICTF, CA	Termination		ICTF
Train Transit Time			**83 hrs**

ZMXCX			
Growth Plan			
Train Miles:	2,223		
Avg Length:	9,582		
Max Length:	12,069		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Port Laredo, TX	Origin	Croxton, Atlanta, Charlotte, Rickenbacker, Sharonville	
SAIT, TX	Work Event & Inspect	Croxton, Atlanta, Greencastle	
Kriby, TX	Crew Change		
Houston, TX	Crew Change & Work Event	Greencastle, Morrisville, Charlotte	
Beaumont, TX	Crew Change		
Livonia, LA	Crew Change		
New Orlelans	Crew Change		
Meridian, MS	Crew Change & Fuel		
Norris Jct, AL	Crew Change		
Atlanta, GA	Crew Change, Work Event, Fuel & Inspect	Greencastle	Atlanta, Charlotte, Rickenbacker, Sharonville
Linwood, NC	Crew Change		
Lynchburg, VA	Crew Change		
Hagerstown, MD	Crew Change		
Greencastle, PA	Work Event	Lathrop	Greencastle
Rutherford, PA	Crew Change & Work Event		Morrisvile, Lathrop
Croxton, NJ	Termination		Croxton
Train Transit Time			**85 hrs**

ZCXMX			
Growth Plan			
Train Miles:	2,239		
Avg Length:	10,743		
Max Length:	14,852		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Croxton, NJ	Origin	Port Laredo, SAIT, Atlanta	
Rutherford, PA	Crew change & Work Event	Greencastle, Atlanta, Wylie	
Greencastle, PA	Work Event	SAIT, Houston	Greencastle
Hagerstown, MD	Crew Change		
Lynchburg, VA	Crew Change	Port Laredo	
Linwood, NC	Crew Change		
Atlanta, GA	Crew Change, Work Event, Fuel & Inspect	Port Laredo	Atlanta, Houston
Norris Jct, AL	Crew Change		
Meridian, MS	Crew Change, Work Event & Fuel		Wylie (*Alternatively set-out in Atlanta)
New Orleans, LA	Crew Change		
Livonia, LA	Crew Change		
Beaumont, TX	Crew Change		
Houston, TX	Crew Change		
Kirby, TX	Crew Change		
SAIT, TX	Work Event & Inspect		SAIT
Port Laredo, TX	Termination		Port Laredo
Train Transit Time			**83 hrs**

ZHOAT			
Growth Plan			
Train Miles:	867		
Avg Length:	7,565		
Max Length:	7,678		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Houston, TX	Origin	Atlanta, Bowden Yard, Sharonville, Croxton, McCalla	
Beaumont, TX	Crew Change		
Livonia, LA	Crew Change		
New Orlelans	Crew Change		
Meridian, MS	Crew Change		
McCalla, AL	Work Event		McCalla
Norris Jct, AL	Crew Change		
Atlanta, GA	Termination		Atlanta, Bowden Yard, Sharonville, Croxton
Train Transit Time			**39 hrs**

ZATHO			
Growth Plan			
Train Miles:	868		
Avg Length:	12,290		
Max Length:	12,382		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Atlanta, GA	Origin	Houston, Port Laredo	
Norris Jct, AL	Crew Change		
McCalla, AL	Crew Change & Work Event	Houston	
Meridian, MS	Crew Change		
New, Orleans, LA	Crew Change		
Livonia, LA	Crew Change		
Beaumont, LA	Crew Change		
Houston	Termination		Houston, Port Laredo
Train Transit Time			**36 hrs**

MLINSC			
Growth Plan			
Train Miles:	612		
Avg Length:	9,433		
Max Length:	12,278		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Livonia, LA	Origin	Chatanooga, Allentown, Birmingham, New Orleans	
New Orleans, LA	Crew Change & Work Event	Chatanooga,Meridian	Birmingham, New Orleans
Meridian, MS	Crew Change & Work Event	Chatanooga	Meridian
Norris Jct, AL	Crew Change		
Chatanooga, TN	Termination		Chatanooga, Allentown

MEKBO			
Growth Plan			
Train Miles:	438		
Avg Length:	8,692		
Max Length:	10,963		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Elkhart, IN	Origin	Boone, Marshalltown, Beverly, Clinton	
Global 2, IL	Crew Change		
Clinton, IA	Crew Change & Work Event		Clinton
Beverely, IA	Work Event		Beverly
Marshalltown, IA	Work Event		Marshalltown
Boone, IA	Termination		Boone

MNPEK			
Growth Plan			
Train Miles:	972		
Avg Length:	9,367		
Max Length:	14,498		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
North Platte East, NE	Origin	Elkhart, East Decatur	
Missouri Valley, IA	Crew Change		
Clinton, IA	Crew Change & Work Event	Elkhart	
Proviso, IL	Crew Change		
Elkhart, IN	Termination		Elkhart, East Decatur

MNLCTB			
Growth Plan			
Train Miles:	463		
Avg Length:	8,201		
Max Length:	8,916		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
North Little Rock, AR Memphis, TN	Origin Crew Change	Chattanooga, Sheffield, Birmingham	
Sheffield, AL Chattanooga, TN	Crew Change & Work Event Termination	Chattanooga	Sheffield, Birmingham Chattanooga

MCTNLB			
Growth Plan			
Train Miles:	463		
Avg Length:	7,570		
Max Length:	8,755		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Chattanooga, TN Sheffield, AL	Origin Crew Change & Work Event	North Little Rock, Sheffield	 Sheffield
Memphis, TN North Little Rock, AR	Crew Change Termination		 North Little Rock

MBHEW			
Growth Plan			
Train Miles:	706		
Avg Length:	8,424		
Max Length:	8,424		
Station	**Activity**	**Blocks Picked-up**	**Blocks Set-Out**
Birmingham, AL Meridian, MS	Origin Crew Change	Englewood	
New, Orleans, LA Avondale, LA Beaumont, LA Englewood, TX	Crew Change Crew Change Crew Change Termination		 Englewood

BEFORE THE
SURFACE TRANSPORTATION BOARD

DOCKET NO. FD 36873

UNION PACIFIC CORPORATION AND UNION PACIFIC RAILROAD COMPANY
—CONTROL—
NORFOLK SOUTHERN CORPORATION AND NORFOLK SOUTHERN RAILWAY COMPANY

SERVICE ASSURANCE PLAN

VERIFIED STATEMENT

OF

JOHN W. TURNER

Table of Contents

SERVICE ASSURANCE PLAN

VERIFIED STATEMENT

OF

JOHN W. TURNER

I. Introduction

A. Witness Qualifications

1. My name is John Turner. I am Senior Vice President Operations – Northern Region at Union Pacific Railroad Company ("UP"). In my current role, I am responsible within UP's Northern Region for providing leadership and optimizing network performance while ensuring the railroad's safety, service, and operational excellence objectives are met. I joined UP in 1998 and have held my current position since April 2024. I began my railroad career as a conductor and worked my way up through the transportation ranks. I previously served as Senior Vice President – Network Planning and Harriman Dispatch Center ("HDC"), Vice President – Network Planning, and Assistant Vice President – Network Integration and Scheduling. I also led the Portland and Utah service units as General Manager. I earned a Bachelor of Science degree in Transportation and Logistics from Iowa State University and an MBA from Mendoza College of Business at the University of Notre Dame.

2. I am sponsoring and verifying this Service Assurance Plan, which Applicants are required to file under 49 C.F.R. § 1180.10. The Service Assurance Plan, in concert with the Operating Plan, describes the precise steps to be taken by

Applicants to ensure that projected service levels would be attainable and that key elements of the Operating Plan would improve service when UP merges with Norfolk Southern Railway Company ("NS").

3. I have overall responsibility for developing the Service Assurance Plan. In accordance with the Board's rules, the Service Assurance Plan addresses Applicants' planning efforts covering a wide range of subject matters. The Service Assurance Plan was developed over the past four months with the assistance of numerous professionals from a variety of disciplines at both UP and NS, each of whom contributed to the planning process. I have relied on their work in sponsoring and verifying this Service Assurance Plan.

4. In particular, the Information Technology Systems portion of the Service Assurance Plan was prepared by and under the supervision of Rahul Jalali, UP's Executive Vice President and Chief Information Officer. Mr. Jalali was appointed Senior Vice President and Chief Information Officer in November 2020 and promoted to Executive Vice President in June 2023. Mr. Jalali serves as the organization's technology thought leader, ensuring UP has a complete, integrated process and systems strategy. Prior to joining UP, Mr. Jalali spent 23 years with Walmart Inc., most recently as corporate vice president in the technology division serving Walmart International. In that role, he specialized in developing world-class global technology solutions and organizations that could scale technology platforms and leverage data, automation, and machine learning to build quality products to grow/optimize businesses.

B. Purpose and Scope

5. This Service Assurance Plan describes how the integration of UP and NS activities following consummation of the proposed transaction, the operational changes expected to result, and the operating efficiencies and other benefits anticipated from the merger, will translate into present and future benefits for the shipping public. The Service Assurance Plan also describes potential areas where service may be impacted due to operational changes and how instances of impacted service might be mitigated.

6. To address these issues, Part II of the Service Assurance Plan describes how the changes described in the Operating Plan will result in improved service levels at a route level, and how the changes will affect shippers, connecting railroads, and ports. Part III describes how the changes will affect the operational fluidity of Applicants' principal classification yards and major terminals. Part IV identifies the infrastructure improvements Applicants currently anticipate they will need to produce the projected service improvements and accommodate the projected merger-related traffic growth, and their plan for timely completion of those improvements.

7. The Service Assurance Plan also describes how Applicants will guard against service degradation through their planning efforts. Part V describes Applicants' planning for integration of their information technology ("IT") systems and the interim systems they will use prior to full integration. Part VI describes Applicants' plans for consolidating their customer service functions and familiarizing customers with new processes and procedures they may encounter. Part VII describes Applicants' plans for reaching necessary labor implementing agreements and shows

Applicants will have sufficient qualified employees available at the proper locations to implement the proposed transaction. Part VIII describes Applicants' plans for providing the necessary training to employees in functions that will be affected by the transaction. Part IX of the Service Assurance Plan describes Applicants' contingency plan for merger-related service disruptions, as well as Applicants' protocol for handling service failure claims.

8. Part X describes how Applicants will continue facilitating the operations of Amtrak and commuter carriers to fulfill existing performance agreements and ensure effective communications to minimize any potential transaction-related negative impacts.

9. The Service Assurance Plan provides a timetable for all major functional and system changes that will occur in Part XI.

10. Finally, the Service Assurance Plan provides benchmarks for measuring corridor performance, yard and terminal performance, and system performance in Part XII.

C. Overview

11. This Service Assurance Plan presents Applicants' current plans and projections regarding the integration process. Applicants have been engaged in the planning process for the past four months, and they have made substantial progress, but their plans will continue to develop and evolve between now and the time the merger is fully implemented, which is not expected to occur until three years after the merger is authorized.

12. Applicants operate in a highly dynamic industry, characterized by a constantly changing market environment. To provide the highest level of service to their customers, Applicants must be flexible and adaptable. Service offerings designed to meet expected customer demands today may no longer meet actual customer demands a year from now. Projected traffic flows that would necessitate investment in new capacity may shift locations or fail to materialize. UP and NS have been leaders in developing and implementing technologies that make rail operations safer and more efficient. Combining the two companies should accelerate the pace of change, so the way work is performed today will not necessarily be the way work is performed tomorrow. The merged company will also continue to improve information technologies that support operations and customer service functions. Systems that are best-in-class today may be replaced by better systems within a few years. The merger will allow the combined companies to respond to changing market dynamics and generate greater positive change than either company could do on its own.

13. The Service Assurance Plan clearly demonstrates that Applicants are engaged in a careful planning process designed to ensure the merger delivers benefits to the shipping public without causing service degradation during the implementation process. However, Applicants' plans are not set in stone; they must remain flexible for the full promise of the transaction to be realized.

II. Service Improvements from Integration of Operations

14. The Operating Plan describes in detail Applicants' plans to integrate UP and NS operations to provide customers faster, more efficient, more reliable single-line service. As described in the Operating Plan, Applicants plan to improve service

in two ways. First, Applicants will optimize existing UP-NS traffic flows by changing train and blocking plans and eliminating interchanges between the two railroads. Second, Applicants will introduce new train services to accommodate projected merger-related traffic growth. Customers with traffic currently interchanged between UP and NS will benefit most directly from the changes described in the Operating Plan, but many other customers of UP, NS, and other railroads will also benefit from optimized traffic patterns that reduce congestion at key gateways, as well as the other safety, service, and technological improvements the merger will make possible.

15. Applicants' plans to integrate UP and NS operations should not result in harm to existing service. As discussed in the Operating Plan, most of Applicants' main lines, yards, and terminals will not experience any significant merger-related increase in activity levels. With regard to main lines, yards, and terminals projected to experience a merger-related increase in traffic levels, Applicants have evaluated their current and future projected capacity and determined they either have sufficient capacity to absorb the increased activity levels or will have sufficient capacity as a result of currently planned or merger-related infrastructure improvements or operating changes.

16. Applicants recognize that any change to train and blocking plans and any yard or terminal rationalization creates a risk of service degradation to the extent plans are flawed in design or execution. UP and NS use similar standardized transportation plan change management workflows to guard against design and

execution flaws. Applicants will follow these change management procedures in implementing the changes to train and blocking plans described in the Operating Plan. Applicants will similarly engage in extensive planning before undertaking the yard and terminal consolidations described in the Operating Plan.

17. Applicants describe the change management procedures they will follow in implementing any changes to train and blocking plans and any yard and terminal consolidations in Section II.A. Applicants then describe their planned changes to manifest and intermodal train operations and the projected impacts on customer service levels in Sections II.B.1 (manifest) and II.B.2 (intermodal). Applicants discuss potential areas of service degradation resulting from their planned changes in Section II.C. Finally, Applicants discuss the impact of their planned changes on connecting carriers and ports in Section II.D.

A. Applicants' Change Management Process

18. UP and NS use similar change management procedures to guard against the risk of service degradation when implementing changes to their train and blocking plans and when planning to add new trains or rationalize yards and terminals. The procedures are designed to establish clear expectations, careful oversight, and accountability. They ensure stakeholders from across the organization analyze potential service impacts, develop criteria for success before changes are implemented, and monitor the implementation process so plans can be adjusted if necessary.

19. Applicants will use these established change management procedures when implementing the changes described in the Operating Plan. Applicants'

procedures require careful consideration of existing conditions and constraints at the time changes are implemented. For this reason, among others, Applicants' Operating Plan and the service improvements identified in this Service Assurance Plan necessarily represent projections rather than finalized plans. However, Applicants will use their established change management procedures in actually implementing any merger-related operational changes.

20. In the first step of the transportation plan change management process, Applicants' network planners prepare a proposal for recommended changes that considers the impact of the proposed changes on critical network assets—*i.e.*, main lines, yards and terminals, crews, locomotives, and rail cars—and on customers. When a proposed change involves a line on which passenger trains operate, the planners also consider the impact of the change on passenger operations. The proposal includes an updated transportation plan that identifies service changes at each intermediate point from origin to destination on the affected service—that is, crew changes, inspections, pick-ups, and set-outs. Applicants' Operating Plan in some ways replicates this first step, though it analyzes the consolidated impact of all the proposed changes rather than the incremental impact of each proposed change.

21. In the second step of the change management process, the updated transportation plan is circulated to a set of internal stakeholders for review. At UP, stakeholders include representatives from potentially affected groups—*e.g.*, operating, marketing, locomotive and crew resources—as well as regional and local operating personnel and personnel responsible for passenger operations. Each

stakeholder department reviews the proposal to determine whether it can be executed as planned. A proposal cannot proceed until it receives approval from each stakeholder. The process is designed to be iterative—each stakeholder can provide feedback, identify additional considerations, and grant contingent approval.

22. Once all stakeholders provide approval, the implementation process begins. The implementation process varies based on the relative complexity and nature of the transportation plan change. Simple changes in blocking patterns may require only providing detailed instructions to personnel in affected yards and periodic remote monitoring by regional and network operations managers. Work crews and facilities are already well-equipped to implement minor alterations to blocking patterns.

23. More complex operational changes such as starting new train pairs and rationalizing terminals typically involve additional considerations and closer supervision. For example, operational changes impacting crew assignments may require negotiations with labor organizations. Main line route changes may require crews to undergo additional familiarization, training, or certification processes. Terminal rationalizations will likely require multiple on-site visits by network planners to walk through specific changes with local operating personnel, as well as close coordination between railroad customer service personnel and customers whose shipments are processed in affected yards.

24. For these more complex changes, Applicants typically develop scorecards to closely track each consideration and ensure implementation metrics

align with projected service improvements. In some cases, scorecards are distributed daily to the teams charged with implementing changes to provide immediate feedback on their progress. In all cases, supervisors and their teams meet on a regular basis to address progress and any deviations from the implementation plan and to adjust plans in response to unanticipated challenges.

25. As discussed above, Applicants will apply their change management processes to the changes described in the Operating Plan. As Applicants get closer to implementing the merger, they will establish an implementation sequence that considers how related changes can be grouped to accelerate delivery of merger benefits while also accounting for regional and local resource availability to ensure no one area is overwhelmed by changes.

26. All changes will be made within a structure that includes clear expectations, careful oversight, and accountability. As Applicants begin implementing changes to train and blocking plans, they will establish a regular cadence of weekly meetings between local and regional operating personnel and network planners to evaluate impacts of recent changes, discuss ongoing implementation efforts, and plan for additional future changes. These meetings will provide opportunities to give and receive feedback and adjust plans as necessary.

27. Applicants also will not make any merger-related changes that cannot be reversed if necessary. They will be able to revert to pre-merger train and blocking patterns if unexpected issues arise with new patterns. They also will be able to restore pre-merger terminal operations if unanticipated issues arise after consolidations.

Applicants have also developed specific contingency plans for merger-related service disruptions, as described in Part IX of this Service Assurance Plan.

28. Applicants' planning process is designed to protect against events that might cause merger-related service disruptions. Applicants will proceed with implementation only when the network and all internal stakeholders are properly oriented for success, and Applicants will ensure customers and affected connecting carriers are informed about the timing of any changes affecting their operations, though, as discussed below, Applicants expect those affects to be minimal.

B. Service Changes from Optimizing Operations

29. As discussed in the Operating Plan, Applicants' consolidation and optimization of UP and NS operations will provide faster, more efficient service for traffic currently interchanged between UP and NS. In aggregate, Applicants' Optimized Plan is projected to eliminate approximately 2,400 daily handlings and save approximately 60,000 daily car miles.[1] Applicants' Growth Plan anticipates the merged railroad will attract a significant amount of new traffic, and thus handlings and car hours increase, but the growth traffic will be created by and benefit from the same types of service improvements and efficiencies achieved in the Optimized Plan. In the sections below, Applicants describe those service improvements and efficiencies on a route level so individual shippers can evaluate the projected improvements and changes.

---

[1] *See* Op. Plan Workpaper "C-251124 Operating Plan Metrics vF.xlsx," Tab "Growth Plan," Cells D17 and D25.

1. Manifest Traffic

30. As described in the Operating Plan, Applicants are planning significant changes to train and blocking plans to optimize current flows of manifest traffic and provide significant transit time improvements. Transit time savings from eliminating car handlings depend on the nature of the handling and the capabilities of the facilities in which the handling occurs, as well as the timing of connecting services. Applicants' experience is that, on average, eliminating handlings reduces transit times by approximately 20 to 24 hours. Applicants' Optimized Plan includes plans to operate several new manifest trains that will allow traffic to move from origin to destination with fewer intermediate handlings. These trains, which are described in more detail in the Operating Plan,[2] include:

- A new train (MNPCW) that will eliminate 220 daily car handlings for traffic moving from west of North Platte to the Ohio Valley and Northeast;
- A new train (MALEK) that will eliminate 151 daily car handlings on traffic moving between Minnesota and Wisconsin, on the one hand, and Ohio, Pennsylvania, and New York, on the other hand;
- A new train (MCWAL) that will eliminate car classifications for approximately 110 cars daily processing through the BRC on traffic moving from New York, Pennsylvania, Ohio, and Virginia to Illinois, Wisconsin, and Minnesota;
- A new train (MNLCW) that will save between one to two handlings for approximately 80 cars daily (144 total daily car handlings) on traffic moving from Texas, Louisiana, and Arkansas to Detroit, the Ohio Valley, and the Northeast; and
- A new train pair (MNLCT/MCTNL) that will eliminate 124 daily car handlings on traffic moving between Texas, Louisiana, Arkansas, and western points on UP, on the one hand, and Kentucky, Alabama,

[2] *See* Op. Plan Workpaper "Manifest T1 vs T2 111825.xlsx."

Tennessee, and northeastern and southeastern points on NS, on the other hand.

31. Applicants' Optimized Plan also incorporates a substantial number of changes to existing plans that do not involve operating new trains but will reduce handlings for manifest traffic that rides existing trains. These changes include:

- Building blocks for eastbound traffic to destinations currently served by NS using Alton & Southern Railway ("A&S"), rather than have A&S transfer eastbound traffic to the Terminal Railroad Association of St. Louis ("TRRA") for blocking;
- Building blocks in North Platte to destinations in Ohio and Pennsylvania served by NS, rather than building blocks for Indiana and blocking the cars again in Indiana;
- Building blocks at Bellevue and Conway for UP's 18th Street and North Little Rock yards to reduce handlings in the St. Louis gateway;
- Building blocks at Birmingham for Texas Gulf traffic to reduce handlings;
- Building blocks in eastern Iowa and Elkhart to reduce terminal handlings in the Chicago gateway;
- Shifting work from NS's North Kansas City Yard to UP's 18th Street Yard to reduce transfers between NS and UP; and
- Shifting work from NS's Oliver Yard to UP's Avondale Yard to reduce transfers between UP and BNSF and NS.

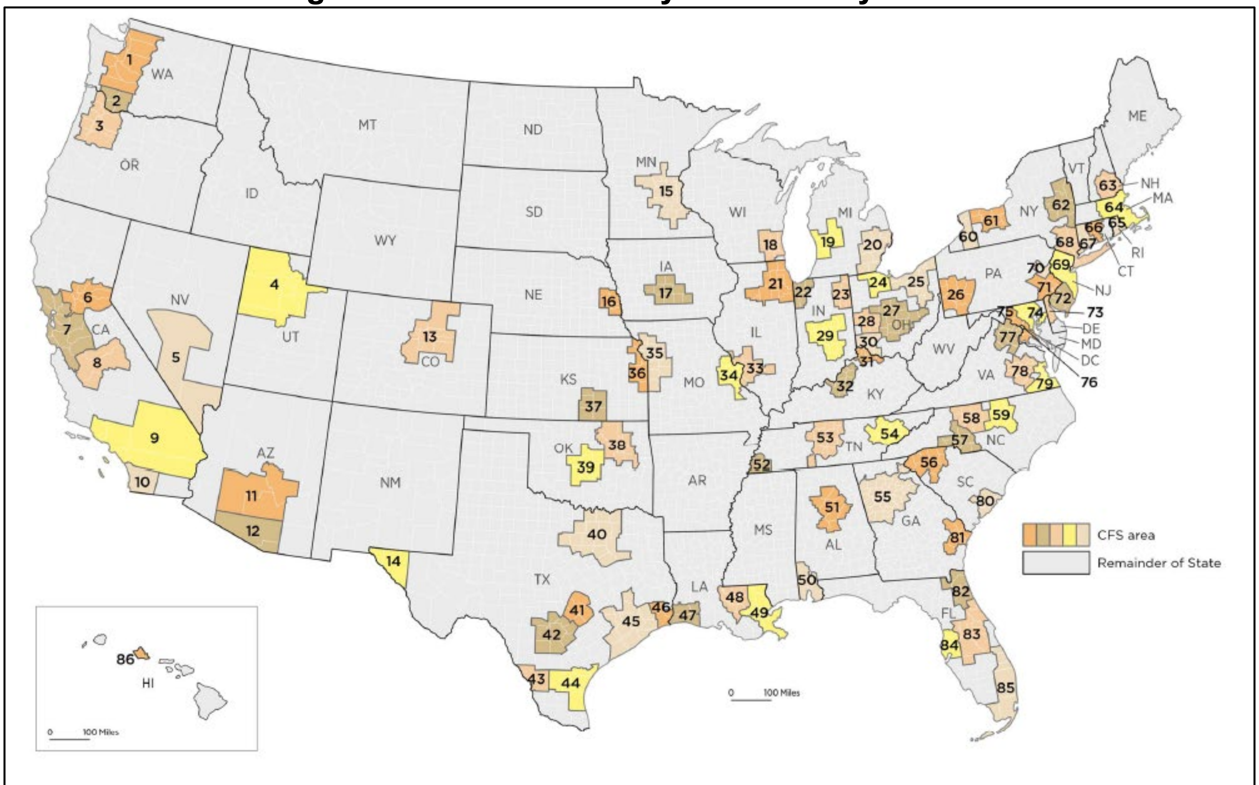
32. Applicants' combined network, as represented in the Optimized Plan, includes approximately 9 million loaded and empty cars of manifest traffic moving between 177,993 origin-destination pairs, including 173,433 origin-destination station pairs with traffic levels of less than one car per day.[3]

---

[3] *See* Workpaper "OD Pair Summary Documentation 112025.xlsx," Tab "Total Manifest Car Count," Cell B6; *id.*, Tab "Documentation."

33. To allow shippers to evaluate projected service improvements and changes on a more manageable level, Applicants identified origin-destination station pairs that had movements in the Base Plan and the Optimized Plan—to allow an apples-to-apples comparison—and assigned the station pairs to origin-destination routes based on Commodity Flow Survey ("CFS") areas used by the U.S. Census Bureau. CFS areas are shown below in Figure 1.

Figure 1: 2022 Commodity Flow Survey Areas



Note: All of Alaska is "Remainder of State."
Source: U.S. Census Bureau, 2025.

34. Applicants' process identified 1,602 manifest CFS-based routes that Applicants project will experience an improvement of at least one handling per day. Applicants are providing the full list of manifest CFS-based routes in Electronic

Appendix W and the accompanying workpapers.[4] Applicants anticipate the manifest trains they project adding as part of their Growth Plan would perform similarly to trains moving over comparable routes in the Optimized Plan.

35. The results presented in Applicants' Appendices reflect modeling performed far in advance of any actual post-merger operating changes. The results therefore do not necessarily represent changes UP/NS will adopt after applying their change management process. Network planners rely on the best information available at the time changes are made. As discussed above, Applicants will not change any train or blocking plan without completing their change management process. Use of the change management process is important to ensure Applicants can successfully execute their plans under the operating conditions that exist when the plans change.

2. Projected Service Improvements for Intermodal Operations

36. As described in the Operating Plan, Applicants are planning significant changes to optimize current flows of intermodal traffic and provide substantial improvements in transit times. Applicants' Optimized Plan includes plans to operate two new intermodal trains that will allow traffic to move from origin to destination using faster routes with fewer intermediate handling. The new trains, which are described in more detail in the Operating Plan, are:

- A new train pair (ZLCCX/ZHBLC) that will save approximately 17 hours of transit time on traffic moving from Southern California to the

[4] *See* Workpaper "20251128 2210 CFS lane analysis_WorkPaper.xlsx," Tab "tab_1A_Manifest_summary."

Northeast and approximately 19 hours on traffic moving in the opposite direction by using NS's line between Kansas City, Missouri, and Butler, Indiana;[5] and

- A new train pair (ZLBAT/ZCTLB) that will save approximately 70 hours of transit time on traffic moving from Southern California to the Southeast and approximately 95 hours on traffic moving in the opposite direction by operating via Shreveport and Meridian.[6]

37. Applicants anticipate ZLCCX will operate between LATC and Croxton in 95 hours; ZHBLC will operate between Harrisburg and LATC in 93 hours.[7]

38. Applicants anticipate ZLBAT will operate between Long Beach and Atlanta in 74 hours; ZCTLB will operate between Charlotte and Long Beach in 83 hours.[8]

39. Applicants are also planning to institute several new intermodal services as part of their Growth Plan. The new services are described in detail in the Operating Plan. The projected origin-to-destination train transit times, from departure to arrival, for the new services are set out below in Table 1.

---

[5] Workpaper "Transcon Lane Level Transit Time & Comps.xlsx," Tab "Transit Times," Cells N4 and N14.

[6] *See* Workpaper "Transcon Lane Level Transit Time & Comps.xlsx," Tab "Transit Times," Cells N5 and N15.

[7] *See id.*, Cells M4 and M14.

[8] *See id.*, Cells M5 and M15.

Table 1[9]
New Intermodal Services

Train Symbol	Direction	Origination	Destination	Planned Transit Time (hrs)
ZLTCX	Eastbound	Lathrop, CA	Croxton, NJ	83
ZCICX	Eastbound	City of Ind, CA	Croxton, NJ	95
ZLCDT	Eastbound	LATC, CA	Livernois, MI	73
ZIEJX	Eastbound	IEIT, CA	Jacksonville, FL	83
ZMXCX	Eastbound	Port Laredo, TX	Croxton, NJ	85
ZHOAT	Eastbound	Houston, TX	Atlanta, GA	39
ZCXLT	Westbound	Croxton, NJ	Lathrop, CA	85
ZCXCI	Westbound	Croxton, NJ	City of Ind., CA	99
ZDTLC	Westbound	Livernois, MI	LATC, CA	80
ZCTLB	Westbound	Charlotte, NC	Long Beach, CA	83
ZCXMX	Westbound	Croxton, NJ	Port Laredo, TX	83
ZATHO	Westbound	Atlanta, GA	Houston, TX	36

40. Applicants can provide more specific estimates of planned transit times for intermodal trains than for manifest trains because intermodal service generally involves fewer elements than manifest service—for example, fewer pick-up and set-out events and fewer connections to coordinate. However, the planned transit times set forth above also reflect only preliminary expectations. Applicants will not institute any new schedules without completing their change management process to ensure the schedules respond to market conditions and can be executed under the operating conditions that exist at the time.

---

[9] *See* Workpaper "Transcon Lane Level Transit Time & Comps.xlsx," Tab "Transit Times."

C. Potential Areas of Service Degradation

41. As discussed throughout the Application, the UP/NS merger will provide tremendous benefits to customers shipping on UP and NS, especially customers shipping traffic between locations on the legacy UP and the legacy NS. Further, as discussed throughout this Service Assurance Plan, Applicants are carefully planning the integration of the two companies to avoid any merger-related service issues.

42. In developing an Operating Plan for the combined company, UP and NS service designers found significant opportunities to improve the speed and efficiency of service for large numbers of customers. As noted above, the combination is projected to eliminate approximately 2,400 daily handlings and save 60,000 daily car miles, which benefits our customers and the public at large.[10] Making these improvements sometimes requires making trade-offs. Sometimes improving transit times for a heavily used route requires changes that have the opposite impact on a route with less traffic. For example, UP currently moves some intermodal traffic directly from Southern California to Marion, Arkansas. Under the Optimized Plan, the Marion traffic will initially ride ZLBAT, a new train UP/NS plans to operate to Atlanta via the Meridian Speedway. UP will split out Marion and Dupo (St. Louis) traffic at Greggton, Texas, where it will continue to Marion on the IGRMN (Greggton to Marion). The new ZLBAT will reduce transit times by 70 hours for 57 containers of traffic per day moving to the Southeast—a number expected to grow as the

[10] *See* Workpaper "C-251124 Operating Plan Metrics vF.xlsx," Tab "Growth Plan," Cells D25 and D17.

improved service attracts even more business.[11] However, the extra handling at Greggton will add approximately 4 hours of transit time to the 191 daily containers in the Marion and Dupo blocks.[12] Applicants would look carefully for ways to mitigate the impacts on Marion and Dupo traffic before implementing any new service as part of their change management process; however, transit times could increase on some routes in creating transit time savings on other routes.

43. To help shippers understand the potential magnitude of the transit time savings in relation to potential transit time increases, Applicants used the manifest CFS-based routes discussed above to identify routes on which traffic was projected to experience any change in average handlings per car from the Base Plan to the Optimized Plan. Of the 9,228 manifest routes identified, 40 percent of routes are projected to have an improvement, 46 percent are anticipated to have no change, for a total of 86 percent projected to have no change or an improvement.[13]

44. To focus on routes on which customers would be likely to experience more noticeable changes, Applicants identified manifest CFS-based routes on which traffic was projected to experience an average change of more than one handling per car. Of the 1,748 routes projected to see an increase or decrease of one or more

[11] *See* Workpaper "Transcon Lane Level Transit Time & Comps.xlsx," Tab "Transit Times," Cell N5; Workpaper "Intermodal T1 vs T2 111925.xlsx," Tab "ZCTLB ZLBAT Detail," Cells G10:G13.

[12] *See* Workpaper "Intermodal T1 vs T2 111925.xlsx," Tab "ZLBAT Greggton Detail," Cell G7.

[13] *See* Workpaper "20251128 2210 CFS lane analysis_WorkPaper.xlsx," Tab "tab_1A_Manifest_summary," Cells M7, M8, and N8.

handlings, Applicants expect that 1,602, or 92 percent, will see a decrease (improvement) in handlings.[14]

45. On the intermodal side, Applicants used the CFS areas to identify intermodal routes projected to see any change in average handlings per car from the Base Plan to the Optimized Plan. Of the 1,569 intermodal routes identified, 88 percent are projected to have no change or an improvement.[15] Applicants also identified 82 additional routes on which they would improve handling by eliminating rubber tire interchanges, for a total of 351 routes with improved handlings.[16] The rubber tire routes were not included among the "changed" routes with improved handlings because the improved origin-destination route was "new" in the Optimized Plan.

46. To focus on routes on which customers would be likely to experience more noticeable changes, Applicants identified intermodal CFS-based routes on which traffic was projected to experience an average change of more than one handling per trip or routes representing converted rubber tire traffic. Of the 247 routes projected to see an increase or decrease of one or more handlings, Applicants expect that 185 routes, representing 301,549 containers, or 94 percent of containers, will see a decrease (improvement) in handlings.[17]

---

[14] *See* Workpaper "20251128 2210 CFS lane analysis_WorkPaper.xlsx," Tab "tab_1A_Manifest_summary," Cells I17 and I18.

[15] *See* Workpaper "20251128 2210 CFS lane analysis_WorkPaper.xlsx," Tab "tab_1B_Intermodal_summary," Cells K25 and Q28.

[16] *See id.*, Cells K28 and K39.

[17] *See id.*, Cells K43, L43, and L46.

47. Again, Applicants emphasize UP/NS will not change current train and blocking plans, institute new trains, or rationalize yard operations without applying the change management process described above in Section II.A. UP/NS will closely monitor the impact of any changes through their normal change management process and provide stakeholders with periodic updates on their merger implementation progress and plans. Applicants will remain committed to transparency throughout the implementation process.

D. Potential Impacts on Connecting Rail Carriers and Ports

48. Applicants' implementation of operational changes will have some impact on the operation of Class II and III railroads, other connecting railroads, and ports, but the impacts should be positive. The sections below first address the effects of Applicants' implementation of operational changes on operations at major gateways. Next, they address the non-gateway effects on operations of Class II and III railroads and the operations of ports.

1. Chicago Gateway

49. Applicants' implementation of operational changes in the Chicago area should help alleviate congestion and thus improve operations for other rail carriers in Chicago. As described in the Operating Plan, Applicants plan to route certain trains around Chicago, thus reducing congestion in the Chicago area. They will also reduce car handlings and crew changes on trains that continue operating through Chicago through train plan and blocking changes and by consolidating certain UP and NS yards and terminals in Chicago.

50. Applicants have no plans to alter their existing interchange with other rail carriers in Chicago, except they will reduce interchange traffic between UP and NS using BRC, as described in the Operating Plan. BRC and IHB will continue to play important roles in the Chicago area, performing local operations and handling traffic interchanged in Chicago between UP/NS and other Class I railroads. By rationalizing handling of UP/NS traffic in Chicago, the UP/NS merger will increase BRC and IHB capacity available to serve other railroads.

2. St. Louis Gateway

51. Applicants' implementation of operational changes in St. Louis will reduce operational complexity and help create interchange and switching capacity in St. Louis. UP/NS will overall reduce yard activity by building blocks for eastbound traffic using A&S, which has capacity to accommodate the additional activity, rather than have A&S transfer eastbound traffic to TRRA for blocking. Applicants will also offset some of the additional work being performed by A&S by building blocks in North Little Rock, Bellevue, and Conway that travel deeper into the combined network, thus reducing classification demand at A&S's Gateway Yard.

52. Applicants have no plans to alter their interchanges with other carriers in St. Louis. UP/NS expect to continue to interchange with other carriers in St. Louis just as UP and NS interchange with those carriers today.

3. Kansas City Gateway

53. Applicants' integration of UP and NS will streamline yard activity in Kansas City. For intermodal traffic, Applicants will use UP's Kansas City Intermodal Terminal and NS's Voltz Yard primarily for separating domestic and international

shipments. For manifest traffic, Applicants will consolidate NS's North Kansas City Yard into UP's 18th Street Yard.

54. Applicants have no plans to significantly alter their interchanges with other carriers in Kansas City. UP/NS expect to adjust their current interchanges with Canadian Pacific Kansas City ("CPKC"), BNSF Railway ("BNSF"), Kansas City Terminal Railway, and Missouri and Northern Arkansas Railway in accordance with the terminal consolidations described above, which will help reduce interchange moves and congestion in the Kansas City gateway.

4. Memphis Gateway

55. Applicants' integration of UP and NS and intermodal terminal rebalancing will not significantly affect other rail traffic moving in and through Memphis.

56. Applicants have no plans to alter their interchanges with other carriers in Memphis. UP/NS expect to continue to interchange with other carriers in Memphis just as UP and NS interchange with those carriers today.

5. New Orleans Gateway

57. Applicants' integration of UP and NS will streamline activity in New Orleans by consolidating operations from NS's Oliver Yard into UP's Avondale Yard. Applicants will also shift BNSF's interchange with NS from Oliver Yard to a UP/NS-BNSF interchange at UP's Avondale Yard. The consolidation of activities in UP's Avondale Yard will free capacity currently consumed when UP and BNSF interchange trains with NS. Specifically, this change will streamline interchange

between UP/NS and BNSF, while other through freight movements will reduce crew change events on the Back Belt, thus further improving fluidity in New Orleans.

58. The changes to Applicants' New Orleans-area operations will not affect interchanges with other carriers in New Orleans. Applicants plan to continue using Oliver Yard to support interchange operations with Canadian National Railway Company ("CN"), CPKC, and New Orleans Public Belt Railroad, but there will be additional opportunities to streamline New Orleans-area operations by shifting NS's current interchanges with CN and CPKC to UP's facilities via Baton Rouge, which will further reduce congestion in New Orleans.

6. Other Class II and Class III Railroads

59. As discussed in the Operating Plan, Applicants' plans do not include any operational changes to connections with UP's and NS's many current short line partners, other than the connections in Chicago and St. Louis discussed above. Applicants' change management process will consider potential impacts on short line connections before UP/NS adopts any new train or blocking plans that would affect short lines. UP and NS highly value their relationships with their short line partners and will look for opportunities to develop even more efficient connections with short lines to take advantage of the many opportunities created by the merger to attract new business to rail.

7. Ports

60. As discussed in the Operating Plan, Applicants' plans do not include any operational changes to connections with the many ports served by UP and NS, though Applicants anticipate traffic moving to ports will increase as businesses take

advantage of single-line service improvements and efficiencies to become more competitive in international markets. Applicants' change management process will consider potential impacts on ports before UP/NS adopts any new train or blocking plans that would affect ports.

III. Yard and Terminal Operations

A. Overview

61. Applicants recognize the operational fluidity of yards and terminals is critical to the successful implementation of a transaction and effective service to shippers. Below, Applicants describe how the operations at principal classification yards and major terminals will be changed and how those changes will affect service to customers. As part of their analysis, Applicants furnish dwell time benchmarks for each facility described and estimate what the expected dwell times will be after operational changes are implemented. Applicants also furnish on-time origination performance benchmarks for each facility described and estimate what the expected on-time origination performance will be after operational changes are implemented.

B. Principal Classification Yards and Major Terminals

62. The Board's rules require reporting on changes to operations of Applicants' "principal classification yards" and "major terminals." However, the Board's rules do not define the terms "principal classification yards" or "major terminals."

1. Principal Classification Yards

63. To respond to the Board's requirements regarding principal classification yards, Applicants identified manifest yards with more than 800 cars

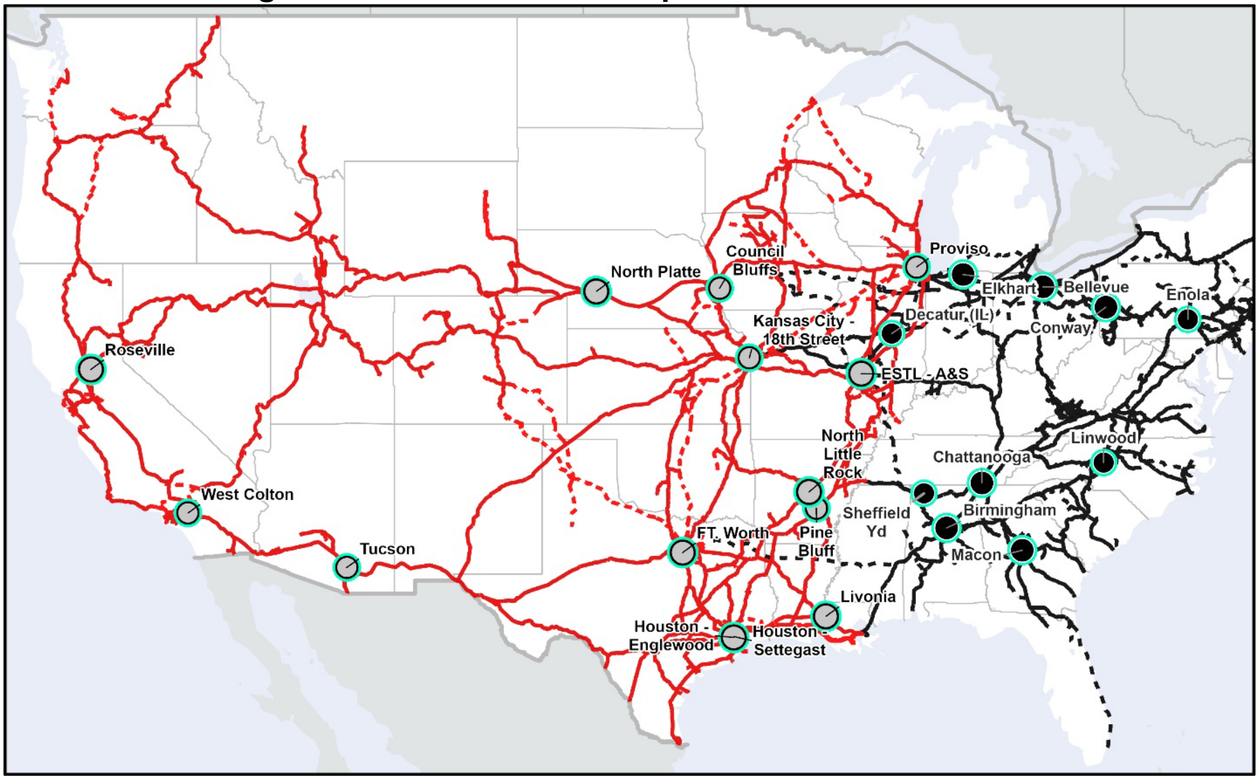
processed per day, as shown in the Operating Plan's Base Plan, and then added several yards to ensure all UP-to-NS gateways had a nearby yard subject to reporting. Applicants use the same yards for the benchmarking required by 49 C.F.R. § 1180.10(k)(2). Applicants list their principal classification yards for reporting purposes below in Table 2 and show the locations of those yards below in Figure 2.

Table 2[18]
Principal Classification Yards

UP Yards	Base Plan Cars/Day	NS Yards	Base Plan Cars/Day
North Little Rock, AR	2,264	Elkhart, IN	2,349
Englewood (Houston), TX	2,040	Moorman (Bellevue), OH	1,811
Gateway Yard (St Louis), IL	1,866	DeButts (Chattanooga), TN	1,671
Livonia, LA	1,813	Birmingham, AL	1,651
Ft. Worth, TX	1,655	Conway, PA	1,500
North Platte East, NE	1,408	Brosnan (Macon), GA	1,172
North Platte West, NE	1,406	Decatur (Incl. East Decatur), IL	1,164
Roseville, CA	1,403	Enola (Harrisburg), PA	880
Settegast (Houston), TX	1,233	Sheffield, AL	671
West Colton (Los Angeles), CA	1,085	Linwood, NC	453
Proviso (Chicago), IL	1,079		
Council Bluffs, IA	727		
18th St (Kansas City), KS	705		
Tucson, AZ	653		
Pine Bluff, AR	585		

[18] *See* Workpaper "Consolidated Terminal Data.xlsx," Tab "D.1.c Principal Class Yards."

Figure 2: Locations of Principal Classification Yards



2. Major Intermodal Terminals

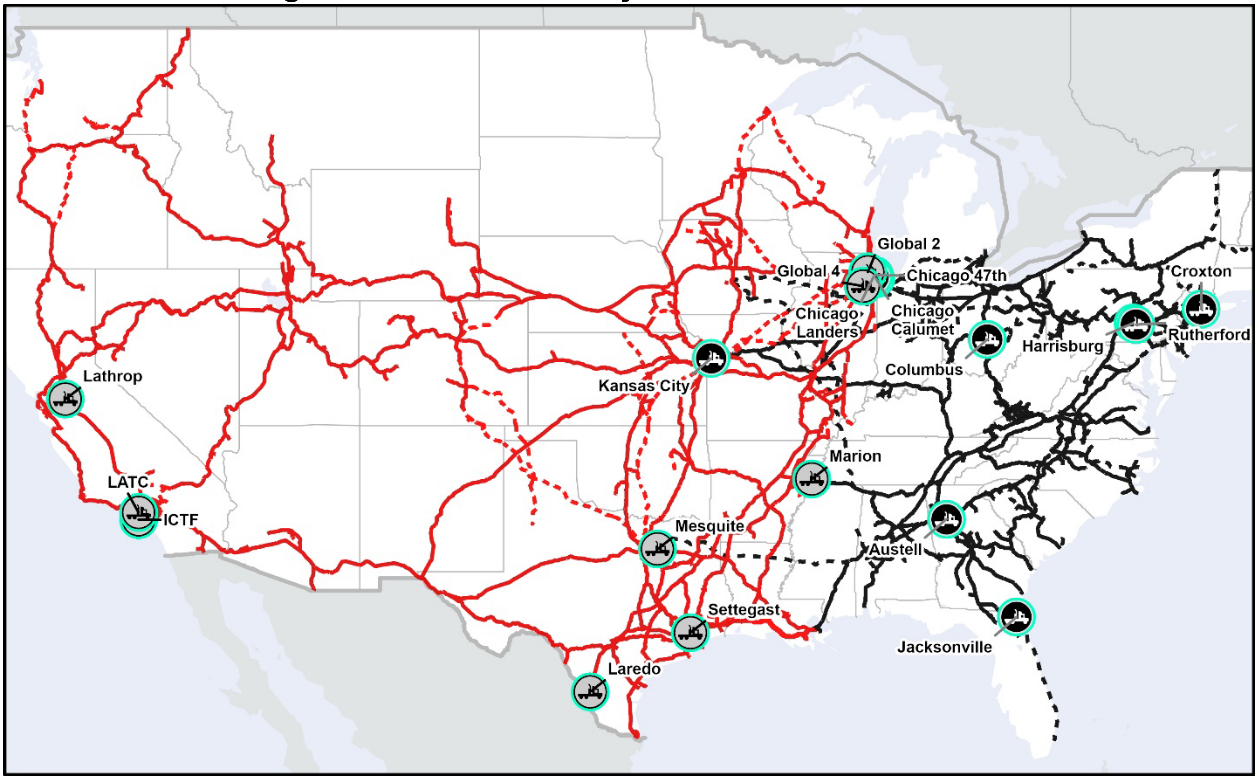
64. To respond to the Board's requirements regarding major intermodal terminals, Applicants identified intermodal terminals with more than 800 lifts per day, as shown in the Operating Plan's Base Plan, and then added several terminals projected to experience meaningful growth as a result of the transaction and to ensure coverage of all major UP-to-NS gateways. Applicants use the same terminals for the benchmarking required by 49 C.F.R. § 1180.10(k)(2). Applicants list their major intermodal terminals for reporting purposes below in Table 3 and show the locations of those terminals below in Figure 3.

Table 3[19]
Major Intermodal Terminals

UP Intermodal Terminals	Base Plan Lifts/Day	NS Intermodal Terminals	Base Plan Lifts/Day
Global 4 (Chicago), IL	1,945	47th St (Chicago), IL	1,269
Global 2 (Chicago), IL	1,381	Austell (Atlanta), GA	1,237
East Los Angeles, CA	1,065	Harrisburg, PA	953
Mesquite (Dallas), TX	821	Calumet (Chicago), IL	856
ICTF (Los Angeles), CA	817	Landers (Chicago), IL	876
Lathrop, CA	745	Croxton (New York City), NJ	839
Marion (Memphis), AR	651	Rutherford (Harrisburg), PA	770
Port Laredo, TX	299	Rickenbacker (Columbus), OH	704
Settegast (Houston), TX	293	Voltz (Kansas City), MO	646
		Jacksonville, FL	640

[19] *See* Workpaper "Consolidated Terminal Data.xlsx," Tab "D.1.c Major Intermodal Terminal."

Figure 3: Location of Major Intermodal Terminals



C. Changes to Operations of Principal Classification Yards and Major Intermodal Terminals

65. As discussed in the Operating Plan, Applicants' principal classification yard and intermodal terminal operations will change as a result of a combination of merger-related growth, changes to train and blocking plans, and yard and terminal consolidations. As described in the first part of the Service Assurance Plan, UP/NS will engage in a thorough change management process before implementing any of these changes to ensure they will not cause any degradation of service to customers.

1. Principal Classification Yards

66. Below in Tables 4 and 5, Applicants show the change in the projected number of cars per day between the Base Plan and the Growth Plan for the classification yards listed in Table 2.

Table 4[20]
Changes to Operations
Principal Classification Yards – UP

Yard	Base Plan Cars/day	Growth Plan Cars/day	Variance
North Little Rock, AR	2,264	2,672	407
Englewood (Houston), TX	2,040	2,286	245
Gateway Yard (St Louis), IL	1,866	2,180	314
Livonia, LA	1,813	2,311	499
Ft. Worth, TX	1,655	1,708	53
North Platte East, NE	1,408	1,524	116
North Platte West, NE	1,406	1,534	128
Roseville, CA	1,403	1,476	74
Settegast (Houston), TX	1,233	1,347	114
West Colton (Los Angeles), CA	1,085	1,087	2
Proviso (Chicago), IL	1,079	897	(182)
Council Bluffs, IA	727	863	135
18th St (Kansas City), KS	705	929	224
Tucson, AZ	653	669	17
Pine Bluff, AR	585	688	104

[20] Workpaper "Consolidated Terminal Data.xlsx," Tab "D.1.c Changes Class."

Table 5[21]
Changes to Operations
Principal Classification Yards – NS

Yard	Base Plan Cars/Day	Growth Plan Cars/Day	Variance
Elkhart, IN	2,349	2,747	398
Moorman (Bellevue), OH	1,811	2,015	204
DeButts (Chattanooga), TN	1,671	2,244	573
Birmingham, AL	1,651	2,030	378
Conway, PA	1,500	1,644	144
Brosnan (Macon), GA	1,172	1,405	234
Decatur (Incl. East Decatur), IL	1,164	1,493	329
Enola (Harrisburg), PA	880	1,009	129
Sheffield, AL	671	676	4
Linwood, NC	453	486	33

67. The projected traffic growth in these yards is the result of improved train and blocking patterns in the Optimized Plan and added traffic in the Growth Plan. For example, Livonia, North Little Rock, Chattanooga, and Birmingham are heavily used in the Optimized Plan to improve blocking for deeper network benefit. These changes, coupled with projected manifest traffic growth between Texas and the Gulf Coast to the Ohio Valley and the Northeast, results in significant increases in volumes at these locations. Similarly, Elkhart is projected to experience increased traffic as a result of traffic growth between the Northeast and the Ohio Valley, on the one hand, and the Midwest and the West, on the other hand.

[21] *See* Workpaper "Consolidated Terminal Data.xlsx," Tab "D.1.c Changes Class."

68. As volume increases at these yards, and as traffic patterns evolve over time, UP/NS will continue to optimize its transportation plan with the goal of reducing handlings below the levels currently projected. UP/NS will also continue to evaluate the need for additional capital investment to accommodate traffic growth. However, Applicants' Operating Plan, including their capital improvement plan, which is described in detail in Part IV of this Service Assurance Plan, is designed to ensure their classification yards will have sufficient capacity to accommodate projected activity levels.

69. Applicants show the projected number of cars per day handled by their principal yards in the Growth Plan and the projected capacity of those yards after planned merger-related and non-merger-related investments below in Tables 6 and 7.

Table 6[22]
Growth Plan Cars per Day v. Capacity
Principal Classification Yards – UP

Yard	Growth Plan Cars/Day	Capacity Cars/Day	Variance
North Little Rock, AR	2,672	2,350	(322)
Englewood (Houston), TX	2,286	2,520	234
Gateway Yard (St Louis), IL	2,180	2,160	(20)
Livonia, LA	2,311	2,040	(271)
Ft. Worth, TX	1,708	1,910	202
North Platte East, NE	1,524	1,860	336
North Platte West, NE	1,534	1,780	246
Roseville, CA	1,476	2,040	564
Settegast (Houston), TX	1,347	1,690	343
West Colton (Los Angeles), CA	1,087	1,320	233
Proviso (Chicago), IL	897	990	93
Council Bluffs, IA	863	900	37
18th St (Kansas City), KS	929	870	(59)
Tucson, AZ	669	850	181
Pine Bluff, AR	688	1,000	312

[22] *See* Workpaper "Consolidated Terminal Data.xlsx," Tab "D.1.c Changes Class v Cap."

Table 7[23]
Growth Plan Cars per Day v. Capacity
Principal Classification Yards – NS

Yard	Growth Plan Cars/Day	Capacity Cars/Day	Variance
Elkhart, IN	2,747	2,620	(127)
Moorman (Bellevue), OH	2,015	2,130	115
DeButts (Chattanooga), TN	2,244	2,300	56
Birmingham, AL	2,030	2,080	50
Conway, PA	1,644	2,200	556
Brosnan (Macon), GA	1,405	1,820	415
Decatur (Incl. East Decatur), IL	1,493	1,500	7
Enola (Harrisburg), PA	1,009	1,130	121
Sheffield, AL	676	1,340	664
Linwood, NC	486	1,010	524

2. Major Intermodal Terminals

70. Below in Tables 8 and 9, Applicants show the change in the projected number of lifts per day between the Base Plan and the Growth Plan for the intermodal terminals listed in Table 3.

[23] *See* Workpaper "Consolidated Terminal Data.xlsx," Tab "D.1.c Changes Class v Cap."

Table 8[24]
Changes to Operations
Major Intermodal Terminals – UP

Intermodal Terminal	Base Plan Lifts/Day	Growth Plan Lifts/Day	Variance
Global 4 (Chicago), IL	1,945	1,719	(226)
Global 2 (Chicago), IL	1,381	1,752	371
East Los Angeles, CA	1,065	1,168	104
Mesquite (Dallas), TX	821	914	92
ICTF (Los Angeles), CA	817	840	23
Lathrop, CA	745	1,294	549
Marion (Memphis), AR	651	1,131	480
Port Laredo, TX	299	638	340
Settegast (Houston), TX	293	877	584

Table 9[25]
Changes to Operations
Major Intermodal Terminals – NS

Intermodal Terminal	Base Plan Lifts/Day	Growth Plan Lifts/Day	Variance
47th St (Chicago), IL	1,269	1,498	229
Austell (Atlanta), GA	1,237	1,531	294
Harrisburg, PA	953	1,045	92
Calumet (Chicago), IL	856	926	70
Landers (Chicago), IL	876	844	(32)
Croxton (New York City), NJ	839	1,405	566
Rutherford (Harrisburg), PA	770	864	94
Rickenbacker (Columbus), OH	704	901	197
Voltz (Kansas City), MO	646	714	68
Jacksonville, FL	640	622	(19)

[24] *See* Workpaper "Consolidated Terminal Data.xlsx," Tab "D.1.c Changes Intm."

[25] *See id.*

71. The projected traffic growth in these terminals primarily results from added traffic in the Growth Plan. For example, volume increases at Croxton and Lathrop are driven by new traffic to the Northeast from the West Coast. Volume increases at Settegast and Austell are driven by new traffic between Texas and the Southeast. Optimized train plans that eliminate UP-NS interchanges in the Chicago gateway will offset some demand at Global 4. In addition, terminal consolidations in the Optimized Plan contribute to traffic increases at 47th Street, Global 2, and Marion.

72. As volume increases at these terminals, and as traffic patterns evolve over time, UP/NS will continue to optimize its transportation plan to make efficient use of its intermodal facilities. UP/NS will also continue to evaluate the need for additional capital investment to accommodate traffic growth. However, Applicants' Operating Plan, including their capital improvements plan, which is described in detail in Part IV of this Service Assurance Plan, is designed to ensure their intermodal terminals will have sufficient capacity to accommodate projected activity levels.

73. Applicants show the projected number of lifts per day in their major intermodal terminals in the Growth Plan and the projected capacity of those terminals after merger-related and non-merger-related investments below in Tables 10 and 11.

Table 10[26]
Growth Plan Lifts per Day v. Capacity
Major Intermodal Terminals – UP

Yard	Growth Plan Lifts/Day	Capacity Lifts/Day	Variance
Global 4 (Chicago), IL	1,719	2,679	959
Global 2 (Chicago), IL	1,752	2,060	308
East Los Angeles, CA	1,168	1,387	219
Mesquite (Dallas), TX	914	1,140	226
ICTF (Los Angeles), CA	840	1,648	809
Lathrop, CA	1,294	1,374	80
Marion (Memphis), AR	1,131	1,195	64
Port Laredo, TX	638	687	48
Settegast (Houston), TX	877	989	112

Table 11[27]
Growth Plan Lifts per Day v. Capacity
Major Intermodal Terminals – NS

Yard	Growth Plan Lifts/Day	Capacity Lifts/Day	Variance
47th St (Chicago), IL	1,498	1,912	414
Austell (Atlanta), GA	1,531	2,091	560
Harrisburg, PA	1,045	1,266	221
Calumet (Chicago), IL	926	1,085	159
Landers (Chicago), IL	844	1,448	604
Croxton (New York City), NJ	1,405	1,442	37
Rutherford (Harrisburg), PA	864	1,115	252
Rickenbacker (Columbus), OH	901	1,129	228
Voltz (Kansas City), MO	714	888	173
Jacksonville, FL	622	832	211

[26] *See* Workpaper "Consolidated Terminal Data.xlsx," Tab "D.1.c Growth v Cap."

[27] *See id.*

D. Dwell Time and On-Time Origination Performance Benchmarks

74. In accordance with the benchmarking requirements in 49 C.F.R. § 1180.10(k), Applicants developed dwell time and on-time origination performance benchmarks for their principal classification yards and major intermodal terminals. Specifically, Applicants used the 36 monthly periods immediately preceding the filing date of the notice of intent to file the application as the benchmarking period.

1. Principal Classification Yards

75. Applicants provide dwell time and on-time origination performance benchmarks for their principal classification yards in Electronic Appendix X.[28] Applicants show the expected post-merger ranges of those benchmarks below in Table 12.

[28] *See* Workpaper "System, Yard, and Terminal Benchmarking Matrix.xlsx," Tab "Yard and Terminal Matrix."

Table 12[29]
Dwell Time and On-Time Origination Performance Ranges
Principal Classification Yards

Yard	Benchmark Dwell Range	Benchmark On-Time Origination Performance Range
North Little Rock, AR	20hrs-26hrs	40%-90%
Englewood (Houston), TX	20hrs-26hrs	40%-90%
Gateway Yard (St Louis), IL	20hrs-26hrs	40%-90%
Livonia, LA	20hrs-26hrs	40%-90%
Ft. Worth, TX	20hrs-26hrs	40%-90%
North Platte East, NE	20hrs-26hrs	40%-90%
North Platte West, NE	20hrs-26hrs	40%-90%
Roseville, CA	20hrs-26hrs	40%-90%
Settegast (Houston), TX	20hrs-26hrs	40%-90%
West Colton (Los Angeles), CA	20hrs-26hrs	40%-90%
Proviso (Chicago), IL	20hrs-26hrs	40%-90%
Council Bluffs, IA	20hrs-26hrs	40%-90%
18th St (Kansas City), KS	20hrs-26hrs	40%-90%
Tucson, AZ	20hrs-26hrs	40%-90%
Pine Bluff, AR	20hrs-26hrs	40%-90%
Elkhart, IN	26hrs-32hrs	25%-75%
Moorman (Bellevue), OH	26hrs-32hrs	25%-75%
DeButts (Chattanooga), TN	26hrs-32hrs	25%-75%
Birmingham, AL	26hrs-32hrs	25%-75%
Conway, PA	26hrs-32hrs	25%-75%
Brosnan (Macon), GA	26hrs-32hrs	25%-75%
Decatur (Incl. East Decatur), IL	26hrs-32hrs	25%-75%
Enola (Harrisburg), PA	26hrs-32hrs	25%-75%
Sheffield, AL	26hrs-32hrs	25%-75%
Linwood, NC	26hrs-32hrs	25%-75%

[29] *See* Workpaper "Consolidated Terminal Data.xlsx," Tab "D.1.c Class Ranges."

76. Applicants do not expect dwell times in their principal classification yards to change substantially as a result of the revised operations reflected in the Growth Plan. Applicants will ensure their classification yards have sufficient capacity such that dwell times should not deteriorate as a result of merger-related traffic growth. Applicants expect that dwell times in legacy UP classification yards will range between 20 and 26 hours under typical operating conditions, and dwell times in legacy NS classification yards will range between 26 and 32 hours under typical operating conditions. As discussed in the contingency planning portion of the Service Assurance Plan, Applicants will activate their contingency plans for the yards addressed in those plans if dwell times rise above 29 hours for legacy UP yards and 36 hours for legacy NS yards after the revised operating plans reflected in the Growth Plan are implemented. Applicants discuss the reasons for selecting those thresholds in the contingency planning portion of the Service Assurance Plan. *See* Section IX.E.

77. Applicants do not expect on-time origination performance in their principal classification yards to change substantially as a result of the revised operations reflected in the Growth Plan. Applicants will ensure their principal classification yards have sufficient capacity such that on-time performance should not deteriorate as a result of merger-related traffic growth. Applicants expect that on-time performance in legacy UP classification yards will remain between 40 and 90 percent, and on-time performance in legacy NS classification yards will remain between 25 and 75 percent, after the revised operations reflected in the Growth Plan are implemented.

2. Major Intermodal Terminals

78. Applicants provide dwell time benchmarks an on-time origination performance benchmarks for their major intermodal terminals in Electronic Appendix X.[30] Applicants show the expected post-merger ranges of those benchmarks below in Table 13.

[30] *See* Workpaper "System, Yard, and Terminal Benchmarking Matrix.xlsx," Tab "Yard and Terminal Matrix."

Table 13[31]
Dwell Time and On-Time Origination Performance Ranges
Major Intermodal Terminals (bold indicates international or mixed ramp)

Yard	Benchmark Terminal Arrival to Van Ground ("TA-VG") Range	Benchmark On-Time Origination Performance Range
Global 4 (Chicago), IL	6hrs to 18hrs	70%-95%
Global 2 (Chicago), IL	5hrs to 9hrs	70%-95%
East Los Angeles, CA	5hrs to 9hrs	70%-95%
Mesquite (Dallas), TX	5hrs to 9hrs	70%-95%
ICTF (Los Angeles), CA	6hrs to 18hrs	70%-95%
Lathrop, CA	5hrs to 9hrs	70%-95%
Marion (Memphis), AR	5hrs to 9hrs	70%-95%
Port Laredo, TX	5hrs to 9hrs	70%-95%
Settegast (Houston), TX	5hrs to 9hrs	70%-95%
47th St (Chicago), IL	5hrs to 9hrs	70%-95%
Austell (Atlanta), GA	6hrs to 18hrs	70%-95%
Harrisburg, PA	5hrs to 9hrs	70%-95%
Calumet (Chicago), IL	6hrs to 18hrs	70%-95%
Landers (Chicago), IL	5hrs to 9hrs	70%-95%
Croxton (New York City), NJ	6hrs to 18hrs	70%-95%
Rutherford (Harrisburg), PA	5hrs to 9hrs	70%-95%
Rickenbacker (Columbus), OH	6hrs to 18hrs	70%-95%
Voltz (Kansas City), MO	6hrs to 18hrs	70%-95%
Jacksonville, FL	6hrs to 18hrs	70%-95%

79. Applicants do not expect dwell times in their major intermodal terminals to change substantially as a result of the revised operations reflected in the Growth Plan. Applicants will ensure their intermodal terminals have sufficient capacity such that dwell times should not deteriorate as a result of merger-related

[31] *See* Workpaper "Consolidated Terminal Data.xlsx," Tab "D.1.c Intm Ranges."

traffic growth. Applicants expect that dwell times at terminals primarily or exclusively handling domestic intermodal traffic will remain between 5 and 9 hours, and dwell times at terminals primarily or exclusively handling international intermodal traffic will remain between 6 and 18 hours, after the revised operations reflected in the Growth Plan are implemented. However, as discussed in more detail in Section XII.B.2 of this Service Assurance Plan, intermodal terminal dwell times depend significantly on the timely performance by third parties to retrieve and remove containers and trailers from yards, and therefore they provide a poor measure of railroad service performance.

80. Applicants do not expect on-time origination performance in their major intermodal terminals to change substantially as a result of the revised operations reflected in the Growth Plan. Applicants will ensure their intermodal terminals have sufficient capacity such that on-time performance should not deteriorate as a result of merger-related traffic growth. Applicants expect that on-time performance in legacy UP and NS intermodal terminals will remain between 70 and 95 percent after the revised operations reflected in the Growth Plan are implemented.

IV. Infrastructure Improvements – Capital Improvement Plan

A. Capital Improvements Critical to Integrating UP and NS

81. As discussed in the Operating Plan, Applicants' combined network has sufficient capacity to accommodate the traffic flows projected in the Optimized Plan. Applicants have not identified any potential infrastructure impediments to the timely integration of UP and NS.

B. Capital Improvements to Handle Projected Growth

82. As also discussed in the Operating Plan, Applicants have planned extensive capital improvements to main lines and yard and terminal facilities on the combined UP/NS network that are projected to experience merger-related traffic growth. These investments will allow the combined railroad to accommodate anticipated traffic growth while also improving safety and service quality.

83. In the sections below, Applicants describe their plans to invest on main lines and in yard and terminal facilities to accommodate the traffic flows projected in the Growth Plan. The investments described below include two types of projects: (1) merger-related investments—projects Applicants planned specifically to address anticipated merger-related growth, and (2) pre-merger investments—projects UP or NS was advancing prior to their agreement to merge. Applicants are not including the second category of projects in their calculations of merger-related capital investment.[32]

1. Main Line Capacity Improvements

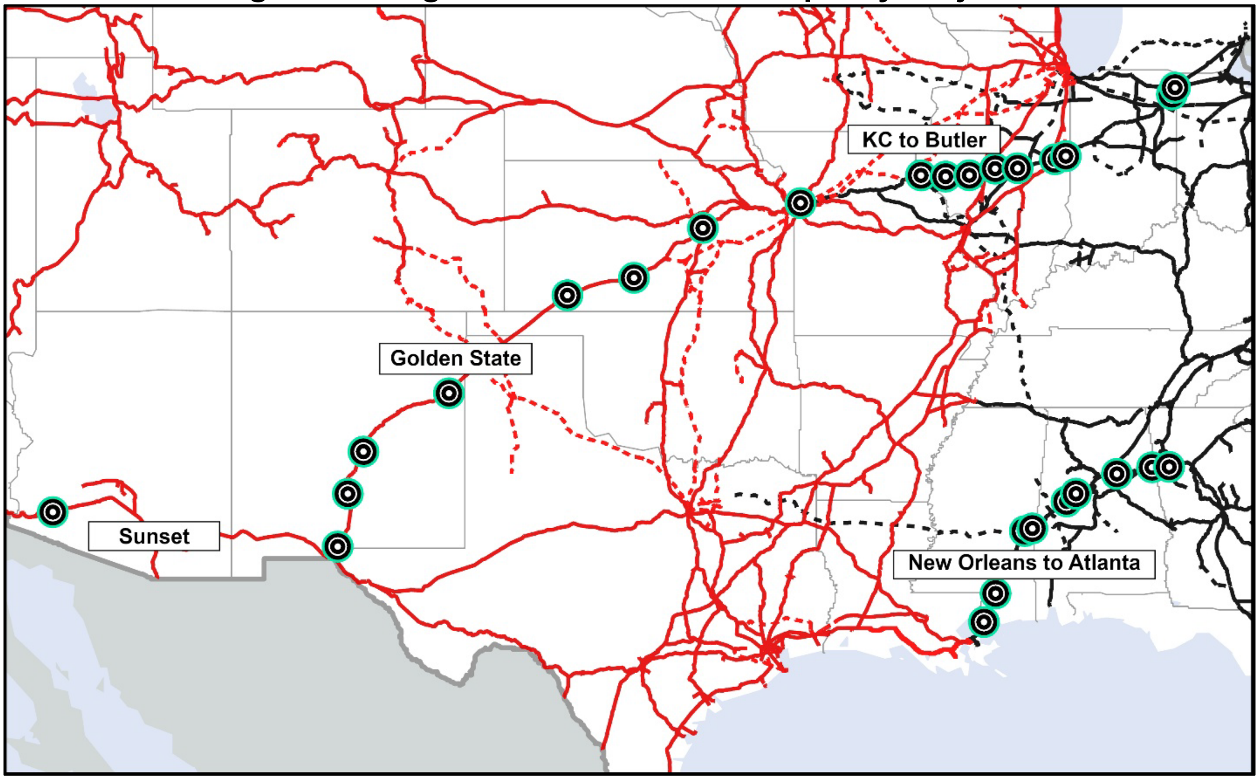
84. Applicants plan to invest approximately $507 million (in 2023 dollars) in projects to increase main line capacity on the combined network.[33] The locations of the planned projects are shown below in Figure 4.

---

[32] In describing expected project completion dates, Applicants refer to the actual year in which UP or NS plans to complete the projects when discussing pre-merger projects, and the number of years following merger approval for post-merger projects (*i.e.*, "Year 1," "Year 2," "Year 3").

[33] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H83. Planned investments are stated in 2023 dollars because 2023 is the year used for the impact analysis in this transaction. Applicants'

Figure 4: Merger-Related Main Line Capacity Projects



a. Main Line Projects on the UP Network

85. Applicants are planning merger-related investments to increase main line capacity on two routes on the legacy UP network: (1) the Sunset route between Los Angeles and El Paso, and (2) the Golden State route between El Paso and Kansas City. UP also has plans underway to increase capacity on its DeQuincy Subdivision that will help accommodate traffic flows projected in the Growth Plan. These investments are described in the next paragraphs.

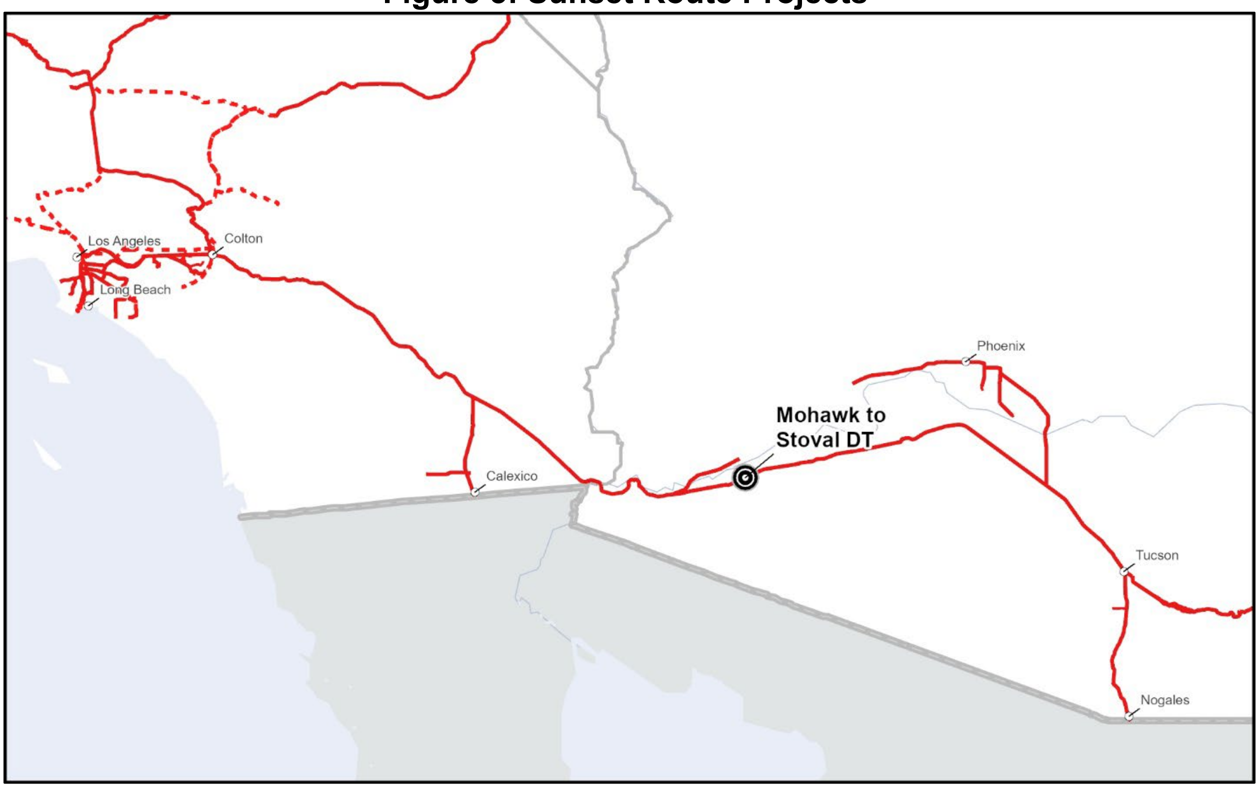
86. *Sunset Route Projects*. UP's Sunset route runs between Los Angeles and New Orleans. In the Growth Plan, Applicants project that the number of trains on

---

workpapers show investments in 2025 dollars to avoid the need for numerous separate conversions to 2023 dollars.

the Sunset route between West Colton, California, and El Paso, Texas, will increase from 30 per day to 36 per day, which would exceed the route's current fluid capacity. However, UP had a pre-merger plan to construct two new double-track segments on the route and had developed plans to further increase capacity as warranted. To accommodate merger-related growth, Applicants plan to make the next investment on UP's list: 3.9 miles of new double-track to connect the Mohawk and Stoval sidings. The location of the post-merger project is shown in Figure 5, and the projects are summarized below. Together, these projects will increase the Sunset route's fluid capacity between West Colton and El Paso well above 36 trains per day.[34]

Figure 5: Sunset Route Projects



34 *See* Workpaper "UP Sunset Corridor Capacity Projects.pdf" at 3–4.

- Pre-Merger Investment:
    - Yuma to Fortuna Double Track (Gila Subdivision MP 737.4 to 742.9). Applicants plan to construct 5.4 miles of new double track between East Yard near Yuma and Fortuna on the Gila Subdivision. Applicants expect to complete this project in 2027.[35]
    - Bosque to Shawmut Double Track (Gila Subdivision MP 862.1 to 870.8). Applicants plan to construct 8.7 miles of new double track between Bosque and Shawmut on the Gila Subdivision. Applicants expect to complete this project in 2027.[36]
- Merger-Related Investment:
    - Mohawk to Stoval Double Track (Gila Subdivision MP 795.9 to 801.9). Applicants plan to construct 3.9 miles of new double track between Mohawk and Stoval on the Gila Subdivision. Applicants estimate this project will cost $34.1 million and be completed by the end of Year 2.[37]

87. *Golden State Route Projects*. UP's Golden State route runs between El Paso, Texas, and Kansas City, Missouri. In the Growth Plan, Applicants project that the number of 14,000-foot trains moving over the Golden State route will increase from 9 per day to 14 per day, which would exceed the route's current fluid capacity. However, UP had a pre-merger plan to construct a new lead track in its Herington Yard to increase capacity on the route. To accommodate merger-related growth, Applicants plan to make a series of additional investments, primarily involving extensions to existing sidings. The locations of the post-merger projects are shown in Figure 6, and the pre- and post-merger projects are summarized below. Together,

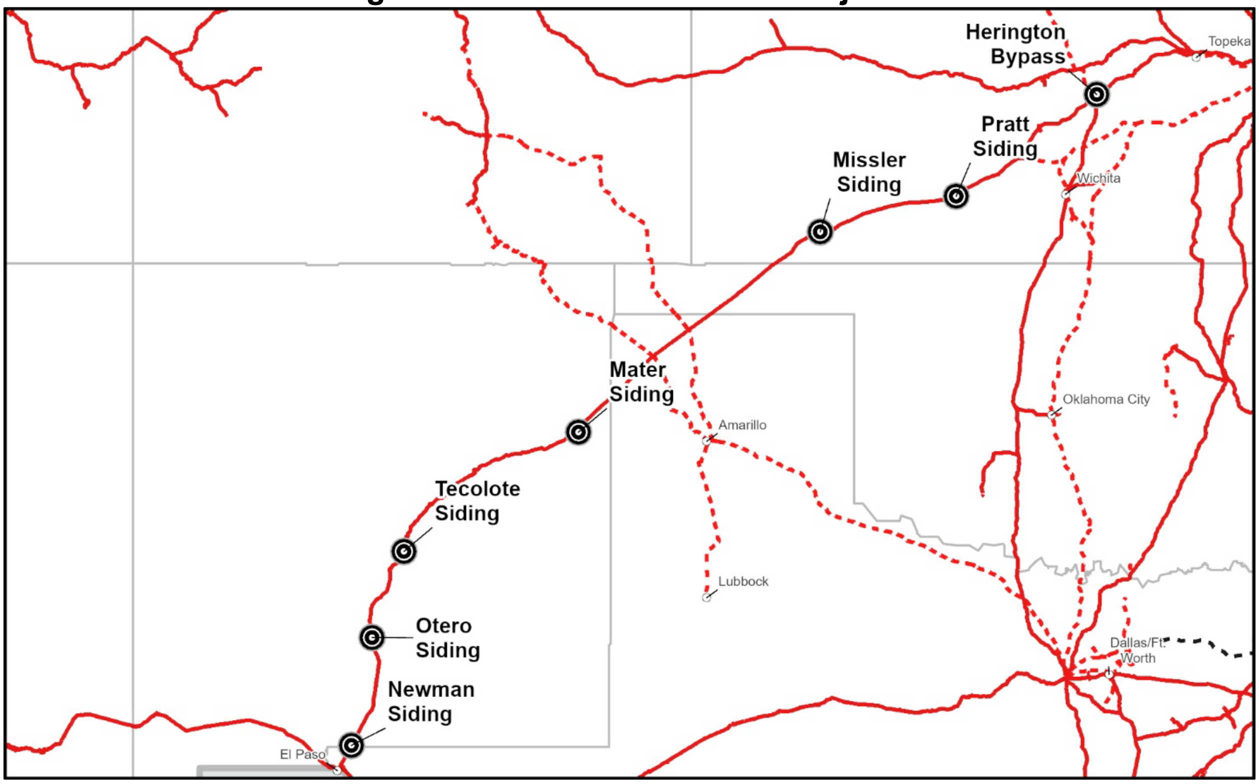
[35] *See id.* at 13.

[36] *See id.* at 14.

[37] *See id.* at 8; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H16.

these projects will allow the Golden State route to accommodate the projected increase in 14,000-foot trains.[38]

Figure 6: Golden State Route Projects



- Pre-Merger Investment: In 2026, UP plans to begin construction on a preexisting capacity improvement project.

  - Herington South Lead (Herington Subdivision MP 174.4 to 171.9). Applicants plan to construct 2.5 miles of new lead track into Herington Yard. This project will reduce congestion in and out of Herington Yard and help traffic flow through the Herington Subdivision. Applicants expect to complete this project by the end of 2026.[39]

- Merger Related Investment:

  - Otero Siding Extension (Carrizozo Subdivision MP 864.1 to 862.9). Applicants plan to extend the existing Otero siding on the

[38] *See* Workpaper "UP Golden State Corridor Capacity Projects.pdf" at 2–3 (total trains) and 4–5 (14,000-foot trains).

[39] *See id.* at 32.

Carrizozo Subdivision from 8,976 feet to over 15,000 feet. Applicants expect that this project will cost $11.2 million and be completed by the end of Year 1.[40]

- Missler Siding Extension (Pratt Subdivision MP 395.9 to 393.7). Applicants plan to extend the existing Missler siding on the Pratt Subdivision from 8,875 feet to over 15,000 feet. Applicants estimate this project will cost $18.9 million and be completed by the end of Year 1.[41]

- Herington Yard Bypass (Herington Subdivision MP 171.9 to 170.2). Applicants plan to construct an additional bypass lane through Herington Yard. The new lane will provide an additional route through the potential bottleneck at Herington and improve fluidity along the Golden State mainline. The combined railroad could also utilize the fast track as needed for additional yard capacity. Applicants estimate this project will cost $19.7 million and be completed by the end of Year 2.[42]

- Pratt Siding Extension (Herington Subdivision MP 296.1 to 294.5). Applicants plan to extend the existing Pratt siding on the Herington Subdivision from 9,219 feet to over 15,000 feet. Applicants estimate this project will cost $13.3 million and be completed by the end of Year 3.[43]

- Mater Siding Extension (Tucumcari Subdivision MP 624.2 to 623.0). Applicants plan to extend the existing Mater siding on the Herington Subdivision from 9,120 feet to over 15,000 feet.

---

[40] *See id.* at 8; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H17.

[41] *See* Workpaper "UP Golden State Corridor Capacity Projects.pdf" at 9; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H18.

[42] *See* Workpaper "UP Golden State Corridor Capacity Projects.pdf" at 10; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H19.

[43] *See* Workpaper "UP Golden State Corridor Capacity Projects.pdf" at 11; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H20.

Applicants estimate this project will cost $10.1 million and be completed by the end of Year 3.[44]

- Newman Siding Extension (Carrizozo Subdivision MP 948.4 to 947.2). Applicants plan to extend the existing Newman siding on the Carrizozo Subdivision from 8,996 feet to over 15,000 feet. Applicants estimate this project will cost $8.3 million and be completed by the end of Year 3.[45]

- Tecolote Siding Extension (Carrizozo Subdivision MP 791.1 to 789.8). Applicants plan to extend the existing Tecolote siding on the Carrizozo Subdivision from 10,414 feet to over 15,000 feet. Applicants estimate this project will cost $11.2 million and be completed by the end of Year 3.[46]

88. *DeQuincy Subdivision Projects*. UP's DeQuincy Subdivision runs between DeQuincy, Louisiana, and Livonia, Louisiana. In the Growth Plan, Applicants project the number of trains operating, including 10,000-foot trains, would exceed the subdivision's current fluid capacity. However, UP had a pre-merger plan to extend the Lawtell Siding, an existing siding on the subdivision, which will create sufficient capacity to accommodate traffic levels projected in the Growth Plan.[47] Applicants expect to complete the new siding in 2027.[48]

---

[44] *See* Workpaper "Golden State Train Length Projects.pdf" at 12; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H21.

[45] *See* Workpaper "UP Golden State Corridor Capacity Projects.pdf" at 13; *see also* Janke Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H22.

[46] *See* Workpaper "UP Golden State Corridor Capacity Projects.pdf" at 14; *see also* Janke Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H23.

[47] *See* Workpaper "UP DeQuincy Subdivision Capacity Projects.pdf" at 3–4 (total trains), 5–6 (10,000-foot trains), and 9 (Lawtell Siding plan).

[48] *See id.* at 9.

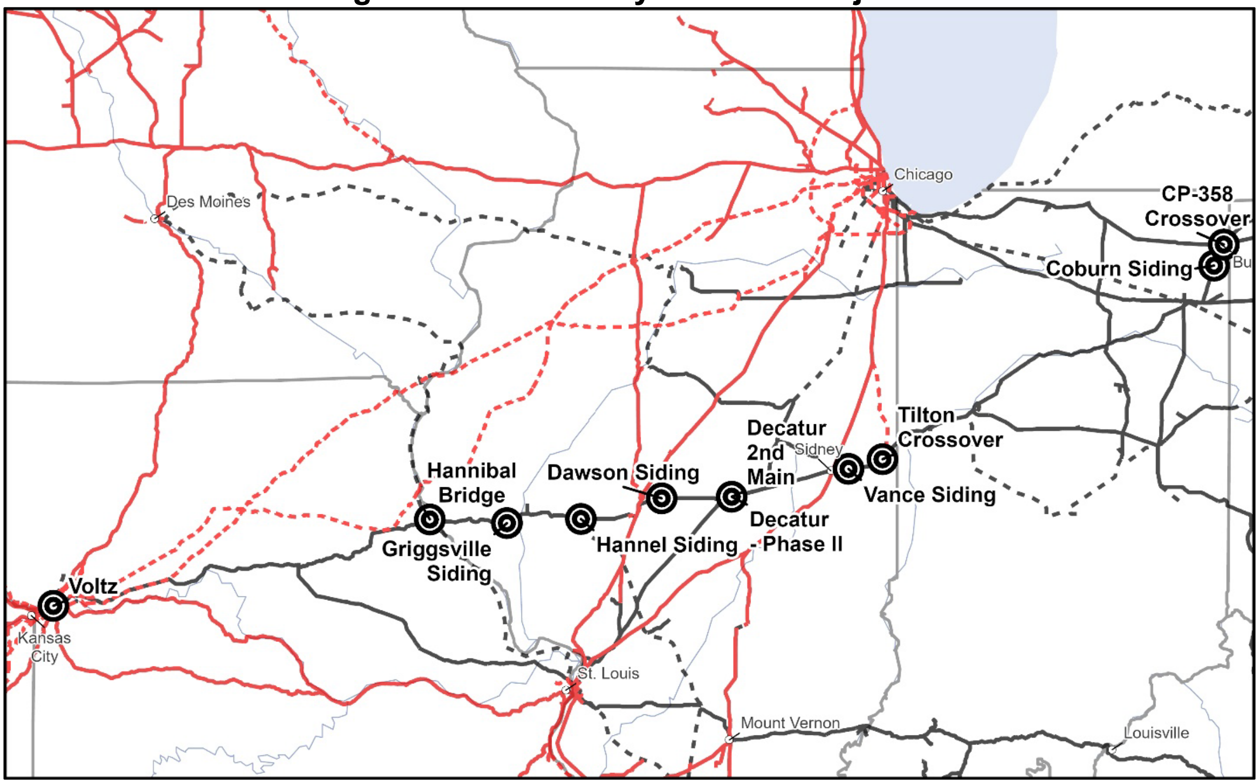
b. Main Line Projects on the NS Network

89. Applicants are planning merger-related investments to increase main line capacity on two portions of the legacy NS network: (1) the corridor between Kansas City, Missouri, and Butler, Indiana, and (2) the corridor between New Orleans, Louisiana, and Atlanta, Georgia. NS also has plans underway to increase capacity on its 3B Subdivision between Burstall, Alabama, and Mobile, Alabama, which will help accommodate traffic flows projected in the Growth Plan. Finally, Applicants are planning merger-related investments to improve operational fluidity by transitioning signaling technology on the legacy NS corridor between Cleveland, Ohio, and Harrisburg, Pennsylvania. These investments are described in the next sections.

90. *Kansas City to Butler Corridor Projects.* NS's Kansas City to Butler corridor is an important link on the combined network's route between Southern California and the Ohio Valley and the Northeast. Applicants project that the number of trains moving over the corridor will increase by 1 to 3 per day under the Optimized Plan and 3 to 8 per day under the Growth Plan. (The variance in train counts is driven by the fact that the corridor has many entry and exit points.) The corridor currently has sufficient fluid capacity to accommodate the projected growth in volume, but Applicants are planning a series of upgrades to reduce transit times and allow operations consistent with the combined company's train-length strategy. The locations of the post-merger projects are shown in Figure 7, and the pre- and post-

merger projects are summarized below. Together, these projects will allow the combined railroad to provide the service described in the Growth Plan.[49]

Figure 7: Kansas City to Butler Projects



- Pre-Merger Investment:
  - CP Brush Phase I (Lafayette Subdivision MP D373). NS has begun constructing a new connecting track between the yard leads and Main 2 at Brush Interlocking. This project will provide important connectivity for originating and terminating trains, trains that are working the yard, and yard movements. The project also includes signaling needed to interface the new track to the Centralized Traffic Control ("CTC") system. Applicants expect this project to be completed by the end of 2026.[50]

[49] *See* Workpaper "NS - Corridor Infrastructure.pdf" at 8 and 10.

[50] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab "Line Capacity Projects," Row 31.

- Merger-Related Investment:
    - UP connection at West MC (Voltz) (Kansas City Subdivision MP S266.0). Applicants plan to upgrade the existing NS-UP connection at West MC. This project will support increased speeds of 30 mph (from 10 mph) and will include a crossover between NS main lines to allow a progressive move to/from either NS main line track to the UP main line track at the connection point. Applicants estimate this project will cost $6.8 million and be completed by the end of Year 2.[51]
    - Positive Train Control ("PTC") Upgrade (Kansas City District MP S212.9 to S148.5; Hannibal District MP H0.0 to H69.9; Springfield District MP DH466.0 to DH515.5). Applicants plan to install PTC on the district between Wabash Junction and Bluffs, a distance of 182 miles. Applicants estimate this project will cost $19.5 million and be completed by the end of Year 3.[52]
    - Hannibal Bridge Speed Upgrade (Springfield-Hannibal District MP DH513.9 to DH515.1). Applicants plan to increase superelevation to approximately two inches for approximately 1.2 miles to support an increased speed over the bridge to 20 mph (from 10 mph). Applicants estimate this project will cost $2.4 million and be completed by the end of Year 2.[53]
    - Griggsville Siding Extension (Springfield-Hannibal District MP DH479.0 to DH482.0). Applicants plan to upgrade and extend the existing siding at Griggsville to a clear length of 15,000 feet. The project will include constructing 1.45 miles of new siding track, upgrading existing siding track to accommodate speeds of 40 mph (from 25 mph), and upgrading turnouts to #20s. Applicants

---

[51] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 4; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 4; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H32.

[52] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 5; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H33.

[53] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 6; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 7; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H36.

estimate this project will cost $11.6 million and be completed by the end of Year 3.[54]

- Hannel Siding Extension (Springfield-Hannibal District MP DH440.4 to DH443.5). Applicants plan to upgrade and extend the existing siding at Hannel to a clear length of 15,000 feet. The project will include constructing one mile of new siding track, upgrading existing siding track to accommodate speeds of 40 mph (from 25 mph), and upgrading turnouts to #20s. Applicants estimate this project will cost $10.6 million and be completed by the end of Year 3.[55]

- Dawson Siding Extension (Springfield-Hannibal District MP DH402.5 to DH405.6). Applicants plan to upgrade and extend the siding at Dawson to a clear length of 15,000 feet. The project will include constructing one mile of new siding track, upgrading existing siding track to accommodate speeds of 40 mph (from 25 mph), and upgrading turnouts to #20s. Applicants estimate this project will cost $10.1 million and be completed by the end of Year 3.[56]

- Decatur Second Main Line (Lafayette District MP D374.3 to D375.4). Applicants plan to construct one mile of new double track between Wabic (D375.3) and 22nd Street (D374.3) at Decatur. The project will include road access for possible fueling and inspection events. This project, in conjunction with the CP-Brush Phase II project discussed below, replaces two single track sections with 23 miles of continuous double track.

[54] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 7; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 9; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investments," Cell H37.

[55] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 8; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 12; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H38.

[56] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 9; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 17; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H39.

Applicants estimate this project will cost $11.9 million and be completed by the end of Year 3.[57]

- CP Brush Phase II (Lafayette Subdivision MP D372.0 to D373.0). This project is additive to the pre-existing (non-merger related) East Decatur CP-Brush Phase I project. This CP-Brush Phase II project, in conjunction with the Decatur Double Track project described above, will replace two single track sections with 23 miles of continuous double track. Applicants estimate this project will cost $16.9 million and be completed by the end of Year 3.[58]

- Vance Siding Extension (Lafayette Subdivision MP D318.0 to D321.1). Applicants plan to upgrade and extend the siding at Vance, Illinois, to a clear length of 15,000 feet. This project will include constructing 1.7 miles of new siding track, upgrading existing track to accommodate speeds of 40 mph (from 25 mph), and upgrading turnouts to #20s. Applicants estimate this project will cost $15.8 million and be completed by the end of Year 3.[59]

- CTC Upgrade: Eldon to Ross Lane Plus Tilton Universal Crossover (Lafayette Subdivision MP D296.4 to D305.7). Applicants plan to convert 9.3 miles of Rule 93/directional double track to CTC at Tilton Yard. The project will include #20 universal crossovers just east of Tilton Yard at MP D302.4. Applicants estimate this project will cost $10.2 million and be completed by the end of Year 2.[60]

---

[57] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 10; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 14; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H40.

[58] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 11; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 20; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H41.

[59] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 12; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 22; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H42.

[60] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Rows 13, 14; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf"

- Coburn Siding Extension (Detroit-Huntington Subdivision MP D123.2 to D126.4). Applicants plan to upgrade and extend the existing siding at Coburn to a clear length of 15,000 feet. The project will include constructing 1.7 new miles of siding track, upgrading existing track to accommodate speeds of 40 mph (from 25 mph), and upgrading turnouts to #20s. Applicants estimate this project will cost $16.3 million and be completed by the end of Year 3.[61]

- CP-358 Crossover (Toledo West Subdivision MP CD358.3). Applicants plan to construct a #20 LH powered crossover within CP-358 on the Chicago Line, which is on the NS Premier Corridor section between Elkhart, Indiana, and Toledo, Ohio. Applicants estimate this project will cost $4.6 million and be completed by the end of Year 2.[62]

91. *New Orleans to Atlanta Corridor Projects*. NS's New Orleans to Atlanta corridor is an important link on NS's network connecting the Southeast to UP's routes to and from South Texas. Under the Optimized Plan, train volumes on this corridor are flat on the Back Belt, reduced by 3 train starts per day between New Orleans and Meridian, Mississippi, and increased by as many as 2 train starts per day between Meridian and Austell, Georgia. Under the Growth Plan, train starts increase by 4 per day on the Back Belt, 3 per day between New Orleans and Meridian, and 9 to 11 per day between Meridian and Austell. Applicants are planning a series of investments

---

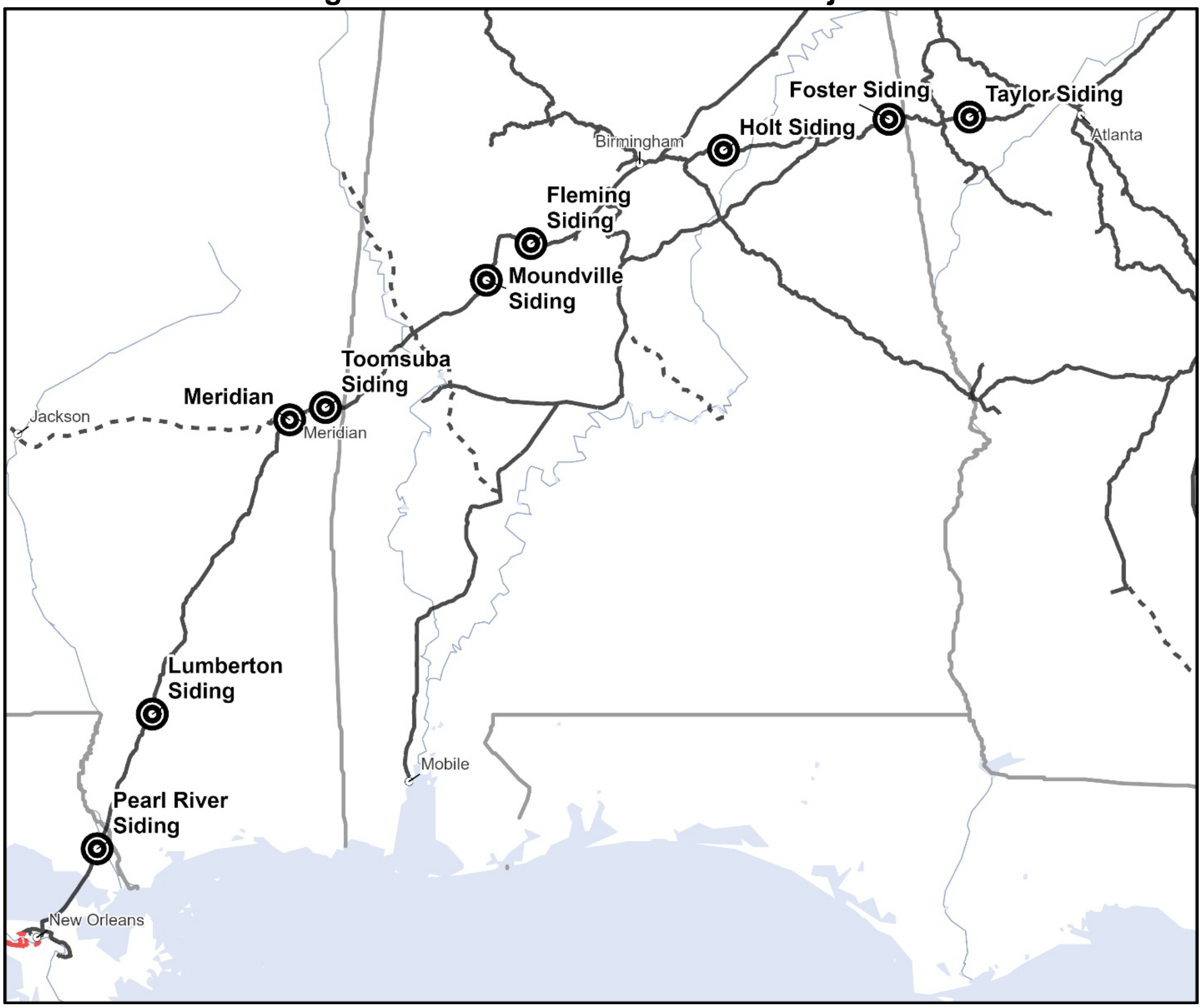
at 25, 26; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cells H43 and H44.

[61] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 15; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 28; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H45.

[62] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 16; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 31; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H46.

to accommodate the projected volume growth. The locations of the projects are shown in Figure 8, and the projects are summarized below. Together, these projects will allow the combined railroad to provide the service described in the Growth Plan.[63]

Figure 8: New Orleans to Atlanta Projects



- Merger-Related Investment:
  - Pearl River Siding Extension (NONE Subdivision MP NO159.52 to NO162.35). Applicants plan to upgrade and extend the existing siding at Pearl River to a clear length of 15,000 feet. The project will include constructing 1.70 miles of new siding track, upgrading existing siding track to accommodate speeds of 40 mph

---

[63] *See* Workpaper "NS - Corridor Infrastructure.pdf" at 20 and 22.

(from 25 mph), and upgrading turnouts to #20s. This segment of track will also be upgraded to CTC. Applicants estimate this project will cost $19.4 million and be completed by the end of Year 3.[64]

- Lumberton Siding Extension (NONE Subdivision MP NO112.1 to NO115.3). Applicants plan to upgrade and extend the siding at Lumberton to a clear length of 15,000 feet. The project will include constructing 1.7 miles of new siding track, upgrading the passing siding to accommodate speeds of 40 mph (from 15 mph), and replacing the existing spring switches with #20-power/dispatcher-controlled switches at each end of the siding. This segment of track will also be upgraded to CTC. Applicants estimate this project will cost $22.0 million and be completed by the end of Year 3.[65]

- North End Meridian Double Track (Birmingham Subdivision MP AG289.7 to AG292.7). Applicants plan to extend the Meridian double track north from CP Breyer by constructing three miles of new track. Applicants estimate this project will cost $28.6 million and be completed by the end of Year 3.[66]

- Toomsuba Siding Extension (Birmingham Subdivision MP AG279.1 to AG282.2). Applicants plan to upgrade and extend the siding at Toomsuba to a clear length of 15,000 feet. The project will include constructing 1.5 miles of new siding track and upgrading the existing track to accommodate speeds of 40 mph

---

[64] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 17; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 33; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H47.

[65] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 18; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 35; *see also Janke* VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H48.

[66] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 19; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 38; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H49.

(from 15 mph). Applicants estimate this project will cost $23.3 million and be completed by the end of Year 3.[67]

- Moundville Siding Extension (Birmingham Subdivision MP AG213.2 to AG216.4). Applicants plan to upgrade and extend the siding at Moundville to a clear length of 15,000 feet. The project will include constructing 1.7 miles of new siding track, upgrading the existing siding to accommodate speeds of 40 mph (from 20 mph), and upgrading turnouts to #20s at each end of the siding. Applicants estimate this project will cost $20.7 million and be completed by the end of Year 3.[68]

- Fleming Siding Extension (Birmingham Subdivision MP AG184.4 to 187.9). Applicants plan to upgrade and extend the siding at Fleming to a clear length of 15,000 feet. The project will include constructing 1.1 miles of new siding track, upgrading the existing siding to accommodate speeds of 40 mph (from 25 mph), and upgrading turnouts to #20s at each end of the siding. Applicants estimate this project will cost $16.0 million and be completed by the end of Year 3.[69]

- Holt Siding Extension (Birmingham Subdivision MP 770.10 to 767.23). Applicants plan to upgrade and extend the existing siding at Roberts-Holt to a clear length of 15,000 feet. The project will include constructing 1.16 miles of new siding track, upgrading existing siding track to accommodate speeds of 40 mph (from 25 mph), and upgrading turnouts to #20s. Applicants

---

[67] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 20; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 41; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H50.

[68] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 21; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 44; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H51.

[69] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 22; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 47; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H52.

estimate this project will cost $17.7 million and be completed by the end of Year 3.[70]

- Foster Siding Extension (Birmingham Subdivision MP 707.3 to 708.5). Applicants plan to upgrade and extend the siding at Foster to a clear length of 15,000 feet. The project will include constructing one mile of new siding track, upgrading the existing siding to accommodate speeds of 40 mph (from 30 mph), and upgrading turnouts to #20s at each end of the siding. Applicants estimate this project will cost $13.1 million and be completed by the end of Year 3.[71]

- Taylor Siding Extension (Birmingham Subdivision MP 674.52 to 677.44). Applicants plan to upgrade and extend the existing siding at Temple-Taylor to a clear length of 15,000 feet. The project will include constructing 1.04 miles of new siding track, upgrading existing siding track to accommodate speeds of 40 mph (from 25 mph), and upgrading turnouts to #20s. Applicants estimate this project will cost $11.4 million and be completed by the end of Year 3.[72]

92. *Birmingham to Mobile Corridor (3B Subdivision) Projects*. NS's 3B Subdivision runs between Burstall and Mobile, Alabama. Under the Growth Plan, projected train counts are expected to exceed fluid capacity on the 3B North District, specifically on the segment between Wilton and Selma. NS previously identified and is currently constructing multiple projects across the entire 3B District. These

---

[70] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 23; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 50; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H53.

[71] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 24; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 53; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H54.

[72] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab Line Capacity Projects," Row 25; Workpaper "NS_Corridor_Infrastructure_Project_Report.pdf" at 56; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H55.

projects will be sufficient to allow the segment to accommodate the traffic projected under the Growth Plan.[73]

93. *Cleveland to Harrisburg Corridor Projects*. The NS network still utilizes cab signals on the Premier Corridor between Cleveland, Ohio, and Harrisburg, Pennsylvania, and from Harrisburg, Pennsylvania, to Perryville, Maryland. Cab signal technology emerged in the early 20th century. With the ongoing expansion of PTC and thanks to a federal waiver that allows trains to operate with PTC in lieu of cab signals, UP phased out its use of cab signal systems on its network, a step approved by the Federal Railroad Administration ("FRA") in 2022. Applicants plan to discontinue legacy cab-signal systems across NS's mainline network between Cleveland and Harrisburg, transitioning to a PTC-only architecture with underlying signal system. Removing out-of-date cab signal technology will improve operational fluidity for trains on the combined UP/NS network. While the NS locomotive fleet is 98 percent equipped with cab signals, UP locomotives are not so equipped. The elimination of cab signals in the legacy NS fleet will provide the combined railroad with more flexibility in the assignment of locomotives to trains. This transition will also enhance safety, reduce maintenance costs, and improve operational efficiency while maintaining regulatory compliance. Additional detail on this initiative appears below.

- Phase I is a $34.3 million investment in PTC-only architecture that replaces the need for cab signal locomotives at Cleveland Terminal. Phase I will allow foreign units to serve as a lead locomotive until arrival at Conway terminal (outside of Pittsburgh). Conway terminal is a

[73] *See* Workpaper "NS - Corridor Infrastructure.pdf" at 36.

natural stopping point because it has the capacity to handle inbound and outbound unit train staging, engine swaps, and brake testing. Stopping trains at Conway terminal will be less disruptive to operations than stopping trains at Cleveland. Applicants estimate that the 139-mile project between RD 122.2 at Cleveland on the Cleveland Line and PC 0.0 at Pittsburgh on the Fort Wayne Line will be completed by the end of Year 3.[74]

- Phase II is a $37.3 million project involving investment in PTC-only architecture that, when complete, will allow for a streamlined network from Chicago to Harrisburg (and consequently to New York) with minimal interruptions or delays for cab signal locomotive additions. Applicants estimate that work on this additional 326-mile footprint (including the primary and Conemaugh Line routes) between PT 353.2 at Pittsburgh on the Pittsburgh Line and PT 105.1 at Harrisburg on the same line will also be completed by the end of Year 3.[75]

94. When both phases are complete, a small pool of cab-signal-equipped locomotives will remain in service east of Conway to ensure compliance with cab signal requirements in Pennsylvania and New Jersey on Shared Assets along with Amtrak and Southeastern Pennsylvania Transportation Authority ("SEPTA") corridors.

2. Yard and Terminal Capacity Improvements

95. Applicants plan to invest approximately $443.5 million (in 2023 dollars) in merger-related projects to increase capacity in UP/NS intermodal, manifest, and automotive yards and terminals to accommodate volumes projected in the Growth

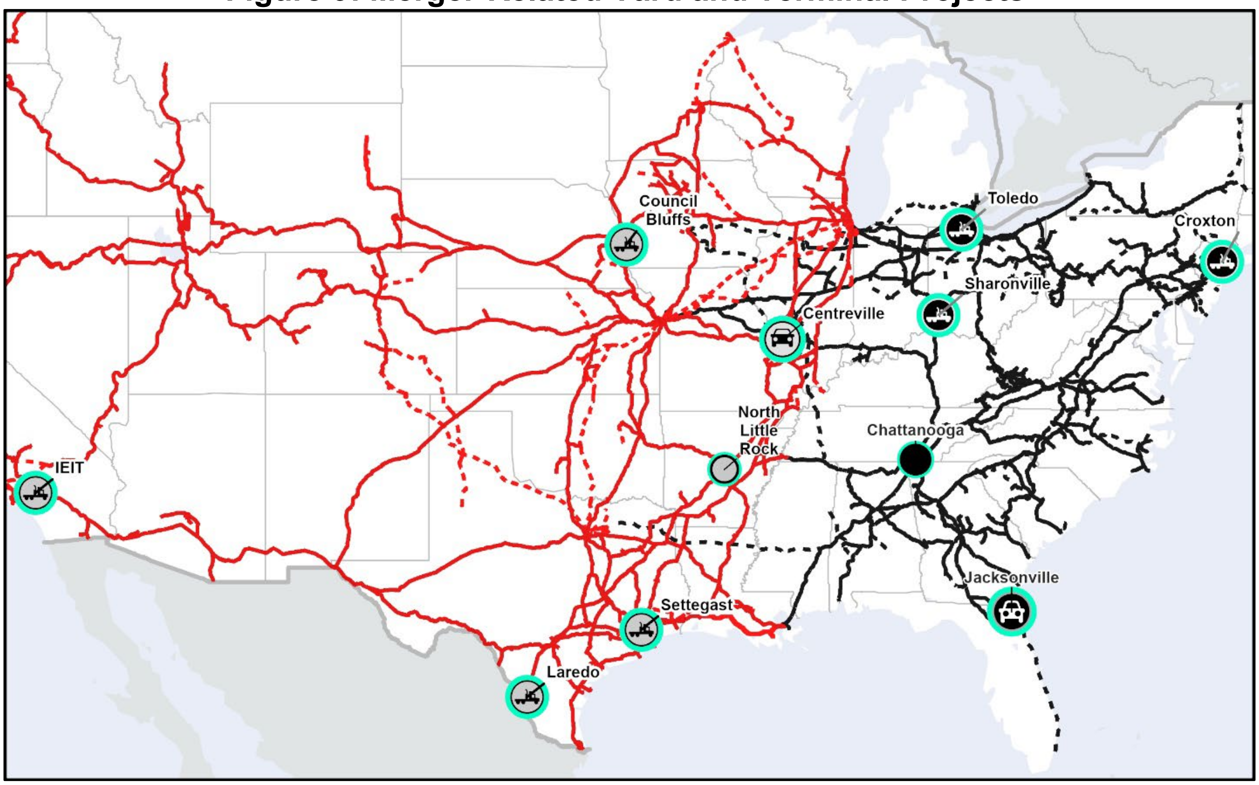
---

[74] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab "Cab Signal Projects," Row 4; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H63.

[75] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab "Cab Signal Projects," Row 5; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H64.

Plan.[76] The locations of these projects are shown below in Figure 9. In the sections below, Applicants describe the pre-merger and merger-related investments in yards and terminals that will help the combined railroad accommodate the volumes projected in the Growth Plan.

Figure 9: Merger-Related Yard and Terminal Projects



a. Intermodal Terminal Projects

96. *Inland Empire (West Colton, California).* UP's Inland Empire intermodal facility in West Colton currently has a fluid capacity of 195,000 lifts per year. Applicants project that Inland Empire will require post-merger capacity of

[76] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cells H25:H28 and H56:H58 (Intermodal); *id.* at Cells H24 and H61 (Manifest); *id.* at Cells H31 and H60 (Autos).

approximately 380,000 lifts per year.[77] Applicants expect to accommodate projected growth through a combination of pre-merger and post-merger investment.[78]

- Pre-Merger Investment: UP has invested heavily at Inland Empire to reconfigure the west end receiving yard to handle intermodal traffic. UP is also adding new working track, parking slots, and parking stalls. UP expects to complete these projects in the first half of 2027. Applicants expect these projects to increase Inland Empire's capacity to 345,000 lifts per year.[79]

- Merger-Related Investment: Applicants plan to add two new working tracks (5,910 ft.), 524 stack slots, and additional crossovers at the Inland Empire intermodal facility. Applicants expect these projects to increase Inland Empire's capacity to 500,000 lifts per year.[80] Applicants estimate these projects will cost $58.1 million and be completed by the end of Year 3.[81]

97. *Settegast (Houston, Texas).* UP's Settegast facility in Houston currently has a fluid capacity of 140,000 lifts per year. Applicants project that Settegast will require post-merger capacity of approximately 320,000 lifts per year.[82] Applicants expect to accommodate projected growth through a combination of pre-merger and post-merger investment.[83]

---

[77] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Intermodal," Row 27.

[78] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Intermodal Terminal Inputs," Rows 38 and 44.

[79] *See* Workpaper "UP Intermodal Terminal Expansion Projects.pdf" at 24.

[80] *See id.* at 5.

[81] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H28.

[82] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Intermodal," Row 4.

[83] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Intermodal Terminal Inputs," Rows 37 and 43.

- Pre-Merger Investment: UP has been planning to construct additional parking stalls at Settegast to accommodate traffic from its Barber's Cut facility. UP has also invested in using the nearby Pierce Yard to support Settegast. UP expects to complete these projects in 2027. Applicants expect these projects to increase Settegast's capacity to 180,000 lifts per year.[84]

- Merger-Related Investment: Applicants plan to add to Settegast 1,045 paved parking stalls, two working tracks (6,000 ft.), PGT automated gate technology, and a new administrative building. Applicants expect these projects to increase Settegast's capacity to 360,000 lifts per year.[85] Applicants estimate this project will cost $102.5 million and be completed by the end of Year 3.[86]

98. *Port Laredo (Laredo, Texas).* UP's Port Laredo intermodal facility currently has a fluid capacity of 160,000 lifts per year. Applicants project that Port Laredo will require post-merger capacity of approximately 233,000 lifts per year.[87] Applicants expect the combined railroad to accommodate projected growth through post-merger investment.[88] Specifically, Applicants plan to add 818 paved parking stalls, 5 support tracks (11,700 ft.), and two working track extensions (9,400 ft.) to the Port Laredo facility. Applicants expect these projects to increase Port Laredo's

---

[84] *See* Workpaper "UP Intermodal Terminal Expansion Projects.pdf" at 23.

[85] *See id.* at 3.

[86] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H25.

[87] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Intermodal," Row 3.

[88] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Intermodal Terminal Inputs," Row 24.

capacity to 250,000 lifts per year.[89] Applicants estimate these projects will cost $63.7 million and be completed by the end of Year 2.[90]

99. *Council Bluffs (Iowa).* UP currently uses an intermodal ramp at Council Bluffs operated by Iowa Interstate Railroad ("IAIS"). Applicants project Council Bluffs will require post-merger capacity of approximately 157,000 lifts per year to accommodate expected traffic growth.[91] Because Applicants believe that the IAIS facility cannot meet the expected demand, they are exploring potential investment opportunities in the area to ensure that UP/NS will have adequate capacity to accommodate the projected traffic growth at Council Bluffs. For purposes of preparing their Application, Applicants are assuming a need for investment to accommodate projected growth at Council Bluffs.[92] Applicants plan to construct a new intermodal terminal at the site of UP's existing Council Bluffs Yard. This new facility would include 510 paved parking stalls, 588 stack slots, three working tracks (7,200 ft.), and pool yard support tracks (5,060 ft.). Applicants expect the new Council Bluffs

---

[89] *See* Workpaper "UP Intermodal Terminal Expansion Projects.pdf" at 6.

[90] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H27.

[91] *See* "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Intermodal," Row 16.

[92] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Intermodal Terminal Inputs," Row 7.

intermodal terminal will have a capacity of 165,000 lifts per year.[93] Applicants estimate this project will cost $75.4 million and be completed by the end of Year 2.[94]

100. *Sharonville (Ohio).* NS's intermodal facility in Sharonville currently has a fluid capacity of 90,000 lifts per year. Applicants project that Sharonville will require post-merger capacity of approximately 195,000 lifts.[95] Applicants expect to accommodate projected growth through a combination of pre-merger and post-merger investment.[96]

- Pre-Merger investment: In 2026, NS plans to begin constructing a terminal expansion that will add 472 stack slots and 2,570 feet of additional working track. NS expects to complete these projects by the end of 2026. Applicants expect these projects to increase Sharonville's capacity by 85,000 lifts per year.[97]
- Merger-Related investment: Applicants plan to add 5,900 feet of support track in Sharonville Yard and to develop a new wheeled parking lot with 350 stalls, complete with adequate lighting, drainage, and security infrastructure. Applicants expect this project to increase Sharonville's capacity to 206,000 lifts per year. Applicants estimate this project will cost $26.2 million and be completed in Year 2.[98]

101. *Appliance Park* (*Louisville, Kentucky).* The NS Appliance Park intermodal facility in Louisville currently has an annual capacity of 140,000 lifts.

---

[93] *See* Workpaper "UP Intermodal Terminal Expansion Projects.pdf" at 4.

[94] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H26.

[95] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Intermodal," Row 40.

[96] *See* Workpaper "NS IM Auto Terminal Capacity Calculations.xlsx," Tab "Intermodal Terminal Inputs," Rows 52 and 57.

[97] *See* Workpaper "NS IM Auto Manifest Expansion Projects.pdf" at 3.

[98] *See id.*, at 10; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H57.

Applicants project that the facility will require post-merger capacity for approximately 145,000 lifts.[99] Applicants expect to accommodate projected growth through pre-merger investment.[100] In 2025, NS began constructing a stack expansion at Appliance Park, intended to densify international stacking at the terminal and open wheeled parking for a new domestic service. The project will deliver 466 new stack slots and displace 130 former wheeled parking stalls. Scheduled for completion in early 2026, this expansion will increase Appliance Park's annual capacity to 161,000 lifts, surpassing projected post-merger demand.[101]

102. *Ayer (Massachusetts).* NS's intermodal facility in Ayer will have a fluid capacity of 98,000 lifts per year following the completion of an ongoing clearance project enabling double-stacked container movements into and out of Ayer. Applicants project that Ayer will require post-merger capacity of approximately 147,000 lifts per year.[102] Applicants expect to accommodate projected growth through pre-merger investment.[103] In 2026, NS expects to begin constructing a parking expansion at Ayer that will add 300 parking stalls with adequate lighting, drainage,

---

[99] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Intermodal," Row 38.

[100] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab "Terminal Capacity Projects," Row 22.

[101] *See* Workpaper "NS IM Auto Manifest Expansion Projects.pdf" at 5; Workpaper "NS IM Auto Terminal Capacity Calculations.xlsx," Tab "Intermodal Terminal Inputs," Row 51.

[102] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Intermodal," Row 34.

[103] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab "Terminal Capacity Projects," Row 19.

and security. NS expects to complete this project by the end of 2027. Applicants expect the project to increase Ayer's capacity to 156,000 lifts per year. [104]

103. *Charlotte (North Carolina).* The NS intermodal facility at Charlotte currently has a fluid capacity of 300,000 lifts per year. Applicants project that Charlotte will require post-merger capacity of approximately 345,000 lifts per year.[105] Applicants expect to accommodate projected growth through pre-merger investment.[106] In 2025, NS began constructing a parking expansion at Charlotte. The pre-merger project will add 463 wheeled parking spots, as well as adequate lighting, drainage, and security for the new lot. NS expects to complete these projects in mid-2026. Applicants expect the projects to increase Charlotte's capacity to 464,000 lifts per year.[107]

104. *Croxton (New Jersey).* NS's intermodal facility in Croxton currently has a fluid capacity of 420,000 lifts per year. Applicants project that Croxton will require post-merger capacity of 511,000 lifts per year.[108] Applicants expect to accommodate the projected growth through post-merger investment.[109] Applicants plan to increase

---

[104] *See* Workpaper "NS IM Auto Terminal Capacity Calculations.xslx," Tab "Intermodal Terminal Inputs," Rows 46 and 47.

[105] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Intermodal," Row 35.

[106] *See* Workpaper "NS IM Auto Manifest Expansion Projects.pdf" at 4; Workpaper "NS Infrastructure Planned Table.xlsx," Tab "Terminal Capacity Projects," Row 23.

[107] *See* Workpaper "NS IM Auto Terminal Capacity Calculations.xlsx," Tab "Intermodal Terminal Inputs," Row 48.

[108] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Intermodal," Row 39.

[109] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab "Terminal Capacity Projects," Row 4.

support yard capacity at Croxton by relocating a lead track that provides access to an adjacent industry, as well as adding 5,205 feet of new support track.[110] Applicants expect that, combined with increased daily working track turns by local switch crews, these projects will increase Croxton's capacity to 525,000 lifts per year. Applicants estimate these projects will cost $7.4 million and be completed by the middle of Year 2.[111]

105. *Livernois (Detroit, Michigan).* The NS Livernois intermodal facility in Detroit currently has a fluid capacity of 147,000 lifts per year. Applicants project that Livernois will require post-merger capacity of 219,000 lifts per year.[112] Applicants expect to accommodate this growth through pre-merger investment.[113] In 2026, NS plans to begin a major terminal expansion at Livernois, funded through a combination of public and private investment. The project will deliver 6,175 feet of new working track, 2,000 additional stack slots, and 200 parking stalls, along with upgrades to the operating surface and improved lighting, drainage, and security.[114]

---

[110] *See* Workpaper "NS IM Auto Manifest Expansion Projects.pdf" at 12.

[111] *See* Workpaper "NS IM Auto Terminal Capacity Calculations.xlsx," Tab "Intermodal Terminal Inputs," Row 56; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H56.

[112] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Intermodal," Row 36.

[113] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab "Terminal Capacity Projects," Row 20.

[114] *See* Workpaper "NS IM Auto Manifest Expansion Projects.pdf" at 2.

Scheduled for completion by the end of 2028, this expansion will increase Livernois's annual capacity to 277,000 lifts, well above projected post-merger demand.[115]

106. *Rickenbacker (Columbus, Ohio).* NS's intermodal facility in Columbus currently has a fluid capacity of 358,000 lifts per year. Applicants project that Rickenbacker will require post-merger capacity of approximately 328,000 lifts per year.[116] NS is currently constructing a major track expansion at Rickenbacker. This pre-merger project includes 23,000 feet of new support track, 5,200 feet of new working track, and additional graded acreage for chassis and container storage. Applicants expect this project, which is scheduled for completion in early 2026, to increase Rickenbacker's annual capacity to 411,000 lifts, well above projected post-merger demand.[117]

107. *Toledo (Ohio).* The NS intermodal facility in Toledo currently has a fluid capacity of 194,000 lifts per year. Applicants project that Toledo will require post-merger capacity of approximately 227,000 lifts per year.[118] Applicants expect that the combined railroad will accommodate projected growth through post-merger investment.[119] Specifically, Applicants plan to relocate tracks within the expansion

---

[115] *See* Workpaper "NS IM Auto Terminal Capacity Calculations.xlsx," Tab "Intermodal Terminal Inputs," Row 51.

[116] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Intermodal," Row 37.

[117] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab "Terminal Capacity Projects," Row 21.

[118] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Intermodal," Row 41.

[119] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab "Terminal Capacity Projects," Row 6.

area, construct 10,500 feet of additional support track and 2,450 feet of additional working track, and add 200 new parking stalls with adequate lighting, drainage, and security.[120] Applicants expect these projects to increase Toledo's capacity to 236,000 lifts per year. Applicants estimate these projects will cost $36.3 million and be completed by the end of Year 3.[121]

108. *McCalla (Birmingham, Alabama).* McCalla, the NS automotive ramp in Birmingham, currently supports only automotive distribution, since NS idled intermodal operations there several years ago. To accommodate projected merger-related intermodal growth, Applicants expect that the combined railroad will resume intermodal service at McCalla. Applicants have developed a plan to collocate intermodal and automotive operations at the ramp without requiring additional capital investment. Reintroducing intermodal operations at McCalla will provide 78,000 annual lifts of capacity, exceeding projected post-merger demand of approximately 50,500 lifts.[122]

109. *Lift Equipment*. In addition to making infrastructure improvements at intermodal terminals, Applicants plan to invest in additional lift equipment to support merger-related intermodal growth. Applicants plan to redeploy surplus

---

[120] *See* Workpaper "NS IM Auto Manifest Expansion Projects.pdf" at 11.

[121] *See* Workpaper "NS IM Auto Terminal Capacity Calculations.xlsx," Tab "Intermodal Terminal Inputs," Row 58; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H58.

[122] *See* Workpaper "NS IM Auto Terminal Capacity Calculations.xlsx," Tab "Intermodal Terminal Inputs," Row 7; Workpaper "NS Terminal Volume Review.xlsx," Tab "Intermodal," Row 6.

cranes from existing fleets where possible. Legacy UP intermodal terminals are expected to require $38.0 million of investment in new equipment to meet post-merger demand, including 9 new RTG cranes and 12 new reach stackers and packers.[123] Legacy NS intermodal terminals are expected to need $32.1 million of investment in new equipment to meet post-merger demand, including 4 overhead RTG cranes, 8 packer cranes, and one widespan RMG.[124]

b. Manifest Yard Projects

110. *North Little Rock (Arkansas).* UP's North Little Rock facility currently has a fluid capacity of 2,190 cars per day. Applicants project that North Little Rock will require post-merger capacity of approximately 2,675 cars per day.[125] Applicants expect that the combined railroad will accommodate projected growth through post-merger investment and operating plan adjustments.[126] Specifically, Applicants plan to add one new track (9,000 ft.) and extend two existing tracks to 9,000 feet at North Little Rock. Applicants expect these improvements to increase North Little Rock's capacity to 2,350 cars per day. Applicants estimate this project will cost $30.4 million

---

[123] *See* Workpaper "UP Intermodal Lift Equipment Capacity Model.xlsx," Tab "Capital Need-T3," Cells D7 and D13; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Tab H29.

[124] *See* Workpaper "Terminal Capital Summary.pdf."; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H59.

[125] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Manifest," Row 85.

[126] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Manifest Yard Inputs," Row 101.

and be completed by the end of Year 2.[127] UP/NS will address any additional capacity needs at North Little Rock by adjusting transportation plans, as described in Section 7.2.2 of the Operating Plan.

111. *Gateway Yard (A&S) (E. St. Louis, Illinois).* Gateway Yard currently has a fluid capacity of 2,100 cars per day. Applicants project that Gateway Yard will require post-merger capacity of 2,180 cars per day.[128] UP has a pre-merger project to install new track connections and crossovers to use the yard's track more efficiently by enabling multiple simultaneous moves. This project will be completed in 2026 and will bring Gateway Yard's capacity to 2,160 cars per day.[129] UP/NS will address any remaining capacity needs by modifying transportation plans as described in Section 7.2.2 of the Operating Plan.

112. *Livonia (Louisiana).* UP's manifest yard at Livonia currently has a fluid capacity of 1,950 cars per day. Applicants project that Livonia will require post-merger capacity of approximately 2,310 cars per day.[130] UP is currently constructing an improvement that includes adding a new 7,300-foot departure track and installing

---

[127] *See* Workpaper "UP Manifest Yard Expansion Projects.pdf" at 3; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H24.

[128] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Manifest," Row 22.

[129] *See* Workpaper "UP Manifest Yard Expansion Projects.pdf" at 8; Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Manifest Yard Inputs," Row 92.

[130] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Manifest," Row 73.

powered switches to the receiving and departure yards.[131] Once this project is completed in 2026, Livonia will have a capacity of 2,040 cars per day.[132] UP/NS will address any remaining capacity needs through transportation planning, using nearby yards as described in Section 7.2.2 of the Operating Plan.

113. *Angleton (Texas).* UP's yard at Angleton currently has a fluid capacity of 610 cars per day. Applicants project that Angleton will require post-merger capacity of 635 cars per day.[133] UP is currently expanding Angleton by adding 4,500 feet of departure track and realigning crossovers to enhance fluidity of operations.[134] Once this project is completed in 2026, Angleton will have a fluid capacity of 650 cars per day. [135]

114. *Bloomington (Texas).* UP's yard in Bloomington, Texas, currently has a fluid capacity of 280 cars per day. Applicants project that Bloomington will require post-merger capacity of approximately 290 cars per day.[136] UP is currently expanding Bloomington by adding 22,000 feet of production trackage, two classification groups, three receiving and departure tracks, switching leads, crossovers, mainline powered

---

[131] *See* Workpaper "UP Manifest Yard Expansion Projects.pdf" at 9.

[132] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Manifest Yard Inputs," Row 98.

[133] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Manifest," Row 9.

[134] *See* Workpaper "UP Manifest Yard Expansion Projects.pdf" at 13.

[135] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Manifest Yard Inputs," Row 94.

[136] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Manifest," Row 8.

switch ingress/egress, and repair track.[137] Once this project is completed in 2026, Bloomington's capacity will be 430 cars per day.[138]

115. *Robinson (Dayton, Texas)*. UP's Robinson yard at Dayton currently has a fluid capacity of 440 cars per day. Applicants project that Robinson Yard will require post-merger capacity of approximately 380 cars per day.[139] As part of its broader Houston terminal expansion strategy, UP is currently engaged in a construction project at Robinson Yard, which includes expanding double-end yard tracks, adding long receiving and departure track that can enable switching from the south, and adding a second north lead to improve switching.[140] Once completed in 2027, this project will increase Robinson Yard's capacity to 640 cars per day.[141] This significantly exceeds Robinson Yard's expected post-merger capacity needs and will allow the combined railroad to address capacity needs at Coady Yard in Baytown, Texas, as described in Section 7.2.2 of the Operating Plan.

116. *Francis (Texas)*. UP's yard in Francis currently has a fluid capacity of 70 cars per day. Applicants project that Francis will require post-merger capacity of

---

[137] *See* Workpaper "UP Manifest Yard Expansion Projects.pdf" at 11.

[138] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Manifest Yard Inputs," Row 93.

[139] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Manifest," Row 43.

[140] *See* Workpaper "UP Manifest Yard Expansion Projects.pdf" at 10.

[141] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Manifest Yard Inputs," Row 97.

approximately 90 cars per day.[142] UP is currently expanding Francis by adding 3 tracks, extending 2 tracks, and installing crossovers to support switching and work events clear of the main line.[143] Once this project is completed in 2026, the yard will have a fluid capacity of 180 cars per day.[144]

117. *Hoskins Junction (Texas).* UP's yard in Hoskins Junction currently has a fluid capacity of 160 cars per day. Applicants project that Hoskins Junction will require post-merger capacity of approximately 165 cars per day.[145] UP is currently expanding Hoskins Junction by extending five tracks, adding 4,500 feet of classification track.[146] Once this project is completed in 2026, Hoskins Junction will have a fluid capacity of 200 cars per day. [147]

118. *Birmingham (Alabama).* NS's classification yard in Birmingham currently has a fluid capacity of 1,890 cars per day. Applicants project that Birmingham will require post-merger capacity of approximately 2,030 cars per day.[148] Applicants expect to accommodate projected growth through a pre-merger

---

[142] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Manifest," Row 12.

[143] *See* Workpaper "UP Manifest Yard Expansion Projects.pdf" at 14.

[144] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Manifest Yard Inputs," Row 95.

[145] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Manifest," Row 15.

[146] *See* Workpaper "UP Manifest Yard Expansion Projects.pdf" at 12.

[147] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Manifest Yard Inputs," Row 96.

[148] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Manifest," Row 4.

project that includes extending the pullback leads and improving track geometry at the north end of the classification tracks.[149] Applicants expect this project to be completed in 2027 and to increase Birmingham's capacity to 2,080 cars per day, above the expected Growth Plan demand.[150]

119. *Chattanooga (Tennessee).* NS's yard in Chattanooga currently has a fluid capacity of 2,100 cars per day. Applicants project that Chattanooga will require post-merger capacity of approximately 2,250 cars per day.[151] Applicants expect that UP/NS will accommodate projected growth through post-merger investment. Applicants plan to expand the classification and forwarding tracks at Chattanooga by 9,830 feet and 4,675 feet, respectively.[152] Upon completion of this project, Chattanooga's capacity will increase to 2,300 cars per day, surpassing post-merger demand. Applicants estimate this project will cost $17.1 million and be completed by the end of Year 3.[153]

120. *Decatur (Illinois).* The NS yards in Decatur and East Decatur currently have a combined fluid capacity of 1,420 cars per day. Applicants project that Decatur

---

[149] *See* Workpaper "NS IM Auto Manifest Expansion Projects.pdf" at 7.

[150] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab "Terminal Capacity Projects," Row 26; Workpaper "NS Manifest Yard Capacity Calculations.xlsx," Tab "Manifest Yard Inputs," Row 45.

[151] See Workpaper "NS Terminal Volume Review.xlsx," Tab "Manifest," Row 5.

[152] *See* Workpaper "NS IM Auto Manifest Expansion Projects.pdf" at 13.

[153] *See* Workpaper "NS Manifest Yard Capacity Calculations.xlsx," Tab "Manifest Yard Inputs," Row 49; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H61.

will require post-merger capacity for approximately 1,500 cars per day.[154] As discussed above in the line capacity capital section, in 2026 NS plans to initiate construction on the CP Brush project, which will enable Decatur to accommodate the anticipated growth. Applicants expect Phase 1 of the project to enhance switching efficiency for yard jobs occupying CP Brush, increasing Decatur Yard's capacity to 1,500 cars per day, above the post-merger throughput demand.[155]

121. *Elkhart (Indiana).* NS's classification yard in Elkhart currently has a fluid capacity of 2,380 cars per day. Applicants project that Elkhart will require post-merger capacity of approximately 2,750 cars per day.[156] NS is addressing Elkhart's capacity needs through a pre-merger project that is already underway. That project will extend three receiving yard tracks, allowing for longer trains to be yarded without disrupting hump operations.[157] Applicants expect the project to be completed in early 2026 and to increase capacity to 2,620 rail cars per day.[158] UP/NS will address any additional capacity needs at Elkhart through lowering the daily throughput demand by routing a train directly between Bellevue and Calumet or Yard Center, bypassing Elkhart with Chicago area blocks created at Conway and Bellevue. Sufficient density exists in this lane to remove approximately 147 cars per day from

---

[154] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Manifest," Row 10.

[155] *See* Workpaper "NS Manifest Yard Capacity Calculations.xlsx," Tab "Manifest Yard Inputs," Row 46.

[156] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Manifest," Row 7.

[157] *See* Workpaper "NS IM Auto Manifest Expansion Projects.pdf" at 16.

[158] *See* Workpaper "NS Infrastructure Planned Table.xlsx," Tab "Terminal Capacity Projects," Row 25; Workpaper "NS Manifest Yard Capacity Calculations.xlsx," Tab "Manifest Yard Inputs," Row 44.

Elkhart in the Growth Plan without straining Bellevue, Conway, Calumet, or Yard Center.

c. Automotive Facility Projects

122. *Centreville (Illinois).* UP's automotive ramp in Centreville currently has a fluid capacity of 100,000 vehicles per year. Applicants project that Centreville will require post-merger capacity of approximately 113,500 vehicles per year.[159] Applicants plan to accommodate expected growth through post-merger investment. Applicants plan to add 536 paved parking stalls at Centreville.[160] Applicants project that, once complete, these improvements will increase Centreville's capacity to 120,000 vehicles per year.[161] Applicants estimate this project will cost $2.1 million and be completed by the end of Year 1.[162]

123. *Santa Rosa (New Mexico).* UP's automotive ramp in Santa Rosa currently has a fluid capacity of 40,000 vehicles per year. Applicants project that Santa Rosa will require post-merger capacity of approximately 41,275 vehicles per

---

[159] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Auto," Row 4.

[160] *See* Workpaper "UP Auto Terminal Expansion Projects.pdf" at 3.

[161] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Automotive Terminal Inputs," Row 35.

[162] *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H31.

year.[163] Applicants expect to accommodate expected growth through a pre-merger investment project that will be completed in 2026.[164]

124. *Bayview (Baltimore, Maryland).* NS's Bayview automotive ramp is currently configured for collocated automotive and intermodal operations. Intermodal service at the ramp is idled, and UP/NS will not need to reinstate that service to accommodate merger-related intermodal growth. NS is currently engaged in a construction project to expand the automotive footprint into the former intermodal acreage. This expansion will provide capacity for 48,000 vehicles annually, exceeding projected post-merger demand.[165]

125. *Jacksonville (Florida).* NS's automotive ramp in Jacksonville currently has a fluid capacity of 97,000 vehicles per year. Applicants project that the terminal will require post-merger capacity to handle 152,000 vehicles per year.[166] Applicants expect that UP/NS will accommodate projected growth through post-merger investment. Through this investment, the combined railroad will extend each of the six existing working tracks at Jacksonville by 550 feet, add 562 new parking bays, construct 7,249 feet of new support track adjacent to the terminal, and install

---

[163] *See* Workpaper "UP Manifest-Intermodal-Automotive Terminal Volume-Capacity Summary.xlsx," Tab "Auto," Row 19.

[164] *See* Workpaper "UP Auto Terminal Expansion Projects.pdf" at 7; *see also* Workpaper "UP Manifest-Intermodal-Automotive Terminal Capacity Inputs & Calculations.xlsx," Tab "Automotive Terminal Inputs," Row 32.

[165] *See* Workpaper "NS IM Auto Terminal Capacity Calculations.xlsx," Tab "Automotive Terminal Inputs," Row 5.

[166] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Auto," Row 20.

lighting, drainage, and security for the expanded footprint.[167] Upon completion of this project, Jacksonville's capacity will increase to 154,000 vehicles per year, greater than post-merger demand. Applicants estimate the project will cost $24.3 million and be completed by the end of Year 2.[168]

126. *Melvindale (Detroit, Michigan).* NS's Melvindale automotive ramp in Detroit currently has a fluid capacity of 189,000 vehicles per year. Applicants project that the terminal will require post-merger capacity to handle approximately 272,500 vehicles per year.[169] Applicants expect to accommodate projected growth through pre-merger investment. In 2026, NS plans to begin construction on a parking expansion at Melvindale, supported by both public and private funding. The project will add 1,106 new parking bays, as well as adequate lighting, drainage, and security for the new lot.[170] Scheduled for completion by the end of 2026, this expansion will increase Melvindale's capacity to 273,000 vehicles per year, well above projected post-merger demand.[171]

---

[167] *See* Workpaper "NS IM Auto Manifest Expansion Projects.pdf" at 14.

[168] *See* Workpaper "NS IM Auto Terminal Capacity Calculations.xlsx," Tab "Automotive Terminal Inputs," Row 28; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investments," Cell H60.

[169] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Auto," Row 19.

[170] *See* Workpaper "NS IM Auto Manifest Expansion Projects.pdf" at 8.

[171] *See* Workpaper "NS IM Auto Terminal Capacity Calculations.xlsx," Tab "Automotive Terminal Inputs," Row 25; Workpaper "NS Infrastructure Planned Table," Tab "Terminal Capacity Projects," Row 24.

127. *Shelbyville (Louisville, Kentucky).* NS's automotive ramp in Louisville currently has a fluid capacity of 88,000 vehicles per year.[172] Shelbyville automotive ramp is currently configured for collocated automotive and intermodal operations. Intermodal service at the ramp is idled, and there is no need to reinstate that service to accommodate merger-related intermodal growth in Louisville. To support post-merger automotive demand, Applicants have developed a plan to expand Shelbyville's automotive footprint into the former intermodal acreage without the need for additional capital investment. This expansion will provide capacity for 142,000 vehicles annually, exceeding projected post-merger demand.[173]

128. *Ramp Equipment*. In addition to making infrastructure improvements at automotive terminals, Applicants plan to invest in ramp equipment to support merger-related volume growth. While Applicants plan to redeploy surplus vehicle loading/unloading ramps from existing fleets where possible, Applicants expect that legacy NS automotive terminals will need $1.765 million of investment in 7 new mobile ramps to meet post-merger demand.[174] Applicants expect that legacy UP

---

[172] *See* Workpaper "NS Terminal Volume Review.xlsx," Tab "Auto," Row 18.

[173] *See* Workpaper "NS IM Auto Terminal Capacity Calculations.xlsx," Tab "Automotive Terminal Inputs," Row 24.

[174] *See* Workpaper "NS Auto Ramp Equipment Capital.xlsx," Tab "Capital Need-T3," Cell D9; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H62.

automotive terminals will need $0.756 million of investment in 3 new mobile ramps to meet post-merger demand.[175]

C. Funding of Capital Improvements

129. Applicants summarize the projected investments in main line, yard, and terminal facilities below in Table 14.

Table 14[176]
Summary of Merger-Related Investments in Main Line, Yard, and Terminal Facilities (2023 dollars)

Investment Type	Project	Facility or Project Type	Location	Investment ($000s)
Yard and Terminal	North Little Rock Yard Expansion	Manifest	Little Rock, AR	$30,441
Yard and Terminal	Settegast Yard Expansion	Intermodal	Houston, TX	102,467
Yard and Terminal	Council Bluffs Yard (Greenfield)	Intermodal	Council Bluffs, IA	75,419
Yard and Terminal	Port Laredo	Intermodal	Laredo, TX	63,691
Yard and Terminal	Inland Empire Intermodal Terminal Yard Expansion	Intermodal	Colton, CA	58,059
Yard and Terminal	Lift Equipment (UP and NS Terminals)	Intermodal	Various	70,027
Yard and Terminal	Ramp Equipment (UP and NS Yards)	Auto	Various	2,521
Yard and Terminal	Centreville Yard Expansion	Autos	Centreville, IL	2,116
Yard and Terminal	Croxton Yard Expansion	Intermodal	Croxton, NJ	7,361
Yard and Terminal	Sharonville Yard Expansion	Intermodal	Sharonville, PA	26,216
Yard and Terminal	Toledo Parking Expansion	Intermodal	Toledo, OH	36,299

175 *See* Workpaper "UP Auto Load-Unload Equipment Capacity Model.xlsx," Tab "Capital Need - T3," Cell D9; *see also* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cell H30.

176 *See* Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Capital Investment," Cells H16:H64.

Investment Type	Project	Facility or Project Type	Location	Investment ($000s)
Yard and Terminal	Jacksonville Yard Expansion	Auto	Jacksonville, FL	24,300
Yard and Terminal	Chattanooga Yard Expansion	Manifest	Chattanooga, TN	17,141
Main Line	Mohawk-Stoval DT	Second mainline	Gila Sub	34,102
Main Line	Otero Siding	Siding extension	Carrizozo Sub	11,241
Main Line	Missler Siding	Siding extension	Pratt Sub	18,870
Main Line	Herington Bypass	Yard bypass	Topeka Sub	19,696
Main Line	Pratt Siding	Siding extension	Herington Sub	13,278
Main Line	Mater Siding	Siding extension	Tucumcari Sub	10,142
Main Line	Newman Siding	Siding extension	Carrizozo Sub	8,302
Main Line	Tecolote Siding	Siding extension	Carrizozo Sub	11,177
Main Line	UP connection to West MC (Voltz)	Connection	Springfield-Hannibal Sub	6,766
Main Line	PTC installation Wabash Junction to CP Huntsville	Signal	Springfield-Hannibal Sub	19,460
Main Line	Hannibal bridge speed upgrade	Bridge, Track	Springfield-Hannibal Sub	2,420
Main Line	Griggsville Siding	Siding extension	Springfield-Hannibal Sub	11,626
Main Line	Hannel Siding	Siding extension	Lafayette Sub	10,577
Main Line	Dawson Siding	Siding extension	Lafayette Sub	10,103
Main Line	Decatur Double Track	Second mainline	Lafayette Sub	11,908
Main Line	Decatur CP Brush Phase II	Track	Lafayette Sub	16,889
Main Line	Vance Siding	Siding extension	Lafayette Sub	15,770
Main Line	Eldon to Ross Lane (Tilton yard) CTC	Signal	Lafayette Sub	4,195
Main Line	Tilton Siding	Crossover	Lafayette Sub	6,020
Main Line	Coburn Siding	Siding extension	Detroit - Huntington Sub	16,314
Main Line	CP-358 Crossover	Crossover	Toledo West Sub	4,598
Main Line	Pearl River Siding	Siding extension	NONE Sub	19,440
Main Line	Lumberton Siding	Siding extension	NONE Sub	22,001

Investment Type	Project	Facility or Project Type	Location	Investment ($000s)
Main Line	North End Meridian Double Track	Second mainline	Birmingham Sub	28,616
Main Line	Toomsuba Siding	Siding extension	Birmingham Sub	23,322
Main Line	Moundville Siding	Siding extension	Birmingham Sub	20,711
Main Line	Fleming Siding	Siding extension	Birmingham Sub	15,982
Main Line	Holt Siding	Siding extension	Birmingham Sub	17,726
Main Line	Foster Siding	Siding extension	Birmingham Sub	13,128
Main Line	Taylor Siding	Siding extension	Birmingham Sub	11,414
Main Line	Cleveland to Conway CTC	Signal	Cleveland-Fort Wayne Lines	34,283
Main Line	Conway to Harrisburg CTC	Signal	Pittsburgh Line	37,308
		Total		**$1,023,445**

130. Applicants plan to fund these projects with available cash flow. Applicants' Proforma Income Statement (Exhibit 17) in Volume 1 of the Application shows UP/NS will have sufficient cash flow to support the capital improvements needed to accommodate the traffic levels projected in the Growth Plan.

V. Information Technology Systems

131. Accurate and timely integration of IT systems will be vitally important to achieving the benefits of the proposed merger, including maintaining and improving service performance. Running a railroad requires coordinating operations of main lines, terminals, crews, locomotives, and rail cars, interacting with customers and other railroads, and managing back-office activities. Data points are received, synthesized, and reviewed, and instructions must be transmitted so that freight moves safely and on time. IT systems make this possible.

132. Applicants have established guiding principles and implementation practices to ensure successful integration of their IT systems. Section V.A of this IT integration plan describes the guiding principles of our systems integration. Applicants have been critically assessing their existing IT systems and have developed plans to first maintain and then improve service quality after merger.

133. Immediately after the transaction closes, Applicants will continue to rely on their existing, effective IT systems, discussed in more detail in Section V.B Applicants will take steps to create visibility into each railroad's existing systems, data, and IT operations, which will allow the combined UP/NS to quickly address issues and support customers and their shipment needs.

134. Applicants plan to execute IT integration in phases. As discussed in Section V.C, the first phase will be to configure the existing UP and NS IT systems to execute a single strategic operating plan across the combined rail network. In subsequent phases, described in Section V.D, UP/NS will deepen integration of the UP and NS systems. This phased approach will give UP/NS time to ensure that integrated solutions are reliable and effective. Both railroads already operate at a high level in their own geographic footprints and can continue to function that way until systems are fully evaluated, integrated, and tested, and stakeholders are fully trained to use them. The phased approach will continue until all IT systems are consolidated into an integrated solution.

135. Applicants will follow a defined process for IT integration. Section V.E outlines the processes Applicants intend to use when integrating their systems. The

ultimate goal will be best-in-class systems that enable safe, reliable operations throughout the entire, combined network.

136. Applicants aim to complete integration in three years following the finalization of the transaction. Applicants will invest approximately $798 million over this period to fully integrate their technology portfolios.

137. As discussed in Section V.F, each railroad has a proven track record of successfully implementing new IT systems that provide benefits to stakeholders, including foundational operating systems. Applicants will use best practices from these experiences and the entire railroad industry.

A. Guiding Principles of the UP/NS IT Integration Plan

138. Applicants have developed guiding principles for the IT integration process, to help ensure the integration supports a more competitive company that better serves its customers. The principles are as follows.

139. *Safe operations, always*. Integration should prioritize the safety of employees, contractors, customers, and communities.

140. *No loss of service or capacity*. Integration should occur without material disruption to the systems needed to run the combined railroad. IT integration will be meticulously planned, executed incrementally where possible, and should avoid negative effects on operations or service.

141. *Prepare for contingencies*. The combined UP/NS will continuously monitor for and remediate any issues that arise in connection with the IT integration. The combined railroad will continue to maintain and enhance disaster recovery capabilities and business resumption plans.

142. *Maintain security*. There will be top-tier cybersecurity throughout the integration, protecting all platforms during the transition. Applicants are committed to ensuring the security of critical systems, maintaining the confidentiality and integrity of data, and restricting access appropriately. The combined railroad will maintain resilience of network infrastructure, as well as rigorous data protection protocols, continuous network monitoring, and integrated incident response processes.

143. *Execute integration thoughtfully*. UP/NS will leverage existing change management frameworks and other best practices, while tailoring plans to meet specific circumstances. Integration will take full advantage of lessons learned from past integrations, as described in Section 7. To minimize risk and ensure smooth transitions, deployments will be incremental where possible.

144. *Measure outputs and adjust with agility*. UP/NS will regularly assess its approach to IT integration and execution results, adapting quickly to recalibrate for the best outcomes. The railroad will be transparent and update key stakeholders on progress.

145. *Maintain flexibility in integration*. Integration will be engineered with strategic flexibility to incorporate future emerging technologies.

146. *Best-in-class portfolio*. Integration's ultimate aim is best-in-class transportation systems that meet stakeholder needs and enable safe, reliable, and secure operations for the country's first transcontinental railroad.

B. Applicants' Robust IT Systems That Will Support Integration

147. UP and NS are industry leaders in IT systems, and have implemented many state of the art solutions, including artificial intelligence technologies that enhance rail safety and enable successful operations. Applicants' existing IT systems are also flexible and scalable. This means they can be—and routinely are—changed and expanded to accommodate new business requirements. These existing systems, which are described in detail below, will continue to operate side by side while the combined company phases in its integrated IT systems.

1. IT Systems Supporting Operations

148. Applicants' railroad operations flow from their respective strategic operating plans, which are comprehensive schedules of train trips, akin to flight schedules for major airlines. UP and NS generate their strategic plans using specialized computer programs developed for the railroad industry and execute the plans using downstream IT systems. Below are the key systems that UP and NS each employ to execute their strategic plans.

149. *Shipment Management* systems serve as the primary means of tracking, recording, and managing shipments and waybills across each railroad's network. They ensure that each shipment is correctly documented and routed, so that it can move efficiently from origin to destination.

150. *Equipment Management* systems govern scheduling, tracing, and managing cycles for freight cars and other equipment. They help Applicants use their assets as efficiently as possible.

151. *Locomotive Management* systems contain planning tools for locomotive deployment. The systems provide real-time monitoring of locomotive status and location; fuel management tracking and optimization; and automated assignment of locomotives for trips based on operational demand and maintenance schedules.

152. *Train Management* systems facilitate building, managing, and monitoring train configurations, ensuring optimal train configurations for safety, efficiency, and regulatory compliance. UP's system, for example, includes a safety tool that simulates the entire train route from origin to destination, to help check for potential car sequencing issues.

153. *Terminal Management* systems address rail yard, intermodal, and auto facility operations, managing everything from switching activities to inbound and outbound flows.

154. *Crew Management* systems ensure that crews are qualified, rested, and available for service, and facilitate regulatory compliance. These systems also assign crews to trains, call the crews to report to work, and monitor their hours of service.

155. *Engineering Track and Signal* systems monitor the health and status of the infrastructure on which trains travel. For example, UP's Track Inspection System collects information from FRA-mandated inspections, as well as inspections driven by UP's own internal policies.

156. *Car Inspection and Repair* systems log inspections, direct cars that need service or repairs to appropriate facilities, and track components as they are removed

and installed. Each Applicant has thousands of safety appliances installed trackside to monitor the health of equipment as it traverses the network.

157. *Safety* systems facilitate incident management and reporting; provide simulations for engineer training; and assess train locomotive and consist configurations. Each applicant has a safety management system that provides a centralized solution to report, investigate, and manage safety-related events such as injuries, equipment accidents, and grade crossing collisions. Simulation solutions create realistic training environments where engineers and other railroad personnel can safely learn to operate trains across a variety of territories. These advanced simulation platforms use sophisticated physics engines to continuously calculate buff and draft forces, taking into account train consist, terrain, and environmental conditions. Beyond training, the simulation solutions are also leveraged to evaluate proposed train configurations. By simulating a train's journey from origin to destination, the system assesses potential issues with the specific consist and route, allowing for safe transit and proactive mitigation of risks before actual operations begin.

158. *Dispatching* systems control train movements to ensure safety and efficiency on a railway. These systems also manage mainline operations by integrating with signals, switches, and other infrastructure to facilitate the safe and efficient passage of trains throughout the network as well as controlling access to track structures, whether for mainline train movements or maintenance activities.

159. *PTC* is a safety system designed to prevent train-to-train collisions, over-speed derailments, injuries to track workers from trains entering work zones, and movements of trains through switches left in the wrong position. If another system or command would otherwise create an unsafe situation, PTC intervenes in the interest of safety.

160. These systems are extraordinarily reliable and available. These systems have a better than 99.95% overall availability rate in both the UP and NS networks. In the rare instance of an outage, procedures and tools are in place to detect and recover expeditiously.

2. Customer-Facing IT Systems

161. In addition to these operating systems, Applicants have customer-facing systems that help customers obtain rates, order cars, track shipments, and pay their bills. Customers can create individualized accounts to receive notifications and obtain customized reports regarding their service history. Applicants both use Salesforce as their primary customer relationship tool. Part VI of the Service Assurance Plan further describes customer service.

3. Back Office IT Systems

162. Applicants also have a number of back-office IT systems that support corporate operations, including finance, supply, and human resources. These systems allow Applicants to complete financial reporting, manage purchasing and procurement, administer employee benefits, train employees, and maintain union relationships. Applicants use a common provider, SAP, for many of these systems.

4. IT Policies and Processes, Including Cyber Incident Response

163. Applicants have developed and implemented policies and practices that allow their IT systems to function accurately and reliably. Both companies proactively monitor for issues, even if they do not affect system availability or performance. Both UP and NS have tools that track thousands of system performance metrics daily, enabling administrators to pinpoint and address emerging issues swiftly and maintain system reliability. Applicants also have established incident response plans for IT-related service interruptions. These plans activate upon defined trigger points and initiate resolution, escalation, and communication processes.

164. UP and NS have each established disaster recovery capabilities designed to ensure rapid recovery from physical facility and technical failures. Multiple computing centers provide redundancy in case of an outage. Applications and data are continuously replicated across data centers to support recovery, and additional backup solutions are in place to address scenarios such as data corruption or ransomware. UP and NS each perform tests annually to ensure all critical applications can be recovered in the event of a disruption.

165. Both companies also have comprehensive cyber incident response plans and playbooks that address a wide range of scenarios, including ransomware, denial of service, data loss, and privacy breaches. These technical plans include clear criteria for invoking incident response, defined roles and responsibilities, reporting obligations, and detailed communication protocols to ensure rapid detection and coordinated response to a cyber event. In parallel, business resumption plans are in

place to sustain services while technical teams recover affected systems, ensuring that essential services continue uninterrupted. In the extreme case of complete IT unavailability, non-digital methods can be used to conduct operations.

166. Integrated crisis management programs further support these efforts by coordinating mitigation activities and communication with customers, communities, and government agencies throughout the incident.

167. UP and NS routinely test these plans to validate their effectiveness and ensure stakeholders are prepared to respond. Both organizations also maintain relationships and retainers with outside counsel and incident response firms, ensuring expert support is available during significant cyber events. This layered approach enables Applicants to detect, respond, and recover from cyber incidents while maintaining reliable service and transparent engagement with all stakeholders.

168. Each company undertakes significant effort to minimize the possibility of cybersecurity related risk. Applicants are both fully compliant with the Transportation Security Administration ("TSA") Cybersecurity Directive requirements and actively participate in the rail industry's cybersecurity efforts through the Rail Information Security Committee ("RISC") that is managed and governed by the industry's trade association, the Association of American Railroads ("AAR"). RISC consistently engages with government agencies including the Federal Bureau of Investigation, the Cybersecurity and Infrastructure Security Agency, and TSA for threat intelligence and cybersecurity briefings.

169. Finally, both companies are committed to continued investment in industry-leading technology innovations that strengthen operational performance, safety, and customer value. UP has demonstrated this through automated gating technologies, advanced hump and yard control systems, and its resource optimization solutions. NS similarly has demonstrated this through its leadership role with RailPulse, an industry organization that outfits sensors on railcars and centrally collects and shares this information with customers and car owners. NS also has leveraged advanced analytics and machine learning to optimize train routing and maintenance planning.

5. Existing Collaboration

170. Applicants also have a decades-long history of successfully building interoperable systems that railroads can use to communicate with each other. Applicants will build on this success to ensure successful IT integration.

171. UP, NS, and other railroads have long acted as partners to serve common customers. This stems from the fact that railroads have tracks in different areas of the country. Indeed, interline shipments that involve more than one railroad comprise greater than 40% of UP's total traffic. Slightly more than 10% of UP's traffic is interline with NS.

172. To facilitate interline shipments, the industry has developed predefined Electronic Data Interchange ("EDI") standards for sharing the most common operating data, including waybills, and train interchange notifications. UP and NS will build on this foundation and expand it by establishing new message formats to support integration of applications across the broader application portfolio during the

interim state. Additionally, existing data-sharing practices, such as those used in PTC, further demonstrate the effectiveness of interoperable messaging systems in supporting safe and coordinated operations.

C. Initial IT System Integration

173. Applicants expect to implement the initial phase of their IT integration during roughly the first 90 days after the transaction is finalized. Immediately following close of the transaction, IT systems supporting each company will operate side-by-side, largely independent of each other. This will preserve current service operations until consolidated solutions can be deployed without disruption.

174. The first IT integration steps will support Applicants' implementation of a single strategic plan. Applicants expect that one master plan will account for all operational resources—track, locomotives, cars, crews, and terminals—across the UP/NS system. This will allow Applicants to begin to deliver the benefits of integration immediately, including reducing interchanges.

175. The existing IT systems of UP and NS will execute this unified strategic plan through their respective existing networks. These systems are designed to, and in practice regularly do, implement changes to strategic and tactical plans as business needs dictate.

176. UP/NS will build additional IT tools on top of these systems, and additional linkages between the companies as necessary, to support efficient operations and service reliability.

177. A critical early task will be to establish comprehensive visibility across the operations of both railroads. To achieve this, Applicants will create secure paths

and provision access between the two companies, ensuring that appropriate UP and NS users have access to each other's systems. This immediate step will allow staff in both organizations to begin sharing operational information and familiarizing themselves with each other's IT environments, laying the groundwork for seamless collaboration.

178. In parallel, Applicants will establish a shared platform that enables both companies to contribute and access operational performance data. This will enable real-time monitoring of nationwide train movements and system-wide availability of key resources such as cars and locomotives.

179. Applicants will also focus on defining and implementing a common set of key commercial and operational performance metrics. These metrics will allow data reported from different systems that perform similar functions to be effectively compared and analyzed, providing a unified understanding of operational performance.

180. Another key early priority will be developing and deploying solutions for customer-facing interactions. As described in more detail in Part VI of the Service Assurance Plan, Applicants intend for all customers to interact with the newly merged company through UP's current website. Through this page, customers will have access to the tools they previously used at NS and UP as well as information regarding their shipments, invoices, and customer service requests. Trained customer representatives will be available throughout the integration process to provide support to ensure the transition is seamless. As with transportation systems,

however, during the initial phase of integration the existing customer IT systems of UP and NS will continue to operate in parallel to accept, process, and resolve customer communications.

181. Finally, during the initial phase of integration, UP/NS intends to quickly begin work toward a unified cybersecurity incident response plan and a coordination of cyber policies across the combined UP/NS.

D. Subsequent Phases of IT System Integration

182. After the initial phase of integration, Applicants intend to begin deeper integration and optimization of their IT systems, including transportation systems and customer service and back-office systems. As explained above, many UP and NS systems will operate in parallel during Year 1. In particular, this will be true for most systems controlling train operations, which will require extensive testing and planning to integrate successfully. But substantial progress toward full integration is expected in Year 1, including the following actions.

183. *Safety Simulations*. UP/NS will expand upon existing train and locomotive simulation tools to cover the entire unified network, enhancing safety assessments of combined routes. As noted, UP's systems utilize a physics-based engine to simulate a train's journey from origin to destination, projecting how the proposed train consist will respond to expected track conditions. Applicants intend to include NS track data in UP's tools.

184. *Customer Experience*. In Year 1, UP/NS will work to provide integrated platforms for customer shopping, as well as a single customer support process.

185. *Policies and Processes*. Another early priority of UP/NS will be coordinating IT policies and processes across the combined operations. In Year 1, Applicants expect to coordinate infrastructure operations teams and their incident escalation processes, as well as implement common security policies and preventative controls.

186. *Reference Data*. Applicants will work to create an integrated set of reference data to support the operations and integration of existing systems. For example, Applicants will generate a single master list of customers with unique identifiers for internal use throughout the entire organization.

187. In Years 2 and 3, Applicants intend to begin integrating operating systems. Principally, Applicants expect that UP will deploy its NetControl system across the NS railroad. Fully deployed at UP in 2024, NetControl is a state-of-the-art transportation management system that facilitates critical functions related to train operations. NetControl encompasses, or is highly integrated with, most of the IT systems that support UP's operations, including train, terminal, shipment and waybill, crew calling, scheduling, locomotive, and equipment systems.

188. Beginning in Year 2, Applicants expect to complete development of an implementation package for NS operations that includes most of NetControl's core functions, such as train, terminal, shipment and waybill, crew calling, intermodal, locomotive, and health and equipment functions. UP/NS will build a virtual testing and validation environment to ensure that this package is effective for NS assets. It

will also establish a training environment to enable employee training in advance of a transition.

189. This package will be implemented in accordance with a phased plan, with contingencies for rollback in the event of an unexpected issue. For example, UP/NS may initially deploy NetControl for limited geographic areas or routes of the legacy NS system before expanding the implementation wider and eventually to the entire NS Network. This approach will minimize disruption risk while allowing early delivery of service benefits to customers.

190. Also beginning in Year 2, Applicants expect to start integrating the commercial systems of UP and NS, including by offering unified solutions for customer order submission and pricing.

191. Alongside these improvements to IT systems, Applicants intend to migrate each company's data into a single storage facility, thereby eliminating the need to query separate, corresponding databases to obtain complete information across the combined UP/NS operations.

192. In Year 3, Applicants plan to begin integrating other operating systems, including dispatching, mechanical, and engineering systems. Applicants also plan to consolidate PTC applications in Year 3.

193. Applicants intend to invest $798 million over this period to integrate their IT systems. This will enable them to realize synergies, manage transition risks, and ensure that the combined rail network operates on best-in-class, reliable, and effective systems.

E. Risk Management for IT Integration

194. When deciding whether and how to integrate IT systems, UP/NS will apply the principles and framework outlined above in Section V.A. Applicants' IT leadership will oversee the IT integration process in coordination with a centralized Integration Management Office.

195. Each integration decision for a specific application will follow one of three common approaches:

- **Interim Integration with Unified Access.** In some cases, UP/NS may implement a more integrated—but still interim—solution. For example, shortly after the transaction, customers will be provided with a single access point for service. From this access point, they may be directed to either the existing UP or NS system depending on the nature of their inquiry. In certain cases, customers may be able to conduct all business through a unified interface, even though the underlying systems remain separate. This approach allows for a seamless customer experience while full integration is still in progress.

- **Direct Transition to End-State Systems.** In other cases, it may be more effective to move directly to the intended end-state solution, such as transitioning additional operations to a preexisting solution currently in place, developing a new in-house solution, or acquiring a new solution from an external vendor.

- **Deferred or No Integration.** Some systems may not require integration in the near term—or at all. For instance, NS systems that support unique business processes, such as coal sorting and loading facilities not present in UP's network, may continue to operate independently without requiring direct interaction with UP systems.

196. System integration projects must manage common risks such as malfunctioning features, inaccurate or incomplete data migration, and issues with transactions initiated immediately before integration begins—all of which can disrupt service. These risks will be mitigated through thorough testing, phased rollouts, and post-implementation data validation. UP/NS will leverage third-party

validation as needed to supplement internal capabilities. Data migration strategies include using checkpoints and reconciliation tools to ensure data integrity, while legacy systems may be temporarily retained to support rollback and continuity.

197. As explained below, UP/NS will further support these projects with careful preparation, robust training, and clear and consistent communication. Effective training empowers internal users and external customers to adopt new systems seamlessly, which in turn makes data more accurate and complete. Coordinated communication across departments and field teams helps prevent delays and errors. Applicants intend to use early engagement with frontline staff, tailored training programs, and ongoing support to build momentum and buy-in for successful IT systems integration. Where possible, Applicants will implement integrations incrementally to minimize risk and support effective change management, such as phasing in use of NetControl across NS's different geographic territories and lines as discussed above.

198. Applicants will begin each IT integration project with a thorough analysis of how the change could impact different groups, using stakeholder and impact assessments to identify who may be affected and to what degree. This analysis will inform the design of a comprehensive change strategy. The strategy also will draw on successes with and lessons learned from analogous past integrations at UP and NS.

199. UP/NS will define in advance key metrics to track system health and service during integration and monitor progress in real time. These metrics will

include not only traditional indicators of system performance and availability, but also early indicators of potential issues, such as trouble tickets and defects reported. By tracking these issues closely, Applicants will be able to identify emerging problems, assess the effectiveness of mitigation strategies, and better ensure that any disruptions are addressed promptly.

200. UP/NS will also develop comprehensive plans for data migration to ensure the secure and accurate transfer of information between legacy and new systems, implement necessary changes to system interfaces so that applications can communicate effectively, and identify unique business process changes that must be accommodated in the integrated system.

201. UP/NS will conduct comprehensive functional and performance testing and validation using representative test data, as well as rigorous end-to-end testing to ensure that all features work as intended and integrate seamlessly with other solutions. This will create confidence that the systems will perform as intended before they are implemented. UP/NS will establish a dedicated test environment that includes all necessary and master reference data to support both functional and performance testing using representative test datasets. For example, testing of consolidated shipment management would involve running waybills through the test system to confirm successful processing of a wide variety of origin and destination pairs, commodity codes, weights, etc. By conducting these tests in pre-production environments, UP/NS will keep production systems unaffected by the testing process. Additionally, UP/NS will employ user acceptance testing to verify that new solutions

meet user requirements and expectations. This methodical, layered approach to testing—refined through UP's successful implementation of NetControl and other major IT projects at both UP and NS as discussed below—will help Applicants identify and resolve issues early, minimize risk, and support smooth, successful IT integration.

202. Drawing on best practices from recent integrations, such as the successful rollout of the A&S systems discussed in Section V.F, UP/NS will provide stakeholders appropriate training before implementation of system changes. Applicants intend to develop a comprehensive communication plan and related materials, provide milestones, and track current status. Training will be delivered through a combination of online modules, quick reference guides, and hands-on support. Resident experts and local advisors will be available on-site to address challenges, answer questions, reinforce learning, and support during and after the transition. Employees and customers will have the opportunity to familiarize themselves with new systems well in advance of integration. Multiple "dress rehearsal" sessions will be planned to ensure a seamless transition. Field implementation teams and trusted instructors will provide direct assistance, while train-the-trainer sessions will help cascade knowledge throughout the organization.

203. When a new system goes live, experts will provide support to address any questions that arise. Support staff typically will be on site, available to sit shoulder-to-shoulder with end-users during their transition. UP/NS will introduce significant technology changes with both on-site support and 24/7 expert availability.

204. Applicants plan to establish feedback loops to capture stakeholder input and monitor engagement throughout the IT integration process. Real-time feedback will be incorporated into future training materials and quick reference guides to address any previously encountered issues. This iterative approach, with a focus on safety and regulatory compliance, helps employees and customers gain confidence in the new system and supports long-term organizational success.

F. Applicants' Successful Management of Transition Risk in Prior IT Projects

205. When the combined UP/NS integrates the IT systems the two railroads use today, it will be building on a decades-long history of interoperable systems. UP, NS, and other railroads have long acted as partners to serve common customers using their respective tracks in different areas of the country. So-called "interline" shipments that involve more than one railroad comprise greater than 40 percent of UP's total traffic, and more than 10 percent of UP's traffic is interline with NS.

206. To facilitate interline shipments, the industry has developed predefined EDI standards for sharing common operating data including waybills, as well as train interchange notifications. Other data-sharing practices, such as those used in PTC, further demonstrate the effectiveness of interoperable messaging systems in supporting safe and coordinated operations. UP/NS intends to expand upon these existing practices by establishing new message formats to support integration of applications across the UP/NS system.

207. Both Applicants, moreover, have extensive track records of successful IT system integrations in their own operations. This experience shows that Applicants

can schedule and accomplish integrations without impacting operations, migrate large volumes of critical data without loss, prepare internal and external stakeholders to use new systems, and effectively implement process improvements based on lessons learned.

208. For instance, in January 2024, UP executed a complex change-over to NetControl without service interruption. As noted earlier, NetControl is UP's industry leading, internally designed and built transportation-management system. It synthesizes tremendous volumes of real-time operating data and is deeply integrated with many key operating, customer, and financial systems. UP executed a complex change-over from a 55-year-old mainframe system to a modern car scheduling system inside NetControl, transitioning the entire network within three hours with no service interruptions.

209. In October 2025, UP implemented NetControl (as well as several other platforms) in one of its operating subsidiaries, the A&S, without service disruption. UP trained all users in advance of implementation, and secured stakeholder buy-in regarding the benefits of the new system. This experience specifically demonstrates UP's ability to implement a mission-critical platform at a railroad that has its own employees, processes, and culture.

210. Beginning in 2020, UP implemented its dispatching system, CADX, without service interruption by utilizing an incremental change methodology. UP implemented CADX over 17 months, starting with just one territory or dispatcher desk in the Pacific Northwest. This location was selected for the initial rollout because

it had a relatively low volume of traffic and simple train movements. From that starting point, UP incrementally expanded CADX to cover all of its 32,880 route miles and related operations. A similar, phased-in approach is planned for dispatch changes in NS territory.

211. NS similarly used an incremental approach to implement its modernized dynamic train service registry ("DTSR") in 2025. DTSR is a core transportation component that manages the execution of NS's real-time train operating plan. The incremental migration of DTSR off of mainframe technology facilitated NS's ability to revert if an issue was identified. After its successful implementation, DTSR now provides NS flexibility to integrate with UP operational systems.

212. In the last two years, both UP and NS have replaced their core PTC data center infrastructure. UP's replacement occurred over multiple maintenance windows, while NS accomplished this as part of a routine hardware refresh. Despite the complexity and safety-critical nature of the task, both companies maintained uninterrupted PTC operations throughout their transitions.

213. UP's experience with IT system changes also includes successfully migrating large volumes of important business data. Specifically, UP recently transitioned its core financial services systems—including accounting, payroll, and accounts payable—to an SAP-managed cloud environment in just eight months. This rapid implementation is noteworthy given the scale and complexity of the upgrade, which included moving from an on-premises solution to a primarily cloud-based

platform. Despite these challenges, the transition was completed without service disruptions or data migration issues. In recognition of this achievement, SAP honored UP at its international conference for the speed and quality of the implementation.

214. UP likewise has had recent success in launching new customer-facing systems. In 2025, UP launched a new Customer Portal, providing a unified interface for customers to view and manage their shipments. This upgrade was rolled out through a collaborative approach, beginning with a pilot group of 40 customers who helped shape the design and requirements of the new system. UP adopted a segmented rollout, introducing the solution sequentially to specific customer groups to test and optimize before full deployment. Alongside the portal, UP introduced a centralized exception management tool that allows users to prioritize and resolve shipment issues within a single interface. These enhancements received positive customer feedback and broad adoption, confirming their thoughtful implementation with a focus on usability and customer benefits.

215. Indeed, both UP and NS well know that robust engagement with users can be essential to meeting IT goals. UP, for example, successfully implemented Terminal Command Center, a platform that provides a comprehensive dashboard of all activities within a terminal, by tailoring the solution to meet each terminal's unique business requirements and providing on-site training so that each team became fully comfortable with the system before it went live. UP also developed a mobile application called UPGo Dray Driver Mobile Experience that allows truck drivers to pre-clear their reservations and enter a terminal without stopping.

Coordinating with local trucking and driver communities, UP operating and tech personnel provided one-on-one support and training, assisting drivers with installing, registering, and using the application. The result of this sustained commitment has been an industry-leading 92% adoption rate for the UPGo mobile application.

216. In 2024, NS successfully implemented intermodal stacking technology at its core intermodal terminal in Austell, Georgia. This included introducing a reservation system that improved management of the flow of containers coming in and out of the terminal and reduced the time required for truckers to drop off or pick up containers. NS designed and built the system with input from multiple customers and local site personnel, provided training, and closely coordinated with stakeholders during launch. NS continues to successfully deploy this best-in-class system, each time providing extensive communications and training.

* * * *

217. In sum, Applicants are well positioned to integrate their IT systems while maintaining safe, reliable operations and uninterrupted customer service. UP and NS have developed and are operating industry-leading IT systems; they will bring this expertise to the implementation of advanced IT systems across the integrated entity. The existing UP and NS systems line up well from a functional perspective, which will facilitate integration. The process of IT integration has begun with extensive study of the railroads' existing systems and lessons learned from past integrations. After the transaction closes, UP/NS will follow a defined process,

informed by best practices, to plan and execute an incremental, phased integration that builds on both railroads' record of successful IT transitions.

VI. Customer Service Integration Plan

A. Overview

218. To realize the full benefits of the proposed merger, Applicants must successfully integrate the UP and NS customer service operations and meet high standards for customer interactions. Applicants have robust programs that provide excellent customer service and will continue to do so after integration. Applicants are dedicated to executing a careful and coordinated strategy to integrate their customer service functions, as outlined below. The existing customer service frameworks of both railroads are being meticulously evaluated, and Applicants are planning to deliver customer care benefits soon after the close of the transaction, along with longer-term improvements.

219. Applicants intend to integrate the customer service functions of UP and NS over a three-year period after close of the transaction, consistent with the framework detailed in Section VI.B. The objective of the framework is to maintain excellent customer service, including systems that support reliable operations across the combined network both during and after the integration.

220. Initially after the close of the transaction, UP/NS will continue utilizing the current customer service systems of UP and NS. The combined railroad will maintain the service levels of these systems and minimize customer disruption. The combined UP/NS will then integrate customer service in stages. Initially, as described in Section VI.D below, Applicants will implement a unified strategic operational plan

across the entire rail network to optimize routing and minimize car touches. This will provide immediate service improvements without overhauling existing frameworks, allowing customers to quickly receive benefits from the integration.

221. Creating transparency between the UP and NS customer service processes will be a top priority so that UP/NS personnel have access to operational status information across the combined system. This is essential for swiftly resolving issues and maintaining strong customer relations. Standardizing and enhancing communication points for customers will also be an early focus after the merger. This strategy for the initial stage of integration will allow safe and smooth operations to continue while new systems are thoroughly evaluated and tested, and stakeholders are trained.

222. Later phases will enhance integration further, with existing processes remaining in place until they are replaced by a unified approach. Interim solutions also may be used as more comprehensive, long-term systems are developed and deployed. Section VI.E discusses these phases of the integration.

223. As explained in Section VI.F, UP and NS both have histories of adopting new customer service systems that benefit stakeholders, with minimal disruption. Applicants are focused on the lessons learned from these successful implementations, as well as best practices from across the railroad industry. Applicants intend to apply those lessons to the integration process so that UP/NS customers will continue to receive excellent—and even better—customer service during and after merger integration.

B. Applicants' Guiding Principles

224. UP and NS take similar approaches to customer service, which will be continued following the merger. For both Applicants, the core principles of their customer care operations are the following:

225. *Prioritize Safety*. Safety is Applicants' highest priority, and the integration process will be conducted in a way that ensures customer shipments are handled safely, keeping customers, our employees, contractors, and communities safe.

226. *Ensure Service Continuity*. Applicants are dedicated to maintaining uninterrupted service and capacity throughout the merger. Integration of customer service operations will occur without disrupting the systems that facilitate critical railroad functions.

227. *Execute Thoughtfully*. By leveraging established change management frameworks, UP/NS will tailor its integration plans to specific needs and lessons learned from previous experiences. An incremental approach will be used where feasible to reduce risk and ensure smooth transitions.

228. *Measure Results*. UP/NS will continuously assess the effectiveness of its customer service integration, remaining agile to change course when necessary. Transparency with customers will be a key focus, and they will be kept informed of progress and changes.

229. *Uphold Security Standards*. UP/NS will maintain high standards of system security and availability during the integration. The integrity of all customer

interactions will be safeguarded throughout this transition, ensuring transparency and trust.

230. *Prepare for Contingencies*. Applicants intend to sustain readiness for unexpected events or external disruptions by continuing to enhance disaster recovery capabilities and business resumption plans.

231. *Plan for the Future*. Recognizing that customer expectations and industry standards evolve, Applicants are planning integration with a long-term perspective. The aim is not only to maintain but to enhance current service offerings, delivering an improved experience for all stakeholders.

232. *Strive for Excellence*. The ultimate goal is for the combined UP/NS to achieve a best-in-class customer service portfolio that supports the reliable operations of the nation's first transcontinental railroad.

C. Current Practices

233. In practice, both Applicants implement these principles by focusing on solving problems at their root cause, aiming for lasting resolutions, and preventing recurrence. They educate both external and internal customers and position them for future self-help solutions, including by introducing customers to the various tools and technologies available, as well as making sure they have access to solution-oriented support.

234. *UP's Customer Service Systems and Staffing*. Most UP customers handle their interactions at UP.com, which features "MyPortal." MyPortal serves as a centralized landing page for customers to manage their shipments with UP. It consolidates several high-usage applications into a streamlined interface, enabling

users to quickly retrieve shipment details, monitor exceptions, and access tools without navigating across multiple pages. Upon initial login, customers are prompted to select preferred locations, allowing the system to tailor content and functionality to their specific operational footprint.

235. MyPortal provides real-time visibility into shipment exceptions, which empowers customers to address potential disruptions before they escalate and thereby mitigate risk and enhance supply chain reliability. The portal also introduces structured navigation under three categories—Plan, Ship, and Pay—promoting clarity in application access and usage.

Figure 10: My Portal Dashboard

236. Customers have expressed satisfaction with UP's MyPortal website. A few examples of customer feedback from 2025 are:

- From a major pulp and paper company: "Just keep doing what you're doing because you have the best user-friendly website of all the railroads operating in [the] U.S."
- From a premier transportation service provider: "Your site is so much better than your competitors. I love that it shows when [the shipment is] load pending, when it's on rail, the ETA when it's available, and the [Last Free Day]."
- From a leading household products manufacturer: "[E]very time more perfect, thank you for all the improvement on this web."

- From a top-tier poultry company: "Best railroad website. . . . [T]wo thumbs up as always!"

237. UPGo is UP's mobile app designed to enhance the intermodal terminal experience for dray carriers. UPGo has been a key part of UP's digital transformation, achieving high adoption rates and contributing to improved operational efficiency. It streamlines gate processes by enabling pre-ingate and pre-outgate validation, real-time parking updates, and access to electronic J1s (the ingate/outgate receipt), all of which significantly reduces dwell time and gate errors. The UPGo app is integrated with Precision Gating Technology, allowing for faster, automated entry using machine vision. UPGo also supports multiple languages and is available on both Android and iOS platforms.

238. When customers encounter an issue they cannot address through self-service via MyPortal or UPGo, UP's Customer Care & Support ("CC&S") Organization provides assistance. CC&S has two customer call centers—one for general inquiries, and one for international inquiries in which customer service agents offer bilingual English/Spanish assistance. These customer call centers are available 24/7 and support a variety of needs, including issues around transactional support, waybills, customer-facing technology, intermodal ramps, and user IDs. UP uses an automated call routing platform and internal applications to route customer calls to the agent that is best positioned to solve the customer's issue during a single interaction. UP's call centers are at the forefront of the railroad industry with a speed

to answer time of less than 60 seconds, a call abandonment rate of just 1 percent, and a customer satisfaction rate of 92 percent.[177]

239. Behind these call centers and customer-facing applications stand the Customer and Transportation Solutions groups in the CC&S Organization. The Customer and Transportation Solutions groups work within the Case Management application and handle more complex, non-transactional issues. These groups are organized much like freight moves on the railroad, including a Manifest Solutions team that handles single car issues, an Intermodal Service Solutions team that handles the intermodal side of the industry, an Automotive Solutions team that handles finished vehicles and automotive parts, and a Unit Train Solutions team that handles full trains typically stocked with coal, soybeans, grain, and other commodities.

240. All customer interactions are tracked in Salesforce. In addition to serving as a comprehensive repository for customer communications and feedback, Salesforce enables the team to analyze collected data, identify trends, and resolve issues more efficiently. By leveraging this information, the CC&S Organization continuously improves its processes and technologies to enhance the overall customer experience.

241. *NS's Customer Service Systems and Staffing.* NS likewise provides exceptional customer experiences through proactive and effective communication,

---

[177] CC&S Tableau Scorecard and KPI Dashboard as of 11/21/2025.

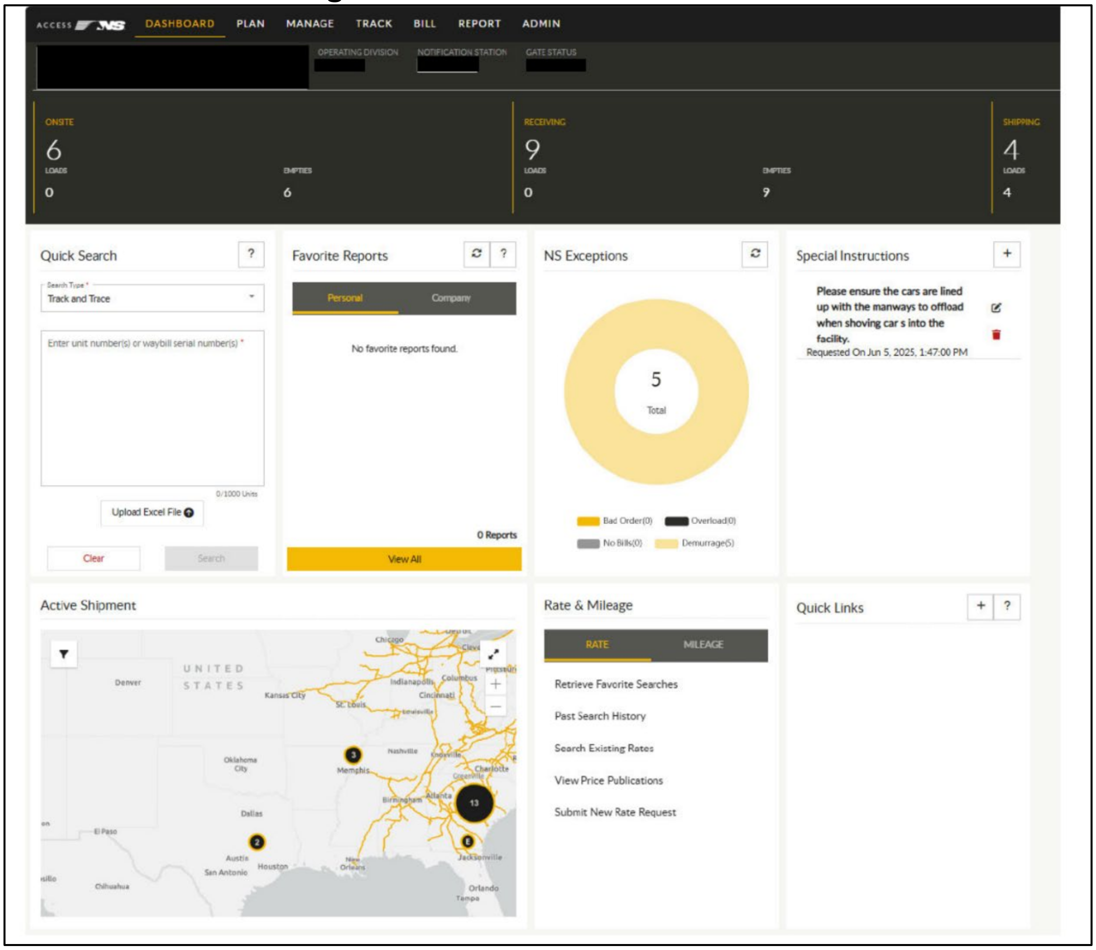
advanced technologies, and best-practice processes, while maintaining a people-oriented approach.

242. AccessNS is the primary customer portal that allows NS customers to learn or confirm details of their service, including inventory management, current location, and ETA for railcars. Through AccessNS, customers can also manage subscriptions and exceptions, create and manage support cases, access internet bills of lading, view and dispute freight bills, receive waybill updates, submit rate inquiries and rate requests, and make intermodal reservations.

243. NS recently redesigned AccessNS to improve visibility into, among other things, the status of NS local service and delayed shipments. Based on customer feedback, NS designed the system so that notifications are customizable and proactive. For example, customers can choose a specific delay threshold for a notification and can specify their most critical commodities.

244. A screenshot of the AccessNS dashboard is below:

Figure 11: AccessNS Screenshot



245. NS customers can also use ExpressNS+, a mobile application that streamlines gate and terminal processes for NS's drayage community. Using ExpressNS+, drivers can verify billing, submit pre-gate information, obtain parking and pickup locations, receive electronic interchange receipts, and submit bad order information.

246. When customers cannot resolve an issue themselves, NS's virtual assistant is able to answer basic questions instantaneously. If more assistance is needed, the customer can use AccessNS to open a case with NS's customer logistics team, without having to make a phone call or send an email. Each case is routed to

teams of individuals who specialize in the particular customers' traffic type. NS's robust customer logistics team provides specialized service based on the type of cargo (*i.e.*, coal, grain, paper, consumer goods, metals, construction, chemicals, plastics, waste), with dedicated customer logistics teams for intermodal and automotive customers. Customer inquiries opened with AccessNS are fed directly into ConnectNS, which is NS's Customer Relationship Management tool, powered by Salesforce. ConnectNS supports superior case management and organization that in turn allows faster handling of issues and a high-quality experience for the customer.

247. Customers may choose to call NS for help with their specific inquiry or concern. NS has an integrated call routing platform that provides phone routing when customers call to talk to a Customer Logistics Specialist. All calls are logged as cases in ConnectNS.

D. Initial Customer Service Integration

248. Applicants have developed plans to ensure that from Day 1 of the UP/NS integration, UP and NS customers will experience an uninterrupted transition of customer service and only improvements in service quality. Initially, both UP and NS customers will continue to interact with the same contacts they have had, through the same channels. For example, the railroads' existing MyPortal and AccessNS systems and customer service contact phone numbers will still be used. UP and NS customer service centers will remain in place, following their established procedures. This continuity is intended to prevent confusion or disruption in how customers receive support immediately after the merger.

249. The immediate visible change for customer engagement will be an updated web presence: On the first day of combined operations, Applicants intend to launch a single public-facing website for the combined company, integrating UP and NS's online presence. NS's external website content will be consolidated into UP's site, giving customers a unified portal for information about the new network. This integrated website will clearly direct users to the appropriate customer tools (in particular, the MyPortal and AccessNS logins), so customers will not need to learn any new systems. The NS website will still remain operational, but it will funnel traffic toward the consolidated UP website for convenience. UP/NS will notify customers about the new unified portal and support channels, providing instructions to ensure the transition is seamless.

250. Even though existing personnel, systems, and processes will remain in place, shippers immediately should enjoy a better customer experience due to coordination between the UP and NS customer service teams. Shippers that previously had to interact with both UP and NS to investigate or address issues with transcontinental shipments will no longer need to do so, as UP and NS customer service teams will be able to coordinate behind the scenes. UP/NS will establish joint escalation paths and hand-off protocols for inquiries that span across the legacy UP and NS networks. For instance, UP's CC&S staff will have direct lines of communication with the NS Customer Support team, so shippers get unified, comprehensive answers even if both legacy territories are involved. These cross-company coordination and escalation channels will help ensure that even complex

transcontinental service issues are addressed promptly through internal collaboration, setting the tone for the broader integration to come.

251. To safeguard against unforeseen issues in the initial stages of the integration, UP/NS will also adopt a command center support model supported by joint performance reporting from the legacy UP and NS systems, enabling supervisors to monitor call volumes, case resolution times, and any customer complaints in real time. This close oversight, backed by redundant resources and contingency plans such as surge staffing protocols and dual-run system backups, will provide an extra layer of security for maintaining customer service continuity after the closing date.

E. Applicants' Plans for Subsequent Seamless Integration of Their Customer Service Systems

252. Integration of UP/NS's customer service functions relates closely to integration of the combined railroad's IT systems. For instance, both Applicants have IT systems that allow customers to obtain rates, order cars, track shipments, and pay their bills. One of the merger's benefits is that customers of each railroad will be able to use a single railroad's systems for all those functions when shipping coast to coast. Many customers, however, will have to learn to navigate new systems to fully enjoy those benefits. Applicants are carefully planning for that process, both in terms of staffing and training their customer support functions and steps to familiarize customers with new processes and procedures.

253. *Phased Integration.* Recognizing the inherent complexity of merging two distinct customer service systems, the combined UP/NS will proceed toward full

customer service integration deliberately and incrementally, drawing upon best-in-class tools and processes from both companies to ensure that every point of interaction between customers and the railroad achieves a high standard of excellence.

254. In the first year following the merger, customer service associates will be trained to resolve customer cases originating in either the UP or NS networks. There will also be mapping of customer data and records as well as data migration and system cutover planning.

255. As an interim step prior to full customer service system integration, Applicants plan to develop a single website that brings together the MyPortal and AccessNS customer service systems. Later, a consolidated customer portal will be launched so that MyPortal and AccessNS interface into a single platform. This consolidated customer portal will be accompanied by unified customer service network infrastructure and call center telephony.

256. Applicants expect that UP/NS will move towards having one customer service center in Omaha, Nebraska. The unified customer service center will be appropriately staffed to support the combined operations and is expected generally to reflect the existing structure of UP's customer service organization. The service center team will have end-to-end visibility across the combined railroad, allowing customers a unified customer service team with a single set of processes and language throughout the length of a shipment. This will reduce complexity for the customer and railroad customer service teams alike.

257. *Employee Training.* As part of the integration, UP/NS employees will undergo targeted training on the various customer support systems, with a focus on cross-platform familiarization and operational continuity. For legacy NS personnel, this training will include guided walkthroughs of UP systems such as MyPortal Dashboard, NetControl, and Salesforce Case Management. UP personnel will receive training on NS platforms like AccessNS and ExpressNS where applicable. System-specific training will be delivered through a combination of digital modules, live demonstrations, and job aids, ensuring that employees are equipped to navigate both legacy and integrated environments.

258. Team members from both the UP and NS systems will also participate in ongoing learning activities that cover not only technical systems and procedures, but also best practices in customer communication and problem-solving.

259. In addition to training on the UP and NS legacy systems and ongoing employee development, Applicants intend to implement targeted training on operational changes associated with the integration. These programs will include cross-system familiarization, updated workflow procedures, and customer interaction protocols aligned with the unified service model. Training will be delivered through a combination of instructor-led sessions, digital modules, and hands-on practice. There will also be feedback mechanisms to continuously refine training content and ensure alignment with evolving operational needs.

260. *Customer Experience.* A key focus of this integration is a thoughtful and thorough onboarding experience for customers as they are introduced to new tools,

technologies, and contact points. Applicants will provide informed guidance, personalized tutorials, and dedicated support to ensure customers feel confident and empowered as they navigate the integrated systems. The approach includes proactive outreach, clear communication about the benefits and functionalities of the new tools, and opportunities for customers to offer feedback and ask questions.

261. The overall objective for integrated customer service is centralized visibility and unified customer support, with a focus on:

- **Shipment Visibility:** Customers will gain access to all active shipments across the transcontinental network through the web, EDI, and API channels.
- **Unified Digital Experience:** There will be integration of shopping, planning, shipping, exception management, and invoicing into a single, best-of-breed suite of online tools.
- **Aligned Support Channels:** There will be standardization of communication via phone, cases, and inquiries, supported by a unified notification system.
- **Change Management:** UP/NS will deploy in-app guidance, replayable walkthroughs, and live webinars to facilitate customers' transition.

262. There will be harmonizing of knowledge bases and communication channels, so customers have continuity and clarity no matter how they had engaged with UP or NS previously, for example:

- **Customer Portal Enhancements:** UP/NS will introduce guided workflows, map visibility toggles, and exception detail improvements tailored to customer-specific solutions.
- **Exception Management Optimization:** Streamlining of case handling and dispute resolution processes will reduce friction and improve transparency.

- **Performance Benchmarking:** Finalization of UP/NS benchmarking will allow the combined railroad to identify best practices and solutions within the legacy UP and NS operations and draw on them to further enhance customer service offerings and processes.

263. The objective is a harmonized, joint operating model whereby customer service performance is analyzed and reported as one entity with standardized and continual training and development procedures designed to ensure that the new entity provides the highest level of customer service. This approach will draw upon proven best practices and procedures in the Applicants' existing operations as well as historical insights and plans developed by both companies.

F. Applicants' Record of Successfully Implementing Customer Service Improvements

264. Both UP and NS bring to the proposed combination a track record of investing in and successfully executing enhancements to their customer service systems and teams. For instance, the summer of 2025 launch of MyPortal enhanced the accessibility, efficiency, and responsiveness of UP's digital customer service platform and shows how UP uses customer feedback and priorities to continuously improve its customer experience. This upgrade was rolled out through a collaborative approach, beginning with a pilot group of 40 customers who helped shape MyPortal's design and requirements. UP then implemented a segmented rollout, introducing the solution sequentially to specific customer groups to test and optimize the platform before full deployment.

265. For each customer group, the launch was implemented in phases: cutover planning, pre-cutover, staging, cutover tasks, validation, and post-

implementation care. Cutover planning was an approximately two-week process that involved development of the launch plan itself, communicating the development team coding pause, scheduling planning meetings and walkthroughs, as well as identifying physical spaces for the technology team and in-person collaboration. The pre-cutover process took a week and required creating communications support channels, sending communications, and verifying technology code releases. Once the pre-cutover process was complete, the actual staging took a day, followed by cutover tasks that entailed deploying the changes over several days, as well as sending communications and monitoring the systems themselves. Finally, validation and testing continued along with a month-long "hypercare" process for ongoing monitoring, addressing feedback triage, and reporting data and metrics.

266. As part of this launch, UP communicated with customers through webinars, knowledge/self-help documents, website guided tours/tooltips, call center tactical responsive help, and emails. UP customer service teams were trained in advance of the MyPortal launch through guided walkthroughs, scenario-based exercises, and system simulations. This internal training enabled frontline staff to confidently support customers during the transition and respond to inquiries with accuracy and empathy.

267. For the post-merger integration, Applicants plan to replicate and expand upon this successful recent model, tailoring trainings to the specific tools and workflows being introduced. This proactive approach should ensure that UP/NS

employees are not only familiar with the new systems but also equipped to guide customers through the onboarding journey with clarity and confidence.

VII. Labor Plan

268. This Part of Applicants' Service Assurance Plan addresses Applicants' plans for reaching necessary labor implementing agreements and provides evidence that sufficiently qualified employees would be available at the proper locations to effect implementation, as required by 49 C.F.R. § 1180.10(g).

A. Labor Implementing Agreements

269. Applicants are committed to obtaining implementing agreements containing the changes necessary to permit the service enhancements and other public benefits made possible by the proposed transaction. To expedite integration of UP and NS operations after approval, Applicants intend while the application is pending to seek implementing agreements with labor organizations willing to engage. To further ensure Applicants' ability to maintain and enhance service following approval, Applicants have committed to provide employment opportunities for current craft employees so they may continue and finish their careers as employees of the combined railroad system, subject to the usual requirements for continued employment. This job security commitment encourages employees to continue their railroad careers and reduces the risk of employees leaving railroad service as a result of the transaction.

270. Both UP and NS are signatories to the "Cramdown Agreements." Consistent with the Cramdown Agreements and Board precedent, Applicants intend to honor existing collective bargaining agreements on each railroad. Applicants will

seek implementing agreements through the customary *New York Dock* procedures as necessary to permit achievement of the transaction's public benefits.

271. With respect to train, engine, and yard ("TEY") service, and mechanical crafts, Applicants will seek agreements focused on enabling the operational changes identified in the Operating Plan, in the sequence described. For example, implementing agreements will be required to address work opportunities for TEY and mechanical employees at current interchange locations. To the extent that aligning the workforce to the work requires relocation of such employees beyond the terms, practices, and interpretations of existing collective bargaining agreements, Applicants will seek agreements to enable such relocation or other changes necessary to protect service and to fulfill Applicants' commitment regarding craft employees.

272. With respect to clerical and dispatching crafts, Applicants will seek implementing agreements to support integration of their systems and operations, which will be driven largely by the phased approach to technology integration. For example, as the combined UP/NS implements uniform technologies as described in the Information Technology Systems Implementation Plan, most of the functions currently performed by craft employees in NS's headquarters in Atlanta, Georgia, will be relocated to UP's headquarters location in Omaha, Nebraska. When the combined company consolidates some or all of these functions, it will serve notice under Section 4 of the *New York Dock* conditions and obtain any necessary implementing agreements to support the relocations or process standardizations, for example, adopting a uniform crew calling process. Beyond three years after the

merger, as Applicants continue to evaluate automation, economies of scale, and/or efficiency opportunities related to the transaction, including elimination of redundant processes or procedures, the combined entity will obtain any necessary implementing agreements.

273. Applicants have factored employee attrition rates into this Service Assurance Plan. Applicants have a combined attrition rate of approximately 8.0 percent per year among their non-probationary craft employees.[178] This end-to-end transaction will not require large-scale employee transfers or dislocations, especially within Applicants' operating, engineering, mechanical, maintenance, and communications and signals crafts. Further, Applicants have made a commitment to provide employment in some capacity for all current craft employees. Thus, Applicants anticipate that their attrition rate will remain relatively constant, allowing Applicants to support the service described in the Operating Plan.

274. Applicants have taken a major step toward reaching implementing agreements by negotiating a landmark agreement with Sheet Metal, Air, Rail and Transportation Workers – Transportation Division ("SMART-TD"), the nation's largest railroad union. The agreement guarantees that SMART-TD members working in train and yardmaster service at the time of the transaction will have craft-specific job protection for the length of their careers, subject to the usual requirements for continued employment. Applicants have made similar agreements with the

---

[178] *See* Workpaper "Craft Attrition Rates by Union.xlsx," Tab "Attrition Chart," Cell E22.

National Conference of Firemen & Oilers, Brotherhood of Railroad Carmen, International Brotherhood of Boilermakers, Blacksmiths and Iron Shipbuilders, and United Supervisors Council of America for their respective represented workforces, which include commitments to provide jobs in the same or other crafts to represented employees working for Applicants at the time of the merger.

275. Experience also teaches that different arrangements and modifications to existing collective bargaining agreements may become necessary as circumstances change and shipping patterns evolve. These developments will provide greater long-term employment opportunities, while affording the combined railroad flexibility to meet its customers' needs, allocate its personnel, and efficiently operate its network.

B. Applicants' Plan to Ensure Sufficient Qualified Employees

276. Applicants will ensure that sufficient qualified employees are available at the proper locations to implement the merger of UP and NS. Applicants project they will need to fill more than 900 additional craft jobs within three years after the companies consolidate to support anticipated merger-related growth.[179] In part to help meet this projected need, Applicants have committed to preserving employment for all craft employees who are employed by UP or NS at the time of the merger.[180] In addition, UP/NS will have a robust hiring and training process to provide for the company's future additional hiring needs.

---

[179] *See* Employee Impact Exhibit, Electronic Appendix A; *see also* App. Vol. 1, Verified Statement of Maqui Parkerson ("Parkerson VS"), ¶ 10; Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Summary," Cell O15.

[180] *See* App. Vol. 1, Verified Statement of V. James Vena, ¶ 54; Parkerson VS ¶ 3.

277. As required by the Board's rules, Applicants analyzed the projected impacts of the proposed transaction on applicant carriers' employees at specific geographic points for three years after the consolidation.[181] The results of the analysis are set forth in the Employee Impact Exhibit. In performing the analysis, Applicants used the best information available, but their projections necessarily depend significantly on assumptions about future conditions. Most of Applicants' projections regarding the number and location of employees needed to operate the merged company depend on projections of future traffic levels, which are subject to economic forces beyond the merged company's control.

1. Craft Employees

278. Applicants analyzed the proposed transaction's projected impacts on craft employees in a three-step process. First, Applicants concluded UP and NS each currently has sufficient qualified employees in the appropriate locations to operate both railroads. Second, Applicants estimated the impacts of optimizing operations of the combined UP/NS based on Applicants' plans described in the Operating Plan. Third, Applicants estimated the impacts of accommodating projected traffic growth for the combined UP/NS based on Applicants' plans described in the Operating Plan. Applicants' method of applying steps 2 and 3 varied based on the amount of location-specific information practically available at this stage of the merger process. A summary of the impacts is provided below in Table 15.

[181] *See* 49 C.F.R. § 1180.6(b)(9).

Table 15[182]
Craft Employee Impact Summary

	Positions Abolished			Positions Created			Positions Transferred			Net Positions
Years	1	2	3	1	2	3	1	2	3	Year 1-3
Car Mechanical	35	32	-	86	91	71	8	8	-	181
Clerical	3	6	2	-	-	-	-	69	118	(11)
Communications	-	-	-	-	-	-	-	-	-	-
Equipment Mechanical	-	-	-	-	-	-	-	-	-	-
Locomotive Mechanical	39	40	0	154	116	116	60	57	-	307
Signal Maintainers	-	-	-	-	-	-	-	-	-	-
Track Maintenance	7	2	-	5	31	-	-	-	-	27
Train Dispatching	8	17	8	-	-	-	-	-	-	(33)
Train Crews	288	338	256	449	508	382	-	-	-	457
Union Supervisors	-	-	-	-	-	-	-	-	-	-
Yard Controllers	-	-	27	-	-	-	-	-	-	(27)
Total	**380**	**435**	**293**	**694**	**746**	**569**	**68**	**134**	**118**	**901**

279. The vast majority of positions affected by Applicants' projected changes to craft positions involve Train Crew positions, that is, TEY employees working in road operations and yard operations.[183] Applicants project a net gain of 457 new positions, reflecting 882 positions abolished through optimization and 1,339 positions created through growth.[184] To estimate the number and location of positions

182 *See* Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Summary."

183 The "Train Crew" category includes employees working in Engineering or Trainpersons crafts in accordance with applicable collective bargaining positions.

184 *See* Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Summary," Cells L12:O12.

abolished, Applicants used actual data to develop relationships between the number of employees and activity levels—daily crew starts for road crews and daily cars processed for yard and local crews—and applied those relationships to location-specific projections of activity levels under the Operating Plan's Optimized Plan and Growth Plan.[185] Applicants also separately estimated the number of positions that would be abolished through planned yard consolidations based on past experience with similar consolidations.[186] In addition, Applicants estimated the number of TEY positions affected by non-location-specific initiatives—such as application to legacy NS crews and locations of UP's train length and deadhead/heldaway processes[187]—and assigned those affected positions to the combined UP/NS system because the location of the impacts would vary based on operating conditions.[188] Finally, Applicants estimated the number of TEY positions affected by implementing UP's Remote Control Operations and SwitchPro eNtry eXit technologies in legacy NS yards[189] and assigned those affected positions to the UP/NS "system" rather than a

---

185 *See* Workpaper "Road Crew FTE Impacts by Yard.xlsx," Tab "Summary ThruFreight"; Workpaper "Yard-Local FTE Impacts by Yard.xlsx," Tab "Exhibit by Yard."

186 *See* Workpaper "Yard-Local FTE Impacts by Yard.xlsx," Tab "Consolidation Summary."

187 *See* Op. Plan § 10.1.2.1 (train length, deadhead/heldaway); Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Train Length Synergy," Cells H47:H49.

188 *See* Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Detail Impacted," Cells D340:F340.

189 *See* Op. Plan § 10.1.2.3; Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "RCO NX," Cell P42.

specific location because site-specific evaluations are ongoing.[190] Ultimately, these efficiency-related "system" reductions are offset by the gains in location-specific positions described below.

280. To estimate TEY positions added, Applicants used the same location-specific projections of activity levels and employee/activity level relationships that they used to estimate positions that would be abolished.[191] Applicants' location-specific approach to matching employee levels to projected activity levels shows UP/NS will have sufficient qualified TEY employees available at the proper locations to support operations under the Operating Plan, although Applicants recognize the precise number and locations of employees will likely change as market conditions change.

281. Projected changes to craft positions also involve a substantial number of changes to Mechanical positions, which includes craft employees who perform repairs on locomotives and rail cars. Applicants project a net gain of 488 positions, reflecting 146 positions abolished and 634 positions created.[192] Applicants primarily used a location-specific approach to estimate reductions and transfers of Mechanical positions, focusing specifically on planned facility consolidations and projected

---

[190] *See* Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Detail Impacted," Cells D340:F340.

[191] *See* Workpaper "Road Crew FTE Impacts by Yard.xlsx," Tab "Summary ThruFreight," Cell; Workpaper "Yard-Local FTE Impacts by Yard.xlsx," Tab "Exhibit by Yard."

[192] *See* Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Summary," Cells L4:O4 and L8:O8.

changes in traffic patterns.[193] In addition, as with changes to TEY positions, Applicants estimated the number of Mechanical positions affected by non-location-specific productivity-improving initiatives that will reduce locomotive utilization,[194] and they assigned those changes to UP/NS "system" rather than a specific location.[195] Ultimately, these efficiency-related "system" reductions are offset by gains in non-location-specific "system" positions created.

282. To estimate Mechanical positions added, Applicants accounted for plans to insource work on wheel set assembly at UP's Jenks, Arkansas, facility and autorack rebuilds at UP's De Soto, Missouri, facility.[196] Applicants also used actual data to develop the relationship between the number of Mechanical positions and the size of the equipment fleet and applied those relationships to the locomotive and car fleets projected under the Growth Plan.[197] Applicants assigned those affected positions to the UP/NS "system" in recognition that, as UP/NS gains experience with

---

[193] *See* Op. Plan § 10.3.2.1 (transfers); Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Shop Curtailment," Cell N30; Op. Plan § 10.3.2.2 (shop curtailment and rationalizations); Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Mech Intchg," Cells F39:N39.

[194] *See* Op. Plan § 10.3.2.3; Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Switching Fleet Plan," Cell D45.

[195] *See* Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Detail Impacted," Row 27.

[196] *See* Op. Plan § 10.3.2.8 (Jenks); Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Wheelset," Cells F28:F29; Op. Plan § 9.2.3 (De Soto); Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "Autoracks Capital," Cells F37 and H37; *see also* Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Detail Impacted," Rows 13 and 16.

[197] *See* Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "ThruFreight Fleet Plan," Cells E36 and E40.

the mechanical needs and traffic patterns of the combined network, it will continue to assess demand by location and allocate its workforce to meet those needs.[198] Where necessary, UP/NS will seek implementing agreements with impacted labor organizations.

283. Applicants are projecting only minor changes to the number of Engineering positions—those craft employees performing maintenance of way activities. Applicants estimate they will reduce a total of nine positions in locations where applicants plan to consolidate UP and NS yards.[199] And Applicants estimate they will need 36 additional maintenance-of-way employees based on plans to in-source certain work currently being contracted out by NS,[200] for a net gain of 27 maintenance-of-way positions, though they have not yet determined precisely where those employees would be located.[201]

284. Similarly, Applicants are projecting only minor changes to the number of Clerical employees. Applicants estimate efficiencies relating to implementing UP's crew calling system on the legacy network will result in the reduction of eleven

---

[198] *See* Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Detail Impacted," Rows 19 and 27.

[199] *See* Op. Plan § 10.2.3.1; Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Yard Curtailment," Cell J26; *see also* Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Detail Impacted," Row 6 to Row 10.

[200] *See* Op. Plan, §§ 10.2.3.2 and 10.2.3.3; Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "SMRT," Cell E61; Janke VS Workpaper "Mech_Eng Synergies.xlsx," Tab "Spray," Cell E32."

[201] *See* Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Detail All," Row 11.

clerical positions at NS's headquarters in Atlanta, Georgia,[202] and 187 other clerical positions will be transferred to Omaha, Nebraska,[203] as most headquarters operations of the combined company will be consolidated in Omaha. Applicants estimate they will reduce a total of 33 Train Dispatching positions in Atlanta as uniform processes are established and productivity levels of legacy NS dispatchers move into line with productivity levels of legacy UP dispatchers in accordance with the applicable collective bargaining agreement.[204] Finally, Applicants estimate that efficiencies related to implementing UP's Terminal Command Center technology in legacy NS yards will result in the reduction of 27 Yard Controller positions.[205] Applicants based these estimates on UP's experience in implementing its Terminal Command Center technology in its own yards.[206] Applicants assigned those affected positions to the UP/NS "system" rather than a specific location because site-specific evaluations are ongoing.[207]

---

[202] *See* Op. Plan § 10.1.2.8; Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "HDC Personnel," Cell G6.

[203] *See* Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Detail Impacted," Cells K4:L4.

[204] *See* Op. Plan § 10.1.2.7; Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "HDC Personnel," Cell G12; *see also* Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Detail Impacted," Cells D28:F28.

[205] *See* Op. Plan § 10.1.2.6; Janke VS Workpaper "Synergies Transportation - Operating.xlsx," Tab "NS YC Planning," Cell E8.

[206] *See* Op. Plan § 10.1.2.6.

[207] *See* Workpaper "Craft Employee Impact Report.xlsx," Tab "Craft Impact Detail Impacted," Cell F382.

285. In sum, Applicants' plans for ensuring that sufficient qualified employees are available at the proper locations to implement the merger are based on expected merger-related synergies and actual operating experience.

2. Management Personnel

286. Applicants' process for estimating the number of qualified management personnel needed to operate the combined company is described in the Verified Statement of Joshua Perkes. As Mr. Perkes explains, Applicants' estimates are based on a careful analysis and leverage natural attrition to the extent possible to achieve appropriate employment levels, which will allow the combined company significant flexibility to adjust plans if conditions warrant.[208] Applicants are also taking great care to maintain employment levels in functions that will be most critical to successful integration of UP and NS. Consistent with Applicants' Information Technology Systems plan, as described in this Service Assurance Plan, planned reductions in the Technology function are limited to duplicative executive and administrative positions and certain support functions that are not needed under UP's approach to supporting the Technology function, leaving over 95 percent of technology positions unaffected.[209] In addition, consistent with Applicants' Customer Service plan, as described in this Service Assurance Plan, reductions in the CC&S function are limited to duplicative executive and administrative positions and positions that are currently vacant, leaving approximately 85 percent of CC&S

---

[208] *See* App. Vol. 1, Verified Statement of Joshua Perkes ("Perkes VS") ¶ 11.

[209] *See* Perkes VS Workpaper "Management_Workpapers_Employee Impact.xlsx," Tab "Workpaper_Impact by Department," Rows 27, 48, 74, and 85.

positions unaffected.[210] Similarly, planned reductions in the Marketing and Sales function are limited to duplicative positions, largely involving executives and analysts, rather than employees with day-to-day customer responsibilities, leaving approximately 85 percent of Marketing and Sales positions unaffected.[211] Applicants' measured approach will capture operational efficiencies while safeguarding essential functions, ensuring the combined company will be well-positioned to deliver reliable service, support employees, and grow.

3. Conclusion

287. Applicants estimate that craft jobs created by merger-related traffic growth will far exceed the number of job reductions from the operating efficiencies resulting from the merger. Applicants based their plans to reduce jobs on documented efficiencies, and they based their plans to increase jobs on documented relationships between employee levels and activity levels, so their plans are expressly designed to provide for a sufficient number of employees to handle projected activity levels. Regarding management jobs, Applicants' plans involve only limited, phased reductions that leverage natural attrition to the extent possible to achieve appropriate employment levels.

288. Applicants do not anticipate any difficulty in hiring the people they need in the proper locations. For a number of projected growth positions, Applicants cannot

---

[210] *See* Perkes VS Workpaper "Management_Workpapers_Employee Impact.xlsx," Tab "Workpaper_Impact by Department," Rows 9, 30, 56, and 77.

[211] Perkes VS Workpaper "Management_Workpapers_Employee Impact.xlsx," Tab "Workpaper_Impact by Department," Rows 24, 45, 71, and 92.

yet determine where new positions will be located. However, as described in the Training Integration section of this Service Assurance Plan, Applicants have well-established recruitment and training processes to ensure the combined railroad will have sufficient employees in the proper locations.

VIII. Training

A. Overview

289. UP and NS have built training programs that meet their current and projected needs as independent railroads and satisfy regulatory requirements. UP and NS develop their training programs either internally or using qualified vendors with recognized credentials in instructional design. To best fit the particular situation, both railroads provide their employees a mix of instructor-led training ("ILT"), computer-based training, on-the-job training ("OJT"), and blended training that incorporates two or more of these approaches. Training staff at both railroads include instructors, trainers, instructional designers, systems administrators, managers, and supervisors. Each company has effective systems to monitor compliance with training requirements and deadlines. UP and NS together provide initial training to approximately 5,000 new employees each year, as well as refresher training to around 15,000 existing employees annually.

290. Applicants have conducted a comprehensive review of UP's and NS's training programs to analyze the current state of training at each company and plan a seamless transition with uninterrupted service after the close of the UP/NS transaction. The joint evaluation concluded not only that each program delivers high-quality instruction that meets federal requirements and effectively prepares

employees to provide safe, reliable service, but also that there are notable similarities in the training offered by UP and NS, which will facilitate integration.

291. The post-transaction training plan and goals that Applicants describe below, while based on careful review and assessments to date, may evolve as UP and NS further consider their existing capabilities, identify additional synergies, and address any unexpected challenges. The ultimate goal, however, will continue to be an industry-leading training program at the combined UP/NS.

B. Applicants' Plan for Integrated Training

292. Applicants intend to establish a single training program that meets the needs of integrated operations across the combined UP/NS railroad. Applicants anticipate that UP's training system generally will continue in the legacy UP territory and will be applied to the legacy NS territory as well. Best-in-class elements from NS's training system will be incorporated into the integrated program. Applicants anticipate UP's training system, with any appropriate updates and improvements, will be fully implemented across the combined UP/NS operations within three years of the merger.

293. UP/NS will monitor staffing requirements and adjust where necessary. The integrated company will have sufficient training staff and resources to meet the needs of job creation projections,[212] as these merger-related new positions represent a manageable 18 percent addition to UP's and NS's current new hire training needs.

---

[212] Labor Impact Reports.xlsx *See* Tab 3, "Summary Sheet."

294. The current UP and NS training programs have key similarities that will aid integration. Applicants have similar curriculums, OJT structure, and use similar technology to promote learning. Each prioritizes instructors sourced from the Craft. Applicants each use a compatible learning management system ("LMS"), meaning that a course offering of one company can be uploaded into the other's system. These pervasive similarities can be seen, for example, in the Training discussion (Section IV) of the Safety Integration Plan.

295. When integrating the UP and NS training systems, UP/NS will prioritize safety, ensure regulatory compliance, and emphasize uninterrupted service and avoidance of disruption. UP's Training Department is well-equipped to lead in executing the integration consistent with these core principles. The team specializes in training development, process implementation, and change management. It has the tools and skills to internally develop curriculum, online training, instructional videos, interactive e-learning modules, webinars, simulation exercises, job aids, digital manuals, and assessment tools. The team also has experience in training integration, having successfully integrated the A&S employee base into UP's technology system and regulatory training standards in 2025. This experience will help guide the UP/NS integration strategy.

296. UP uses a rigorous, auditable training method that is flexible enough to keep pace with rapidly evolving technologies, changing safety protocols, and modern learning techniques. This ensures workers are prepared for new equipment, updated

procedures, and emerging risks. Applicants intend to maintain this flexible approach in the integrated UP/NS training system.

297. Applicants expect to adopt a decentralized training model, as is currently used by UP, for the combined railroad. This means training is held near the trainee rather than at a central location. In addition to being cost effective and more convenient for employees, decentralized training facilitates flexible training solutions tailored to the location's operational needs.

298. Immediately after the close of the transaction, all UP and NS training centers will remain open, and legacy UP and NS programs will remain separate to prevent potential disruptions or safety risks. Different aspects of the training programs will be integrated at different times, but in general there are three main areas of focus for the UP/NS training integration.

299. First, there is training that supports the overall integration of UP and NS. Applicants expect to move toward a single set of operating rules and systems for the combined railroad. Training will ensure that field staff are prepared to implement these unified rules. Additionally, after the transaction, employees of both UP and NS will be exposed to new systems and ways of doing business in the combined company. As departments participate in the integration of UP and NS, they will provide training to their own personnel to promote effective collaboration, skills development, and integration.

300. Second, there is integration of the training function itself. Applicants have separate systems to track and assign training to employees, as well as distinct

curricula. UP/NS initially will maintain these separate systems, while gradually transitioning its training program to a single, integrated operation. To prepare for this, additional training staff will be upskilled to deliver lessons through a "train-the-trainer" coaching process.

301. Third and finally, there is regulatory training. Significant employee training is required or otherwise overseen by the FRA, the Occupational Safety and Health Administration ("OSHA"), and other regulatory bodies. UP/NS will work to eliminate duplication of required trainings between the legacy UP and NS operations and create a unified set of best-in-class training materials that satisfy regulatory requirements. Applicants expect that combining the UP and NS regulatory training programs will be the majority of integration-related training work.

302. The subsections below discuss in detail each of the three elements of training integration: training that supports the overall UP/NS integration, training that supports integration of the UP and NS training systems, and regulatory training. In addition, Section IV of Applicants' Safety Integration Plan provides a granular view of how Applicants intend to integrate safety-related training across the combined UP/NS.

C. Integration Support

303. *Integration Training Structures*. Immediately after the merger, UP/NS will create structures to promote coordination between the UP and NS training organizations and support NS's onboarding training. Individuals will be appointed to serve on dedicated committees, councils, and work groups to streamline and integrate training across all targeted employee functions.

304. UP/NS will appoint Local Onboarding Coordinators ("LOCs") for major NS locations and work groups. LOCs will receive training to assist with adoption of UP operating systems and serve as points of contact for informing the NS workforce about merger-related process changes. A UP/NS Delegate Training Committee, consisting of UP/NS technical training subject matter experts, will work in tandem with Department Learning Advisors to support the LOCs. UP/NS will update the UP/NS Training Executive Advisory Council and union leadership on the training integration during regularly scheduled calls. To identify strengths and weaknesses in onboarding training, NS employees will be asked to complete onboarding surveys periodically for three years after the merger.

305. UP/NS will dedicate training subject matter experts to oversee and coordinate initial onboarding of NS staff into the combined railroad. Additional training staff will be assigned as necessary to support the transition process.

306. *Transportation and Dispatch.* UP and NS have different FRA-approved operating rules for trains running on their railroads. UP utilizes its General Code of Operating Rules ("GCOR"), while NS operates under its own proprietary rules. Similarly, while UP uses NetControl for transportation management and CADX for train dispatching, NS currently uses different systems. Ultimately, Applicants intend to conduct all traffic on their roads under UP's GCOR, and likewise will integrate their IT systems that govern transportation management and dispatching as described in the Information Technology section of this Service Assurance Plan.

307. When integration occurs, field employees will be trained on the integrated operating rules and process changes, as well as data entry into these systems. For instance, before UP's transportation systems are deployed, NS employees will be required to complete applicable training, and training resources will support the associated business process changes.

308. *Code of Conduct and Other Mandatory Training*. Following the merger, NS employees will be assigned to UP's company-wide mandatory training. This training focuses on ensuring employees remain knowledgeable, safe, vigilant, and compliant with corporate policies. Upon successful completion of their initial training, the former NS employees will be expected to meet annual, biennial, or triennial company training requirements based on current UP policy.

309. *Leadership Development*. After the merger, NS management employees will be eligible to participate in UP's flagship leadership development and operations programs. Training will be held in Omaha, Nebraska, or at field locations. UP/NS training staff will review NS's leadership programs and incorporate applicable best practices into the UP curriculum. This will ensure employees across the combined UP/NS benefit from a consistent set of professional growth opportunities.

310. *Payroll and Timekeeping*. Initially after the merger, the legacy UP and NS operations will continue to use their different platforms for payroll and time tracking. Within a three-year period, Applicants expect to integrate NS's systems into UP's platforms, resulting in centralized and streamlined payroll and timekeeping

processes throughout UP/NS. Training materials for this integration will include Quick Reference Guides, collective bargaining agreement training, and OJT.

311. *Other Department-Specific Training*. Integration of the two formerly separate railroads will create demands for training from departments across UP/NS as they collaborate, explore integration opportunities, and combine functions. For example, an early priority will be giving UP and NS teams visibility into each other's systems so operations can be quickly understood and information shared. To that end, departments may draw upon UP/NS's Department Learning Advisors to develop training aligned with the particular organization's learning needs. The integration training processes discussed above will be used to develop effective methods for educating and upskilling the various departments' employees.

D. Training Functions

312. *Integration of Training Systems*. The combined UP/NS will gradually shift all employees to a single set of training platforms, with regular evaluations to track progress and compliance. The principal applications used for training, all of which are expected to be integrated across UP/NS within three years of the merger, are:

- Class Scheduler – used to schedule crew for classes
- Concur – external software used to book travel and manage expense reports
- CPM – Compliance Management System
- DOCS – records retention database
- DMMS – train dispatcher scheduling system

- EDCS – timekeeping database
- EQMS – Employee Quality Management System
- Exam Tool – online testing platform
- HRT – student travel database
- LMS – Learning Management System (external software)
- Microsoft Teams – messaging and email (external software)
- MOQ – Machine Operator Qualification
- TEP – Time Entry Portal

313. Early in the integration process, UP/NS will begin to establish a consolidated Learning Management System. The UP and NS LMSs contain comprehensive directories of courses, including training videos, exams, and employee attestations that training has been completed. By Year 3, all applicable NS training and employee materials will be copied into UP's LMS. All LMS training files and course codes will be evaluated to identify and remove duplicative or obsolete material.

314. Another early focus will be establishing a single Compliance Management System. The CPM is used to notify supervisors of upcoming and overdue training deadlines so employees who lack complete and current regulatory training can be barred from performing certain tasks. UP/NS initially will maintain NS's manual system for tracking regulatory training compliance, but only until NS's trainings are integrated into UP's electronic CPM.

315. Before the expected cutover of NS operations to UP's GCOR, and while UP and NS training departments and class structures remain separate, NS technical instructors will adopt relevant portions of UP's training curriculum. This will allow

timely and effective delivery of UP-aligned trainings to support implementation of the GCOR across legacy NS operations.

E. Regulatory Training

316. For most of the first three years after the merger, regulatory training programs will continue to exist in parallel for the legacy UP and NS workforces. During this transition period, UP/NS will seek from the relevant regulators approval to add NS's initial and refresher training programs to the list of trainings offered through the legacy UP training system. UP/NS also will review the NS regulatory trainings to assess where they should be modified to reflect UP rules, policies, and procedures, or can be added immediately to UP's training programs.

1. Train and Engine Service

317. Conductor initial and refresher training will remain separate following the merger, with NS operations set to adopt UP's 49 C.F.R. Part 242 certification programs within three years. Student engineer initial and refresher training similarly will remain separate following the merger, with NS operations set to adopt UP's 49 C.F.R. Part 240 certification program within three years. The specific timeline for adopting UP practices will be determined by rule reviews, technology considerations, hiring strategy, prioritization of integration activities related to safety, and service assurance. To meet the expected demand for initial engineer training, UP/NS will utilize the existing UP training center in Omaha, Nebraska, and the existing NS training center in McDonough, Georgia.

2. Motive Power and Equipment

318. Qualification standards for mechanical and locomotive personnel will remain separate for a period after the merger, although Applicants plan for NS operations eventually to adopt UP's qualification standards. During the transition period, existing UP and NS qualification programs will be reviewed, and employees will receive training that addresses differences between those programs. As with train and engine service trainings, the exact timeline for adopting UP practices will be determined by rule reviews, technology considerations, hiring strategy, prioritization of integration activities related to safety, and service assurance.

319. Mechanical training likewise will remain separate for a period after the merger, with plans for UP's FRA-approved initial regulatory training to be implemented across UP/NS within three years. UP's initial regulatory training will be adopted in the new-hire program to recognize UP/NS employees as Qualified Mechanical Inspectors.

320. Similarly, UP's and NS's mechanical refresher trainings will remain separate for a period after the merger, with plans for UP's FRA-approved refresher training to be implemented within three years of the close of the transaction. Because coded cab signals are used only in NS territory and not UP territory, however, related NS refresher trainings may remain separate for a longer period until the underlying safety systems are aligned.

321. Locomotive PTC refresher training also will remain separate for a period after the merger, with plans to adopt UP's FRA-approved Locomotive PTC refresher

training across UP/NS. The training will be delivered online, followed by a proficiency checklist that instructors complete at field locations to verify competence.

322. Car recertification training is another training that will remain separate for a period after the merger, with plans to implement UP's FRA-approved UP refresher training within three years.

3. Track, Signal, Safety Standards, and Bridge Structures

323. Qualification standards for UP and NS track, signal, and bridge personnel will remain separate for a period after the merger to accommodate differences in technology related to existing track authority and PTC Change Management Systems, with plans for NS regions to ultimately adopt UP's qualification standards. The timeline for adopting UP practices in NS territory will be influenced by rule reviews, technology considerations, hiring strategy, prioritization of integration activities related to safety, and service assurance.

324. Engineering training too will remain separate for a period after the merger, with plans to implement UP's FRA-approved initial regulatory training for all relevant UP/NS personnel within three years. After the transition, UP/NS new hires will receive On Track Safety and Track Safety Standards training based on UP's approved initial trainings. Applicants expect that all new UP/NS hires will receive On-Track Safety training, and certain employees will receive Track Safety Standards training from the current UP and NS qualified instructors.

325. Signal training is another program that will remain separate for a specified period post-merger. Applicants expect to adopt the FRA-approved UP initial regulatory training within three years of the merger. UP's signal training meets

regulations for Grade Crossing Safety and PTC. UP/NS will assess signal equipment differences across the legacy UP and NS systems and align UP/NS trainings to those differences. As noted, Coded Cab Signal training currently applies only to NS territory.

326. Telecommunications training will remain separate for a period post-merger, with plans to adopt UP's FRA-approved initial regulatory training within three years. UP's telecommunications training meets regulatory requirements for Grade Crossing Safety and PTC. During the three-year period immediately after the merger, UP/NS will assess telecommunications equipment differences across the combined railroad and align telecommunications training to those differences.

327. Engineering Air Brake training will remain separate in the legacy UP and NS operations for a period after the merger, with plans to consolidate this training with Mechanical Air Brake training across the combined railroad within three years. This will include Air Brake training for Brandt trucks or power units used by track employees.

328. Engineering refresher training will remain separate for a period after the merger. Applicants expect that within three years the current qualified instructors from UP and NS will provide UP's FRA-approved refresher training for all of UP/NS.

329. UP and NS currently have similar prerequisites for enrollment in their Commercial Driver's License ("CDL") programs. Applicants plan to adopt the UP CDL training program for UP/NS within three years of the merger closing. Employees will

be required to complete online training and obtain a permit prior to being enrolled in the two-week driving program.

4. Hazardous Materials

330. Ensuring safe handling of hazardous materials will remain a top priority at UP/NS. UP's hazardous materials training standards are some of the highest in the industry. Applicants expect that legacy NS operations will adopt UP's hazardous materials training programs, which address the pillars of Prevention, Preparedness, Response, and Recovery. Specialized training programs, along with emergency preparedness, communication, and notification procedures will be conducted at the Omaha, Nebraska, and McDonough, Georgia, training centers, as well as at hiring locations.

331. Hazardous materials training of NS personnel will begin with bringing NS's Hazardous Materials Management ("HMM") Team into the UP program. Onboarding NS's HMM Team will include a comprehensive review of their qualifications and certifications to ensure they meet UP requirements and standards. All instructors must be Hazardous Waste Operations and Emergency Response certified under OSHA rules (29 C.F.R. § 1910.120), trained as a Qualified Individual, and certified as tank car specialists. In addition, HMM members will be trained (or re-trained) on National Incident Management System sections 100, 200, 300, 320, 400, 700, and 800, and their position-specific Incident Command System ("ICS")

roles.[213] Then, NS's HMM Team will participate in UP's Prevention Program to reduce enterprise risk through tasks such as tank car inspections. In addition, HMM employees will receive UP's training on industrial firefighter requirements, and they will learn to operate UP's mobile firefighting foam trailers and to manage hazmat railcar transfers (including non-hazardous materials). Applicants' goal is that all incoming NS HMM employees will complete training within six months of the merger.

5. Dispatching

332. During the initial phase of integration, UP/NS will maintain distinct train dispatcher training programs based on the different train dispatching software and operating rules UP and NS currently use.

333. UP and NS annually provide a combined 9,020 hours of dispatcher training—6,744 hours for UP and 2,276 hours for NS. NS's train dispatchers and 49 C.F.R. § 217.9 efficiency testing officers undergo computer-based refresher training every three years, while their UP counterparts complete ILT refreshers annually. Starting in Year 2, all NS train dispatchers and Section 217.9 efficiency testing officers will transition to annual ILT refresher training facilitated by a qualified instructor consistent with UP standards. In addition to annual rules refresher training, all NS train dispatchers and Section 217.9 efficiency testing officers, like their UP counterparts, annually will be required to complete an operating rules exam, Passenger Train Emergency Preparedness exam, and Hazardous Materials exam

[213] ICS roles include the Logistics Section Chief, Operations Section Chief, Planning Section Chief, and Safety Officer.

with a minimum passing score of 90% as required by UP's submission to FRA under 49 C.F.R. § 217.11. Existing NS instructors will be trained to deliver rules refresher training in accordance with UP's standards.

334. Following a comprehensive evaluation of the legacy UP and NS dispatcher training systems, UP/NS will select one system to serve as the primary application for all train dispatchers across the combined railroad. To enable a seamless transition, training staff will be familiarized with the selected system well in advance of the cutover date.

6. Contractor Training and Management

335. UP and NS currently use the same vendor for their contractor management. Applicants plan to use this shared vendor's documentation process to gather data on training, certification, and compliance for UP/NS contractors. Safety and background checks through eRailSafe will follow company and industry standards.

336. UP/NS will require all contractors to be trained and compliant with FRA, OSHA, and Federal Motor Carrier Safety Administration regulations as determined by their scope of work. Any NS contractors with an exemption for 49 C.F.R. Parts 219 and 243 will undergo a review to determine if the exemption will be sustained or revoked per UP's standards. In addition, all NS contractors will be evaluated and assigned a grade score and risk profile. A contractor's risk profile will determine their training requirements. When legacy NS territories cut over to UP's GCOR and System Special Service Instructions, UP/NS will require contractors to be trained on, and compliant with, these requirements as well.

337. Applicants have determined that UP's Safety Department will manage contractor oversight for the combined UP/NS. In general, Applicants expect that the legacy UP and NS operations will continue existing relationships with their respective contractors for at least the first six months after the merger. During this time and beyond, UP/NS will review contractor support needs and determine synergies, gaps, and realignment opportunities, with most merger-related changes taking effect by the end of Year One.

IX. Contingency Plans for Merger-Related Service Disruptions

A. Introduction

338. The UP/NS merger will protect against service disruptions because the combined company will be more resilient and better able to address conditions that cause service disruptions in three important ways. First, combining UP and NS will increase the availability of critical resources—main line track, terminals, crews, locomotives, and rail cars—required to keep traffic flowing and respond to temporary strains on the network.

339. Second, the merger will create new options for rapidly rerouting traffic to avoid congested areas and expand access to crews and locomotives—resources that are essential in responding to and recovering from disruptions caused by external forces.

340. Third, one of the primary operating changes resulting from the integration of UP and NS will be to implement new train and blocking plans designed to reduce rail car handlings, especially where the two railroads currently interchange traffic. This reduction in handlings will result in a reduction of events that can lead

to service disruptions by creating operational variability, particularly when interchanges are not fluid.

341. Accordingly, Applicants expect that the merger will improve service. Applicants do not expect customers to experience any merger-related service disruptions. They are committed to an integration process in which no changes will be made without careful planning, preparation, and execution.

342. While Applicants do not expect any merger-related service disruptions, they take the issue very seriously. As required by 49 C.F.R. § 1180.10(i), Applicants have established contingency plans to address potential merger-related service disruptions on the combined railroad and to promptly restore adequate service levels if disruptions should occur. They also have established a special problem resolution team and developed specific procedures for the combined railroad to use to resolve merger-related service disruptions.

343. Contingency plans are proactive: they are procedures designed to help an organization respond effectively to potential future events. More specifically, they are designed to ensure that an organization can quickly restore normal operations in the face of unexpected disruptions.

344. Problem resolution procedures are reactive: they are applied when a problem has already occurred. Problem resolution procedures become relevant when executing contingency plans. They involve diagnosing and resolving problems that a railroad detects. More specifically, problem resolution procedures include appraising the situation, analyzing the root cause of the problem, and deciding on the best course

of corrective action. In essence, problem resolution procedures are used when a contingency occurs and a specific response is required. Problem resolution teams are the personnel responsible for executing problem resolution procedures.

345. As part of their contingency planning process, Applicants have engaged in a risk assessment process that identified three broad areas that create risks of merger-related service disruptions:

- Changes in traffic levels and patterns. This refers to changes in the volume of traffic moving over the merged system's lines and through its yards and terminals as new train and blocking plans are implemented and yard and terminal operations are changed or consolidated. Although the effect of planned changes will be to streamline operations, and no changes will be made without careful planning, preparation, and execution, Applicants recognize that implementing operational change necessarily involves risks.

- Changes in procedures and processes. This refers to changes in the procedures and processes followed by employees as the combined railroad implements a uniform system of standards, practices, and procedures, as well as changes that customers and other railroads will have to make in interacting with and coordinating with the merged company as UP/NS personnel implement common protocols.

- Changes in systems. This refers to changes in information technology systems as the two companies migrate to common platforms, particularly for their operations-related systems.

346. Applicants' contingency plans and problem resolution procedures for merger-related service disruptions build on their well-established plans and procedures for promptly restoring adequate service levels in response to other types of potentially disruptive events.[214] UP and NS currently maintain procedures for

[214] Other parts of this Service Assurance Plan describe how Applicants expect the combined railroad to mitigate the risk of disruptions arising from other sources,

addressing factors that can influence service, including natural disasters, severe weather conditions, mechanical failures, and unexpected traffic surges.

347. In planning for the provision of rail service generally, Applicants focus on ensuring the availability of five critical resources to move traffic: main lines, terminals, crews, locomotives, and rail cars. In Applicants' experience, service disruptions, whatever the cause, ultimately manifest as an inability to move current traffic volumes because of a shortage of one or more of those five critical resources. To restore adequate service, railroad personnel must determine how to effectively deploy additional resources to address accumulated inventory while also taking steps to understand and resolve the root cause of the problem.

348. Applicants' contingency plans in general, and their plans for merger-related service disruptions in particular, incorporate a flexible problem resolution process to diagnose the causes of specific service disruptions and then develop and execute appropriate responses. Applicants' general approach to contingency planning for service thus involves:

- Identifying and assessing potential risks, including their location and magnitude.
- Maintaining buffer capacity for critical resources to help effectuate service recovery.
- Monitoring to detect potential service disruptions.
- Developing and executing response actions.
- Monitoring response effectiveness.

---

including risk relating to IT systems and changes in procedures and processes, and to changes in systems, through intensive planning, training, and coordination.

- Communicating with stakeholders.

349. Applicants provide additional details about their approach to contingency planning for service disruptions and their plans for potential merger-related service disruptions in the remaining sections of this Part.

B. Applicants' Development of Integration Plans to Protect Against Merger-Related Service Disruptions

350. Applicants' end-to-end combination will reduce the risk of service disruptions, not cause them. The UP/NS merger will not directly affect most traffic currently moving on the UP and NS systems. The merger's impacts will be concentrated on traffic UP and NS currently interchange, and the impacts of the merger on that traffic will be to reduce the risk of service disruptions. Furthermore, the increased buffer resources and routing optionality made available by their combination will strengthen resiliency across the entirety of the integrated network—protecting against service disruptions even for traffic not directly impacted by the merger.

351. For traffic UP and NS currently interchange, Applicants plan to optimize train and blocking plans to reduce handlings. Applicants also plan to reroute some of the affected traffic over more efficient routes. In addition, Applicants plan to consolidate certain yard and terminal facilities. These changes will produce faster transit times and eliminate variability, thus protecting against service disruptions.

352. UP and NS have established processes for planning and implementing operating changes to optimize train and blocking plans. They regularly make changes to train and blocking plans in response to changing demand conditions. Their

operating personnel have substantial expertise in designing and executing these types of efficiency-enhancing adjustments to their networks. UP/NS employees will apply that expertise to the operation of the combined railroad following the merger.

353. Applicants have taken particular care in developing new train and blocking plans and plans to optimize routing in their merger planning process. Applicants' planning teams analyzed each impacted line and yard to ensure those facilities will have sufficient capacity to implement the planned changes. Where Applicants identified a need for additional capacity, they developed appropriate investment plans. Applicants also reviewed staffing to ensure that there will be a sufficient number of qualified employees available at affected locations to affect the proposed changes.

354. UP/NS will take steps throughout the merger integration process to ensure that the railroad's implementation of operating changes protects against service disruptions. UP/NS will refrain from taking any actions that cannot be quickly reversed should unexpected issues emerge as operations transition. For example, where Applicants propose to consolidate yard operations, they plan to maintain the ability to unwind the changes and restore pre-merger service patterns for a substantial period of time after implementing new service patterns.[215] Similarly, where Applicants propose to reroute traffic to improve service, they plan to maintain

[215] Applicants have no plans to sell or remove track assets where they propose to consolidate yards. The consolidations are intended to create additional capacity to accommodate growth.

the ability to unwind those changes and restore former routings.[216] In addition, as discussed in detail below, UP/NS will closely monitor locations affected by operating changes to detect and address potential service disruptions.

355. Applicants expect the merged system will attract significant volumes of new traffic. Just as Applicants are carefully preparing for UP/NS to implement changes affecting existing traffic, they are taking care to ensure the combined railroad can accommodate additional traffic without disrupting service. Applicants' resource planning process has considered not only the impacts of operating changes for existing traffic, but also whether the combined railroad will have sufficient main line, yard, equipment, and workforce capacity to handle the anticipated new business.

356. Finally, Applicants recognize successful integration of IT systems and IT-related customer service functions is critical to achieving the merger's benefits. As described in other parts of this Service Assurance Plan, Applicants are engaged in a careful process of planning for integration of their IT systems and customer service functions and are confident their plan for integration will protect against merger-related service disruptions that could be caused by IT integration. Nevertheless, Applicants' contingency plans and problem resolution procedures address these risks and account for the possibility that service disruptions might stem from IT-related issues.

[216] Applicants have no plans to abandon any lines as a result of the merger.

C. Devotion of Significant Resources to Preventing and Addressing Service Disruptions

357. UP and NS design and execute their operating plans with the goal of never experiencing a service disruption. However, in their normal course of business, they face the constant risk of service disruptions from a wide range of causes, including natural disasters, severe weather conditions, mechanical failures, and unexpected traffic surges. To mitigate impacts from these ever-present risks, Applicants have developed contingency plans that include establishing buffer resources, monitoring their networks for warning signs of potential disruptions, using problem resolution teams to develop and execute response actions, monitoring the effectiveness of their response actions, and communicating with stakeholders. Applicants' plans for addressing potential merger-related service disruptions will build upon their existing plans and protocols that are effective at preventing and addressing service disruptions.

1. Assessing Potential Risks

358. UP and NS have extensive experience operating their networks, which has allowed them to understand the types of events most likely to trigger service disruptions and the locations most vulnerable to particular sources of disruption. In some instances, Applicants face recurring risks of such a similar nature that they have developed specific response "playbooks." For example, UP has developed lists of procedures to be followed in certain rail yards if temperatures are projected to remain below specified points for specified periods of time. Applicants have also developed more general plans for responding to recurring events that raise similar issues but

vary in location and scope, such as hurricanes and flooding. These more general plans include proactive interruption recovery preparation, such as pre-positioning generators, emergency ballast, and surfacing equipment so recovery can begin as soon as possible following an event.

359. In most cases, the causes and consequences of service disruptions are too varied to be addressed using an off-the-shelf playbook. Instead, flexibility is critical to successful recovery. UP's and NS's risk assessments have led them to create strategies that involve maintaining certain buffer capacity resources and placing them in proximity to vulnerable areas, as well as planning to use other resources as buffers both to prevent service disruptions and to mitigate and remedy any disruptions that were not preventable.

360. Applicants' buffer strategies are described in the next section.

2. Maintaining Buffer Capacity for Critical Resources

361. Service disruptions can arise from a multitude of factors, but they ultimately manifest as an inability to move current traffic volume because of a shortage of one or more of five critical resources: main lines, terminals, crews, locomotives, and rail cars. Maintaining a flexible capacity buffer therefore plays a critical role in contingency planning. UP and NS have distinct strategies for each critical resource. For fixed resources—main lines and terminals—Applicants maintain buffer capacity through built-in surge capacity and flexible transportation planning. For mobile resources that can be deployed across the network—crews, locomotives, and rail cars—Applicants have built buffer capacity through strategic placement of reserve units and rapid deployment strategies. These strategies allow

UP and NS to mitigate the symptoms of service disruptions even before they identify the underlying causes or implement more permanent solutions. In many cases, the deployment of additional buffer capacity resources can drastically reduce or even eliminate the impact of a network disruption on stakeholders. Applicants have therefore invested heavily in the ability to deploy buffer strategies with speed and flexibility.

a. Main Lines

362. Applicants' first line of defense to service disruptions on main lines is the excess capacity built into their operations. Applicants plan traffic flows so main lines operate below their maximum capacity. This buffer serves a preventative purpose. Applicants' main lines can absorb most temporary fluctuations without changing operations.

363. Applicants' strategy of building excess capacity into their main line operations also allows them to use main line resources reactively to respond to larger disruptions. While main lines are fixed in place, Applicants each have expansive networks that often allow them to route traffic around developing or existing trouble spots. This reactive measure would not be possible if those alternate routes lacked capacity to absorb the incremental traffic.

364. The UP/NS merger will increase the ability to use main lines flexibly to prevent and mitigate service disruptions because it will eliminate the delays involved when two companies must negotiate operating changes. For example, if a hurricane disrupts trains scheduled to move through New Orleans, the combined railroad will be able to rapidly reroute traffic via Memphis, which not only keeps those trains

moving, but also mitigates the risk that congestion on its main lines to New Orleans will compound and spread to its main lines and terminal outside of New Orleans.

b. Terminals

365. Terminals often become trouble spots when service is disrupted. Congestion in terminals can compound as processing times slow and dwell times increase. In addition, congestion in one terminal can spread to other portions of the network as upstream terminals hold cars rather than launch them toward already congested areas.

366. Applicants' buffer capacity strategy for terminals is largely like their strategy for main lines. In the first instance, Applicants plan operations so terminals operate below their maximum capacity. The buffer can be used to absorb temporary increases in terminal activity without disrupting operations.

367. In addition, while terminals, like main lines, are fixed in place, Applicants' strategy of building excess capacity into their terminal operations also allows them to use terminal resources to respond reactively to larger disruptions. Applicants often can alleviate congestion in one terminal by shifting certain traffic to alternative terminals.

368. The UP/NS merger will increase the combined railroad's ability to shift traffic between terminals, particularly in critical locations where UP and NS each have their own terminals today, including Chicago, Kansas City, and New Orleans.

c. Crews

369. Crew availability often becomes a critical constraint when networks experience service disruptions, especially because crew working hours are regulated

by federal law. When trains are delayed on main lines or in yards because of a service disruption, crews may not have time to complete their scheduled work, and additional crews are required to handle the same volume of traffic. If sufficient crews are not available, then trains cannot move, and congestion compounds.

370. Applicants both currently maintain larger crew bases than are necessary to handle the number of trains scheduled to move. They maintain this buffer of trained, experienced personnel in part so extra crews will be available when necessary to help mitigate service disruptions. Applicants also have a variety of tactical strategies they can employ to respond to short-term, unexpected surges in demand for train crews using their current workforce. For example, they can cancel non-essential training activities to maximize availability of the existing workforce and ensure they are ready for assignment. Applicants also have procedures that allow them to pivot crew assignments from low to high demand areas within a seniority hub. Similarly, Applicants have procedures to increase transportation and lodging options for crews to optimize the hours of service that crew members are available. If they still need additional crews, Applicants have several options they can pursue, including using "borrow out" employees from regions with sufficient capacity and redeploying them to locations in need of additional crew resources.

371. In addition to their more formal crew redeployment programs, Applicants have each adopted an all-hands-on-deck approach to addressing certain types of major service disruptions. UP operates "Rail Relief," a program in which management and other employees voluntarily travel to impacted locations where

they transport work crews, help set up mobile command centers, and handle other logistical functions to maximize the capacity of work crews. NS operates "go teams," a program in which employee volunteers from locations with sufficient capacity are rapidly deployed to provide additional support wherever needed.

372. Following the merger, the combined railroad will have an even broader workforce to call on if needed to respond to service disruptions.

d. Locomotives

373. For the same reasons relevant to crew availability, locomotive availability often becomes a critical constraint when networks experience service disruptions. When trains are delayed on main lines or in yards because of a service disruption, their locomotives are not available to move other trains, and additional locomotives are required to handle the same volume of traffic. If sufficient locomotives are not available, trains cannot depart from yards, and congestion compounds.

374. Applicants both maintain fleets of buffer locomotives. These locomotives serve three main purposes: (1) meeting surge needs at terminals, (2) replacing broken-down units during transit, and (3) handling unexpected volume surges for customers.

375. UP has invested significant resources in analyzing terminals, locations, and customers with the greatest need for accessible locomotive resources. UP currently has approximately 200 "at the ready" ("ATR") locomotives that it has strategically placed at its largest terminals to address service interruptions or a deficit of inbound locomotives that could cause significant terminal processing

backlogs.[217] UP keeps these locomotives fueled and maintained, so they are available for immediate deployment at the large terminals or distribution to nearby smaller terminals that might experience locomotive shortages.

376. UP also has approximately 100 Rapid Response locomotives that it has placed across the network at key intermodal terminals and in locations that have experienced elevated rates of engine failure—primarily locations with significant grades.[218] UP can quickly dispatch these locomotives to ensure the flow of premium intermodal products and protect main lines against locomotive failures.

377. UP also keeps approximately 35 stored grain locomotives at or near key customer locations to assist with bulk shipments and larger-than-expected volume. Finally, UP has an additional reserve fleet of approximately 350 stored serviceable locomotives, each of which could return to service within a few days to help respond to surges in car loadings.[219]

378. NS also maintains a buffer fleet of locomotives for immediate deployment, referred to as "Hot and Ready" or "HNR." NS's buffer fleet varies with the season and ranges from 25 to 50 locomotives.[220] NS needs a smaller buffer fleet than UP because NS can more readily reposition locomotives as needed across its more compact system. Like UP, NS has positioned these locomotives at or near key

---

[217] *See* Workpaper "UPRR ATR Locomotives 20251128.xlsx."

[218] *Id.*

[219] *See* Workpaper "UP Locomotive Shop Stored Servicable.png."

[220] *See* Workpaper "NS HNR for System 20251202.xlsx."

terminals and other critical network locations. NS also has approximately 70 locomotives that it could return to service after completing repairs.[221]

379. The UP/NS merger will increase the availability of buffer locomotives. The larger buffer fleet of the legacy UP will immediately be available to the combined railroad to help address service disruptions affecting what are currently NS main lines and yards.

e. Rail Cars

380. Rail car availability can also become a constraint when networks experience service disruptions. If customers cannot access sufficient rail cars, they cannot load traffic for pickup.

381. Applicants both keep ATR rail cars at strategic locations on their networks and at certain customer locations. UP maintains a fleet of approximately 145,000 owned, leased, and allocated TTX railcars.[222] NS maintains a fleet of approximately 96,000 owned, leased, and allocated TTX railcars.[223] Depending on storage type, reserve rail cars can be pressed into service within a matter of days. Applicants concentrate reserve cars around terminals and near customers most likely to experience short-term demand surges. Customers can call on these cars when they are tight on equipment—for example, when their inbound flows experience delays, they receive bad ordered cars, or they have unexpected business opportunities.

---

[221] *See* Workpaper "NS Mechanical Return to Service Locomotives.xlsx."

[222] *See* Op. Plan § 9.2.1, Table 15.

[223] *See* Op. Plan § 9.2.1, Table 15.

3. Monitoring to Detect Potential Service Disruptions

382. Applicants devote considerable time and effort to monitoring their networks for warning signs of potential service disruptions. The most effective way to address service disruptions is to prevent them from occurring in the first place by detecting the warning signs in time to utilize the buffer capacity resources described above. Even when disruptions cannot be prevented entirely, early detection and response can mitigate their severity.

383. In the normal course of business, Applicants actively monitor a variety of system-wide and local measures of network health, looking for signs that indicate actual or potential problems relating to excess inventory—that is, an accumulation of more rail cars than can be moved using immediately available assets. These measures provide information regarding the status of the critical resources discussed above.

- **Main lines.** Applicants monitor the overall health status of their networks and main line operations using network monitoring tools that track data regarding train velocity, car velocity, and various train and car inventory reports, as well as other system-wide metrics.

- **Yards.** Applicants monitor the status of their yards and terminals using metrics such as terminal dwell time, operating inventory, trains held, on-time train departures, and other measures designed to identify sub-optimal performance (*e.g.*, cars held more than 32 hours).

- **Crews.** Applicants continually compare train demand with crew supply using metrics that provide visibility into timely fulfillment of assignments. Applicants also use statistics identifying workforce utilization, which includes recrews, held-away time, and other measures of availability.

- **Locomotives.** Applicants use tools to calculate daily inbound locomotive supply and demand in terminals. Applicants also use metrics such as trains held for power to detect potential localized and system-wide issues affecting locomotive availability.

- **Rail cars.** Applicants use a variety of metrics to maintain the health of the equipment fleet and understand possible constraints, including customer order fulfillment, customer on time placement, car dwell, and cars per carload.

384. Applicants have invested substantial effort in developing technologies to capture, compile, and deliver performance-related metrics to employees charged with monitoring network health and identifying and addressing resource constraints. As an example, both railroads use tools that provide managers real-time visibility into key operating data for yards, such as current inventory, current dwell, and en route volume. Both railroads also use locomotive planning tools that calculate expected locomotive demand in their terminals. In addition, UP is developing and testing a tool designed to identify potential service disruptions using indicators derived from analyses of past events. The tool flags deviations from normal levels in metrics that correlate with future service disruptions, providing UP with even earlier warnings of potential problems than were previously possible. Applicants expect that the combined railroad will deploy this advanced tool across the entirety of the merged network.

385. Applicants also monitor external data to identify and plan for events that might cause service disruptions. For example, both UP and NS have partnerships with AccuWeather to provide near-real-time alerts of changing weather conditions that feed into their operational systems so they can trigger plans for addressing excessive cold or excessive heat, or plan for other natural events including severe storms, flooding, and fires. They also monitor news reports and regularly

communicate with stakeholders so they can prepare for shifts in the demand for transportation caused by events ranging from labor action at ports to changes in market conditions that may affect commodity flows and thus the demand for rail transportation.

386. Finally, Applicants each have procedures in place for escalating issues identified through their monitoring processes. Applicants maintain escalation processes at the system and regional level to promptly respond to any other fluctuation that may pull operations off-plan, such as mechanical failures, stops for curfews, and traffic surges. Both railroads hold standing daily meetings between regional and central management to address sources of potential service disruption and develop action plans for the day's operations.

4. Developing and Executing Response Actions

387. When an issue is identified through monitoring, Applicants develop and execute response actions. In most cases, their monitoring processes alert Applicants to potential issues well before any service disruption occurs, and operating personnel with specific responsibilities for the resource at issue promptly develop and execute corrective actions. For example, when UP's locomotive managers receive alerts regarding potential locomotive shortages from UP's Unified Locomotive Planner or local operating personnel, they will alert UP's Locomotive Directors and General Directors. The locomotive management team will then develop and execute plans to reallocate resources using buffer locomotives or by shifting locomotives between terminals to address any shortfall. Similarly, when localized crew issues are observed, they are addressed by the Crew Management group.

388. Applicants address more significant service disruptions and threats of such disruptions using cross-departmental teams. At UP, these cross-departmental teams typically consist of representatives from UP's HDC (which includes UP's dispatching, crew, and locomotive management functions), Network Planning & Operations department (which is responsible for designing transportation plans and railcar distribution), CC&S department, and the affected regional Service Units. NS uses cross-departmental teams that typically include the NS-equivalents to the UP departments listed above.

389. At both railroads, the cross-departmental team has two basic functions related to problem resolution: (1) identifying the cause of the service disruption, and (2) determining how to deploy capacity buffer resources to protect against disruption or restore acceptable service levels. Identifying the disruption's cause helps determine the combination of resources and other actions that will most effectively resolve the disruption. However, Applicants often begin adding resources to protect or restore service before they completely understand the cause.

390. UP's problem resolution process begins by seeking to identify the service disruption's cause as either a non-execution issue, an execution issue, or some combination of each. Non-execution issues primarily involve issues arising from operations planning (*e.g.*, the plan requires moving too many cars through a yard) and customer patterns (*e.g.*, customers want to move traffic in unexpected amounts or between unexpected locations). Resolving disruptions caused by non-execution issues often requires revisiting the railroad's transportation plan or adjusting

network resources, as well as consulting with customers to determine whether their transportation needs have changed.[224] Execution issues involve disruptions caused by failures to execute the transportation plan. Resolving disruptions caused by execution issues generally requires deploying on-site teams to fully understand the reason for the execution failure and modify procedures or training to prevent recurrences.

391. UP's next step in the problem resolution process is determining the combination of capacity buffer resources to deploy that will most quickly and effectively restore acceptable service levels, and then executing the plan. The specific resources that are practically available to the railroad and their effectiveness will differ from situation to situation, and determining which resources to deploy and in what combinations involves the exercise of judgment based on experience and available information.

392. For example, in some situations, trains can be routed around problem areas to allow congested main lines to clear. However, the ability to reroute trains depends on the availability of alternate routings, as well as the impact of using those alternatives on other resources that might already be constrained, including line and terminal capacity on the alternate route and crew and locomotive availability. In some cases, Applicants will contact other railroads with requests to detour trains over

---

[224] The railroad would not necessarily need to revisit its transportation plan if the disruption is caused by severe weather or a transitory change in shipping patterns, but it would still engage in post-recovery analysis to determine whether future operational changes might help reduce the impact of similar events in the future.

their routes. Options for rerouting trains would be developed by network planners, but any decision to reroute trains would require substantial input from members of the cross-departmental team with responsibility for crew and locomotive management, as well as those familiar with the operations of potentially affected lines and terminals.

393. Similarly, in some situations, railroad personnel can change operating plans to shift traffic to alternate yards while a congested yard works through its backlog. The ability to use alternate yards depends on capacity limitations at those yards, capacity limitations on main line routes used to access those yards, and crew and locomotive availability. Again, network planners develop options for shifting traffic to alternative yards, but cross-departmental expertise and input are required to evaluate the feasibility of such plans considering the circumstances presented at the time.

394. In many instances, addressing and recovering from moderate and more severe service disruptions require adding crew resources to offset reductions in train velocity and work through backlogs on main lines and in yards. As discussed above, UP and NS have a series of strategies they can activate, either separately or in combination, to increase crew availability, ranging from cancelling non-essential training, repositioning crew resources to the impacted areas (borrow-outs), and combining trains to reduce crew demand. Crew management personnel develop and then execute options for increasing crew resources. However, cross-departmental expertise and input are required to help determine the number of additional crews

needed, the locations at which they are needed, and the length of time they will likely be needed, which will help inform the specific strategies used to increase crew resources.

395. Similarly, addressing and recovering from moderate and more severe service disruptions typically require additional locomotive resources. Locomotive management personnel are responsible for developing and executing plans for using buffer locomotives to provide needed resources. Cross-departmental expertise and input are used to help determine the number of additional locomotives needed, the locations at which they are needed, and the length of time they will likely be needed, which will help inform the specific strategies used to increase locomotive resources, including whether to use ATR locomotives, return other buffer locomotives to service, or both.

396. Recovering from moderate and more severe service disruptions sometimes requires directly addressing the number of rail cars moving on congested lines or in congested terminals. When a service disruption causes train and car velocity to slow, railroad personnel emphasize service performance to drive cars to customer facilities while working directly with customers and deploying additional resources when appropriate to reduce inventory. Another way to address excess cars online is to direct empty railroad-owned railcars to storage locations. Applicants' equipment management personnel proactively develop plans to reduce cars online. Cross-departmental expertise and input are used to evaluate which railroad-owned

cars can be removed from the active fleet while ensuring that the service recovery benefits of such actions take into account customer service performance.

397. While Applicants are deploying their buffer resources and, where an execution issue was identified, working on the ground in affected areas to retrain local personnel or restructure local processes, they continue analyzing the disruption to be certain they understand its root causes. They use the results of their analysis to develop and implement changes to transportation plans, resource allocations, or other practices and procedures to prevent future occurrences of similar disruptions. Changes might include revising operating plans to redirect traffic flows, increasing critical resources at key locations, and, in the case of execution issues, providing additional training or reworking processes at the local level. The root cause analysis also helps ensure that Applicants obtain sufficient information to communicate fully and accurately with customers and other external stakeholders.

5. Monitoring Response Effectiveness

398. Applicants use a combination of metrics-based analysis and, in certain circumstances, on-the-ground observation to measure the effectiveness of the actions taken in response to service disruptions. Applicants generally use the same metrics in monitoring their progress towards service recovery that they use to identify service disruptions. Applicants' cross-departmental teams conduct meetings at least once a day to review operating conditions and, if necessary, modify response plans in light of new information. The monitoring effort and regular cross-departmental meetings continue until normal operations are restored and conditions have stabilized.

6. Communicating with Stakeholders

399. Prompt and accurate communication with stakeholders—particularly customers, but also short lines, passenger railroads, and other affected rail carriers—is an integral part of Applicants' plans for responding to service disruptions. As Applicants pursue the steps described above to mitigate the impacts of service disruptions, they also take steps to ensure stakeholders receive timely, accurate information about the status of network operations and expected timelines for service restoration.

400. Effective stakeholder communication includes both proactive and reactive components. Applicants recognize the importance of gaining and maintaining stakeholder trust and confidence by providing early, accurate information directly to affected parties. If proactive communication is delayed, stakeholders will either be left in the dark or receive potentially incomplete information from secondhand sources. If proactive communication is inaccurate, stakeholders will not trust continued communication throughout the duration of the disruption. Applicants therefore seek to balance the need for both speed and accuracy when proactively communicating with stakeholders.

401. Applicants' proactive communications with stakeholders occur through several channels, including announcements on UP's and NS's web pages and email communications targeted to customers likely to be affected by a disruption. Applicants can target emails to customers based on their origin, destination, location, and commodity. Applicants use this information to inform customers when their service may be delayed by more than 24 hours due to major weather events,

derailments, strikes, or other disruptions. Applicants also continue to follow up with affected customers during and after the event. For example, during hurricanes and other major weather events, UP follows a structured communication process to ensure customers are informed, supported, and engaged throughout the disruption. When a weather event is imminent, UP notifies impacted customers with initial alerts describing the situation and the railroad's readiness to respond. From that point forward, UP engages in daily direct outreach—via email, phone, or its Salesforce case system—to provide updates, confirm service status, and collect feedback. After service is restored, UP provides the impacted customer a summary of actions taken and invites feedback.

402. Applicants also have well-developed systems for engaging in reactive communications with stakeholders—that is, responding to issues raised by customers directly with the railroads. UP and NS both have customer call centers, so customers can contact railroad representatives to obtain information about their shipments or raise issues requiring resolution. UP's and NS's call centers use similar processes to document interactions, track progress, and ensure accountability. Customers can also raise questions and concerns electronically using customer portals that provide real-time visibility into their shipments.

D. Applicants' Successful Contingency Planning Frameworks

403. UP's and NS's contingency planning frameworks described above have proven extraordinarily successful during recent service disruptions. The examples described below demonstrate both the efficacy and flexibility of their existing processes.

1. International Intermodal Rush (2024 to 2025)

404. In 2024, UP successfully absorbed a substantial increase in international intermodal traffic over a two-month period. This international traffic surge was caused by a series of overlapping events, including impending tariffs, a strike by the East Coast Longshoremen, and unforeseen delays in both the Suez and Panama canals.

405. UP's monitoring infrastructure flagged the change in shipping departures and inbound port activity as these conditions unfolded. UP immediately formed a cross-functional team that included representatives of its Service Design, Premium Operations, Fleet Distribution, HDC, and Marketing and Sales teams. This team worked around the clock to coordinate tasks among departments, monitor changes, respond to developments, and develop alternative transportation plans.

406. UP quickly determined that the traffic surge would require the deployment of additional assets to Southern California to meet demand. Within days, UP had repositioned locomotives within the Los Angeles Basin and prepared them for immediately deployment. UP also ensured sufficient onsite crew support by executing 15 borrow-outs and increasing staffing along key lanes with projected impacts. To meet the projected increase in intermodal traffic, UP also repositioned empty intermodal wells in strategically placed locations near the Los Angeles Basin.

407. UP's team held frequent calls with foreign carriers to understand changing flows into the main line network and the pipeline from Los Angeles to Chicago. At terminals, UP coordinated with vendors to secure the resources needed

to ensure that ramp productivity could meet demand. UP also worked with customers to maximize the efficiency of equipment flows on key portions of the network.

408. As it took all these steps, UP closely monitored metrics like train speed and car velocity both locally and throughout the network.

409. UP's response strategy minimized both the severity and duration of the surge while protecting the rest of the network from cascading effects. In the wake of the intermodal rush, UP invested in higher-frequency dock monitoring to provide even greater visibility into port infrastructure.

2. Upper Great Lakes (June 2024)

410. In June of 2024, UP faced a challenging rainy season in the Upper Great Lakes region. Over a two-week period, shifting weather and flood patterns caused daily changes in the lines the railroad could keep open for service. UP established a war room to coordinate operations across departments.

411. Each day, as new weather reports arrived, UP determined which lines would be affected and where affected traffic could be shifted. It readjusted transportation plans to accommodate the altered traffic flows and shifted ATR locomotives to support the revised plans. UP’s Engineering team worked around the clock to restore routes and repair bridges as a result of the historic flooding events in Northern Iowa and throughout Minnesota. UP’s CC&S team then identified which customers would be impacted and provided them updates on changes to operations. The next day, UP repeated the same process to ensure traffic continued flowing to the maximum extent possible and customers remained informed.

412. Throughout this episode, UP closely tracked inventory and traffic flow metrics to identify hot spots and divert additional resources where necessary. This response strategy enabled UP to contain the effects of the disruption to the affected region and substantially mitigated the impacts of the weather on customers.

3. Baltimore Key Bridge Collapse (March 2024)

413. On March 26, 2024, a cargo vessel struck the Francis Scott Key Bridge in Baltimore, Maryland, resulting in the collapse of the bridge and the blockage of a key East Coast Port for almost three months. This event severed one of NS's largest bulk lanes: export coal from Southwest Pennsylvania through the Port of Baltimore. In addition to the bulk impacts, the blockage created a supply chain disruption for international steamship lines, which were unable to get units into or out of the Port. NS responded to these rapidly changing customer needs through a multi-pronged approach that required close coordination between the Operations and Commercial teams. To restore the coal flows and enable a large customer to continue to operate their mines, NS shifted this globally significant export coal volume to NS's Lamberts Point Coal Pier in Norfolk, Virginia. This was a massive routing shift that required adding locomotive resources due to the extended distance and grade of the diversion route. Between the Pennsylvania mines and the Norfolk Pier, NS deployed more than 40 Train and Engine employees via "Go Teams" to handle the diverted traffic. The results achieved were record coal loadings at Lamberts Point in the two-month period following the bridge collapse, with over 2 million tons loaded in May, the first time this benchmark had been reached since April 2013.

414. To address the supply chain disruption experienced by the steamship lines, NS responded by popping up an international intermodal service at the Baltimore Intermodal ramp, which had previously processed only domestic shipments. To add the international service, Service Design quickly developed a train plan to and from the Port of New York and New Jersey into Baltimore, connecting to existing services where possible to maximize efficiency. The Intermodal Commercial team worked with customers to quantify shipping requirements and establish expectations for handling international shipments at this domestic ramp. In doing so, NS leveraged its Triple Crown Services, Inc. network to provide drayage to and from Seagirt Marine Terminal. This complex movement required constant communication between Intermodal Customer Logistics and shippers, along with close coordination with the Operating Team.

415. Overall, the comprehensive NS response to the disruption solved problems for our customers and kept the NS network moving fluidly.

4. Hurricane Helene (September 2024)

416. Hurricane Helene made landfall as a Category 4 hurricane near Big Bend, Florida, in late September 2024 and proceeded to cause significant damage throughout the Southeast, particularly in NS's Coastal, Gulf, and Blue Ridge Divisions. In advance of the storm, NS closely monitored the storm approach and established a war room within NS's Network Operations Center ("NOC") to ensure maximum coordination across the various Operating Groups. NS Engineering forces were able to strategically pre-position personnel, equipment, and material in key locations along core routes, including coordination with the NOC to stage loaded

Herzog ballast trains and GREX dump trains. Coordination even extended to Enterprise Resources (Sourcing), which worked to secure rock quarry support and local trucking support for anticipated restoration efforts. The NOC and the war room safely managed operations while NS Engineering restored the two most crucial routes —the GS&F and Southern Mains—within 24 hours. All core routes were restored within 72 hours except for the AS Line, which incurred catastrophic destruction. The immediate restoration efforts involved the clearing of over 15,000 downed trees. Following the track restoration, NS closely coordinated traffic flows and tactically managed the transportation plan to carefully reestablish service while ensuring yard resources were not overwhelmed. Throughout the process, NS's Customer Logistics group kept customers informed of impacts via broadcast messages and direct customer communication.

E. Applicants' Contingency Plans for Merger-Related Service Disruptions

417. Applicants modeled their contingency plans for merger-related service disruptions on Applicants' existing contingency plans and problem-solving procedures described above. The following sections describe how, post-merger, Applicants plan to address potential merger-related service disruptions, promptly restore adequate service levels, and utilize problem resolution teams and procedures.

1. Risk Identification and Assessment

418. As discussed above, Applicants engaged in a risk assessment process that identified three broad areas that create risks of merger-related service disruptions: changes in traffic levels and patterns, changes in procedures and

processes, and changes in IT systems. Applicants concluded that the risk of merger-related service disruptions would be highest at the classification yards and intermodal terminals with the most merger-related operational changes. Those classification yards and intermodal terminals are: Chicago, St. Louis, Kansas City, Memphis, and New Orleans. In those yards and terminals, not only could changes in traffic flows present risks, but any unexpectedly negative impacts arising from changes in procedures, processes, and systems during the integration process could also potentially pose additional risks to operations. Applicants also concluded that they should develop contingency plans for the main line from Kansas City to Butler via Sidney, which they will use for the first time as a significant route for traffic moving between the legacy UP and NS systems, as well as for the main lines from New Orleans to Birmingham and from Birmingham to Atlanta, because these corridors are expected to experience a significant amount of construction to accommodate projected growth.

419. Applicants have documented their contingency plans for addressing merger-related service disruptions on the main lines identified above and in Chicago, St. Louis, Kansas City, Memphis, and New Orleans, including the elements described in the following sections, in Appendix A.

2. Identification and Maintenance of Buffer Resources

420. As discussed above, service disruptions ultimately manifest as an inability to move current traffic volume because of a shortage of one or more of five critical resources: main lines, terminals, crews, locomotives, and rail cars. For each of the areas described above, Applicants have compiled information regarding likely

sources of buffer resources. Specifically, for the Kansas City to Butler, New Orleans to Birmingham, and Birmingham to Atlanta line segments, Applicants identified and show in their contingency plans in Appendix A:

- Main lines: alternate main lines that could be used to route traffic to avoid the line segment, including lines requiring detours over other railroads.
- Yards/Terminals: alternate yards/terminals that could be used to accommodate traffic that cannot access terminals on the line segment.
- Crews: the crew base used to crew trains that move over the line segment and the next closest crew base point on the network.
- Locomotives: the two terminals closest to the line segment with a sizable number of ATR locomotives and the projected number of ATR locomotives at each terminal.

421. Similarly, for each of the gateways identified above, Applicants identified and show in their contingency plans in Appendix A:

- Main lines: alternate main lines that could be used to route traffic to avoid the terminal, including lines requiring detours over other railroads.
- Yards/Terminals: alternate yards/terminals that could be used to accommodate traffic that cannot access the terminal.
- Crews: the crew base used by crews that report to the terminal and the next closest crew base point on the network.
- Locomotives: the two terminals closest to the terminal with a sizable number of ATR locomotives and the projected number of ATR locomotives at each terminal.
- Rail Cars: the two terminals closest to the line segment with a sizable number of available rail cars and the projected car needs at each terminal.

3. Monitoring to Detect Merger-Related Service Disruptions

422. Applicants believe that the operations monitoring they conduct in the ordinary course of business will be more than sufficient to detect merger-related service disruptions. However, as an added layer of protection, UP/NS will monitor operations in its principal classification yards using the terminal dwell benchmarks established in Part XII of this Service Assurance Plan.

423. Based on their experience, Applicants believe terminal dwell times in manifest yards are a meaningful indicator of network health in a terminal area and provide an important leading indicator of potential issues on the main lines leading into and out of the terminal area.[225] Terminal dwell time information from principal classification yards will provide information regarding network health in and around the gateways of Chicago (Proviso, Elkhart), St. Louis (A&S); Kansas City (18th Street), Memphis (North Little Rock, Sheffield), and New Orleans (Livonia). Information about network health in the Kansas City gateway will provide an indicator of potential issues involving the Kansas City to Butler main line. Terminal dwell times for principal classification yards will also provide a broad view of the combined network's health, as the principal classification yards connect key locations on all principal routes.

---

[225] As discussed below in Section XII.B.2, terminal dwell times for intermodal terminals are based on the time between when a railroad grounds a container and the time the container leaves the terminal, which often depends more on local drayage operations than the health of railroad operations.

424. In addition to the specific monitoring measures described above, UP/NS will increase the combined company's level of vigilance when portions of the combined network experience significant changes as part of ongoing integration efforts—for example, during and immediately after significant changes in terminal operations, during and immediately after IT system cut-overs that affect key operating systems, including systems related to customer car ordering and waybilling, and during and immediately after periods in which legacy NS employees become subject to legacy UP operating rules.

425. Further, as discussed below, UP/NS will establish "go teams" of managers, supervisors, and other personnel who will be prepared to travel to locations that are implementing significant changes as part of the integration process to provide on-the-ground guidance if service issues emerge.

426. In addition, as described in the Customer Service section of this Service Assurance Plan, UP/NS will ensure adequate numbers of trained customer service personnel are available to answer questions and respond to any issues that may arise when customer service functions are integrated and customers begin using new systems for car ordering and waybilling.

4. Developing and Executing Response Actions Through a Special Problem Resolution Team

427. UP/NS will create a special merger-related problem resolution team to address any merger-related service disruptions during the merger integration period. UP/NS will activate the special problem resolution team if the previous month's terminal dwell time in any of the combined railroad's principal classification yards

exceeds a predetermined threshold: 36 hours for yards on the legacy NS system, and 29 hours for yards on the legacy UP system. Exceeding the dwell-time threshold would not mean that a merger-related service disruption has occurred or that any special action is required. However, it would signal the need for attention and investigation.

428. Applicants developed these thresholds based on their experience with the correlation between terminal dwell times and service issues. They expect that the combined railroad will use a single standard for all yards on each legacy network, rather than separate standards for each yard, for manageability purposes. However, use of a lower threshold for legacy UP yards appropriately reflects UP's practice of using tighter terminal cutoff times and transportation plans that drive lower dwell times.

429. Applicants' benchmarking data show the 36- and 29-hour thresholds are appropriately calibrated to identify potential merger-related problems. During the 36-month period prior to Applicants' filing of their notice of intent to file their merger application, NS's operations would have activated the special problem resolution team 55 times, and UP's operations would have activated the special problem resolution team 47 times. The thresholds would have appropriately signaled UP's and NS's service difficulties during the post-Covid period, as well as other events that caused short-term service disruptions.

430. The special problem resolution team will be led by the relevant regional vice president and include senior representatives from at least the following functional areas:

- Network planning
- Crew management
- Locomotive management
- Car management
- Regional management of the affected region
- Service unit management of the affected service unit
- Terminal management of the affected terminal
- Information technology
- Passenger operations
- Customer care and support
- Short line management
- Safety
- Law

431. The special problem resolution team will coordinate (and may overlap) with UP/NS personnel who will address non-merger-related service disruptions. It will convene at least once a day until actual dwell-times in the yard or yards at issue fall below the threshold and remain below the threshold for seven consecutive days, or until the team determines that the issue causing the decline in the pre-merger baseline measures is not merger-related.

432. The special problem resolution team will follow the same basic problem resolution procedures in resolving merger-related service problems that UP/NS will apply to other service problems, and which are described in detail above, with one exception. The exception is that they will also assess whether the issue causing the increased dwell time is merger-related. If they determine the issue is merger-related, they will attempt to identify the underlying cause of the problem as a non-execution issue or an execution issue, and at the same time, they will use the menu of buffer resources described above, as well as their experience and judgment, to determine the most appropriate way to apply those resources to promptly restore adequate service levels. Further, as they direct resource changes, they will continue to monitor the results to evaluate the need for additional changes. The special problem resolution team will also be empowered to recommend rolling back any integration-related changes to reevaluate the change and the implementation process.

433. In addition, UP/NS will create "go teams" of managers, supervisors, and other personnel that the special problems resolution team can rapidly deploy to locations experiencing merger-related service disruptions that they determined resulted from execution errors at the local level. The precise configuration of the "go teams" will depend on the nature of the disruption and the resources needed to address the disruption, but the teams will include personnel with experience and judgment to identify and fix issues that require additional training and direct supervision to address.

434. Finally, the special problems resolution team will be tasked with identifying root causes of any merger-related service disruption and developing and supervising the execution of plans to ensure problems do not recur. This might include supervising transportation plan redesigns or supervising the development of additional training and testing tools and processes before integration activities proceed.

5. Monitoring Response Effectiveness

435. As discussed above, the special merger-related problem resolution team will monitor the effectiveness of UP/NS's response to any merger-related service disruptions and direct additional resource changes if it concludes such changes are necessary. The special team will remain responsible for monitoring any necessary service recovery efforts until actual dwell-times in the yard or yards at issue fall below the threshold and remain below the threshold for seven consecutive days.

436. Once the special problem resolution team's monitoring role is concluded, the team will prepare a report documenting both the cause of the issue and any lessons learned that would aid in future efforts. The special team will also consider, and its report will also address, whether monitoring additional metrics would provide earlier identification and correction of similar problems in the future.

6. Stakeholder Communications

437. In addition to the communications UP/NS would share with stakeholders following a substantial disruption of service from any cause, UP/NS would provide additional reporting for merger-related service disruptions.

438. If the special merger-related problem resolution team is activated, UP/NS will inform the Board's Office of Public Assistance, Government Affairs, and Compliance ("OPAGAC") and describe the railroad's efforts to identify the root cause of the increase in dwell time and its plan for promptly resolving any merger-related service disruption.

439. Unless UP/NS subsequently determines the root cause is not merger-related, the combined company will report to OPAGAC on a weekly basis until actual dwell-times in the yard or yards at issue fall below the threshold and remain below the threshold for seven consecutive days.

7. Commitment to Working with Other Carriers

440. In addition to committing to the measures described above, Applicants commit to ensuring that the combined railroad will work with other carriers to overcome serious service disruptions on their lines during the transition period and afterwards.

441. UP and NS have long worked with other carriers to establish detour arrangements and other cooperative efforts when they experience serious disruptions on their lines and other carriers are in a position to provide assistance to UP or NS, or when other carriers experience serious disruptions and UP or NS is in a position to provide them with assistance. The combined company will continue to seek cooperation from other carriers when the combined company needs assistance, and the merged company will continue UP's and NS's practices of cooperating when other carriers approach UP/NS for assistance.

F. Remedies for Service Disruptions

442. The Board's rules require Applicants to suggest a protocol for handling claims related to failure to provide reasonable service due to merger implementation problems and state that commitments to submit all such claims to arbitration will be favored. *See* 49 C.F.R. § 1180.1(h)(5). Applicants are carefully planning and staging the integration process to ensure the merger improves service for their customers. Their record of recent, successful cutovers of major systems provides good reason for confidence. Applicants are willing to offer customers the option of arbitration in the event they raise merger-related service claims. However, Applicants urge customers to raise any merger-related service concerns using well-established channels of communication with customer care personnel and contacts within the Marketing and Operating departments of the combined railroad. If a customer believes merger integration is causing a service problem, UP/NS should have the opportunity to hear and respond to the customer's concerns.

443. If a customer believes it has been damaged by a merger-related deterioration in service and is not satisfied with the combined railroad's response, Applicants are willing to resolve claims using a formal arbitration process. Applicants describe the process in detail in Appendix B to the Service Assurance Plan. Under the process, arbitration would be available to resolve damages claims filed by shippers of non-exempt commodities under common carrier service during the three-year merger integration period. The process would be administered by JAMS on a confidential basis and is designed to resolve the matter quickly through issuance of a final, binding, enforceable decision with only a limited right to appeal.

444. Applicants expect no customer will ever have cause to invoke the arbitration process, but the process will be available as an option to pursuing claims outside of formal judicial or regulatory proceedings.

X. Coordination of Freight and Passenger Operations

445. In this Part of the Service Assurance Plan, Applicants describe how they will continue to facilitate passenger operations, fulfill existing performance agreements for passenger services, ensure effective communication with passenger operators, and avoid potential negative impacts on passenger rail service that otherwise might be associated with a transaction of this type. Applicants also describe their current coordination with passenger operators, including communication and operating protocols. Applicants each work closely and collaboratively with their passenger rail partners, and the combined transcontinental railroad will continue to do so following the merger.

446. As hosts to Amtrak, Applicants devote significant time and resources to satisfying both contractual and statutory obligations. Under 49 U.S.C. § 24308(a), Applicants provide services to Amtrak under contractual arrangements. Under 49 U.S.C. § 24308(c), Amtrak has a statutory right to preference over freight transportation. Section 24308(f) contains a Congressionally established on-time performance standard that applies to Amtrak. Congress charged the Federal Railroad Administration with developing a metric for measuring on-time performance. FRA's metric is referred to as Customer On-Time Performance ("COTP").[226]

---

[226] *See* 49 C.F.R. § 273.5(a)(1).

447. As a regulatory mandate, COTP is separate from Applicants' contractual performance obligations under 49 U.S.C. § 24308(a). The Board's merger regulations, 49 C.F.R. § 1180.10(b), require Applicants to describe "how they would continue to facilitate [Amtrak or commuter] operations so as to fulfill existing *performance agreements* for those services" (emphasis added). Applicants therefore focus the following section on their contractual obligations to Amtrak and the other passenger services that operate over their lines.

A. Facilitating Passenger Operations to Fulfill Contractual Obligations

448. The accompanying Operating Plan describes in detail the current passenger services that operate over Applicants' lines. These services generally operate pursuant to commercial agreements, some of which contain negotiated performance standards, performance-related payment schemes, or other performance-related provisions as described below.

449. The UP/NS merger will not result in any adverse impact to passenger operations. UP/NS will facilitate passenger operations hosted on UP/NS lines. As described in the Operating Plan, the merger will not change—or will reduce—train counts on many of the lines on which the combined UP/NS will continue to host passenger operations. Where Applicants project that a route on which they host passenger operations will experience a merger-related increase in train counts, they have planned to ensure the route will have sufficient capacity to fulfill any contractual commitments to passenger carriers.

1. Passenger Rail Services on UP

450. On its network, UP hosts Amtrak, other passenger rail services, and commuter rail services, as described in more detail in the Operating Plan.

451. **Amtrak**. Except as described below for particular Amtrak services, UP's contractual obligations to Amtrak for Amtrak-operated services hosted by UP are governed by a January 1, 2000, agreement (as amended) between UP and Amtrak (the "UP-Amtrak Agreement") that sets forth terms and conditions for coordinating freight and passenger services over UP's network.[227] That agreement provides {{

}} As described in the Operating Plan, Applicants expect that the merger will remove freight trains from Amtrak's Lincoln (Illinois), Missouri River Runner, and Lincoln/Missouri routes, and a portion of the Texas Eagle route. Applicants do not expect that the merger will add freight trains to Amtrak's Cascade, Coast Starlight, Pacific Surfliner, or Winter Park (Ski Train) routes. For Amtrak routes where Applicants expect to add freight trains—the Sunset Limited, California Zephyr, and Gold Runner routes and a portion of the Texas Eagle route—the Operating Plan and accompanying workpapers show that (1) existing main line capacity is sufficient to accommodate projected traffic levels while maintaining

---

[227] *See* Workpaper "Amtrak - Agreement.pdf"; Workpaper "Amtrak - Amendment Agreement.pdf."

current passenger service levels or (2) Applicants' plans to increase main line capacity will accommodate projected freight traffic growth without disruption of passenger services.

452. *Amtrak's Capitol Corridor Service.* UP, the Capitol Corridor Joint Powers Authority, and Amtrak are parties to a December 1, 2003, Agreement on Performance Payment for Operation of Capitol Corridor Trains in California.[228] In that agreement, {{

}}

453. As described in the Operating Plan, Applicants' plan to institute a new intermodal service between Northern California and the Northeast would add one daily train pair to the Capitol Corridor route between Sacramento and Auburn, California. Also as shown in the Operating Plan, the Capitol Corridor route has sufficient capacity to accommodate the additional trains while maintaining current passenger service levels.[229]

454. *Amtrak's Pacific Surfliner Service.* The Pacific Surfliner is the subject of a December 15, 2022, agreement between UP and the Los Angeles-San Diego-San Luis Obispo Rail Corridor Agency ("LOSSAN") (the "UP-LOSSAN Agreement"), in

---

[228] *See* Workpaper "Capitol Corridor - Performance Payment Agreement.pdf."

[229] *See* Op. Plan § 7.1.1.2.

which the parties agreed that the incentive portion of the UP-Amtrak Agreement would not apply and instead established a separate incentive-based performance payment scheme for the Pacific Surfliner.[230] Under the UP-LOSSAN Agreement, UP receives incentive payments based on on-time performance levels. If end-point on-time performance falls below 75 percent of the stated levels, the parties must meet to discuss root cause issues and determine potential mitigation measures. Under the terms of a June 1, 2025, amendment to the UP-Amtrak Agreement, the penalty portion of the UP-Amtrak Agreement applies to the Pacific Surfliner service. As explained in the Operating Plan, Applicants do not expect that the merger will add trains to the Pacific Surfliner route.[231]

455. *Amtrak's Sunset Limited Service.* In a 2025 agreement with Amtrak, {{

}}[232] As explained in the Operating Plan, Applicants plan to increase main line capacity on the Sunset Limited route to ensure UP/NS has sufficient capacity to maintain passenger service levels while accommodating a projected merger-related increase in freight traffic moving over that route.[233]

---

[230] *See* Workpaper "Pacific Surfliner - Passenger Rail Cooperative Agreement.pdf."

[231] *See* Op. Plan § 7.1.1.8.

[232] *See* Workpaper "Sunset Limited - Settlement Agreement.pdf."

[233] *See* Op. Plan § 7.1.1.9.

456. **Rocky Mountaineer (Seasonal)**. UP and Rocky Mountaineer have a passenger rail operating agreement governing the Rocky Mountaineer's seasonal service.[234] Under the agreement, {{

}} As explained in the Operating Plan, Applicants do not expect the merger to increase the number of trains operating over the Rocky Mountaineer route.[235]

457. **ACE (Commuter).** UP and the San Joaquin Regional Rail Commission have a trackage rights agreement governing access to UP's lines for the Altamont Corridor Express ("ACE") service.[236] Under the agreement as amended, {{

[234] *See* Workpaper "Rocky Mountaineer - Operating Agreement.pdf."

[235] *See* Op. Plan § 7.1.3.6.

[236] Workpaper "ACE - Trackage Rights Agreement.pdf"; Workpaper "ACE - First Amendment to TRA.pdf"; Workpaper "ACE - Fourth Amendment to TRA.pdf"; Workpaper "ACE - Sixth Amendment to TRA.pdf."

}} As explained in the Operating Plan, Applicants' planned new intermodal service between Northern California and the Northeast would affect a small part of the ACE route, but the corridor's existing configuration supports Applicants' projected merger-related traffic increase while maintaining the current passenger service levels.[237]

458. **Caltrain (Commuter)**. This commuter service is governed by a trackage rights agreement between a UP predecessor and the Peninsula Corridor Joint Powers Board, the organization that owns and manages Caltrain.[238] Under the agreement, UP maintains dispatching control of the line used by Caltrain. There are no performance standards or performance payment schemes under the agreement. As explained in the Operating Plan, Applicants do not expect the merger will increase the number of trains operating over the line used by Caltrain.[239]

459. **Metra (Commuter)**. There are no contractual performance standards for Metra's operations on UP's lines in the Chicago area. The Purchase of Service Agreement that previously governed the relationship between UP and Metra expired in June 2025. The Board subsequently entered an order granting terminal trackage rights to Metra, and the parties are engaged in negotiations regarding terms and

---

[237] *See* Op. Plan § 7.1.3.1.

[238] *See* Workpaper "Caltrain - Trackage Rights Agreement.pdf."

[239] *See* Op. Plan § 7.1.3.2.

conditions. *See generally Commuter Rail Div. of the Regional Transp. Auth.—Terminal Trackage Rights—Union Pac. R.R.*, Docket No. FD 36844. As explained in the Operating Plan, UP/NS will have sufficient capacity to accommodate a projected merger-related increase in freight traffic moving over a portion of UP's Geneva Subdivision used by Metra while maintaining the current passenger service levels.[240]

460. **Metrolink (Commuter).** UP and the Ventura County Transportation Commission have agreements related to the Metrolink commuter services over UP's lines in California. A Commuter Train Access Agreement, as amended, governs Metrolink's use of UP's lines between Moorpark and North Montalvo.[241] The Riverside Operating Agreement, as supplemented, governs Metrolink's use of UP's lines between West Riverside and Los Angeles.[242] Under the agreements, UP has dispatching authority on the lines used by Metrolink and is generally required to give priority to Metrolink commuter trains in defined situations. There are no performance standards or performance-related payment schemes. As explained in the Operating Plan, the corridor's existing configuration supports a projected merger-related increase in freight traffic of approximately two trains per day while maintaining the current passenger service levels.[243]

---

[240] *See* Op. Plan § 7.1.3.3.

[241] *See* Workpaper "Metrolink - Commuter Access Agreement.pdf;" Workpaper "Metrolink - Third Amendment to CAA.pdf."

[242] *See* Workpaper "Metrolink - Riverside Operating Agreement.pdf"; Workpaper "Metrolink - Supplemental Agreement to Riverside OA.pdf"; Workpaper "Metrolink - Saugus and Ventura Shared Use Agreement.pdf."

[243] *See* Op. Plan § 7.1.3.4.

2. Passenger Rail Services on NS

461. On its network, NS hosts Amtrak, other intercity passenger rail services, and commuter rail services, as the Operating Plan describes in more detail.

462. **Amtrak.** Except as explained below for particular Amtrak services, Amtrak long-distance and state-supported intercity passenger services are covered by a 2006 Off-Corridor Operating Agreement, as amended, between Amtrak and NS (the "Off-Corridor Agreement").[244] Under that agreement, NS has agreed, among other things, to make reasonable efforts to deliver each train to all scheduled stops on NS within its scheduled running time, to avoid delays to trains and make up delays incurred, and to seek ways to reduce the scheduled running time between points. The agreement also contains performance payments and penalties based on the number of minutes of "NSR Delays" that specified Amtrak trains incur. NSR Delays are defined as delays based on certain delay codes and attributable to NS.

463. As described in the Operating Plan, Applicants expect that the merger will add freight trains to all of the routes used by Amtrak services that operate over NS's lines: the Blue Water, Cardinal, Carolinian and Piedmont, Crescent, Floridian (temporary combination of Capitol Limited and Silver Star services), Lake Shore Limited, Mardi Gras, Pennsylvanian, Pere Marquette, Richmond/Newport News/Norfolk, Roanoke, and Wolverine services. The Operating Plan and workpapers explain how there is either sufficient capacity to support the projected freight increase while maintaining the current passenger service levels or how Applicants

[244] *See* Workpaper "Amtrak - A&R Off-Corridor Operating Agreement.pdf."

plan to support the projected freight increase while maintaining the current passenger service levels.[245]

464. *Amtrak's Carolinian and Piedmont Services.* The Carolinian and Piedmont services are addressed in a 2011 Definitive Service Outcomes Agreement ("DSOA") among the North Carolina Department of Transportation, North Carolina Railroad Company, NS, and Amtrak.[246] Under the DSOA, as amended, NS committed to the service frequencies then occurring. The parties also agreed to the schedules for these services and achievement of certain service performance levels. NS's compliance with the contractual delay standard is based on two metrics. The first is Quarterly Endpoint OTP, which is the average endpoint on-time performance of all specified trains in a quarter. The second is based on NS-Controlled Trigger Delay Minutes, which is the sum of delay minutes as set forth in Amtrak's conductor delay reports that are determined to be within NS's control. The contract sets out provisions for root cause analyses, corrective action plans if necessary, remedies, and dispute resolution. As described in the Operating Plan, the route has sufficient existing capacity to support the projected merger-related increase in freight traffic without compromising passenger services.[247]

465. *Amtrak's Crescent Service.* In addition to the Off-Corridor Agreement's performance scheme based on delay minutes, an addendum to the Off-Corridor

---

[245] *See* Op. Plan §§ 7.1.2.1 to 7.1.2.13.

[246] *See* Workpaper "Carolinian & Piedmont - DSOA.pdf."

[247] *See* Op. Plan § 7.1.3.3 (Carolinian); *id.* § 7.1.2.10 (Piedmont).

Agreement provides for performance payments and penalties based on COTP.[248] Further, in 2024 the U.S. Department of Justice ("DOJ") filed a complaint against NS alleging that NS was failing to provide preference to Amtrak trains on the Crescent route. Without admitting liability, NS entered into a settlement agreement with DOJ on September 8, 2025, which, among other things, provided that NS would grant Amtrak the highest dispatching priority; clarified how dispatching decisions would be made; and mandated retention of certain data and the government's ability to access the data.[249] As described in the Operating Plan, UP/NS intends to implement targeted infrastructure enhancements at key locations, primarily focused on the corridor between New Orleans and Atlanta, ensuring the route has sufficient capacity to support a projected increase in freight traffic while maintaining current passenger service levels.[250]

466. *Amtrak's Roanoke Service.* In addition to the Off-Corridor Agreement discussed above, the Roanoke service is the subject of a 2024 Amended and Restated Comprehensive Rail Agreement between NS and the Virginia Passenger Rail Authority ("VPRA").[251] Under that agreement, the second round trip between Manassas and Roanoke will be subject to a performance regime based on FRA's COTP

---

[248] *See* Workpaper "Crescent - Addendum to Appendix V.pdf."

[249] *See* Workpaper "Crescent - DOJ Settlement Agreement.pdf."

[250] *See* Op. Plan § 7.1.2.4.

[251] *See* Workpaper "Roanoke - A&R Comprehensive Rail Agreement.pdf."

metric, measured on a quarterly basis.[252] NS is currently in discussions with VPRA in anticipation of that performance regime becoming effective. As described in the Operating Plan, there is sufficient capacity on the route to support a projected merger-related increase in freight traffic while maintaining the current passenger service levels.[253]

467. **VRE (Commuter)**. Virginia Railway Express's ("VRE") operations are conducted on NS's lines pursuant to an Operating Access Agreement among NS and the two owners of the VRE, the Northern Virginia Transportation Commission and the Potomac and Rappahannock Transportation Commission.[254] The operating agreement provides that NS will make reasonable efforts to avoid unnecessary interference with and to maintain specified schedules of VRE service and that NS will also make reasonable efforts to attain future schedules specified in the agreement. The agreement further provides that NS will make reasonable efforts to avoid delays or cancellations but does not contain specific performance standards. As explained in the Operating Plan, Applicants do not expect the merger to add trains to the VRE route.[255]

468. **Metra (Commuter)**. Metra's operation on NS's line is pursuant to a January 1, 1993, joint line (lease) agreement, as modified by a May 14, 1993, letter

---

[252] Future extension of passenger service to Christianburg, Virginia, would likewise be subject to this performance standard.

[253] *See* Op. Plan § 7.1.2.12.

[254] *See* Workpaper "VRE - Operating Access Agreement.pdf."

[255] *See* Op. Plan § 7.1.4.2.

agreement, between Metra and NS's predecessor.[256] The agreement provides that NS maintains dispatching authority; establishes time restrictions on NS operations to accommodate commuter operations; and contains incentive and reverse incentive compensation provisions relating to on-time performance of commuter trains. On-time performance under the agreement is based on either arrival time at specific points or aggregate delay minutes attributable to NS dispatching (within NS's control) for the commuter train. The agreement gives Metra's commuter trains priority over all other rail operations on the joint line. As explained in the Operating Plan, Applicants do not expect the merger to add trains to the NS line over which Metra operates.[257]

3. Future Passenger Services

469. Applicants are in different stages of discussions with various entities regarding potential future passenger services on their networks (including additional train runs on current services). For example, UP and the Illinois Department of Transportation have entered into a memorandum of agreement for future access to UP's lines for intercity passenger rail service between Chicago and Rockford, Illinois. Similarly, NS has worked collaboratively with the City of Charlotte, North Carolina, to incorporate future commuter rail service between Charlotte and northern towns in Mecklenburg County, North Carolina.

[256] Workpaper, "Metra - Joint Line Agreement.pdf"; Workpaper, "Metra - Letter Agreement.pdf."

[257] *See* Op. Plan § 7.1.4.1.

470. Because these and other possible future passenger services are not yet "commuter services . . . operated over the lines of applicant carriers," 49 C.F.R. § 1180.10(b), Applicants do not address them in detail here. To the extent that there are agreements in place regarding future service, Applicants intend that UP/NS will abide by those contractual commitments, as it will with respect to other commercial agreements.

4. Applicants' Freight Services on Passenger Providers' Lines

471. Although, as just noted, Board regulations require Applicants to address facilitation of operations only where passenger services "are operated over the lines of applicant carriers," *id.*, it bears mention that Applicants conversely operate freight services on some passenger lines.[258]

472. For example, UP conducts operations over Metrolink in the Los Angeles Basin and over Caltrain in the San Francisco Bay area pursuant to freight easements and separate operating agreements. UP also operates via trackage rights over portions of the Trinity Railway Express commuter rail system in Texas. The Utah Transit Authority's FrontRunner rail system generally runs parallel to UP's right-of-way, but UP operates on some portions of the FrontRunner system to reach local industries.

[258] There are also instances where passenger lines are adjacent to Applicants' lines, but where freight and passenger are not using the same track. For example, the Tri-County Metropolitan Transportation District of Oregon ("TriMet") operates light rail service in and around Portland, some of which shares a corridor with UP with UP and TriMet operating on separate tracks.

473. NS operates over three rail lines owned by Amtrak. It operates over the Northeast Corridor (Washington, District of Columbia, to Boston) and Keystone Corridor (Philadelphia to Harrisburg) pursuant to freight easements and over an Amtrak-owned line from Porter, Indiana, to Kalamazoo, Michigan, pursuant to trackage rights.

474. NS also has operating rights over certain rail lines owned by other passenger rail providers—including New Jersey Transit (trackage rights), SEPTA (trackage rights), and VPRA (freight easement).

B. Operating Protocols Ensuring Effective Communication with Passenger Rail Operators

475. Applicants understand the importance of effectively communicating with their passenger rail partners. Each has established protocols for facilitating operations of passenger services over its lines, including protocols for ensuring effective communications. This section describes Applicants' existing protocols relating to passenger services and plans to ensure the combined railroad's effective communication with passenger rail providers.

476. For both UP and NS, existing protocols effectively facilitate passenger operations on joint lines in three ways. First, Applicants each have teams with established protocols for communicating and coordinating freight and passenger operations. Second, Applicants each review performance data to better understand trends related to delays and take more effective action to reduce such delays. Finally, Applicants' dispatcher training programs ensure effective communication and coordination with passenger operators.

1. Communication & Coordination Protocols

a. Union Pacific

477. UP has robust communication protocols that ensure effective coordination with its passenger partners. These protocols include a centralized dispatch center for coordinating operations, recurring meetings with its passenger partners as well as avenues for instantaneous communication, and protocols for addressing service interruptions.

478. To support safe and efficient coordination of freight and passenger operations moving in real time on UP's lines, the railroad has integrated dispatching of passenger trains into the operations of its HDC. Within the HDC, a Senior Director of each territory or service unit has dispatching authority for their specific territory, including any passenger operations on UP's lines within their territory. Each Senior Director is responsible for both freight and passenger services within their territories. They analyze any delays and, depending on the service unit and in association with the Passenger Operations Director, communicate directly with the relevant passenger service.

479. In addition, the HDC has a dedicated passenger operations desk, known as the Passenger Ops Corridor Desk, that operates 24 hours per day, seven days per week. The Passenger Ops Corridor Desk monitors passenger trains on UP's network to proactively identify potential issues, collaborate with the responsible dispatcher, corridor manager, and/or foreign road to resolve issues, and communicate directly with the relevant passenger service contact. The Passenger Ops Corridor Desk is

strategically positioned within the HDC to facilitate real-time access and coordination with on-duty dispatchers and corridor managers.

480. The Passenger Ops Corridor Desk works closely with Amtrak, monitoring the location and performance status of Amtrak trains and corresponding network conditions and handling incident management support for Amtrak trains. Amtrak has a direct line to UP's Passenger Ops Corridor Desk. The Passenger Ops Corridor Desk coordinates services needed by Amtrak, such as when UP provides Amtrak with rescue locomotives and crews to pilot Amtrak trains when their locomotives fail. In addition, the Passenger Ops Corridor Desk participates in a Daily Network call with partners that covers Amtrak services, as well as Metra, Metrolink, and ACE commuter services, that operate over UP's lines. The Daily Network Call does not include Caltrain or the seasonal Rocky Mountaineer service because those entities do not regularly provide performance data to UP. The Senior Directors of the respective service units and the Passenger Ops team coordinate those passenger operations.

481. UP's Senior Directors within the HDC, in association with the Passenger Operations Director, are generally the primary contact for coordinating with ACE, Metrolink, Metra, Caltrain, and Rocky Mountaineer. The Senior Directors of the relevant territories are the Northern California Service Unit for Caltrain and ACE, the Los Angeles Service Unit for Metrolink, and the Great Plains Services Unit for Rocky Mountaineer. UP communicates and coordinates with Metra through two positions, in addition to the Passenger Operations Director: UP's General Manager

of the Chicago Service Unit and UP's Senior Director of the Great Lakes Service Unit (the latter of which handles the mainline operations of the Chicago Service Unit). The General Manager and Senior Director work closely with each other to coordinate UP's and Metra's operations.

482. In addition to the extensive communications that occur through the Senior Directors of the service units and Passenger Ops Corridor Desk, UP holds a variety of regular meetings with Amtrak and other passenger providers to coordinate and discuss passenger rail-related topics. For example, UP has bi-weekly meetings with Metra on performance, bi-weekly meetings with Metrolink on performance, monthly meetings with Amtrak and LOSSAN on performance, monthly meetings with Amtrak on engineering projects, and bi-monthly meetings with Amtrak on state rail projects, to name a few. As previously noted, because neither Caltrain nor Rocky Mountaineer provide regular performance data to UP, UP does not hold regularly scheduled meetings on performance for those services.

483. UP has Microsoft Teams channels dedicated to real-time communications for passenger operations on UP's lines. These channels facilitate the exchange of daily plans, information about service interruptions that could affect passenger operations, and any necessary real-time service adjustments. UP has established Teams chats with Amtrak, as well as with the Capitol Corridor Joint Powers Authority regarding Amtrak's Capitol Corridor service, LOSSAN regarding Amtrak's Pacific Surfliner service, Metrolink, the San Joaquin Regional Rail

Commission regarding ACE commuter service, Metra, and Rocky Mountaineer.[259] These channels enable direct, one-to-one chats between UP and passenger rail providers, including Amtrak personnel from Amtrak's operation centers (Consolidated National Operations Center ("CNOC") or Oakland Operations) and field teams to discuss various aspects of Amtrak operations.

484. As an additional resource, Amtrak has access to UP's National Railroad Passenger Corporation Officer ("NRPC Officer") within the Network Planning Department. The NRPC Officer is responsible for UP's overall contractual relationship with Amtrak. The NRPC Officer has the responsibility to administer the UP-Amtrak Agreement and to ensure UP's performance of its obligations thereunder. The NRPC Officer serves as a liaison and is available to meet with Amtrak representatives.

485. Using the channels described above, UP communicates regularly and effectively with its passenger rail partners to notify them of UP engineering projects related to passenger operations, service interruptions or adjustments, station updates, and other information pertinent to passenger train movements across the UP system.

486. For example, UP has an established protocol for communicating with passenger providers in the event of a main line service interruption. Whenever notified of a main line service interruption, the Passenger Operations Manager

---

[259] There is no Teams channel set up for Caltrain because the operations that occur on UP's line between San Francisco and Gilroy are predominantly Caltrain passenger operations requiring comparatively little coordination.

evaluates the potential impact to passenger operations. The Passenger Operations Manager is then responsible for communicating with the Passenger Operations Director, corridor manager, dispatcher, and the passenger provider (*e.g.*, contacting Amtrak's CNOC) to provide incident and recovery planning information. UP's protocols require the Passenger Operations Manager to maintain an open flow of communication—with updates every 60 minutes—and to coordinate relief crew efforts as necessary.

487. UP's Passenger Train Emergency Preparedness Plans prepared pursuant to 49 C.F.R. Part 239 sets out communication and notification protocols that take effect in the event of a passenger train incident or accident.

488. Complementing these mutually reinforcing communication channels, UP's operational practices facilitate passenger services. In planning for train meets, for instance, UP trains and instructs its dispatchers to prioritize all passenger trains. If a passenger train is delayed, dispatchers must notify the corridor manager, who must also notify the Passenger Ops Corridor Desk for prompt communication and escalation.

489. UP's Passenger Operations Managers are required throughout their shifts to monitor passenger train performance for host-responsible delay and to work to anticipate any possible delays based on train movement (*e.g.*, meets/passes) and the dynamic environment (*e.g.*, service interruptions). This monitoring reduces delay risk. The Passenger Operations Managers are required to communicate with dispatchers and corridor managers whenever passenger trains are below the delay

threshold and whenever a possible delay appears likely. Together, this team collaborates to determine the best course of action to avoid or mitigate delays.

490. Finally, UP uses standard dispatching processes to coordinate freight and passenger operations on passenger lines over which it operates. For example, where the passenger entity dispatches UP crews, the UP crews follow that entity's protocols. If there is any need to communicate with the operator of the line, UP's corridor managers communicate with the relevant contacts to ensure effective and safe coordination. If the owner of a passenger line is conducting maintenance, the engineering groups coordinate and discuss any potential issues.

b. Norfolk Southern

491. NS likewise works closely and collaboratively with its passenger partners to coordinate operations. NS's coordination and communication with passenger providers have many similarities to UP's processes and are grounded in three NS teams.

492. First, much like UP's HDC, NS's NOC, within its Transportation Department, is responsible for ensuring the safe, efficient, and real-time movement of all trains—including passenger trains—across NS's network. The NOC is responsible for dispatching and train movement coordination and communicates with Amtrak control centers and field personnel. Like UP's integrated dispatching at its HDC, passenger operations are integrated into the broader dispatching structure at NS's NOC. Regional dispatch desks—like UP's Senior Directors of territories—are responsible for coordinating passenger train movements within their territories, including communication with Amtrak and other passenger operators. Like UP's

Passenger Ops Corridor desk, NS's regional dispatch desks are staffed 24/7 to ensure continuous oversight and coordination. The NOC is also responsible for implementing operational strategies aligned with NS's two other passenger-related teams, Interline Services and Strategic Planning.

493. NS's Interline Services is responsible for managing day-to-day execution and compliance with operating agreements with Amtrak and other passenger providers, ensuring coordination across shared corridors and adherence to contractual obligations. Interline Services analyzes performance data including on-time performance, manages scheduling, and facilitates communication and recovery efforts during service interruptions. Within this team NS's National Railroad Passenger Corporation Operations Officer is the primary conduit for day-to-day operational coordination with Amtrak. Also within the team, NS's Manager of Interline Planning is responsible for monitoring on a daily basis historical passenger train delay, as discussed further below. NS's Chief Compliance Officer, who reports directly to NS's Chief Legal Officer, is responsible for overseeing the company's compliance function, including NS's compliance with its obligations under 49 U.S.C. § 24308(c).

494. NS's Strategic Planning team leads NS's engagement in long-term passenger rail initiatives and ensures alignment with NS's infrastructure capacity and applicable regulatory frameworks. This team evaluates proposals for new or expanded service and conducts modeling and analysis to determine infrastructure needs. Within Strategic Planning, the Manager of Passenger Policy has responsibility

for policy development and strategic initiatives related to passenger rail. This includes developing, implementing, and enforcing consistent policies for NS's interaction with passenger services. The role also includes evaluating service proposals, supporting regulatory and grant processes, and ensuring alignment with long-term infrastructure and operational goals.

495. NS has robust communication processes with Amtrak and commuter partners to ensure effective communication. To ensure operational alignment with Amtrak, NS participates in coordinating activities with Amtrak on a daily, weekly, bi-weekly, monthly, quarterly, and annual basis related to different lines or issues. For example, NS participates in a daily Northeast Corridor planning call, weekly coordination calls on Amtrak work outage planning, monthly performance reviews, and annual meetings for longer-term planning. Similar recurring communications are maintained for the commuter services that operate over NS lines.

496. Like UP, NS coordinates with affected passenger service providers in advance of planned engineering projects, including service modifications. For example, NS has provided Amtrak and state sponsors with a yearly preview of planned capital work, with increasingly frequent coordination as start dates for specific projects near.

497. In the event of a service interruption, NS contacts Amtrak and other passenger providers, typically over the phone. Like UP, NS regularly uses Teams for timely and effective communication with Amtrak.

498. NS's Passenger Train Emergency Preparedness Plans prepared pursuant to 49 C.F.R. Part 239 establish communication and notification protocols in the event of a passenger train incident or accident.

499. Like UP, NS handles coordination of freight and passenger operations on passenger-owned lines through standard dispatching and engineering communications. For effective and efficient coordination, the specifics of the communications depend on each service. NS runs only local traffic over the lines used by VPRA and New Jersey Transit, so coordination of operations for those lines is handled locally by the Manager of Train Operations and/or the Senior Road Manager. For SEPTA, NS runs both road and local trains over SEPTA's lines, so NS's Harrisburg East Dispatch desk coordinates communications. For example, if NS's allocated daily freight window is missed, the Harrisburg East Dispatcher coordinates an out-of-window move with SEPTA. NS similarly has weekly communications with Amtrak to coordinate outages on Amtrak's NEC or Keystone corridors.

2. Monitoring of Passenger Performance

a. Union Pacific

500. As noted above, UP's agreements with passenger rail providers include performance provisions. For Amtrak, the agreement includes a performance measurement system that Amtrak has named the Delay Avoidance Incentives system, which measures delay based on the concept of host-responsible delay minutes. Even where UP does not have contractual performance commitments with a passenger service partner, UP nonetheless monitors available performance data, as discussed further below.

501. For Amtrak service, Amtrak provides conductor delay information to UP every two hours; that data is then fed into UP's internal Conductor Delay Report program. UP's program categorizes Amtrak delays as host-responsible, Amtrak responsible, or third-party responsible and includes detailed information on each service, train, and schedule. UP's Passenger Operations Managers and Passenger Operations Director review this information regularly—from daily to quarterly—for accuracy and to request changes, as necessary. The data are then used to provide performance reports by service and train. The information enables UP to better understand trends related to host-responsible delays so that it can better reduce such delays.

502. Internally, UP's Passenger Operations Manager provides to relevant UP personnel a daily report with performance information for Amtrak trains. That report provides the prior day's performance and month-to-date performance for each Amtrak service with respect to the contractual on-time performance standard (host-responsible delay minutes). The report also provides information on Amtrak's active long-haul trains and potential weather issues. The Passenger Operations Manager also prepares bi-monthly reports that are specific to each Amtrak service. Each report contains information such as an overview of situations that have impacted performance for the Amtrak service, discussion of opportunities for improvement, and action items. Relevant UP personnel also receive a comprehensive monthly report on host-responsible delays to Amtrak services.

503. UP also regularly monitors performance of other passenger providers that provide performance data to UP. For example, the Southern California Regional Rail Authority provides UP with daily, train-by-train delay reports on Metrolink performance. Those reports indicate if a particular train experienced delay and provides an explanation of the delay (*e.g.*, track inspection, interference with freight or Amtrak trains, etc.). Metra similarly provides UP with daily reports on Metra performance, including a train-by-train summary of delay with delay codes and explanation. Metra also provides UP with a monthly report of on-time performance by commuter corridor, showing the total counts of trains it has recorded as delayed and on-time. UP also receives daily conductor delay reports for the ACE commuter service, which include explanations of delay. UP personnel review all these reports daily. Each morning as part of the Daily Network Call, the Passenger Operations Manager addresses passenger service performance, including commuter performance.[260]

504. In addition to internal monitoring and data-sharing, passenger train performance is a regular topic in UP's extensive discussions with its passenger partners. With Amtrak, UP holds a monthly discussion on performance, as well as more specific meetings on particular Amtrak services. For example, UP has a monthly discussion with Amtrak and the State of Illinois on the performance of Amtrak's Illinois passenger services (the Lincoln and Lincoln River Runner). UP also

---

[260] UP does not receive reports on performance for Caltrain. Rocky Mountaineer provides UP with an annual on-time performance report.

holds quarterly meetings with Amtrak relating to its Capitol Corridor, ACE, and San Joaquin services to discuss performance. UP meets every two weeks with Metrolink and with Metra to discuss passenger train performance.

b. Norfolk Southern

505. The Manager of Interline Planning leads NS's monitoring of passenger performance with support from the NOC, field operations, and Strategic Planning. NS's Manager of Interline Planning conducts a daily review of passenger delay data. This position also reviews historical delay data for Amtrak train performance. The Manager of Interline Planning has access to data Amtrak derives from its conductor delay reports. NS has also established daily data feeds to receive this information, which the NOC and Interline Planning then analyze.

506. NS's protocols for reviewing passenger performance data vary depending on the performance regime contained in the applicable contractual agreements. For example, NS has established separate committees with North Carolina, Pennsylvania, and Virginia to review specific state-supported services. These committees, led by Strategic Planning and Interline Planning, meet on a quarterly basis to discuss performance. NS's Off-Corridor Operating Agreement with Amtrak also establishes an administrative process for communication and review of performance data.

507. In addition to internally monitoring passenger performance data, NS provides Amtrak with access to its dispatching system so that Amtrak personnel are able to review NS's dispatching decisions in near real-time and monitor train performance and individual train delay.

3. Training

a. Union Pacific

508. Dispatcher training is another aspect of UP's current protocols that helps ensure effective communication and coordination with Amtrak and other passenger services that operate over UP's network.

509. UP dispatchers undergo extensive training for approximately six months before operating on their own. The first three months is classroom training with units on the GCOR, Timetables, System Special Instructions, Rules governing Train Dispatchers and Control Operators, CADX dispatcher software, train dispatcher policies, Amtrak's right to preference under 49 U.S.C. § 24308(c), Amtrak routes, and delay coding information. Students take periodic quizzes and must achieve a score of 90 percent or higher on three exams to complete the classroom section of training. Upon completion of the rigorous classroom training, student train dispatchers undergo at least 10 weeks of on-the-job training. This on-the-job training is designed to develop territory-specific knowledge, experience, and judgment.

510. And train dispatcher training never ends. UP train dispatchers must complete an annual rules refresher class, which includes refresher training on passenger operations and Amtrak's rights to preference. In addition to annual classroom refresher training, train dispatchers must successfully complete an annual GCOR test and are tested annually on the Passenger Train Emergency Preparedness Plans prepared pursuant to 49 C.F.R. part 239 with a minimum passing score of 90 percent on each exam.

511. In addition to this formal education, UP provides quarterly presentations to train dispatchers, Corridor Managers, and Senior Directors specifying UP's obligations under federal law and passenger/commuter contracts, as well as information on delay coding. UP employees involved in supporting passenger operations also have access to online Job Aids, including information relating to passenger rail service.

b. Norfolk Southern

512. Training is also a key component in how NS effectively communicates and coordinates with its passenger service partners.

513. Like UP dispatchers, NS dispatchers undergo extensive training. New dispatchers at NS receive up to 25 weeks of formal training that starts with classroom instruction, then training on hypothetical scenarios, followed by on-the-job training. This training covers operating rules and Amtrak's right to preference, among other things.

514. After completion of formal training, new dispatchers receive coaching in the early years in their position. NS provides recurring training for experienced dispatchers as well, including the use of hypothetical scenarios to test and refresh the dispatchers' knowledge of proper procedures.

515. Further, pursuant to NS's 2025 settlement agreement with DOJ, NS has committed to provide annual training to all NS dispatchers relating to NS's obligation to provide preference to Amtrak trains and to ensure that its general training programs will include training on providing preference to Amtrak trains in real-world dispatching situations.

516. NS instructs its dispatchers to notify the Chief Dispatcher any time an Amtrak train is going to be delayed or might be delayed. This early communication with the Chief Dispatcher regarding even potential delays helps minimize the impact to Amtrak trains.

C. Applicants' Plans for Effective Communication by the Combined Railroad

517. Applicants have engaged in thorough planning to ensure that the combined railroad will be able to continue to fulfill UP's and NS's performance obligations to passenger rail providers. As detailed in the Operating Plan, for routes where Applicants host passenger services, the proposed UP/NS combination will either add no additional trains, will reduce the number of trains, or, where additional trains are expected, will ensure sufficient capacity to continue to meet legal and contractual obligations. Where Applicants host passenger operations on lines expected to experience merger-related freight traffic growth, Applicants have reviewed capacity data to ensure the lines will have sufficient capacity to accommodate the expected additional trains without negatively impacting passenger operations. Furthermore, the new train and blocking plans for UP/NS are designed to reduce rail car handlings, which should lessen operational variability. Reduced operational variability will in turn bring performance benefits for passenger providers operating on the combined railroad's lines.

518. As additional assurance for passenger service partners as well as UP/NS customers, and as noted earlier in this Plan, the combined railroad will use change management procedures when implementing changes to train and blocking plans.

The change management process will consider potential impacts on passenger operations before UP/NS adopts any new train or blocking plan that would affect passenger operators. Specifically, when a change involves a line on which passenger trains operate, the planners will consider the impact of the change on passenger operations and all internal stakeholders—including personnel responsible for passenger operations—must approve an updated transportation plan before implementation can begin.

519. Applicants' existing protocols for communicating with Amtrak and other passenger rail services provide a strong foundation for effective communication with these partners after the transaction. Accordingly, following the merger the combined railroad initially will continue to use the legacy UP and NS passenger teams, dispatching systems, and communication protocols.

520. The combined railroad management then will move to coordinate and streamline, as appropriate, the legacy UP and NS recurring meetings with passenger service providers so that there is a unified point of contact at UP/NS. For example, personnel of the combined railroad will work with their Amtrak counterparts to consolidate the respective UP and NS monthly performance meetings into one consolidated UP/NS monthly performance meeting. Likewise, the combined railroad would work with Amtrak to consolidate into one meeting the current UP/Amtrak and NS/Amtrak bi-weekly contract coordination calls.

521. Applicants intend that UP/NS will leverage their existing communication structures to address any transaction-related issues or questions that

arise with passenger services. For example, in addition to reviewing contractual performance measures at its monthly performance meeting, Applicants expect the combined railroad will work with passenger partners to incorporate the system benchmarking metrics addressed below in Part XII of this Service Assurance Plan, as appropriate.

522. As described in the Information Technology Systems section of this Service Assurance Plan (Part V), prior to implementing any IT system changes, the combined railroad will provide to its passenger service partners a communication package that will include relevant training materials (*e.g.*, quick reference guides) to ensure the passenger rail entities are informed, prepared, and able to ask any clarifying questions prior to the transition. In addition, any IT integration project will involve a thorough analysis of how the planned changes could impact the passenger service partners, whose input will be requested to conduct the impact assessments. As with UP and NS currently, the combined railroad will continue to provide 24/7 contact points for its passenger service partners if they have questions or need support during or after the integration period.

523. As previously noted, because neither Caltrain nor Rocky Mountaineer provides regular performance data to UP, UP does not currently hold regularly scheduled meetings on performance for those services. Instead, coordination of those passenger operations by the Senior Directors of the respective UP service units and the Passenger Operations team has been successful. As discussed in both the Operating Plan and this Service Assurance Plan, the UP/NS merger will not increase

the number of freight trains operating over the lines used by Caltrain or Rocky Mountaineer. As a result, existing procedures should be more than adequate for the combined railroad to ensure effective communication with and facilitation of these services.

524. UP/NS will adopt Applicants' existing channels of communication to provide notifications to passenger rail providers regarding engineering projects, service interruptions or adjustments, and other service-related information. Merger-related projects that could impact passenger operations will be communicated in advance to passenger rail providers in the same manner.[261]

525. Applicants are confident the passenger rail monitoring that they conduct in the ordinary course of business and that will be adopted by the combined railroad will be more than sufficient to detect any issues relating to passenger rail performance. In addition to this monitoring, the legacy Passenger Operations Directors and NRPC Officers will monitor the passenger benchmarking metrics described in Part XII of this Service Assurance Plan and the overall performance of passenger services during integration.

526. Part IX, above, describes Applicants' contingency plans the combined railroad will use in the event of merger-related service problems. UP/NS will create a special problem resolution team that will address any merger-related service disruption during the merger integration period. That team will be activated based

[261] Other sections of this Service Assurance Plan describe in detail Applicants' post-merger plans relating to dispatcher training, the integration of dispatching systems, and plans for IT cutovers.

on terminal dwell metrics reflecting Applicants' experience regarding the correlation between terminal dwell times and service issues. The special problem resolution team will include senior representatives from various functional areas, including passenger operations so that the team can assess impacts on passenger rail operations. These efforts will help ensure that the combined UP/NS will fulfill existing performance agreements relating to passenger service and continue communicating effectively with passenger operations during the merger integration process.

XI. Timetable

527. This Part of the Service Assurance Plan identifies the major functional or system changes that would occur during the integration process and the timeline for successful completion.

528. The information below is organized into half-year periods, beginning with the day control authority is consummated ("Day 1"). It addresses the major functional areas that are the focus of the Service Assurance Plan—operations, information technology, customer service, and training—as well as safety, and key integration milestones in those areas. In substantial part, the information below consolidates timing-related information presented in the separate Parts of the Service Assurance Plan.

529. The Board's rules in § 1180.10(j) expressly request information about system changes that would occur during the integration process. Consequently, this Part does not address the extensive pre-control date preparation and planning

activities that are described in the Service Assurance Plan and that will continue up through Day 1.

A. Day 1 through Day 180

- Key objectives: Operate "as-is" in respective geographies with full enterprise visibility; cross-company access to critical information; aligned incident response and escalation; singular customer-facing entry point.

1. Safety

- Ensure and maintain Day 1 regulatory compliance.
- Align safety rules and disciplinary rules.
- Harmonize critical incident response and escalation.
- Enable cross-company access to risk identification and mitigation datasets.
- Launch integration of safety communication channels.

2. Operations

- Activate consolidated operating governance.
- Ensure full visibility into all network operating metrics.
- Negotiate implementing agreements with labor organizations that have not entered into implementing agreements.
- Implement shared oversight of train and crew management.
- Begin implementing improved operating practices and standardized escalation protocols for safety and incident response.
- Begin launching phased service changes using joint network planning tools (low-risk train and blocking enhancements).
- Begin prioritized terminal rationalizations and workflow redesigns.

- Begin execution of capital projects to enable service growth.
- Stand up problem-resolution team.
- Begin monitoring operational data as provided in contingency plan.

3. Information Technology

- Implement critical cybersecurity fundamentals (*e.g.*, cross-company incident response).
- Implement common data layer to enable network visibility and operational metrics.
- Enable cross-company access to key systems and data after ensuring security and risk protocols are fully implemented.
- Enable cross-company collaboration capabilities.
- Deploy re-branded public web presence and customer portal.
- Deploy interim data feeds for opportunity pipeline and case management reporting.
- Deploy interim solution for customer support (coordinate with customer support).

4. Customer Service

- Institute a single commercial "voice-to-the-customer," including harmonizing overlapping accounts, unifying customer support exception management resolution processes and quick reference guides, and initiating training across customer-facing teams.
- Institute joint customer support escalation protocols.

5. Training

- Launch onboarding for NS personnel.
- Initiate department specific training programs to include customer-facing teams.

- Operate separate FRA regulatory training.

B. Day 181 through Year 1

- Key objectives: Begin low-risk operational and customer-facing integration efforts, while building toward mid-cycle technology migrations.

1. Safety

- Adopt interim, rules-based process for Train Build (based on Physics Train Builder), enabled by interim tech solution.
- Initiate safety training programs.

2. Operations

- Continue and complete launching of phased service changes (train and blocking plan enhancements).
- Continue terminal rationalizations.
- Initiate unified dispatching and crew management standards.
- Centralize operating management.

3. Information Technology

- Harmonize reference data to serve as a foundation to enable operational and commercial business processes.
- Deliver interim platform to support singular customer experience across shopping, pricing, and onboarding.
- Provide expanded train and locomotive simulation tools.

4. Customer Service

- Deploy interim single customer experience (shopping, pricing, onboarding) with manual back-end orchestration.
- Establish interim pricing and quotations processes.
- Standardize sales Standard Operating Procedures ("SOPs") and performance management.

- Initiate alignment of case handling protocols and introduce integrated call-routing where feasible.

5. Training

- Deploy safety rules conformity and systems training.
- Complete UP mandatory training for former NS employees.
- Begin dispatcher training for eventual standards convergence.
- Operate regulatory training in compliance with FRA regulations and company standards, while reviewing curricula for alignment opportunities.

C. Year 2, Half 1

- Year 2 key objectives: Execute first wave of key system migrations and higher-impact operating changes that enable end-state efficiencies, supported by rigorous change management and training.

1. Safety

- Integrate monitoring, field support, call center operations into UP Operating Practices Compliance Center.
- Standardize rulebooks/discipline.
- Standardize training and qualifications.
- Expand centralized oversight of safety teams.

2. Operations

- Expand ramp/terminal consolidations.
- Continue execution of capital projects to enable service growth.
- Consolidate mechanical helpdesk.
- Begin launching new services.

3. **Information Technology**

- Implement the foundational NetControl capabilities, establish a dedicated NetControl training environment, and begin testing and validating NetControl integrations with NS applications.

4. **Customer Service**

- Continue leveraging interim solutions during end-state technology solution build.
- Align customer care and support protocols.

5. **Training**

- Review and align regulatory training.

D. **Year 2, Half 2**

1. **Safety**

- Initiate integration of Safety Management Systems.

2. **Operations**

- Align blocking and routing strategies.
- Advance NetControl deployment.
- Advance crew/locomotive planning convergence.
- Consolidate car and back shop operations.

3. **Information Technology**

- Initiate incremental deployment of NetControl package (including core capabilities like train, terminal, shipment and waybill, scheduling, locomotive, equipment, revenue systems, crew calling).
- Deploy unified data and analytics platforms for performance management and reporting.
- Plan and facilitate NetControl training for legacy NS employees.

4. **Customer Service**

- Continue leveraging interim solutions during end-state technology solution build.
- Align customer care and support protocols.

5. **Training**

- Maintain training centers and consolidate where applicable.
- Continue FRA-compliant recurrent training with adoption of UP certification programs aligned with cutover schedules.
- Scale train-the-trainer programs to enable integration changes.

E. Year 3, Half 1

- Year 3 key objectives: Complete full run-rate service with unified systems and processes across the combined railroad.

1. **Safety**

- Consolidate licensing and certifications for Engineers and Conductors (subject to FRA approvals).

2. **Operations**

- End-state network planning and execution of unified systems.
- Continue developing and launching new services.

3. **Information Technology**

- Continued incremental deployment of NetControl.
- Begin consolidation of dispatch, engineering, and mechanical systems.
- Consolidate Positive Train Control back-office systems.
- Deploy unified customer platforms.

4. **Customer Service**

- Deploy fully integrated customer experience (shopping, pricing, onboarding, and invoicing).
- Establish singular customer relationship management system with merged customer profiles.

5. **Training**

- Advance full integration of unified UP certification and qualification programs.

F. **Year 3, Half 2**

1. **Safety**

- Achieve fully integrated safety, training, and qualified system.
- Achieve fully integrated safety management systems with centralized oversight.
- Achieve unified Physics Train Builder system and processes.
- Implement system-wide predictive risk modeling and inspection.
- Implement engineering and conductor licensing under UP programs (subject to FRA approval).

2. **Operations**

- Enable predictive analytics and automated scheduling on unified system.
- Enable real-time KPI management across train, terminal, and corridor flows.
- Continue developing and launching new services.
- Complete execution of capital projects to support growth.

3. Information Technology

- Achieve full deployment of NetControl across the combined network.
- Achieve full system and data migration for dispatch, engineering, and mechanical systems.
- Implement unified crew management system.
- Complete consolidation of locomotive fleet and help desks.

4. Customer Service

- Implement standardized governance and claims processes.
- Implement unified company performance indicator reporting.

5. Training

- Complete payroll and timekeeping training.
- Establish harmonized training and certification cadence under UP standards.

* * *

Below, Applicants provide the information above divided into function-specific tables.

Table 16
Safety

Year 1	H1	• Maintain regulatory compliance (*e.g.*, permitting, licensing) • Review and align UP-NS Safety rules, discipline • Harmonize critical incident reporting • Visibility into risk identification and mitigation data • Launch integration of safety communication channels
	H2	• Adopt interim, rules-based safety train build process (based on Physics Train Builder (PTB) enabled by interim tech solution • Initiate safety training programs
Year 2	H1	• Integrate all monitoring, field support, call center ops into UP Operating Practices Compliance Center • Standardize rulebooks/discipline and training & qualification
	H2	• Initiate integration of Safety Management Systems
Year 3	H1	• Consolidate licensing and certifications for Engineers and Conductors (subject to FRA approvals)
	H2	• Achieve fully integrated safety training & qualification system, safety management systems • Unified PTB system and process • Implement system-wide predictive risk modeling and inspection • Implement engineering and conductor licensing under UP programs (subject to FRA approval)

Table 17
Operations

Year 1	H1	• Visibility into joint UP-NS operating metrics • Activate joint operating governance • Begin execution of capital projects to enable service growth • Implement shared oversight of train and crew management • Negotiate implementing agreements with labor organizations • Stand up problem-resolution team to monitor operational performance metrics • Begin prioritized terminal rationalizations and workflow redesigns • Launch T-Plan utilizing joint network planning tool
	H2	• Launch new blocking / services • Unify dispatching and crew management standards • Centralize operating management
Year 2	H1	• Expand ramp/terminal consolidations • Continue execution of capital projects to enable service growth • Continue developing and launching new services • Consolidate mechanical helpdesk
	H2	• Align blocking and routing strategies • Advance NetControl deployment and crew / locomotive planning convergence • Consolidate card and back shop operations
Year 3	H1	• End-state network planning and execution on unified systems • Continue implementing new services to accommodate merger-driven and organic growth
	H2	• Predictive analytics and automated scheduling enabled • Continue developing and launching new services • Real-time KPI management across train, terminal, and corridor flows

Table 18
Information Technology

Year 1	H1	• Combined operational metrics data and network visibility established • Implement singular digital branding • Enable cross-company access to systems and collaboration tools • Enable cybersecurity fundamentals (*e.g.*, cross-company security incident response)
	H2	• Establish harmonized reference data for combined organization • Expand train and locomotive simulation tools for NS territory • Implement a consolidated customer experience (shopping, pricing, onboarding, etc.)
Year 2	H1	• Establish NetControl training environment
	H2	• Implement foundational NetControl capabilities • Begin testing and validation of NetControl integrations to NS systems • Begin incremental deployment of NetControl and crew solutions • Establish a unified data and analytics platform
Year 3	H1	• Continued incremental deployment of NetControl and Crew capabilities • Deployment of consolidated dispatch, engineering, and mechanical systems • Consolidate PTC back-office systems
	H2	• Deploy fully integrated customer experience • Complete incremental deployment of NetControl and Crew capabilities • Complete deployment of dispatch, engineering, and mechanical systems

Table 19
Customer Service

Year 1	H1	• Harmonize overlapping accounts to establish a single voice-to-the-customer (Marketing & Sales) • Establish interim opportunity/case visibility and activate joint escalation protocols, hand-offs • Unify call scripts and quick-reference guides; initiate training across customer-facing teams
	H2	• Interim process for unified shopping / pricing / onboarding (via manual orchestration) • Initiate alignment of case handling protocols and integrated call-routing • Interim pricing & quotations processes • Standardize sales SOPs and performance management
Year 2	H1/H2	• Continue leveraging interim workarounds during end-state technology solution build • Align UP-NS CC&S service protocols
Year 3	H1	• Continue leveraging interim workarounds during end-state technology solution build • Fully integrated customer experience (incl. shopping, pricing, onboarding & invoicing) • Singular CRM instance
	H2	• Implement standardized governance and claims processes. • Implement unified company performance indicator reporting

Table 20
Training

Year 1	H1	• Begin train-the-trainer programs for UP curricula • NS onboarding training[262]
	H2	• Deploy safety rules conformity and system training • NS completes UP company mandatory training • Begin dispatcher training for eventual standards convergence • Achieve compliance with Hazardous Materials training, certifications, and qualifications
Year 2	H1	• Review and align regulatory training
	H2	• Consolidate training centers where applicable • Continue FRA-compliant recurrent training
Year 3	H1	• Advance full integration of unified UP certification programs
	H2	• Complete payroll and timekeeping training • Harmonized training and certification cadence under UP standards

XII. Benchmarking

530. This Part of Applicants' Service Assurance Plan provides the benchmarking data required by 49 C.F.R. § 1180.10(k). In accordance with section 1180.11(k), Applicants are submitting benchmarking data based on the 36 monthly periods immediately preceding the filing date of the notice of intent to file the Application.

262 Train-the-Trainer is a program that equips subject matter experts with instructional skills to effectively teach others, ensuring consistent knowledge transfer across the organization.

531. Applicants' benchmarking provides an historic monthly baseline against which the actual post-transaction levels of performance can be measured. Applicants' benchmarking data are detailed and encompassing to give a meaningful picture of operational performance of the newly merged system.

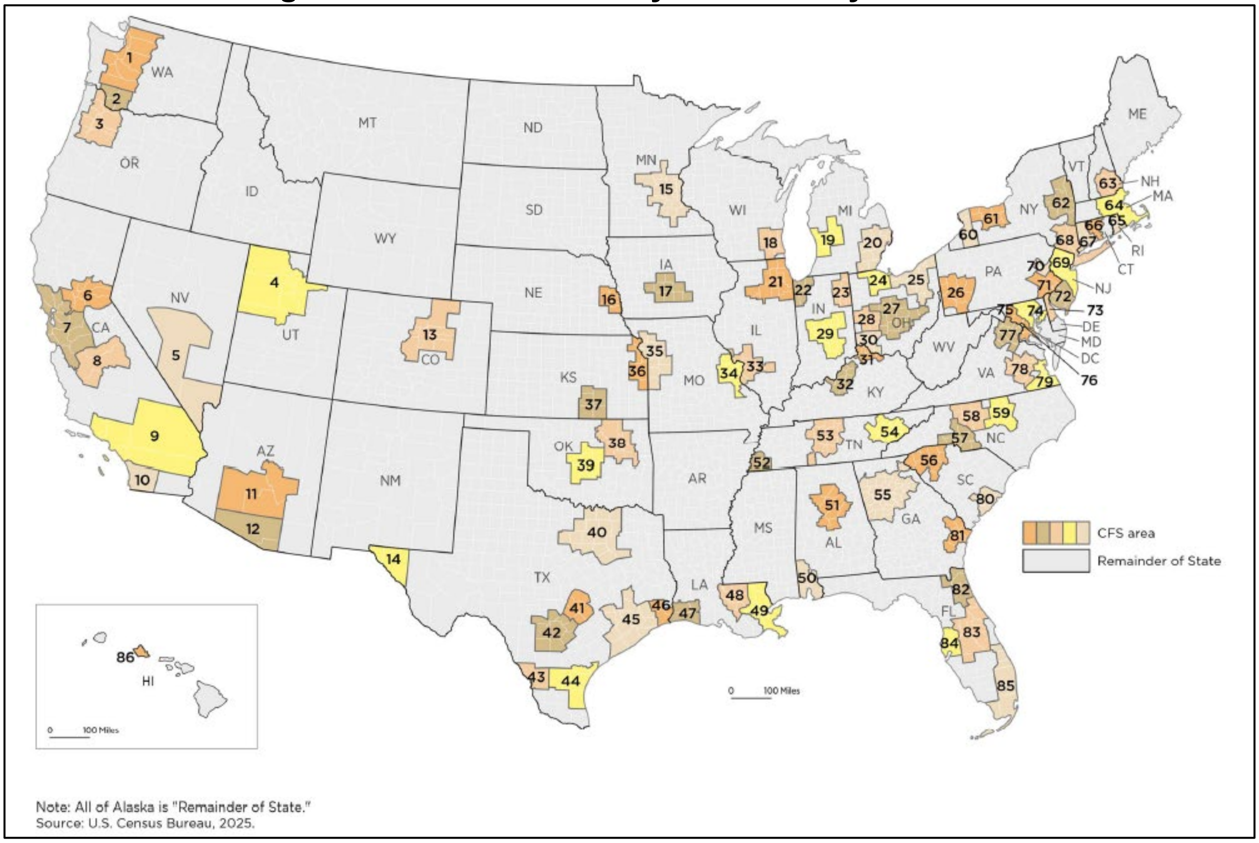
532. Applicants will report the benchmarking data in a matrix structure and provide for the reporting of actual monthly data during the monitoring period.

A. Corridor Performance Benchmarking

533. In accordance with 49 C.F.R. § 1180.10(k)(1), Applicants have developed corridor performance benchmarks consisting of route-level performance information including flow data for traffic moving on their systems. The data encompass flows to and from "major points."

534. For purposes of corridor performance benchmarking, Applicants defined "major points" as the Commodity Flow Survey ("CFS") areas used by the U.S. Census Bureau in its most recent Commodity Flow Survey. CFS areas are shown below in Figure 12.

Figure 12: 2022 Commodity Flow Survey Areas[263]



535. Applicants concluded that using CFS areas is appropriate for representing traffic flows to and from major points because the Census Bureau's CFS is designed to provide policy makers and transportation planners information to assess the demand for transportation facilities.[264]

536. Applicants also considered using individual railroad stations but concluded that the number of station-to-station flows required to fully represent system flows would make the service monitoring process unwieldy.

---

[263] *See* https://www2.census.gov/programs-surveys/cfs/technical-documentation/geographies/2022%20CFS%20Areas%20Map.pdf.

[264] *See* https://www.census.gov/programs-surveys/cfs.html.

537. To develop corridor performance benchmarks, Applicants mapped their rail stations to CFS areas. For each CFS-area-to-CFS-area flow, for the 36 monthly periods immediately preceding the filing of notice of intent to file the Application, Applicants calculated average transit times for all movements flowing between the CFS areas.[265]

538. Applicants applied a uniformly constructed measure of average transit time to data from both UP and NS. Specifically, they measured the volume of cars and transit hours between a combination of CFS origin and destination groupings. Applicants sampled geographic locations based on the volume of cars that represent major network flows. Applicants sorted these flows into three categories: (1) UP intra-lanes, (2) NS intra-lanes, and (3) UP to NS interchanges. Applicants will be able to use the same measure for historic and post-transaction operations.

539. In addition to identifying traffic flows by areas, Applicants identified each movement by commodity sector—that is, as either Intermodal, Manifest/Automotive, Coal Unit, Grain Unit, or Ethanol Unit.

540. Applicants then identified enough corridors for reporting purposes to fully represent system flows, including interchanges with 104 short lines and 38 interchange locations with other Class I railroads, and internal traffic of UP and NS before the proposed transaction.[266]

---

[265] *See* Workpaper "Corridor Benchmarking Matrix.xlsx," Tab "Data"; *see also* Workpaper "Corridor benchmarking methodology UP 1180.10(k)(1).pdf."; Workpaper "Corridor benchmarking methodology NS 1180.10(k)(1).pdf."

[266] *See* Workpaper "Interchanges Impacted - Corridor Benchmarking.xlsx," Tabs "Class 1 Comp" and "SL Comp."

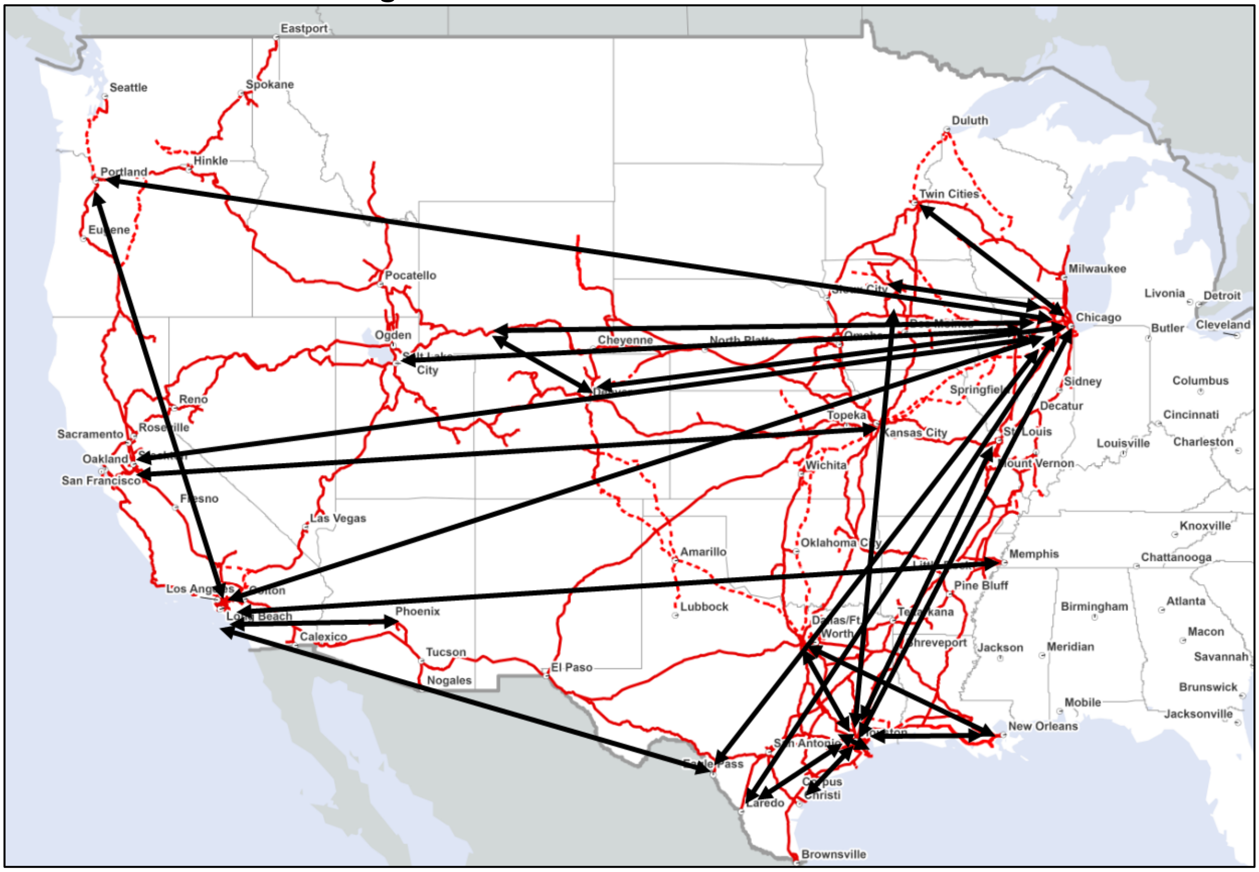
1. UP Internal Traffic Benchmarking

541. Applicants developed benchmarks for 25 flows of manifest traffic on the pre-transaction UP system.[267] The 25 flows represented 18 percent of manifest carloads moving in the benchmarking period. The 25 flows were chosen from among the top 88 flows to fully represent the geography of the network. These flows include areas where UP interchanges traffic with short lines and other Class I railroads, and the traffic flows over routes on which UP carries substantial volumes of traffic it interchanges with short line and other Class I railroads. The geographic areas covered by these flows are depicted below in Figure 13.

---

[267] *See* Workpaper "Consolidated Corridor Lane Selection.xlsx," Tab "UP OD Manifest."

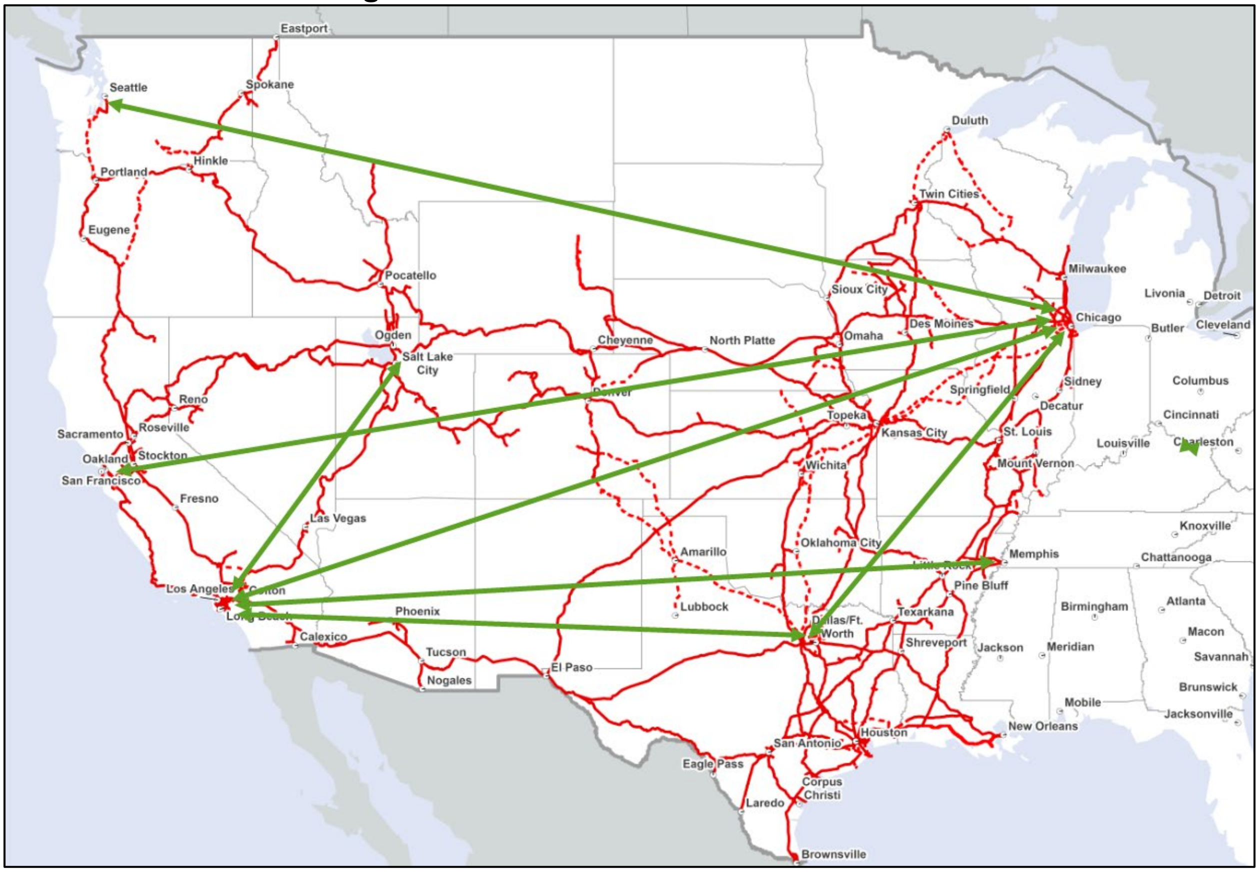
Figure 13: UP Manifest Traffic Flows



542. Applicants also developed benchmarks for the top 7 flows of intermodal traffic on the pre-transaction UP system.[268] The top 7 flows represented 54 percent of intermodal containers moving in the benchmarking period. The geographic areas covered by these flows are depicted below in Figure 14.

[268] *See* Workpaper "Consolidated Corridor Lane Selection.xlsx," Tab "UP OD Intermodal."

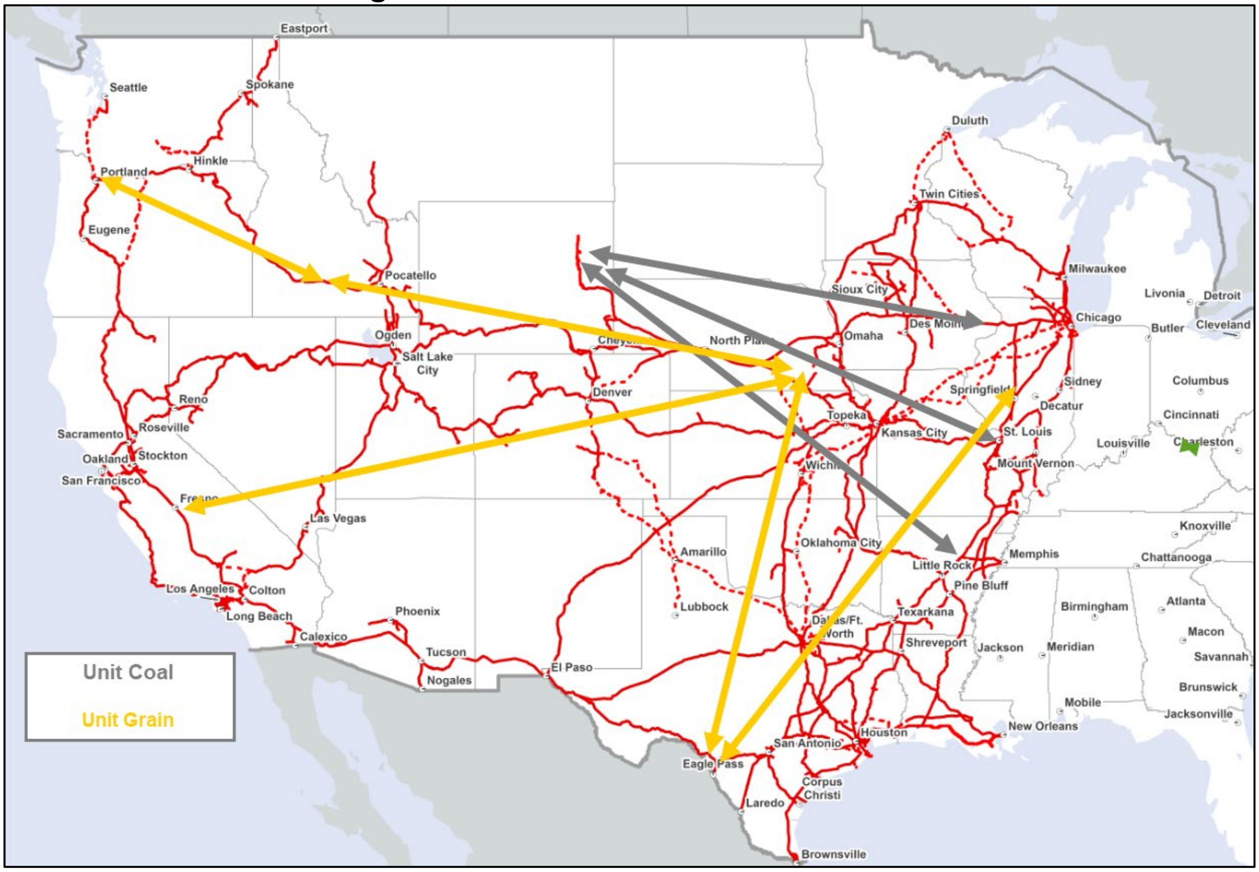
Figure 14: UP Intermodal Traffic Flows



543. Applicants also developed benchmarks for representative flows of coal and grain traffic on the pre-transaction UP system.[269] For unit train traffic, the top flows represented 28 percent of coal traffic and 35 percent of grain traffic. The geographic areas covered by these flows are depicted below in Figure 15.

[269] *See* Workpaper "Consolidated Corridor Lane Selection.xlsx," Tabs "UP OD Coal" and "UP OD Grain."

Figure 15: UP Unit Train Traffic Flows



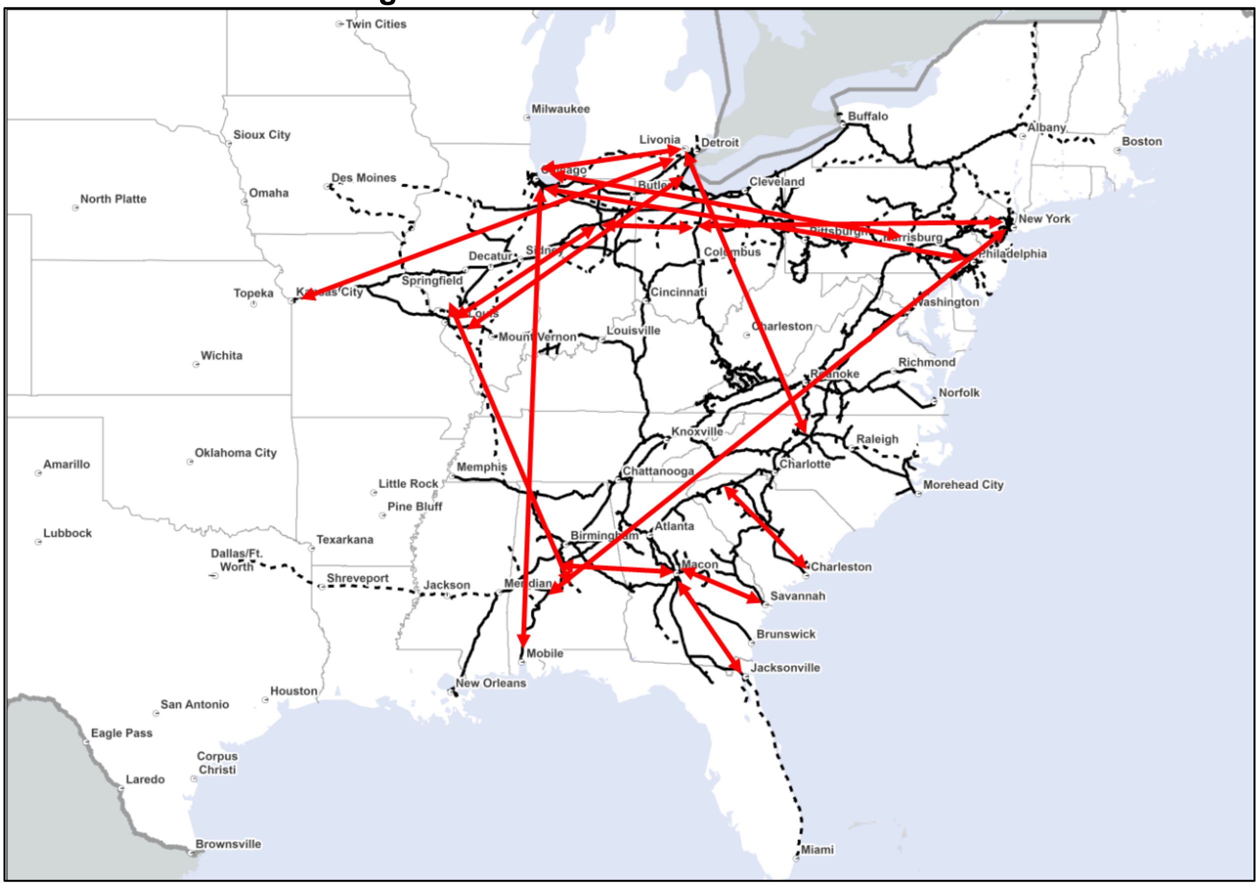
2. NS Internal Traffic Benchmarking

544. Applicants developed benchmarks for 15 flows of manifest traffic on the pre-transaction NS system.[270] The 15 flows represented 12 percent of manifest carloads moving in the benchmarking period. The 15 flows were chosen from among the top 62 flows to fully represent system flows. These flows include areas where NS interchanges traffic with short lines and other Class I's, and the traffic flows over routes on which NS carries substantial volumes of traffic it interchanges with short

[270] *See* Workpaper "Consolidated Corridor Lane Selection.xlsx," Tab "NS OD Manifest."

line and other Class I's. The geographic areas covered by these flows are depicted below in Figure16.

Figure 16: NS Manifest Traffic Flows

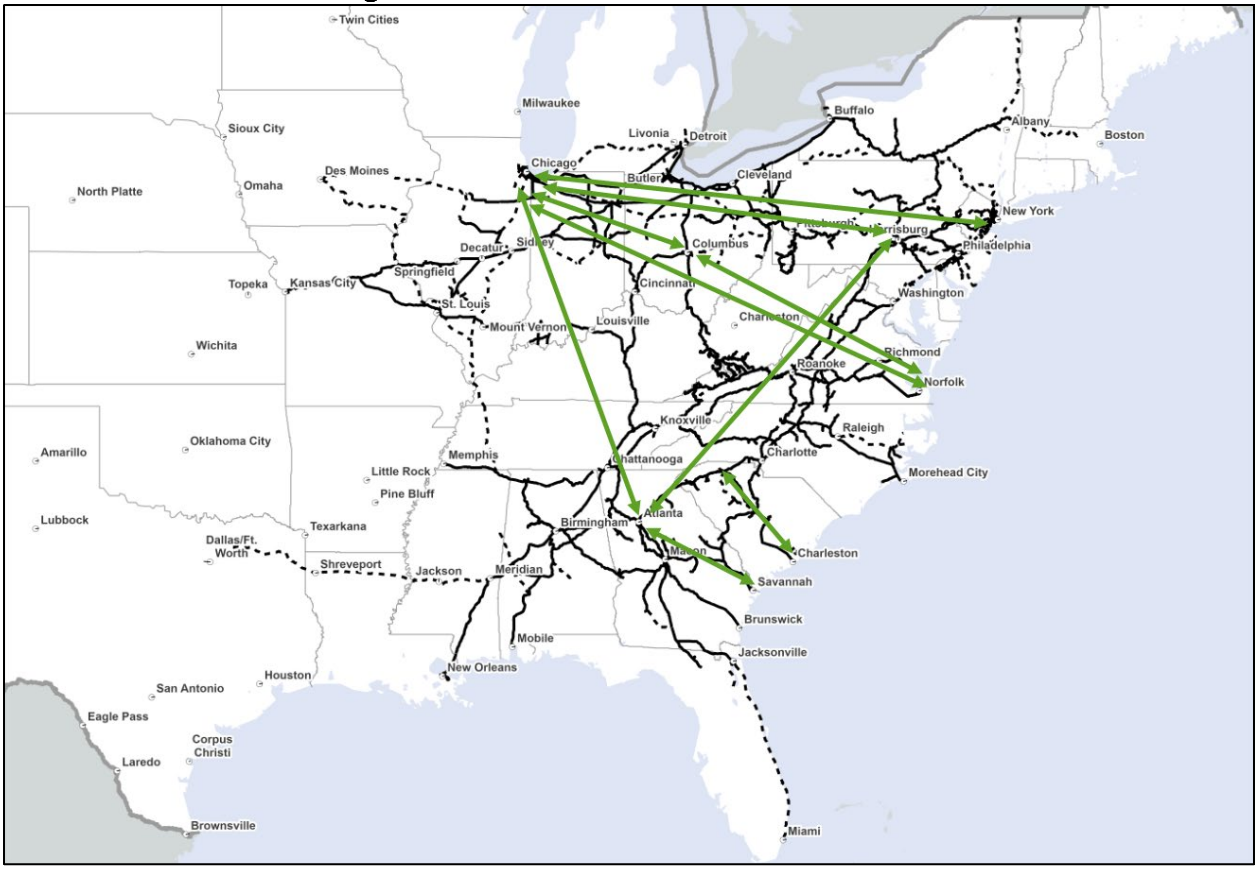


545. Applicants also developed benchmarks for the top 9 flows of intermodal traffic on the pre-transaction NS system.[271] The top 9 flows represented 40 percent of intermodal containers moving in the benchmarking period. The geographic areas covered by these flows are depicted below in Figure 17.

---

[271] *See* Workpaper "Consolidated Corridor Lane Selection.xlsx," Tab "NS OD Intermodal."

Figure 17: NS Intermodal Traffic Flows



546. Applicants also developed benchmarks for representative flows of coal, grain, and ethanol unit trains on the pre-transaction NS system.[272] For unit train traffic, the top flows represented 37 percent of coal traffic, 8 percent of grain traffic, and 43 percent of ethanol traffic moving in the benchmarking period. The geographic areas covered by these flows are depicted below in Figure 18.

---

[272] *See* Workpaper "Consolidated Corridor Lane Selection.xlsx," Tabs "NS OD Unit Coal," "NS OD Unit Grain," and "NS OD Unit Ethanol."

Figure 18: NS Unit Train Traffic Flows

3. UP-NS Pre-Transaction Benchmarking

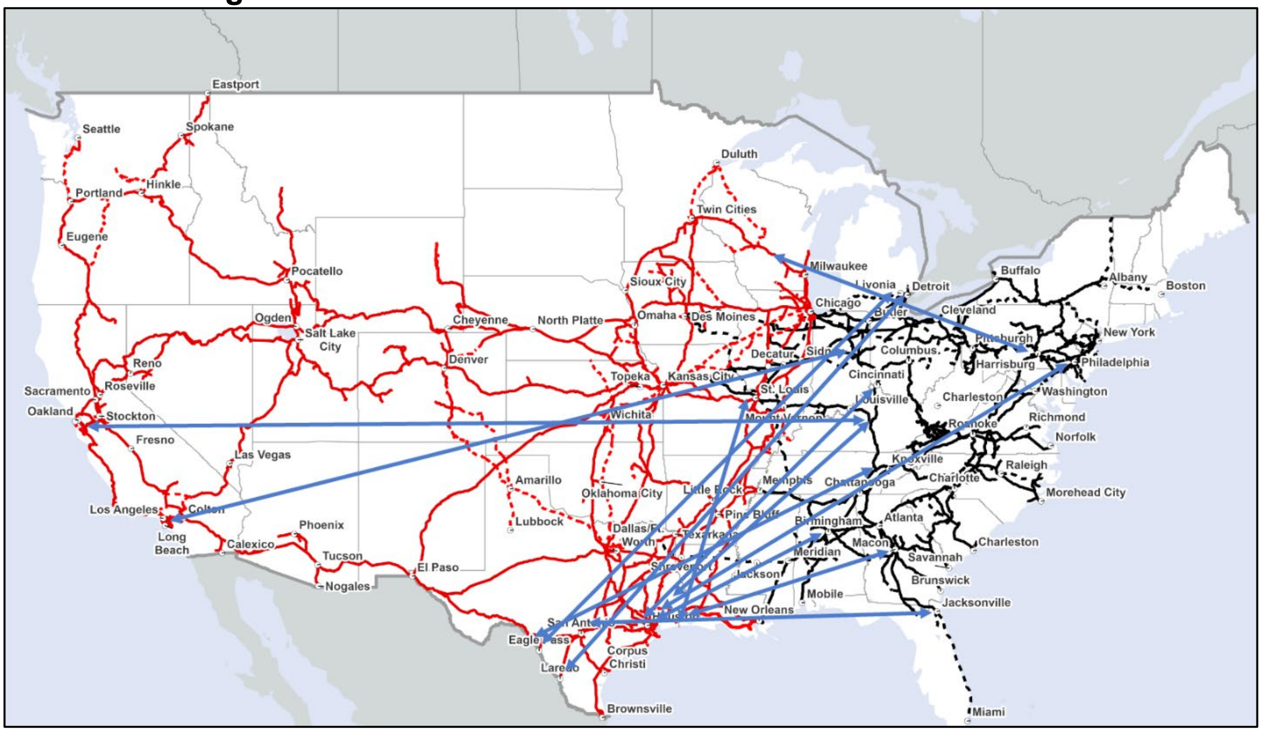
547. Applicants also developed benchmarks for representative flows of manifest, intermodal, and unit train traffic between the pre-transaction UP and NS systems.

548. Applicants developed benchmarks for 15 flows of manifest traffic between the pre-transaction UP and NS systems.[273] The 15 flows represented 16 percent of UP-NS interline manifest carloads moving in the benchmarking period.

[273] *See* Workpaper "Consolidated Corridor Lane Selection.xlsx," Tab "UPNS Manifest."

The 15 flows were chosen from among the top 27 flows to fully represent system flows. The geographic areas covered by these flows are depicted below in Figure 19.

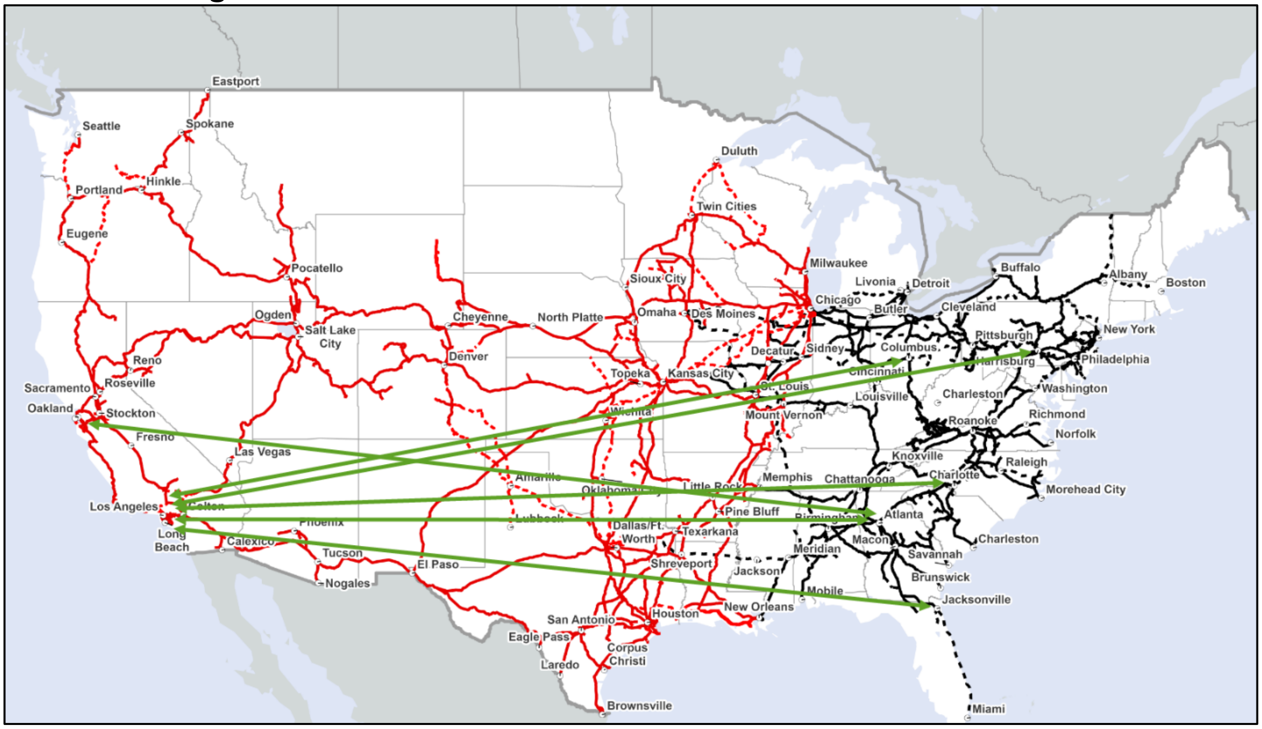
Figure 19: UP-NS Pre-Transaction Manifest Traffic Flows



549. Applicants also developed benchmarks for the top 6 flows of intermodal traffic between the pre-transaction UP and NS systems.[274] The top 6 flows represented 48 percent of UP-NS interline intermodal containers moving in the benchmarking period. The geographic areas covered by these flows are depicted below in Figure 20.

[274] *See* Workpaper "Consolidated Corridor Lane Selection.xlsx," Tab "UPNS Intermodal."

Figure 20: UP-NS Pre-Transaction Intermodal Traffic Flows



4. Corridor Benchmarking Data

550. Applicants are providing a matrix structure with historic monthly benchmark data for each flow, including traffic volumes in carloads (units), miles (area to area), and elapsed time in hours for loaded traffic, in Electronic Appendix Y.[275]

B. Yard and Terminal Benchmarking

551. In accordance with 49 C.F.R. § 1180.10(k)(2), Applicants have developed terminal dwell and on-time origination performance benchmarks for principal classification yards and major intermodal terminals, as defined for benchmarking

[275] *See* Workpaper "Corridor Benchmarking Matrix.xlsx," Tab "Corridor Benchmarking Matrix."

purposes, using data based on the 36 monthly periods immediately preceding the filing date of the notice of intent to file the Application.

552. The Board's rule titled "Yard and terminal benchmarking," literally requires benchmarking only for "major yards." However, to ensure compliance, Applicants provide benchmarking information regarding the same "principal classification yards" and "major intermodal terminals" they use for the yard and terminal benchmarking required by 49 C.F.R. § 1180.10(c).

1. Principal Classification Yards

553. Applicants list their principal classification yards for benchmarking purposes below in Table 16.

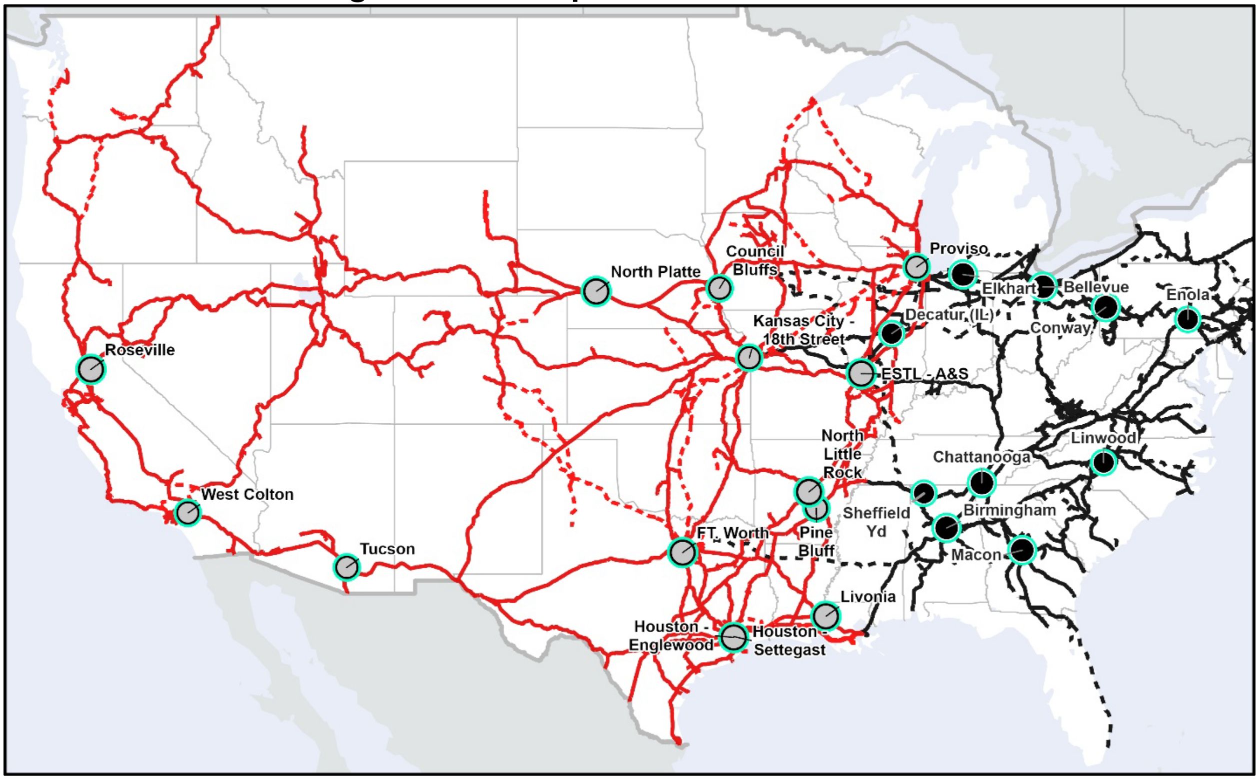
Table 21[276]
Principal Classification Yards

UP Yards	NS Yards
North Little Rock, AR	Elkhart, IN
Englewood (Houston), TX	Moorman (Bellevue), OH
Gateway Yard (St Louis), IL	DeButts (Chattanooga), TN
Livonia, LA	Birmingham, AL
Ft. Worth, TX	Conway, PA
North Platte East, NE	Brosnan (Macon), GA
North Platte West, NE	Decatur (Incl. East Decatur), IL
Roseville, CA	Enola (Harrisburg), PA
Settegast (Houston), TX	Sheffield, AL
West Colton (Los Angeles), CA	Linwood, NC
Proviso (Chicago), IL	
Council Bluffs, IA	
18th St (Kansas City), KS	
Tucson, AZ	
Pine Bluff, AR	

554. Applicants show the locations of their principal classification yards for benchmarking purposes below in Figure 21. The principal classification yards for benchmarking purposes were chosen using a threshold of more than 800 cars processed per day, with additional yards added to ensure all UP to NS gateways had a nearby terminal reported.

[276] *See* Workpaper "Consolidated Terminal Data.xlsx," Tab "D.1.c Principal Class Yards."

Figure 21: Principal Classification Yards



555. Applicants applied a uniformly constructed measure of terminal dwell time to data from both UP and NS. Specifically, they measured the average number of hours a car resides at the specified terminal location. The time a car resides at a location begins with train arrival, customer release, or interchange received, and ends with train departure, customer placement (actual or constructive), or interchange offering or delivery. Applicants' terminal dwell calculation excludes runthrough and bypass trains, maintenance of way cars, stored cars, and time spent in bad order status. Applicants will be able to use the same measure for historic and post-transaction operations.[277]

[277] *See* Workpaper "System and Terminal Measures Documentation - UP.pdf"; Workpaper "System and Terminal Measures Documentation - NS.pdf."

556. Applicants also applied a uniformly constructed measure of on-time originations to data from both UP and NS. Specifically, they measured whether scheduled trains originating at a particular yard departed on time, where "on time" was measured as departing on time or early.[278] Applicants will be able to use the same measure for historic and post-transaction operations.

557. Applicants are providing a matrix structure with historic monthly benchmark data for terminal dwell times and on time originations for their principal classification yards in Electronic Appendix X.[279]

2. Major Intermodal Terminals

558. Applicants list their major intermodal terminals for benchmarking purposes below in Table 17.

---

[278] *See* Workpaper "System and Terminal Measures Documentation - UP.pdf"; Workpaper "System and Terminal Measures Documentation - NS.pdf."

[279] *See* Workpaper "System, Yard and Terminal Benchmarking Matrix.xlsx," Tab "Yard and Terminal Matrix."

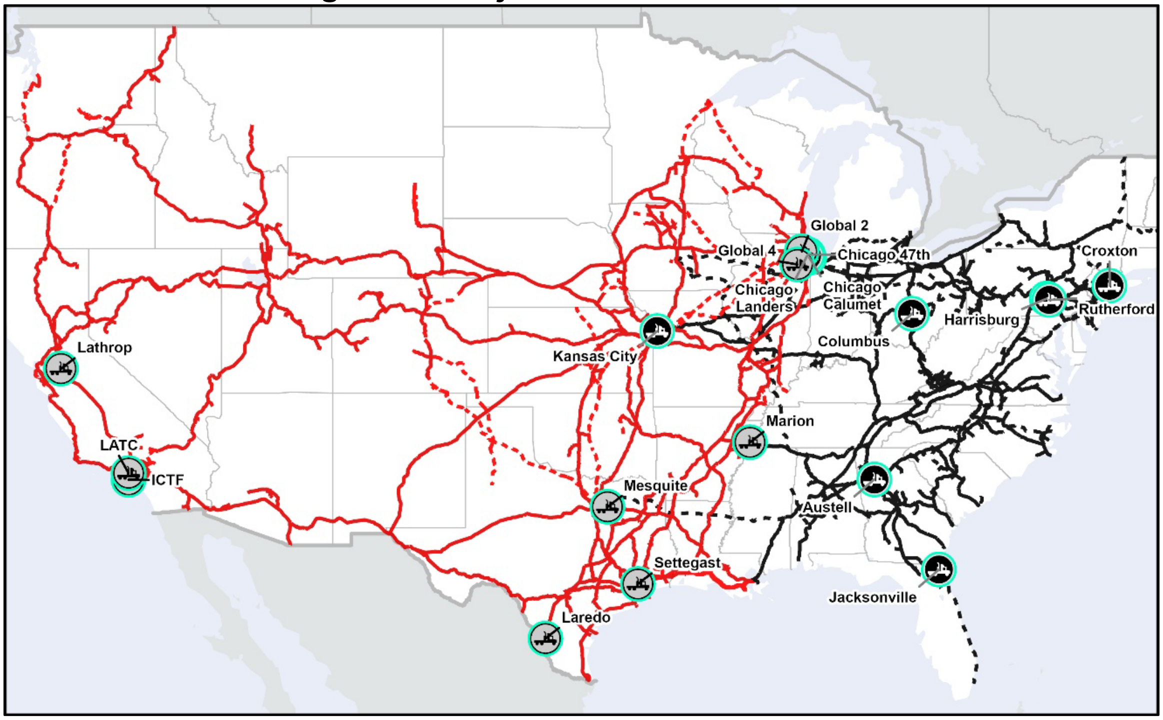
Table 22[280]
Major Intermodal Terminals

UP Intermodal Terminals	Base Plan Lifts/Day	NS Intermodal Terminals	Base Plan Lifts/Day
Global 4 (Chicago), IL	1,945	47th St (Chicago), IL	1,269
Global 2 (Chicago), IL	1,381	Austell (Atlanta), GA	1,237
East Los Angeles, CA	1,065	Harrisburg, PA	953
Mesquite (Dallas), TX	821	Calumet (Chicago), IL	856
ICTF (Los Angeles), CA	817	Landers (Chicago), IL	876
Lathrop, CA	745	Croxton (New York City), NJ	839
Marion (Memphis), AR	651	Rutherford (Harrisburg), PA	770
Port Laredo, TX	299	Rickenbacker (Columbus), OH	704
Settegast (Houston), TX	293	Voltz (Kansas City), MO	646
		Jacksonville, FL	640

559. Applicants show the locations of their principal intermodal terminals for benchmarking purposes below in Figure 22. The major intermodal terminals for benchmarking purposes were chosen using a threshold of more than 800 lifts per day. Additional intermodal terminals were added to capture terminals projected to experience meaningful growth as a result of the transaction (Lathrop, Port Laredo, Settegast, Jacksonville) and to ensure coverage of all major UP to NS gateways (Marion, Voltz).

[280] *See* Workpaper "Consolidated Terminal Data.xlsx," Tab "D.1.c Major Intermodal Terminal."

Figure 22: Major Intermodal Terminals



560. Applicants applied a uniformly constructed measure of TA-VG (Terminal Arrival to Van Ground) time for intermodal terminals from both UP and NS. Specifically, they measured the average number of hours from when a container arrives at a terminal to being ready for customer pickup.[281] Applicants will be able to use the same measure for historic and post-transaction operations.

561. Applicants also applied a uniformly constructed measure of on time originations to data from both UP and NS. Specifically, they measured whether scheduled trains originating at a particular terminal departed on time, where "on

281 *See* Workpaper "System and Terminal Measures Documentation - UP.pdf"; Workpaper "System and Terminal Measures Documentation - NS.pdf."

time" was measured as departing on time or early.[282] Applicants will be able to use the same measure for historic and post-transaction operations.

562. Applicants are providing a matrix structure with historic monthly benchmark data for terminal dwell times and on time originations for their principal classification yards in Electronic Appendix X.[283]

C. System Benchmarking

563. In accordance with 49 C.F.R. § 1180.11(k)(3), Applicants are providing system benchmarking data for cars on line, average train velocity by train type, and locomotive fleet size and applicable bad order ratios. Applicants are also providing benchmark data on passenger train performance for commuter and intercity passenger services.

1. Cars on Line

564. In accordance with 49 C.F.R. § 1180.11(k)(3)(i), Applicants are providing 36 months of data showing cars on line for UP and NS using the official AAR cars on line number calculated using Railinc data. AAR's cars on line measure uses the average daily inventory of all freight cars in the revenue fleet regardless of location or status. The measure includes cars located on short line railroads, cars delivered to customer facilities, and stored cars. AAR's measure excludes maintenance of way cars

---

[282] *See* Workpaper "System and Terminal Measures Documentation - UP.pdf"; Workpaper "System and Terminal Measures Documentation - NS.pdf."

[283] *See* Workpaper "System, Yard and Terminal Benchmarking Matrix.xlsx," Tab "Yard and Terminal Matrix."

and counts articulated cars as a single unit.[284] Applicants are providing a matrix structure with historic monthly benchmark data in Electronic Appendix Z.[285]

2. Average Train Velocity by Train Type

565. In accordance with 49 C.F.R. § 1180.11(k)(3)(ii), Applicants are providing 36 months of data showing average train velocity, by train type, for UP and NS. Applicants calculated train velocity by dividing train miles by total hours from origin to destination less intermediate terminal time. The calculations exclude yard, local, passenger, foreign, and maintenance of way trains.[286] Applicants are providing a matrix structure with historic monthly benchmark data in Electronic Appendix Z.[287]

3. Locomotive Fleet Size and Applicable Bad Order Ratios

566. In accordance with 49 C.F.R. § 1180.11(k)(3)(iii), Applicants are providing 36 months of data showing locomotive fleet size and applicable bad order ratios. Applicants calculate locomotive fleet size as the number of high horsepower and low horsepower locomotives not in storage and in service. Applicants calculate the applicable bad order ratio as the number of locomotives in bad order status (in shop, en route to shop, and past inspection) compared to the number of active

---

[284] *See* Workpaper "System and Terminal Measures Documentation - UP.pdf"; Workpaper "System and Terminal Measures Documentation - NS.pdf."

[285] *See* Workpaper "System, Yard and Terminal Benchmarking Matrix.xlsx," Tab "System Matrix," Rows 16 and 27.

[286] *See* Workpaper "System and Terminal Measures Documentation - UP.pdf"; Workpaper "System and Terminal Measures Documentation - NS.pdf."

[287] *See* Workpaper "System, Yard and Terminal Benchmarking Matrix.xlsx," Tab "System Matrix," Rows 17 to 24 and Rows 28 to 35.

locomotives.[288] Applicants are providing a matrix structure with historic monthly benchmark data in Electronic Appendix Z.[289]

4. System Benchmarking for Passenger Services

567. In accordance with 49 C.F.R. § 1180.11(k)(3)(iv), Applicants are providing 36 months of benchmarking data for passenger services, where available, in Electronic Appendix AA. Due to the different nature of passenger performance data available by service, Applicants are providing multiple benchmarks, as discussed below.

a. Amtrak Passenger Services

568. For Amtrak passenger services, including state-sponsored intercity passenger services operated by Amtrak, Applicants are providing historic benchmarking data based on FRA's COTP metric. FRA's definition of on-time performance is not necessarily the same as the on-time performance obligations that Applicants have separately negotiated pursuant to contracts they have entered with Amtrak under 49 U.S.C. § 24308(a), and which are discussed above in Part X of this Service Assurance Plan.

569. When FRA adopted COTP, it recognized that Amtrak's published train schedules had not been designed with the COTP metric in mind.[290] Thus, COTP can

---

[288] *See* Workpaper "System and Terminal Measures Documentation - UP.pdf"; Workpaper "System and Terminal Measures Documentation - NS.pdf."

[289] *See* Workpaper "System, Yard and Terminal Benchmarking Matrix.xlsx," Tab "System Matrix," Rows 25 to 26 and Rows 36 to 37.

[290] Metrics and Minimum Standards for Intercity Passenger Rail Service, 85 Fed. Reg. 72,971, 72,979 (Nov. 16, 2020).

be misleading. Despite these limitations, COTP data is already tracked by and available to both UP and NS for each Amtrak service and thus is the most sensible system-wide data to utilize for purposes of comparing Amtrak-related passenger service pre- and post-merger on a service-by-service basis.

570. Applicants have contractual performance agreements with Amtrak, and the reporting of COTP data should not be construed as creating a new or separate performance obligation. Rather, the COTP data provides historical context for these services and allows for benchmarking pursuant to § 1180.10(k)(3)(iv). The tables below show the three-year COTP range and COTP average and notes whether each service is certified or not. Underlying data is provided in the workpapers.

Table 23[291]
Amtrak Services on UP Lines

Amtrak Service	COTP 3-Year Range	COTP 3-Year Average*	Schedules Certified
California Zephyr	5% to 73%	40.6%	No
Capitol Corridor	73% to 93.9%	87.1%	Yes
Cascades	44.8% to 72.3%	60.2%	Yes
Coast Starlight	37% to 72.1%	55.9%	Yes
Gold Runner**	44% to 84%	70%	Yes
Lincoln (Illinois)	50.8% to 84%	69.9%	Yes
Lincoln/Missouri	23% to 79%	53.8%	Yes
Missouri River Runner	14% to 97.1%	69.8%	Yes
Pacific Surfliner	70% to 90.5%	82%	Yes
Sunset Limited	5% to 77.3%	47.9%	No
Texas Eagle	28% to 82%	53%	No

*July 2022 to July 2025

**Previously known as the San Joaquins

[291] *See* Workpaper "UP Passenger Benchmarking.xlsx," Tab "Amtrak."

Table 24[292]
Amtrak Services on NS Lines

Amtrak Service	COTP 3-Year Range	COTP 3-Year Average*	Schedules Certified
Blue Water	47.6% to 93.2%	70.3%	No
Capitol Ltd.	42.7% to 84.1%	66.2%	No
Cardinal	28.4% to 66.9%	53.1%	No
Carolinian	23.9% to 79.6%	56.8%	Yes
Crescent	33.8% to 82.1%	62.8%	Yes
Floridian**	9.2% to 43.2%**	25.7%**	No
Lake Shore Ltd.	37.6% to 87.3%	71.7%	No
Mardi Gras***	N/A***	N/A***	No
Pennsylvanian	53.2% to 92.6%	73.6%	Yes
Pere Marquette	70.1% to 96.1%	86.0%	No
Piedmont	52.7% to 90.2%	72.2%	Partially
Roanoke	50.7% to 84.6%	70.2%	Yes
Richmond/Newport News/Norfolk	51.3% to 86.8%	69.3%	Yes
Silver Star	60.6% to 15.4%	42.1%	No
Wolverine	44.6% to 84.1%	68.3%	No

*July 2022 to July 2025

**The Floridian is a service that began November 2024 combining the Capitol Limited and Silver Star services, which are temporarily discontinued. Applicants are providing COTP data for the current service rather than discontinued services.

***The Mardi Gras service commenced in August 2025, outside of the benchmarking period.

b. Other Passenger Services

571. Applicants are providing performance data, as available, for each commuter and other passenger service, as discussed below.[293]

---

[292] *See* Workpaper "NS Passenger Benchmarking.xlsx," Tab "Amtrak."

[293] UP does not receive monthly performance data for the Rocky Mountaineer or Caltrain in the normal course of business. UP contacted both passenger providers to request 36 months of historic performance data if available. As of the date of this Application, UP has been unable to obtain that data.

572. As with reported COTP data, the reported data for passenger services other than Amtrak services allows a comparison of passenger service against a historic benchmark as required by § 1180.10(k)(3)(iv) and should not be construed as creating a performance standard or obligation. Applicants note that the particular services below can vary significantly, including with respect to the number of freight trains that operate on the shared lines and the frequency of passenger services provided.

i. Metrolink (UP)

573. UP does not have a performance standard under its agreements with Metrolink, but Metrolink provides UP a daily train-by-train performance report. In response to a request by UP, Metrolink provided UP with 24 months of performance data. Metrolink measures whether trains arrive within 5 minutes of their scheduled arrival times. For the 24 months of benchmarking data provided by Metrolink, UP's on-time performance ranged from 72.2 percent to 98.2 percent, with an average of 89.8 percent.[294]

ii. ACE (UP)

574. UP {{ }} under its agreement with ACE, {{

}} In response to a request by UP, ACE provided UP with 36 months of

[294] *See* Workpaper "UP Passenger Benchmarking.xlsx," Tab "Metrolink." UP requested data going back to July 2022, but as of the date of this Application, Metrolink has not provided the data to UP.

performance data. On-time performance is measured based on {{

}} For the 36-month benchmarking period, UP's on-time performance ranged from 91.1 percent to 100 percent, with an average of 98.2 percent.[295]

iii. Metra (UP and NS)

575. Metra operates over both UP and NS lines and provides performance information to both UP and NS, though in different forms and frequencies. Metra also posts on-time performance reports on its website on a line-by-line basis.[296] Metra considers a train to be on time if it reaches its final destination within five minutes of its scheduled arrival, with its reporting standards filtering out some of the delays that are beyond a railroad's control.[297]

576. To compile 36 months of historic performance data for the Metra services that operate over UP's lines, UP used Metra's publicly available on-time performance reports for July 2022 through November 2022 and internal monthly reports provided by Metra for December 2022 through July 2025. For the 36-month benchmarking period, for all three UP lines over which Metra operates, on-time

---

[295] *See* Workpaper "UP Passenger Benchmarking.xlsx," Tab "ACE."

[296] *See* Metra, Ridership and On-Time Performance, https://www.metra.com/ridership-and-on-time-performance ("On-Time Performance Reports") (last visited Nov. 26, 2025).

[297] *See* Metra, Ridership and On-Time Performance, https://www.metra.com/ridership-and-on-time-performance ("How We Measure Delays") (last visited Nov. 26, 2025).

performance ranged from 81.0 percent to 97.6 percent, with an average of 92.7 percent.[298]

577. NS compiled 36 months of historic performance data from Metra's publicly available on-time performance reports. For the 36-month benchmarking period for Metra's SWS service on NS's Manhattan Sub, on-time performance ranged from 86.0 percent to 96.8 percent, with an average of 91.4 percent.[299]

iv. VRE (NS)

578. For VRE's operations over NS's lines, NS is not subject to any contractual performance standards. VRE provides information about on-time performance on its website,[300] and VRE provided NS with 36 months of performance data for the Manassas line. The monthly data measures performance based on the number of trains that arrive at their last scheduled stop within six minutes of schedule. The data does not differentiate between host-responsible delays and other reasons for delays. For the 36-month benchmarking period, on-time performance for VRE's operations over NS's Manassas line ranged from 59.0 percent to 88.0 percent, with an average of 78.9 percent.[301]

---

[298] *See* Workpaper "UP Passenger Benchmarking.xlsx," Tab "Metra."

[299] *See* Workpaper "NS Passenger Benchmarking.xlsx," Tab "Metra." Data for March 2025 was not available on Metra's website (https://www.metra.com/ridership-and-on-time-performance) and thus is not included in the calculations.

[300] *See* VRE, *Reports*, https://www.vre.org/about/reports/ ("CEO Reports") (last visited Nov. 26, 2025).

[301] *See* Workpaper "NS Passenger Benchmarking.xlsx," Tab "VRE."

VERIFICATION

I, John W. Turner, declare under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this statement.

Executed this 17th day of December, 2025.

APPENDIX A

Appendix A – Contingency Plans

Contingency Plan for Chicago

I. Yards/Terminals

A. Manifest

1. Proviso
2. Yard Center
3. Intermediate Carriers (BRC/IHB)

B. Intermodal

1. Global 2
2. Global 4
3. Yard Center (Idled)
4. 47th St.
5. 63rd St. (Idled)
6. Landers
7. Colehour

C. Mixed

1. Global 3
2. Ashland Ave
3. Calumet

D. Post-Merger Facilities with Additional Capacity

1. Yard Center (Intermodal – consolidating into 47th)
2. 63rd St. (Intermodal – consolidating into G2)

II. Buffer Resources

A. Yard/Terminal Substitutes

1. Manifest Capacity

a) Utilize freed capacity from the former intermodal operations at Yard Center and 63rd Street.

b) Alternate switch at UP/NS locations, including all terminals in the Chicago complex, Elkhart, Indiana, and Butler, Wisconsin.

c) Leverage the IHB – Put cars into the IHB to switch (NS has partial ownership and can pay a rate to utilize their capacity and UP/NS could do the same).

d) Leverage the BRC – Put cars into the BRC to switch (UP has ownership and an allotment of capacity).

2. Intermodal Capacity

a) Utilize freed capacity from the former intermodal operations at Yard Center and 63rd Street.

b) Utilize excess intermodal capacity at Global 3.

c) Utilize idle intermodal capacity at Global 1.

3. Automotive Capacity

a) Leverage the IHB – Put cars into the IHB to switch (pay a rate to utilize their capacity).

b) Utilize idle automotive ramp capacity at Chicago Heights.

B. Crew Base Information

1. Crew base used: UP/NS would be able to negotiate a crew responsibility area through the collective bargaining process.

2. Next closest crew base: Utilize existing borrow-out strategy to fill additional labor needs.

C. Locomotive Information

1. UP/NS will maintain a fleet of 20 ATR locomotives at yards and terminals in the Chicago Gateway that can be deployed to assist with traffic surges and congestion.

2. Next closest locations with ATR locomotives: Additional ATR locomotives at North Platte and North Little Rock can be deployed to the Chicago Gateway within 1–2 days to meet additional locomotive needs.

D. Car Inventory Reduction Management

1. Excess cars will be stored in the first instance at terminals and mainlines adjacent to the Chicago Gateway likely to have excess capacity. Examples include facilities at Janesville, Belvedere, and the Peoria subdivision.

2. Next closest location with car storage capacity cars: Additional locations outside the Chicago Gateway, including the Great Lakes service unit and the Mid-America service unit.

III. Monitoring Trigger(s) (as applicable)

A. Pre-merger dwell time benchmark/trigger

IV. Regional/Service Unit/Local Management

A. General Manager – Chicago Service Unit

B. Superintendent – Chicago Metro

C. Sr. Director Chicago and Great Lakes – Train Management (Harriman Dispatch Center)

Contingency Plan for St. Louis

I. Yards/Terminals

A. Manifest

1. Alton & Southern's Gateway Yard
2. TRRA's Madison Yard
3. Granite City

B. Mixed

1. Luther (Manifest & Intermodal) – Manifest switching consolidated at A&S's Gateway Yard.
2. Dupo (Manifest & Intermodal)

C. Automotive

1. Wentzville
2. Centreville

D. Post-Merger Facilities with Additional Capacity

1. Luther Yard (Manifest)

II. Buffer Resources

A. Yard/Terminal Substitutes

1. Manifest Capacity
    a) Utilize manifest capacity at Dupo Yard.
    b) Leverage freed up manifest capacity at Luther Yard.
2. Intermodal Capacity
    a) Dupo and Luther Intermodal facilities have excess surge capability.
3. Automotive
    a) Utilize latent capacity at Centreville.

B. Crew Base Information

1. Crew base used: UP/NS will be able to negotiate a crew responsibility area through the collective bargaining process.
2. Next closest crew base: Utilize existing borrow-out strategy to fill additional labor needs.

C. Locomotive Information

1. UP/NS will maintain a fleet of 15 ATR locomotives at yards and terminals in the St. Louis Gateway that can be deployed to assist with traffic surges and congestion.

2. Next closest location with ATR locomotives: North Little Rock (1 day), Chicago (1 day), and North Platte (2 days).

D. Car Inventory Reduction

1. UP/NS will store excess cars in the first instance at terminals and mainlines adjacent to the St. Louis Gateway likely to have excess capacity. These include Luther, Sparta Sub, Pinckneyville sub.

III. Monitoring Trigger(s) (as Applicable)

A. Pre-merger dwell time benchmark/trigger

IV. Regional/Service Unit/Local Management

A. General Manager – MidAmerica Service Unit

B. Superintendent – St Louis District

C. Sr. Director MidAmerica – Train Management (Harriman Dispatch Center)

Contingency Plan for Kansas City

I. Yards/Terminals

A. Manifest

1. 18th St.
2. Neff Yard
3. North Kansas City (Idled)
4. Fairfax

B. Intermodal

1. Kansas City Intermodal Terminal

C. Mixed

1. Voltz (Intermodal and Auto)

D. Automotive

1. Muncie (Idled)

E. Post-Merger Facilities with Available Capacity

1. North Kansas City (Manifest) consolidated into 18th St.
2. Muncie (Auto) consolidated into Voltz.

II. Buffer Resources

A. Yard/Terminal Substitutes

1. Manifest Capacity
   a) Neff
   b) Utilize freed capacity from the former North Kansas City.
   c) North Platte
2. Intermodal Capacity
   a) Utilize excess capacity at Voltz and or Kansas City Intermodal Terminal.
3. Automotive
   a) Reopen Muncie.

B. Crew Base Information

1. Crew base used: Protected by a single source of supply from a pool and/or extra board.

2. Next closest crew base: Utilize existing borrow-out strategy to fill additional labor needs. To use additional sources of supply, UP/NS must negotiate additional crew responsibility area through the collective bargaining process.

C. Locomotive Information

1. UP/NS will maintain a fleet of 10 ATR locomotives at yards and terminals in the Kansas City Gateway that can be deployed to assist with traffic surges and congestion.

2. Next closest location with ATR locomotives: North Platte (less than 1 day), North Little Rock (1–2 days).

D. Car Inventory Reduction Management

1. UP/NS will store excess cars in the first instance at terminals and mainlines adjacent to the Kansas City Gateway likely to have excess capacity. Examples include facilities at Neff and North Kansas City.

2. Next closest location with car storage capacity: Additional locations outside the Kansas City Gateway, including the mainline sidings on the River Subdivision and Moberly, Missouri.

III. Monitoring Trigger(s) (as Applicable)

A. Pre-merger dwell time benchmark/trigger

IV. Regional/Service Unit/Local Management

A. General Manager – Heartland Service Unit

B. Superintendent – Kansas City Metro District

C. Sr. Director Heartland – Train Management (Harriman Dispatch Center)

Contingency Plan for Memphis

I. Yards/Terminals

A. Manifest

1. Sargeant Yard

B. Intermodal

1. Marion
2. Rossville

C. Mixed

1. None

D. Automotive

1. Gavin

E. Post-Merger Facilities with Additional Capacity

1. Rossville (Intermodal)

II. Buffer Resources

A. Yard/Terminal Substitutes

1. Manifest Capacity
   a) North Little Rock
   b) Sheffield
   c) Chattanooga
   d) Pine Bluff
2. Intermodal Capacity
   a) Rossville Intermodal
3. Automotives
   a) Reisor, Louisiana
   b) Centreville (East St. Louis, Illinois)

B. Crew Base Information

1. Crew base used: UP/NS will be able to negotiate a crew responsibility area through the collective bargaining process.
2. Next closest crew base: Utilize existing borrow-out strategy to fill additional labor needs.

C. Locomotive Information

1. UP/NS will maintain a fleet of 20 ATR locomotives at North Little Rock, 5 ATR locomotives at Marion, and 5 ATR locomotives at Pine Bluff that can be deployed to assist with traffic surges and congestion.

2. Next closest location with ATR locomotives: Englewood (1–2 days)

D. Car Inventory Reduction Management

1. UP/NS will store excess cars in the first instance at terminals and mainlines adjacent to the Memphis complex. Examples include the idled Roseville Intermodal terminal.

2. Sidings of directional mainlines on the Mid-America Service Unit

III. Monitoring Trigger(s) (as Applicable)

A. Pre-merger dwell time benchmark/trigger

IV. Regional/Service Unit/Local Management

A. General Manager – MidAmerica Service Unit

B. Superintendent – Road District

C. Sr. Director MidAmerica – Train Management (Harriman Dispatch Center)

Contingency Plan for New Orleans

I. Yards/Terminals

A. Manifest

1. Avondale
2. Oliver (Idled)

B. Intermodal

1. None

C. Mixed

1. None

D. Automotive

1. None

E. Post-Merger Facilities with Capacity

1. Oliver Yard (going into Avondale Yard)

II. Buffer Resources

A. Yard/Terminal Substitutes

1. Manifest Capacity
   a) Utilize freed capacity at Oliver Yard.
   b) Livonia
   c) Birmingham
   d) Addis, Louisiana
   e) Alexandria, Louisiana
2. Intermodal Capacity
   a) Not applicable
3. Automotives
   a) Not applicable

B. Crew Base Information

1. Crew base used: UP/NS will be able to negotiate a crew responsibility area through the collective bargaining process.
2. Next closest crew base: Utilize existing borrow-out strategy to fill additional labor needs.

C. Locomotive Information

1. UP/NS will maintain a fleet of 10 ATR locomotives in the New Orleans Gateway and 15 ATR locomotives at Livonia that can be deployed to assist with traffic surges and congestion. Additionally, UP/NS will maintain 5 ATR locomotives in Shreveport to ensure fluidity over the Meridian Speedway.

2. Next closest location with ATR locomotives: North Little Rock/Pine Bluff (1 day), Englewood (1 day).

D. Car Inventory Reduction Management

1. UP/NS will store excess cars in the first instance at terminals and mainlines adjacent to the New Orleans complex. Examples include Oliver Yard.

III. Monitoring Trigger(s) (as Applicable)

A. Pre-merger dwell time benchmark/trigger

IV. Regional/Service Unit/Local Management

A. General Manager – Gulf Coast Service Unit

B. Superintendent – East District

C. Sr. Director Gulf Coast – Train Management (Harriman Dispatch Center)

Contingency Plan for Chattanooga

I. **Yards/Terminals**

A. Manifest

1. Chattanooga

B. Intermodal

1. None

C. Mixed

1. None

D. Post-Merger Idle Facilities

1. None

II. Buffer Resources

A. Yard/Terminal Substitutes

1. Manifest Capacity

a) Elkhart – Bypass Georgia/Florida traffic to Macon.

b) Macon – Utilize latent capacity to bypass Chattanooga to North Little Rock and to Louisville.

c) Bellevue – Utilize blocking capacity to drive Birmingham traffic from Detroit/Columbus past Chattanooga.

2. Intermodal Capacity

a) N/A

3. Automotive Capacity

a) N/A

B. Crew Base Information

1. Crew base used: Applicants can negotiate crew responsibility area through the collective bargaining process.

2. Next closest crew base: Utilize existing borrow-out strategy to fill additional labor needs.

C. Locomotive Information

1. Applicants will maintain a fleet of three ATR locomotives at Chattanooga, supported by the Chattanooga Diesel Shop. These locomotives can be deployed to assist with traffic surges and congestion.

2. Next closest location with ATR locomotives: Birmingham, Alabama.

D. Car Inventory Reduction Management

1. Excess cars will be stored in the first instance at terminals and mainlines adjacent to the Chattanooga yard likely to have excess capacity. Examples include facilities at Tyner, Georgia, and Knoxville, Tennessee.

III. Monitoring Trigger(s) (as Applicable)

A. Pre-merger dwell time benchmark/trigger

IV. Regional/Service Unit/Local Management

A. Regional General Manager – Southern Region

B. Superintendent – Gulf Division

C. Assistant Superintendent – Chattanooga

D. General Superintendent Transportation (Network Operations Center)

Contingency Plan for Mainline Route: Kansas City—Sidney—Butler

I. Line Segment:

A. Kansas City to Moberly (Missouri)

B. Moberly to Decatur, Illinois

C. Decatur to Peru, Indiana

D. Peru to Butler, Indiana

II. Buffer Resources

A. Alternate Main Lines

1. If issues occur at Kansas City, traffic for Sydney can be routed to St. Louis and from there to Springfield, and then Sidney.

2. For any disruption between Moberly and Butler, traffic can be routed via the W line from Kansas City towards Danville, Kentucky, and use the Cincinnati, New Orleans and Texas Pacific Railway. From there, traffic can be routed north or south.

3. For any disruption between Moberly and Kansas City, traffic can be routed from Moberly to St. Louis on the W Line, and from St. Louis to Decatur.

4. For disruptions between Sidney and Butler, there are two alternate routes to Chicago. From St. Louis to Sidney to Chicago, or from Springfield to Chicago.

B. Alternate Terminals

1. Utilize yards in St. Louis (A&S, Luther) as an alternative to Decatur.

C. Crew Base Information

1. Crew base: UP/NS will be able to negotiate a crew responsibility area through the collective bargaining process.

2. Next closest crew base: Utilize existing borrow-out strategy to fill additional labor needs.

D. Locomotive Information

1. Closest location with ATR locomotives: Major yards along the line, including Kansas City/Voltz, St. Louis, and Decatur maintain stores of buffer locomotives.

E. Car Storage

1. Decatur

III. Monitoring Trigger(s) (as Applicable)

A. 18th Street (Kansas City) dwell time (manifest)

B. Decatur (including East Decatur) dwell time (manifest)

C. Voltz (Kansas City) dwell time (intermodal)

IV. Regional/Service Unit/Local Management

A. General Manager – Heartland Service Unit

B. Superintendent – Kansas City Metro District

C. Sr. Director Heartland – Train Management (Harriman Dispatch Center)

V. Additional Notes Regarding Potential Recovery Actions

A. CN operates out of Decatur. CSX operates out of Decatur and St. Louis.

Contingency Plan for Mainline Route: New Orleans-Birmingham

I. Line Segment:

A. New Orleans to Meridian (NO&NE)

B. Meridian to Birmingham (AGS South)

II. Buffer Resources

A. Alternate main lines

1. If issues arise on the route from New Orleans to Birmingham, traffic can be diverted via the Memphis Gateway.
2. Traffic can be blocked to allow for separation of Chattanooga and Birmingham traffic at Sheffield, Alabama.
3. Traffic bound for Chattanooga can transit the Memphis East to Chattanooga.
4. Traffic bound for Birmingham can operate down the NA West from Sheffield to Birmingham.

B. Alternate Terminals

1. Utilize Oliver Yard for staging.

C. Crew Base Information

1. Crew base: Applicants can negotiate crew responsibility area through the collective bargaining process.
2. Next closest crew base: Utilize existing borrow-out strategy to fill additional labor needs.

D. Locomotive Information

1. Closest location with ATR locomotives: Birmingham, Alabama, and Chattanooga, Tennessee.

E. Car Storage

1. Oliver Yard (New Orleans, Louisiana)
2. Sheffield, Alabama

III. Monitoring Trigger(s) (as applicable)

A. Birmingham dwell time (manifest)

IV. Regional/Service Unit/Local Management

A. General Manager – Southern Region

B. Superintendent – Gulf Division

C. Assistant Superintendent – Birmingham

D. General Superintendent Transportation (Network Operations Center)

V. Additional Notes Regarding Potential Recovery Actions

A. N/A

Contingency Plan for Mainline Route: Meridian-Atlanta

I. Line Segment:

A. Birmingham to Atlanta (East End)

II. Buffer Resources

A. Alternate Main Lines

1. If issues arise on the route from Meridian to Atlanta, traffic can be diverted via the Memphis Gateway.
2. Traffic needing to get past Birmingham towards Atlanta can route via Chattanooga down the Georgia North End to Atlanta. This route has equal crew districts and can provide comparable transits.
3. Detoured traffic can be handled at Sheffield, Alabama, and/or Chattanooga, Tennessee, to process traffic for final destination.

B. Alternate Terminals

1. Sheffield, Alabama
2. Chattanooga, Tennessee

C. Crew Base Information

1. Crew base: Applicants can negotiate crew responsibility area through the collective bargaining process.
2. Next closest crew base: Utilize existing borrow-out strategy to fill additional labor needs.

D. Locomotive Information

1. Closest location with ATR locomotives: Chattanooga, Tennessee

E. Car Storage

1. Knoxville, Tennessee
2. Sheffield, Alabama

III. Monitoring Trigger(s) (as Applicable)

A. Birmingham dwell time (manifest)

B. Austell (Atlanta) dwell time (intermodal)

IV. Regional/Service Unit/Local Management

A. General Manager – Southern Region

B. Superintendent – Gulf Division

C. Assistant Superintendent – Birmingham

D. General Superintendent Transportation (Network Operations Center)

V. Additional Notes Regarding Potential Recovery Actions

A. N/A

APPENDIX B

Appendix B – Alternative Dispute Resolution Program

Alternative Dispute Resolution Agreement
A Three-Year Program for Merger-Related Service Arbitration via JAMS

Introduction

This Alternative Dispute Resolution ("ADR") program provides customers of the combined Union Pacific/Norfolk Southern with a voluntary, efficient means of resolving disputes concerning service during the service integration period. Surface Transportation Board rules and regulations require Union Pacific and Norfolk Southern to provide a protocol for handling claims related to failure to provide reasonable service due to merger implementation problems, and the Board has stated that commitments to submit all such claims to arbitration will be favored. *See* 49 C.F.R. § 1180.1(h)(5).

This program is designed to offer a streamlined process outside of formal regulatory proceedings and to satisfy the protocol requirements in § 1180.1(h)(5). Participation in this program is optional, and customers may instead seek relief directly from the STB.

Definitions

For purposes of this Agreement, the following terms shall have the meanings set forth below:

1. "**Arbitrator**" means the neutral decision-maker appointed pursuant to Section 1 to administer and resolve disputes under this Agreement.

2. "**Carrier**" means the combined Union Pacific/Norfolk Southern rail carrier that is subject to the jurisdiction of the STB.

3. "**Customer**" means the shipper on the bill of lading who is responsible for paying the freight charges for the transportation service that is the subject of the Service Dispute and that elects to participate in this ADR program.

4. "**STB**" means the Surface Transportation Board.

5. "**Service Dispute**" means a dispute concerning whether the carrier has failed to provide reasonable service as a result of merger implementation problems.

6. "**Notice of Intent to Arbitrate**" means a written notice served by a Customer on both the Carrier and JAMS to commence arbitration under this Agreement.

7. "**JAMS**" means the company Judicial Arbitration and Mediation Services ("JAMS"). *See* www.jamsadr.com.

1. Initiation and Appointment

1.1 A Customer may commence arbitration by serving a Notice of Intent to Arbitrate upon both the Carrier and JAMS.

1.2 Within 21 calendar days of receipt, JAMS shall appoint the Arbitrator if the parties have not agreed upon one.

1.3 If the parties cannot agree, JAMS shall appoint a neutral former federal judge from the United States district courts or courts of appeal.

1.4 The Arbitrator shall convene an initial conference within 14 calendar days of appointment to establish the schedule and procedures.

2. Confidentiality and Discovery

2.1 All aspects of the arbitration proceedings, including all submissions, arbitrator rulings, and the arbitrator's final decision, shall remain confidential.

2.2 The Arbitrator may order discovery of nonprivileged matters that is: (i) relevant to any claim or defense; and (ii) proportional to the needs of the case, considering the issues at stake, the amount in controversy, access to information, burdens of discovery, and cost–benefit balance.

3. Venue and Decision

3.1 Unless otherwise agreed by the parties, arbitration shall take place in the venue identified in the tariff that governs the transportation at issue. The parties may agree to conduct proceedings by videoconference.

3.2 The Arbitrator shall issue a reasoned written decision within 180 calendar days of the institution of the arbitration, unless the parties mutually agree to grant the Arbitrator additional time.

3.3 The decision shall be final, binding, and enforceable in any court of competent jurisdiction.

4. Right to Cure

4.1 To avoid unnecessary expenditure of time and costs, Carrier shall have the right to cure the alleged failure to provide reasonable service as a result of merger implementation problems (hereinafter referred to in this section as the "Service Issue") according to the terms of this section.

4.2 Prior to commencing arbitration as set forth in Section 1, Customer shall provide Carrier with at least 30 days' notice of Customer's intent to commence arbitration under this Program and shall describe the Service Issue it intends to allege in sufficient detail so that Carrier has the opportunity to cure the alleged Service Issue.

4.3 During the notice period described in 4.1, Carrier shall have the opportunity to cure the alleged Service Issue prior to Customer commencing arbitration.

4.4 It shall be a complete defense to liability if Carrier cures the alleged Service Issue during the notice period described in 4.1 (which will be prior to Customer commencing arbitration).

5. Standard for Relief

5.1 The Arbitrator may determine whether the Carrier failed to provide reasonable service due to merger implementation problems during the statute of limitations period.

5.2. Customer must demonstration that (a) it suffered a substantial deterioration in service that was not cured by the railroad prior to the commencement of arbitration, (b) that merger implementation was the proximate cause of that substantial deterioration in service, and (c) that the substantial deterioration in service caused direct damages to the customer.

6. Relief Limitations

6.1 This program applies only to non-exempt commodities shipped under tariff service (not contract service or exempt commodities, unless otherwise agreed).

6.2 The Arbitrator may not award injunctive or equitable relief.

6.3 Monetary relief is capped at $2,000,000. The Customer may not subdivide larger claims into multiple proceedings to avoid monetary limits. All claims during the statute of limitations period must be filed in a single arbitration.

6.4 Damages are limited to those incurred within one year prior to the notice of intent to arbitrate.

6.5 Customer may seek relief for direct damages only, not indirect damages (*e.g.*, lost profits). All further limitations on relief as set forth in the Interstate Commerce Act or in the governing tariffs that apply to the transportation at issue also govern.

7. Appeal

7.1 An appeal of right may be taken to the STB within 20 days of the arbitration decision.

7.2 Appeals are limited to cases where: (i) the decision is inconsistent with sound principles of rail regulation economics; (ii) a clear abuse of arbitral authority or discretion occurred; or (iii) award limitations were violated.

7.3 If the STB vacates the decision, the parties shall notify JAMS, which shall appoint a new Arbitrator within 30 days following final judgment (including appeals).

8. Costs & Arbitration Fees

8.1 Each party shall bear its own costs and an equal share of arbitration fees and expenses.

9. Preservation of Rights

9.1 Participation in this ADR program is voluntary, and customers retain their full rights to bring disputes before the STB at any time.

10. Duration and Review

10.1 This ADR program shall remain in effect for three years from the effective date of STB approval of the Union Pacific-Norfolk Southern merger transaction.

RELATED APPLICATIONS

BEFORE THE
SURFACE TRANSPORTATION BOARD

DOCKET NO. FD 36873 (SUB-NO. 1)

UNION PACIFIC CORPORATION, UNION PACIFIC RAILROAD COMPANY, NORFOLK SOUTHERN CORPORATION, AND NORFOLK SOUTHERN RAILWAY COMPANY
—CONTROL—
PEORIA AND PEKIN UNION RAILWAY COMPANY

RAILROAD CONTROL APPLICATION

RAYMOND A. ATKINS
CARRIE C. MAHAN
MATTHEW J. WARREN
ALLISON C. DAVIS
MARC A. KORMAN
Sidley Austin LLP
1501 K Street, NW
Washington, DC 20005
(202) 736-8000

JASON M. MORRIS
JOSEPH H. CARPENTER IV
THOMAS E. ZOELLER
HANNA M. CHOUEST
T. MATTHEW LOCKHART
Norfolk Southern Railway Company
650 W. Peachtree Street NW
Atlanta, GA 30308

Attorneys for Norfolk Southern Corporation and Norfolk Southern Railway Company

MICHAEL L. ROSENTHAL
DEREK LUDWIN
JAMES J. O'CONNELL
MATTHEW J. GLOVER
PEGAH NABILI
Covington & Burling LLP
One CityCenter
850 Tenth Street, NW
Washington, DC 20001
(202) 662-6000

CHRISTINA B. CONLIN
JAMES B. BOLES
TONYA W. CONLEY
TANYA L. SPRATT
Union Pacific Railroad Company
1400 Douglas Street
Omaha, NE 68179

Attorneys for Union Pacific Corporation and Union Pacific Railroad Company

December 19, 2025

Union Pacific Corporation ("UPC"), Union Pacific Railroad Company ("UP"), Norfolk Southern Corporation ("NSC"), and Norfolk Southern Railway Company ("NS") (collectively, "Applicants") file this application for Board approval and authorization under 49 U.S.C. §§ 11323-25 for the acquisition of control of the Peoria and Pekin Union Railway Company ("PPU").

In the primary application to which this application relates, Applicants seek authority for the acquisition of control by UPC of NSC, and through NSC of NS and NS's rail carrier subsidiaries, and for the resulting common control by UPC of UP and NS and the consolidation of the rail operations of UP and NS. PPU is a non-operating Class III rail carrier in which UP currently holds a 12.5 percent interest and in which NS currently holds a 40.64 percent interest. PPU owns approximately 20 miles of rail line in Tazewell and Peoria counties in the state of Illinois. Upon consummation of the primary transaction following Board approval, the combined UP/NS will control a majority of shares of PPU. The proposed transaction accordingly requires Board approval under §§ 11323-25.

In the primary application, Applicants commit to divesting as much of NS's ownership interest in PPU as is required to reduce Applicants' combined holdings to 50 percent, unless PPU's other current owner—Illinois Central Railroad ("CN")—declines to acquire the additional shares. However, Applicants may need authority to control PPU before those arrangements can be made and effectuated. Applicants, therefore, are filing this related application.

APPLICATION INFORMATION

In support of this Application, and pursuant to the Board's regulations at 49 C.F.R. Part 1180, Applicants submit the following information:

- ***1180.6(a)(1)(i) A brief summary of the proposed transaction, the name of the applicants, their business address, telephone number, and the name of the counsel to whom questions regarding the transaction can be addressed.***

As described in the primary application, UPC and NSC entered into an Agreement and Plan of Merger dated as of July 28, 2025, under which UPC, through its wholly-owned subsidiary, Ruby Merger Sub 1 Corporation, will acquire control of NSC, and through it of NS and NS's rail carrier subsidiaries.

PPU is a Class III rail carrier in which UP currently holds a 12.5 percent interest and in which NS currently holds a 40.64 percent interest. PPU owns approximately 20 miles of rail line in Tazewell and Peoria counties in the state of Illinois. Upon consummation of the primary transaction following Board approval, Applicants will control PPU. Applicants' acquisition of control of PPU is a result of the primary transaction, but it is purely incidental to the transaction.

The Applicants involved in the transaction are:

Union Pacific Corporation
1400 Douglas Street
Omaha, NE 68179
Telephone: (402) 544-5000

Union Pacific Railroad Company
1400 Douglas Street
Omaha, Nebraska 68179
Telephone: (402) 544-5000

Norfolk Southern Corporation
650 W. Peachtree Street NW

Atlanta, GA 30308
Telephone: (470) 463-6314

Norfolk Southern Railway Company
650 West Peachtree Street NW
Atlanta, Georgia 30308
Telephone: (470) 463-6314

The names of counsel to whom questions regarding the proposed transaction can be addressed are shown on the cover of this Application.

- ***1180.6(a)(1)(ii) The proposed time schedule for consummation of the proposed transaction.***

Applicants' acquisition of control of PPU will occur following the receipt of all required approvals and satisfaction or waiver of all conditions to closing set forth in the Agreement and Plan of Merger for the primary transaction.

- ***1180.6(a)(1)(iii) The purpose sought to be accomplished by the proposed transaction, e.g., operating economies, eliminating excess facilities, improving service, or improving the financial viability of the applicants.***

Applicants' acquisition of control of PPU is related to the primary transaction, the purpose of which is described in Section 1180.6(a)(1)(iii) of that application.

- ***1180.6(a)(1)(iv) The nature and amount of any new securities or other financial arrangements.***

No new securities will be issued or other financial arrangements entered into specifically in connection with Applicants' acquisition of control of PPU. Securities and financial arrangements in connection with the primary transaction are addressed in Section 1180.6(a)(1)(iv) of that application.

- ***1180.6(a)(2) A detailed discussion of the public interest justifications in support of the application, indicating how the proposed transaction is***

consistent with the public interest, with particular regard to the relevant statutory criteria, including:

Applicants' control of PPU will unquestionably serve the public interest. As the primary application explains in Section 1180.6(a)(2) and as further detailed in the verified statements accompanying the primary application, the UP/NS merger will greatly intensify competition among railroads and competition between railroads and trucks, expand and improve rail transportation service and customer access to markets, increase transportation safety, strengthen the national defense, and promote job growth and economic expansion across the United States. Applicants' acquisition of control of PPU is a result of that larger transaction, but it is purely incidental to the transaction.

The control of PPU by Applicants will not affect rail operations. PPU is currently a non-operating carrier. The lines of PPU have been operated by the Tazewell & Peoria Railroad, Inc. ("TPR")—a Genesee & Wyoming subsidiary—since 2004. *See Tazewell & Peoria R.R.—Lease & Operation Exemption—Peoria & Pekin Union Ry.*, Docket No. FD 34544 (STB served Sep. 28, 2004). Operation of the PPU rail lines is under the exclusive direction and control of TPR. Applicants' control of PPU will have no impact on Amtrak.

- ***1180.6(a)(2)(i) The effect of the transaction on inter- and intramodal competition, including a description of the relevant market (see § 1180.7). Include a discussion of whether, as a result of the transaction, there is likely to be any lessening of competition, creation of a monopoly, or restraint of trade in freight surface transportation in any region of the United States.***

Applicants' acquisition of PPU is part of the primary transaction, which will offer substantial competitive benefits, as described in Section 1180.6(a)(2)(i) of the primary application and as further detailed in the verified statements accompanying the primary application.

Applicants' acquisition of control of PPU will not have any effect on inter- or intramodal competition, nor will it cause any lessening of competition or create any monopoly or restraint of trade. As noted above, operations are not expected to change as a consequence of this transaction, as the lines of PPU are currently operated under the exclusive direction and control of TPR. Moreover, pursuant to a marketing and interchange agreement that accompanies the lease agreement, TPR is required to operate interchanges without discrimination toward any railroad and to provide equal access to PPU's rail lines with any and all other users.[1]

- ***1180.6(a)(2)(ii) The financial consideration involved in the proposed transaction, and any economies, to be effected in operations, and any increase in traffic, revenues, earnings available for fixed charges, and net earnings, expected to result from the consummation of the proposed transaction.***

There is no separately stated financial consideration for Applicants' acquisition of control of PPU. The financial consideration for the primary transaction is described in Section 1180.6(a)(2)(ii) of the primary application.

- ***1180.6(a)(2)(iii) The effect of the increase, if any, of total fixed charges resulting from the proposed transaction.***

Applicants' acquisition of control of PPU will not have any effect on fixed charges separate and apart from the primary transaction. The effect on fixed charges

[1] *See* Workpaper "PPU Operating, Marketing and Interchange Agreement.pdf."

of the primary transaction is addressed in Section 1180.6(a)(2)(iii) of the primary application.

- ***1180.6(a)(2)(iv) The effect of the proposed transaction upon the adequacy of transportation service to the public, as measured by the continuation of essential transportation services by applicants and other carriers.***

Applicants' acquisition of control of PPU will not affect the adequacy of transportation to the public. Applicants expect that TPR will continue to operate the lines of the PPU, as it has for the past 20 years. The effect of the primary transaction on the adequacy of transportation to the public is set forth in Section 1180.6(a)(2)(iv) of the primary application.

- ***1180.6(a)(2)(v) The effect of the proposed transaction upon applicant carriers' employees (by class or craft), the geographic points where the impact will occur, the time frame of the impact (for at least 3 years after consolidation), and whether any employee protection agreements have been reached.***

PPU does not have any of its own employees. Operations on PPU's rail lines are conducted by TPR. Applicants do not anticipate any effects on their rail carrier employees as a result of the incidental control of PPU.

The effects of the primary transaction on Applicants' employees are set forth in the primary application. As PPU has no employees who could be affected by the transaction, Applicants do not anticipate that any separate implementing agreements will be entered with respect to PPU.

- ***1180.6(a)(2)(vi) The effect of inclusion (or lack of inclusion) in the proposed transaction of other railroads in the territory, under 49 U.S.C. 11324.***

The inclusion of other railroads in the transaction giving Applicants control of PPU would not be in the public interest for the reasons discussed in Section 1180.6(a)(2)(vi) of the primary application. Further, Applicants' acquisition of control of PPU will not result in the loss of traffic or revenue by any other carrier and will not result in the loss of essential services. As explained herein, the lines of PPU are and will continue to be operated by TPR. Because no loss of essential services is threatened as a result of Applicants' control of PPU, any forcible inclusion of another railroad in the transaction would be unwarranted.

- ***1180.6(a)(3) Any other supporting or descriptive statements applicants deem material.***

Applicants' acquisition of control of PPU is incidental to the primary transaction, which will unquestionably provide substantial public benefits and enhance competition. Statements from shippers, public officials, and other industry stakeholders supporting the primary application are provided in Volume 3 of the primary application. Supporting statements from officers of UP and NS and expert witnesses are provided in Volumes 1 and 2 of the primary application.

- ***1180.6(a)(4) An opinion of applicants' counsel that the transaction meets the requirements of the law and will be legally authorized and valid, if approved by the Board. This should include specific references to any pertinent provisions of applicants' bylaws or charter or articles of incorporation.***

The primary merger application contains the opinion of Applicants' counsel that Applicants' acquisition of control of PPU, as a directly-related transaction that involves Applicants, meets the requirements of the law and will be legally authorized and valid, if approved by the Board.

- ***1180.6(a)(5) A list of the State(s) in which any part of the property of each applicant carrier is situated.***

PPU owns approximately 20 miles of rail line in the state of Illinois.

The states in which Applicants conduct rail operations are listed in the primary application at Section 1180.6(a)(5).

- ***1180.6(a)(6) Map (exhibit 1). Submit a general or key map indicating clearly, in separate colors or otherwise, the line(s) of applicant carriers in their true relations to each other, short line connections, other rail lines in the territory, and the principal geographic points in the region traversed. If a geographically limited transaction is proposed, a map detailing the transaction should also be included. In addition to the map accompanying each application, 20 unbound copies of the map shall be filed with the Board.***

The map required by Section 1180.6(a)(6) is attached hereto in Exhibit 1. That map shows the rail lines of PPU, which are operated by TPR, and other carriers, including UP and NS, in the area in which PPU is located. The relationship of the lines shown on that map to rail lines in other areas is shown on the maps provided in Exhibit 1 of the primary application.

- ***1180.6(a)(7)(i) Describe the nature of the transaction (e.g., merger, control, purchase, trackage rights), the significant terms and conditions, and the consideration to be paid (monetary or otherwise).***

Applicants' acquisition of control of PPU is a result of the primary merger transaction, but it is purely incidental to the transaction, as described above. There are no specific terms, conditions, or consideration relating to Applicant's acquisition of control of PPU. The terms, conditions, and consideration for the primary transaction are described in the primary application.

- ***1180.6(a)(7)(ii) Agreement (exhibit 2). Submit a copy of any contract or other written instrument entered into, or proposed to be entered into, pertaining to the proposed transaction. In addition, parties to exempt trackage rights agreements and renewal of agreements described at § 1180.2(d)(7) must submit one copy of the executed agreement or renewal agreement with the notice of exemption, or within 10 days of the date that the agreement is executed, whichever is later.***

Applicants' acquisition of control of PPU will be effected pursuant to the primary transaction. The Agreement and Plan of Merger dated as of July 28, 2025, is provided in the primary application at Exhibit 2.

- ***1180.6(a)(7)(iii) If a consolidation or merger is proposed indicate: (A) The name of the company resulting from the consolidation or merger; (B) the State or territory under the laws of which the consolidated company is to be formed or the merged company is to file its certificate of amendment; (C) the capitalization proposed for the resulting company; and (D) the amount and character of the capital stock and other securities to be issued.***

Not applicable. No merger or corporate consolidation involving PPU is proposed. Applicants' acquisition of control of PPU is purely incidental to the primary transaction.

- ***1180.6(a)(7)(iv) Court Order (exhibit 3). If a trustee, receiver, assignee, or personal representative of the real party in interest is an applicant, submit a certified copy of the order, if any, of the court having jurisdiction, authorizing the contemplated action.***

Not applicable.

- ***1180.6(a)(7)(v) State whether the property involved in the proposed transaction includes all the property of the applicant carriers and, if not, describe what property is included in the proposed transaction.***

The proposed transaction involves all of the property of PPU.

- ***1180.6(a)(7)(vi) Briefly describe the principal routes and termini of the lines involved, the principal points of interchange on the routes, and the amount of main-line mileage and branch line mileage involved.***

PPU owns approximately 20 miles of rail line in Tazewell and Peoria Counties, Illinois. Its rail lines extend from: (1) approximately milepost 0.0 (at or near Peoria, Illinois) to approximately milepost 9.2 (at or near Pekin, Illinois); (2) approximately milepost 0.0 to approximately milepost 3.87N (at or near Iowa Interstate Junction, Illinois); (3) approximately milepost 0.0 to approximately milepost 5.1W (at or near P&PU Junction, Illinois); and (4) approximately Wesley Junction, Illinois, to approximately East Peoria, Illinois (approximately 1.7 miles of track). PPU also holds trackage rights over approximately 1.7 miles of main-line track owned by UP from approximately milepost 4.0 (at or near P&PU Junction) to approximately milepost 5.7 (at or near Sommer, Illinois) in Peoria County, Illinois. The lines of PPU are operated by TPR.

TPR connects with BNSF Railway Company, CN, Keokuk Junction Railway, Illinois & Midland Railroad, Iowa Interstate Railroad, NS, UP, and Toledo, Peoria & Western Railway in Creve Coeur, Illinois.

- ***1180.6(a)(7)(vii) State whether any governmental financial assistance is involved in the proposed transaction and, if so, the form, amount, source, and application of such financial assistance.***

No governmental financial assistance is involved.

- ***1180.6(a)(8) Environmental data (exhibit 4). Submit information and data with respect to environmental matters prepared in accordance with 49 CFR part 1105. In major and significant transactions, applicants shall, as soon as possible, and no later than the filing of a notice of***

intent, consult with the Board's Office of Environmental Analysis for the proper format of the environmental report.

Not applicable. Under 49 C.F.R. §§ 1105.6(c)(1) and 1105.8(b)(3), environmental documentation is not required for Applicants' acquisition of control of PPU because the transaction merely involves a corporate ownership change that will not result in significant changes in carrier operations. The lines of PPU will continue to be operated by TPR. Environmental data for the primary transaction will be separately provided in the primary docket.

- ***1180.8(c) Operational Data. For minor transactions: Operating plan-minor (exhibit 15). Discuss any significant changes in patterns or types of service as reflected by the operating plan expected to be used after consummation of the transaction. Where relevant, submit information related to the following: (1) Traffic level density on lines proposed for joint operations. (2) Impacts on commuter or other passenger service operated over a line which is to be downgraded, eliminated, or operated on a consolidated basis. (3) Operating economies, which include, but are not limited to, estimated savings. (4) Any anticipated discontinuances or abandonments.***

The Operating Plan for the primary transaction pursuant to 49 C.F.R. § 1180.8(a) (major transactions) is provided in Exhibit 13 to the primary application. The rail lines of PPU will continue to be operated by third-party TPR following the primary transaction.

- ***1180.11 Transnational and other informational requirements.***
- ***(a) For applicants whose systems include operations in Canada or Mexico, applicants must explain how cooperation with the Federal Railroad Administration would be maintained to address potential***

impacts on operations within the United States of operations or events elsewhere in their systems.

Not applicable. Transnational and other informational requirements relating to the primary transaction are contained in Section 1180.11 of the primary application.

- ***(b) All applicants must assess whether any restrictions or preferences under foreign or domestic law or policies could affect their commercial decisions, and discuss any ownership restrictions applicable to them.***

Not applicable. Transnational and other informational requirements relating to the primary transaction are contained in Section 1180.11 of the primary application.

CONCLUSION

For the reasons set forth above, Applicants respectfully request that the Board grant this application for control of PPU.

Respectfully submitted,

/s/ Raymond A. Atkins
RAYMOND A. ATKINS
CARRIE C. MAHAN
MATTHEW J. WARREN
ALLISON C. DAVIS
MARC A. KORMAN
Sidley Austin LLP
1501 K Street, NW
Washington, DC 20005
(202) 736-8000

JASON M. MORRIS
JOSEPH H. CARPENTER IV
THOMAS E. ZOELLER
HANNA M. CHOUEST
T. MATTHEW LOCKHART
Norfolk Southern Railway Company
650 W. Peachtree Street NW
Atlanta, GA 30308

Attorneys for Norfolk Southern Corporation and Norfolk Southern Railway Company

/s/ Michael L. Rosenthal
MICHAEL L. ROSENTHAL
DEREK LUDWIN
JAMES J. O'CONNELL
MATTHEW J. GLOVER
PEGAH NABILI
Covington & Burling LLP
One CityCenter
850 Tenth Street, NW
Washington, DC 20001
(202) 662-6000

CHRISTINA B. CONLIN
JAMES B. BOLES
TONYA W. CONLEY
TANYA L. SPRATT
Union Pacific Railroad Company
1400 Douglas Street
Omaha, NE 68179

Attorneys for Union Pacific Corporation and Union Pacific Railroad Company

December 19, 2025

Union Pacific Corporation and Union Pacific Railroad Company

I, V. James Vena, declare under penalty of perjury that I am Chief Executive Officer of Union Pacific Corporation and Union Pacific Railroad Company (collectively, "Union Pacific"), applicants herein; that I am one of the executive officers duly authorized to sign, to verify, and to file this Application on behalf of Union Pacific; that I have knowledge of the matters contained in this Application to the extent they relate to Union Pacific; and that the statements made in this Application are true and correct to the best of my knowledge and belief.

V. J. Vena

V. James Vena

Dated this 17th day of December, 2025.

I, Christina B. Conlin, certify that I am Executive Vice President, Chief Legal Officer and Corporate Secretary of Union Pacific Corporation ("UPC") and Union Pacific Railroad Company ("UP"), applicants herein, and that V. James Vena, Chief Executive Officer of UPC and UP, is duly authorized to sign, to verify, and to file this Application on behalf of UPC and UP.

Christina B. Conlin
Christina B. Conlin
Executive Vice President, Chief Legal
Officer & Corporate Secretary
Union Pacific Corporation
Union Pacific Railroad Company

Dated this 17th day of December, 2025.

Norfolk Southern Corporation and Norfolk Southern Railway Company

I, Mark R. George, declare under penalty of perjury that I am President, and Chief Executive Officer of Norfolk Southern Corporation and Chairman, President and Chief Executive Officer of Norfolk Southern Railway Company (collectively, "Norfolk Southern"), applicants herein; that I am one of the executive officers duly authorized to sign, to verify, and to file this Application on behalf of Norfolk Southern; that I have knowledge of the matters contained in this Application to the extent they relate to Norfolk Southern; and that the statements made in this Application are true and correct to the best of my knowledge and belief.

Mark R. George

Dated this 19th day of December, 2025.

I, J. Jeremy Ballard, certify that I am General Counsel Corporate and Corporate Secretary of Norfolk Southern Corporation ("NSC"), one of the applicants herein, and that Mark R. George, President & Chief Executive Officer of NSC, is duly authorized to sign, to verify, and to file this Application on behalf of the foregoing.

J. Jeremy Ballard
Corporate Secretary
Norfolk Southern Corporation

Dated this 19th day of December, 2025.

I, Joseph C. Wolfe, certify that I am Corporate Secretary of Norfolk Southern Railway Company ("NS"), one of the applicants herein, and that Mark R. George, Chairman, President & Chief Executive Officer of NS, is duly authorized to sign, to verify, and to file this Application on behalf of the foregoing.

Joseph C. Wolfe
Corporate Secretary
Norfolk Southern Railway Company

Dated this 19th day of December, 2025.

EXHIBIT 1
MAP

BEFORE THE
SURFACE TRANSPORTATION BOARD

DOCKET NO. FD 36873 (SUB-NO. 2)

UNION PACIFIC CORPORATION, UNION PACIFIC RAILROAD COMPANY, NORFOLK SOUTHERN CORPORATION, AND NORFOLK SOUTHERN RAILWAY COMPANY
—CONTROL—
TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS

RAILROAD CONTROL APPLICATION

RAYMOND A. ATKINS
CARRIE C. MAHAN
MATTHEW J. WARREN
ALLISON C. DAVIS
MARC A. KORMAN
Sidley Austin LLP
1501 K Street, NW
Washington, DC 20005
(202) 736-8000

JASON M. MORRIS
JOSEPH H. CARPENTER IV
THOMAS E. ZOELLER
HANNA M. CHOUEST
T. MATTHEW LOCKHART
Norfolk Southern Railway Company
650 W. Peachtree Street NW
Atlanta, GA 30308

Attorneys for Norfolk Southern Corporation and Norfolk Southern Railway Company

MICHAEL L. ROSENTHAL
DEREK LUDWIN
JAMES J. O'CONNELL
MATTHEW J. GLOVER
PEGAH NABILI
Covington & Burling LLP
One CityCenter
850 Tenth Street, NW
Washington, DC 20001
(202) 662-6000

CHRISTINA B. CONLIN
JAMES B. BOLES
TONYA W. CONLEY
TANYA L. SPRATT
Union Pacific Railroad Company
1400 Douglas Street
Omaha, NE 68179

Attorneys for Union Pacific Corporation and Union Pacific Railroad Company

December 19, 2025

Union Pacific Corporation ("UPC"), Union Pacific Railroad Company ("UP"), Norfolk Southern Corporation ("NSC"), and Norfolk Southern Railway Company ("NS") (collectively, "Applicants") file this application for Board approval and authorization under 49 U.S.C. §§ 11323-25 for the acquisition of control of the Terminal Railroad Association of St. Louis ("TRRA").

In the primary application to which this application relates, Applicants seek authority for the acquisition of control by UPC of NSC, and through NSC of NS and NS's rail carrier subsidiaries, and for the resulting common control by UPC of UP and NS and the consolidation of the rail operations of UP and NS. TRRA is a Class III terminal and switching carrier that operates approximately 170 miles of rail line in and around St. Louis, Missouri. UP currently holds a 42.84 percent interest and NS currently holds a 14.29 percent interest in TRRA. Upon consummation of the primary transaction following Board approval, the combined UP/NS will control a majority of shares of TRRA. The proposed transaction accordingly requires Board approval under §§ 11323-25.

In the primary application, Applicants commit to divesting NS's ownership interest in TRRA and redistributing NS's shares equally to UP and TRRA's other current owners—which are BNSF Railway Company, CSX Transportation, Inc., and Illinois Central Railroad ("CN")—unless those owners decline to acquire the additional shares. However, Applicants may need authority to control TRRA before those arrangements can be made and effectuated. Applicants, therefore, are filing this related application.

APPLICATION INFORMATION

In support of this Application, and pursuant to the Board's regulations at 49 C.F.R. Part 1180, Applicants submit the following information:

- ***1180.6(a)(1)(i) A brief summary of the proposed transaction, the name of the applicants, their business address, telephone number, and the name of the counsel to whom questions regarding the transaction can be addressed.***

As described in the primary application, UPC and NSC entered into an Agreement and Plan of Merger dated as of July 28, 2025, under which UPC, through its wholly-owned subsidiary, Ruby Merger Sub 1 Corporation, will acquire control of NSC, and through it of NS and NS's rail carrier subsidiaries.

TRRA is a Class III terminal and switching carrier that operates approximately 170 miles of rail line in and around St. Louis, Missouri. TRRA's main yard is located in Madison, Illinois. UP currently holds a 42.84 percent interest and NS currently holds a 14.29 percent interest in TRRA. Upon consummation of the primary transaction following Board approval, Applicants will control TRRA. Applicants' acquisition of control of TRRA is a result of the primary transaction, but it is purely incidental to the transaction.

The Applicants involved in the transaction are:

Union Pacific Corporation
1400 Douglas Street
Omaha, NE 68179
Telephone: (402) 544-5000

Union Pacific Railroad Company
1400 Douglas Street
Omaha, NE 68179
Telephone: (402) 544-5000

Norfolk Southern Corporation
650 W. Peachtree Street NW
Atlanta, GA 30308
Telephone: (470) 463-6314

Norfolk Southern Railway Company
650 W. Peachtree Street NW
Atlanta, GA 30308
Telephone: (470) 463-6314

The names of counsel to whom questions regarding the proposed transaction can be addressed are shown on the cover of this Application.

- ***1180.6(a)(1)(ii) The proposed time schedule for consummation of the proposed transaction.***

Applicants' acquisition of control of TRRA will occur following the receipt of all required approvals and satisfaction or waiver of all conditions to closing set forth in the Agreement and Plan of Merger for the primary transaction.

- ***1180.6(a)(1)(iii) The purpose sought to be accomplished by the proposed transaction, e.g., operating economies, eliminating excess facilities, improving service, or improving the financial viability of the applicants.***

Applicants' acquisition of control of TRRA is related to the primary transaction, the purpose of which is described in Section 1180.6(a)(1)(iii) of the primary application.

- ***1180.6(a)(1)(iv) The nature and amount of any new securities or other financial arrangements.***

No new securities will be issued or other financial arrangements entered into specifically in connection with Applicants' acquisition of control of TRRA. Securities and financial arrangements in connection with the primary transaction are addressed in Section 1180.6(a)(1)(iv) of the primary application.

- ***1180.6(a)(2) A detailed discussion of the public interest justifications in support of the application, indicating how the proposed transaction is consistent with the public interest, with particular regard to the relevant statutory criteria.***

Applicants' control of TRRA will unquestionably serve the public interest. As the primary application explains in Section 1180.6(a)(2) and as further detailed in the verified statements accompanying the primary application, the UP/NS merger will greatly intensify competition among railroads and competition between railroads and trucks, expand and improve rail transportation service and customer access to markets, increase transportation safety, strengthen the national defense, and promote job growth and economic expansion across the United States. Applicants' acquisition of control of TRRA is a result of that larger transaction, but it is purely incidental to the transaction.

Applicants' acquisition of control of TRRA will not affect rail operations. TRRA is a terminal and switching carrier that operates in and around St. Louis. It provides local service to approximately 70 customers in the St. Louis area. TRRA will continue to provide these services following Applicant's acquisition of control.

TRRA's system includes two bridges over the Mississippi River—the Merchants Bridge and the MacArthur Bridge. Amtrak currently operates passenger trains into St. Louis and can use either of two routes, one utilizing the Merchants Bridge and the other utilizing the MacArthur Bridge. Applicants' control of TRRA will have no impact on Amtrak. In 2016, TRRA and its owners entered into an agreement regarding rehabilitation of the Merchants Bridge and also agreed to future cost allocations regarding replacement of the MacArthur Bridge.

As a result of the primary application, Applicants anticipate reducing yard activity in the St. Louis area by building certain blocks for eastbound traffic using the Alton & Southern Railway ("A&S") rather than have A&S transfer eastbound traffic to TRRA for blocking. TRRA will continue to play an important role in the St. Louis area in performing local operations and handling traffic interchanged in St. Louis. Applicants' plans will increase TRRA's capacity to serve other railroads in St. Louis.

- ***1180.6(a)(2)(i) The effect of the transaction on inter- and intramodal competition, including a description of the relevant market (see § 1180.7). Include a discussion of whether, as a result of the transaction, there is likely to be any lessening of competition, creation of a monopoly, or restraint of trade in freight surface transportation in any region of the United States.***

Applicants' acquisition of control of TRRA is part of the primary transaction, which will offer substantial competitive benefits, as described in Section 1180.6(a)(2)(i) of the primary application and as further detailed in the verified statements accompanying the primary application.

Applicants' acquisition of control of TRRA will not have any effect on inter- or intramodal competition, nor will it cause any lessening of competition or create any monopoly or restraint of trade. As noted above, TRRA will continue to operate as a terminal and switching carrier and no changes to operations are expected as a result of Applicants' control of TRRA.

Further, under Article XVI of TRRA's operating agreement, TRRA may not discriminate in any manner in favor of any company with respect to the use of its terminal system, nor may it discriminate with respect to the transfer or handling of cars. The operating agreement provides that all companies shall have equal facilities and accommodations.[1] All carriers that currently have access to TRRA facilities and locally served industries will continue to have access, and Applicants' control of TRRA will not impair these other carriers' ability to obtain service from TRRA on equal terms.

In addition, notwithstanding the fact that Applicants will control four of the seven Director positions at TRRA, under an agreement entered into in 2016, any change in a rate or fee, or any establishment of a new rate or fee, charged by TRRA to any of its individual owners, including trackage rights fees, crossing charges, and/or local switching fees, requires a unanimous vote of the Directors of TRRA.[2] Further, under TRRA's bylaws, capital contributions would still require a vote of three-fourths of the Directors voting. And amendments to the bylaws pertaining to the expenditure of money for capital contributions must receive a three-fourths vote of all the Directors.[3]

- ***1180.6(a)(2)(ii) The financial consideration involved in the proposed transaction, and any economies, to be effected in operations, and any increase in traffic, revenues, earnings available for fixed charges, and***

[1] Workpaper, "TRRA Operating Agreement.pdf."

[2] Workpaper, "Merchants Bridge Rehabilitation Agreement.pdf" § 9.

[3] Workpaper, "Merchants Bridge Rehabilitation Agreement.pdf" Ex. D.

net earnings, expected to result from the consummation of the proposed transaction.

There is no separately stated financial consideration for Applicants' acquisition of control of TRRA. The financial consideration for the primary transaction is described in Section 1180.6(a)(2)(ii) of the primary application.

- ***1180.6(a)(2)(iii) The effect of the increase, if any, of total fixed charges resulting from the proposed transaction.***

Applicants' acquisition of control of TRRA will not have any effect on fixed charges separate and apart from the primary transaction. The effect on fixed charges of the primary transaction is addressed in Section 1180.6(a)(2)(iii) of the primary application.

- ***1180.6(a)(2)(iv) The effect of the proposed transaction upon the adequacy of transportation service to the public, as measured by the continuation of essential transportation services by applicants and other carriers.***

Applicants' acquisition of control of TRRA will not affect the adequacy of transportation to the public. The effect of the primary transaction on the adequacy of transportation to the public is set forth in Section 1180.6(a)(2)(iv) of the primary application.

- ***1180.6(a)(2)(v) The effect of the proposed transaction upon applicant carriers' employees (by class or craft), the geographic points where the impact will occur, the time frame of the impact (for at least 3 years after consolidation), and whether any employee protection agreements have been reached.***

TRRA has approximately 215 employees. Applicants do not anticipate any effects on TRRA employees, as the control of TRRA by Applicants is not expected to result in any changes to operations.

The effects of the primary transaction on Applicants' employees are set forth in the primary application. Because no changes in TRRA's operations are contemplated, Applicants do not anticipate that any separate implementing agreements will be entered with respect to TRRA.

- ***1180.6(a)(2)(vi) The effect of inclusion (or lack of inclusion) in the proposed transaction of other railroads in the territory, under 49 U.S.C. 11324.***

The inclusion of other railroads in the transaction giving Applicants control of TRRA would not be in the public interest for the reasons discussed in Section 1180.6(a)(2)(vi) of the primary application. Further, Applicants' acquisition of control of TRRA will not result in the loss of traffic or revenue by any other carrier and will not result in the loss of essential services. As explained above, Applicants' control of TRRA will not affect TRRA's operations. Because no loss of essential services is threatened as a result of Applicants' control of TRRA, any forcible inclusion of another railroad in the transaction would be unwarranted.

- ***1180.6(a)(3) Any other supporting or descriptive statements applicants deem material.***

Applicants' acquisition of control of TRRA is incidental to the primary transaction, which will unquestionably provide substantial public benefits and enhance competition. Statements from shippers, public officials, and other industry stakeholders supporting the primary application are provided in Volume 3 of the primary application. Supporting statements from officers of UP and NS and expert witnesses are provided in Volumes 1 and 2 of the primary application.

- ***1180.6(a)(4) An opinion of applicants' counsel that the transaction meets the requirements of the law and will be legally authorized and***

valid, if approved by the Board. This should include specific references to any pertinent provisions of applicants' bylaws or charter or articles of incorporation.

The primary merger application contains the opinion of Applicants' counsel that Applicants' acquisition of control of TRRA, as a directly-related transaction that involves Applicants, meets the requirements of the law and will be legally authorized and valid, if approved by the Board.

- ***1180.6(a)(5) A list of the State(s) in which any part of the property of each applicant carrier is situated.***

TRRA operates approximately 170 miles of rail line in and around St. Louis, in the states of Missouri and Illinois.

The states in which Applicants conduct rail operations are listed in the primary application at Section 1180.6(a)(5).

- ***1180.6(a)(6) Map (exhibit 1). Submit a general or key map indicating clearly, in separate colors or otherwise, the line(s) of applicant carriers in their true relations to each other, short line connections, other rail lines in the territory, and the principal geographic points in the region traversed. If a geographically limited transaction is proposed, a map detailing the transaction should also be included. In addition to the map accompanying each application, 20 unbound copies of the map shall be filed with the Board.***

The map required by Section 1180.6(a)(6) is attached hereto in Exhibit 1. That map shows the rail lines of TRRA and other carriers, including UP and NS, in the area in which TRRA is located. The relationship of the lines shown on that map to rail lines in other areas is shown on the maps provided in Exhibit 1 of the primary application.

- ***1180.6(a)(7)(i) Describe the nature of the transaction (e.g., merger, control, purchase, trackage rights), the significant terms and conditions, and the consideration to be paid (monetary or otherwise).***

Applicants' acquisition of control of TRRA is a result of the primary merger transaction, but it is purely incidental to the transaction, as described above. There are no specific terms, conditions, or consideration relating to Applicants' acquisition of control of TRRA. The terms, conditions, and consideration for the primary transaction are described in the primary application.

- ***1180.6(a)(7)(ii) Agreement (exhibit 2). Submit a copy of any contract or other written instrument entered into, or proposed to be entered into, pertaining to the proposed transaction. In addition, parties to exempt trackage rights agreements and renewal of agreements described at § 1180.2(d)(7) must submit one copy of the executed agreement or renewal agreement with the notice of exemption, or within 10 days of the date that the agreement is executed, whichever is later.***

Applicants' acquisition of control of TRRA will be effected pursuant to the primary transaction. The Agreement and Plan of Merger dated as of July 28, 2025, is provided in the primary application at Exhibit 2.

- ***1180.6(a)(7)(iii) If a consolidation or merger is proposed indicate: (A) The name of the company resulting from the consolidation or merger; (B) the State or territory under the laws of which the consolidated company is to be formed or the merged company is to file its certificate of amendment; (C) the capitalization proposed for the resulting company; and (D) the amount and character of the capital stock and other securities to be issued.***

Not applicable. No merger or corporate consolidation involving TRRA is proposed. Applicants' acquisition of control of TRRA is purely incidental to the primary transaction.

- ***1180.6(a)(7)(iv) Court Order (exhibit 3). If a trustee, receiver, assignee, or personal representative of the real party in interest is an applicant,***

submit a certified copy of the order, if any, of the court having jurisdiction, authorizing the contemplated action.

Not applicable.

- ***1180.6(a)(7)(v) State whether the property involved in the proposed transaction includes all the property of the applicant carriers and, if not, describe what property is included in the proposed transaction.***

The proposed transaction involves all of the property of TRRA.

- ***1180.6(a)(7)(vi) Briefly describe the principal routes and termini of the lines involved, the principal points of interchange on the routes, and the amount of main-line mileage and branch line mileage involved.***

TRRA operates approximately 170 miles of rail line in and around St. Louis. TRRA's system includes two bridges over the Mississippi River—the Merchants Bridge and the MacArthur Bridge. TRRA's main yard is located in Madison, Illinois.

- ***1180.6(a)(7)(vii) State whether any governmental financial assistance is involved in the proposed transaction and, if so, the form, amount, source, and application of such financial assistance.***

No governmental financial assistance is involved.

- ***1180.6(a)(8) Environmental data (exhibit 4). Submit information and data with respect to environmental matters prepared in accordance with 49 CFR part 1105. In major and significant transactions, applicants shall, as soon as possible, and no later than the filing of a notice of intent, consult with the Board's Office of Environmental Analysis for the proper format of the environmental report.***

Not applicable. Under 49 C.F.R. §§ 1105.6(c)(1) and 1105.8(b)(3), environmental documentation is not required for Applicants' acquisition of control of TRRA because the transaction merely involves a corporate ownership change that will not result in significant changes in carrier operations. Environmental data for the primary transaction will be separately provided in the primary docket.

- ***1180.8(c) Operational Data. For minor transactions: Operating plan-minor (exhibit 15). Discuss any significant changes in patterns or types of service as reflected by the operating plan expected to be used after consummation of the transaction. Where relevant, submit information related to the following: (1) Traffic level density on lines proposed for joint operations. (2) Impacts on commuter or other passenger service operated over a line which is to be downgraded, eliminated, or operated on a consolidated basis. (3) Operating economies, which include, but are not limited to, estimated savings. (4) Any anticipated discontinuances or abandonments.***

The Operating Plan for the primary transaction pursuant to 49 C.F.R. § 1180.8(a) (major transactions) is provided in Exhibit 13 to the primary application. That operating plan discusses changes to operations in the St. Louis area anticipated to result from the primary transaction.

- ***1180.11 Transnational and other informational requirements.***

- ***(a) For applicants whose systems include operations in Canada or Mexico, applicants must explain how cooperation with the Federal Railroad Administration would be maintained to address potential impacts on operations within the United States of operations or events elsewhere in their systems.***

Not applicable. Transnational and other informational requirements relating to the primary transaction are contained in Section 1180.11 of the primary application.

- ***(b) All applicants must assess whether any restrictions or preferences under foreign or domestic law or policies could affect their commercial decisions, and discuss any ownership restrictions applicable to them.***

Not applicable. Transnational and other informational requirements relating to the primary transaction are contained in Section 1180.11 of the primary application.

CONCLUSION

For the reasons set forth above, Applicants respectfully request that the Board grant this application for control of TRRA.

Respectfully submitted,

/s/ Raymond A. Atkins
RAYMOND A. ATKINS
CARRIE C. MAHAN
MATTHEW J. WARREN
ALLISON C. DAVIS
MARC A. KORMAN
Sidley Austin LLP
1501 K Street, NW
Washington, DC 20005
(202) 736-8000

JASON M. MORRIS
JOSEPH H. CARPENTER IV
THOMAS E. ZOELLER
HANNA M. CHOUEST
T. MATTHEW LOCKHART
Norfolk Southern Railway Company
650 W. Peachtree Street NW
Atlanta, GA 30308

Attorneys for Norfolk Southern Corporation and Norfolk Southern Railway Company

/s/ Michael L. Rosenthal
MICHAEL L. ROSENTHAL
DEREK LUDWIN
JAMES J. O'CONNELL
MATTHEW J. GLOVER
PEGAH NABILI
Covington & Burling LLP
One CityCenter
850 Tenth Street, NW
Washington, DC 20001
(202) 662-6000

CHRISTINA B. CONLIN
JAMES B. BOLES
TONYA W. CONLEY
TANYA L. SPRATT
Union Pacific Railroad Company
1400 Douglas Street
Omaha, NE 68179

Attorneys for Union Pacific Corporation and Union Pacific Railroad Company

December 19, 2025

Union Pacific Corporation and Union Pacific Railroad Company

I, V. James Vena, declare under penalty of perjury that I am Chief Executive Officer of Union Pacific Corporation and Union Pacific Railroad Company (collectively, "Union Pacific"), applicants herein; that I am one of the executive officers duly authorized to sign, to verify, and to file this Application on behalf of Union Pacific; that I have knowledge of the matters contained in this Application to the extent they relate to Union Pacific; and that the statements made in this Application are true and correct to the best of my knowledge and belief.

V. J. Vena

V. James Vena

Dated this 17th day of December, 2025.

I, Christina B. Conlin, certify that I am Executive Vice President, Chief Legal Officer and Corporate Secretary of Union Pacific Corporation ("UPC") and Union Pacific Railroad Company ("UP"), applicants herein, and that V. James Vena, Chief Executive Officer of UPC and UP, is duly authorized to sign, to verify, and to file this Application on behalf of UPC and UP.

Christina B. Conlin
Executive Vice President, Chief Legal Officer & Corporate Secretary
Union Pacific Corporation
Union Pacific Railroad Company

Dated this 17th day of December, 2025.

Norfolk Southern Corporation and Norfolk Southern Railway Company

I, Mark R. George, declare under penalty of perjury that I am President, and Chief Executive Officer of Norfolk Southern Corporation and Chairman, President and Chief Executive Officer of Norfolk Southern Railway Company (collectively, "Norfolk Southern"), applicants herein; that I am one of the executive officers duly authorized to sign, to verify, and to file this Application on behalf of Norfolk Southern; that I have knowledge of the matters contained in this Application to the extent they relate to Norfolk Southern; and that the statements made in this Application are true and correct to the best of my knowledge and belief.

Mark R. George

Dated this 19th day of December, 2025.

I, J. Jeremy Ballard, certify that I am General Counsel Corporate and Corporate Secretary of Norfolk Southern Corporation ("NSC"), one of the applicants herein, and that Mark R. George, President & Chief Executive Officer of NSC, is duly authorized to sign, to verify, and to file this Application on behalf of the foregoing.

J. Jeremy Ballard
Corporate Secretary
Norfolk Southern Corporation

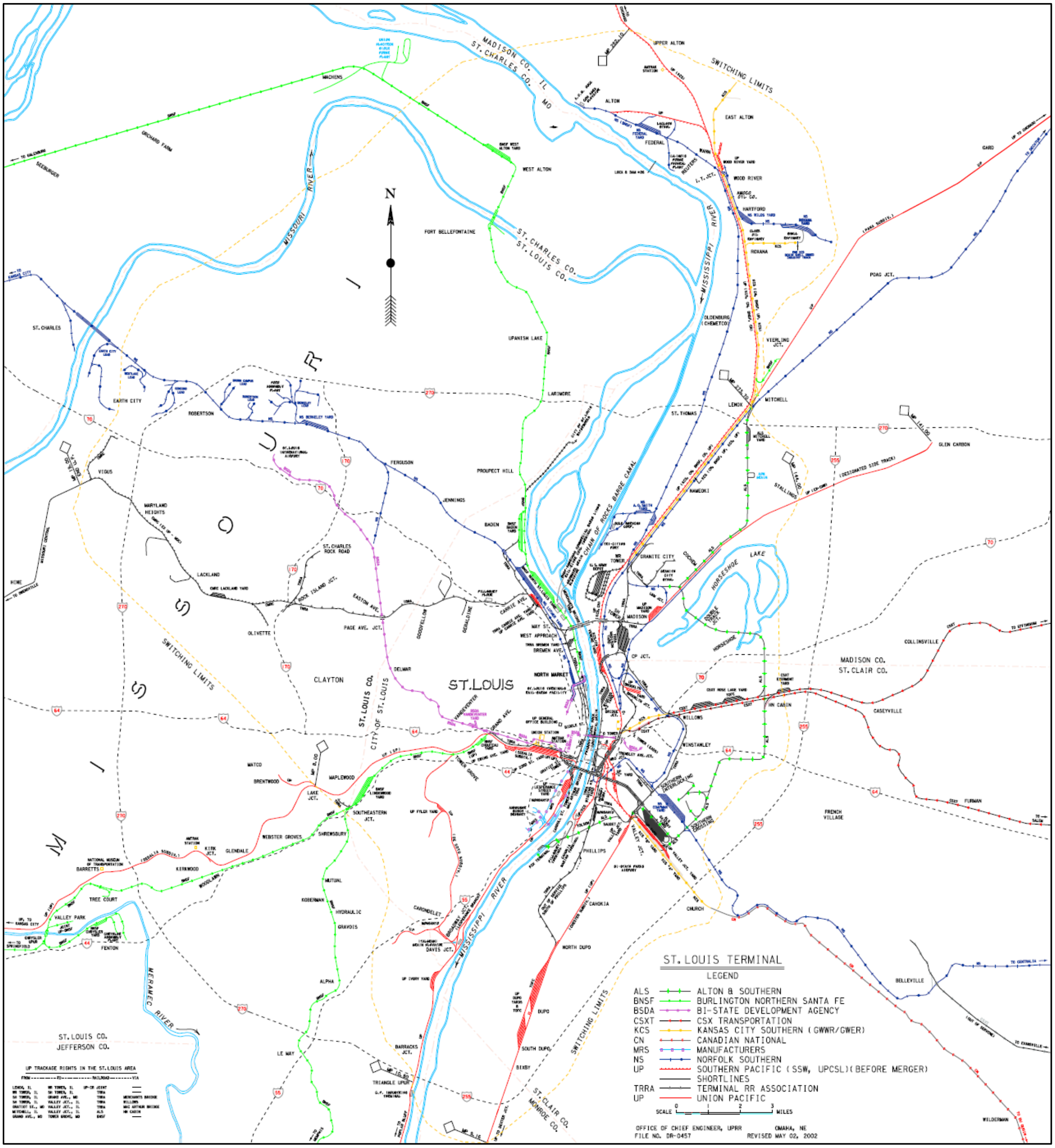
Dated this 19th day of December, 2025.

I, Joseph C. Wolfe, certify that I am Corporate Secretary of Norfolk Southern Railway Company ("NS"), one of the applicants herein, and that Mark R. George, Chairman, President & Chief Executive Officer of NS, is duly authorized to sign, to verify, and to file this Application on behalf of the foregoing.

Joseph C. Wolfe
Corporate Secretary
Norfolk Southern Railway Company

Dated this 19th day of December, 2025.

EXHIBIT 1
MAP



DENSITY CHARTS (EXHIBIT 14)

UNION PACIFIC 2024 DENSITY CHART

TONNAGE CHART OF YEAR 2024

ENGINEERING DEPARTMENT - OMAHA, NE.
SEPT 24, 2025

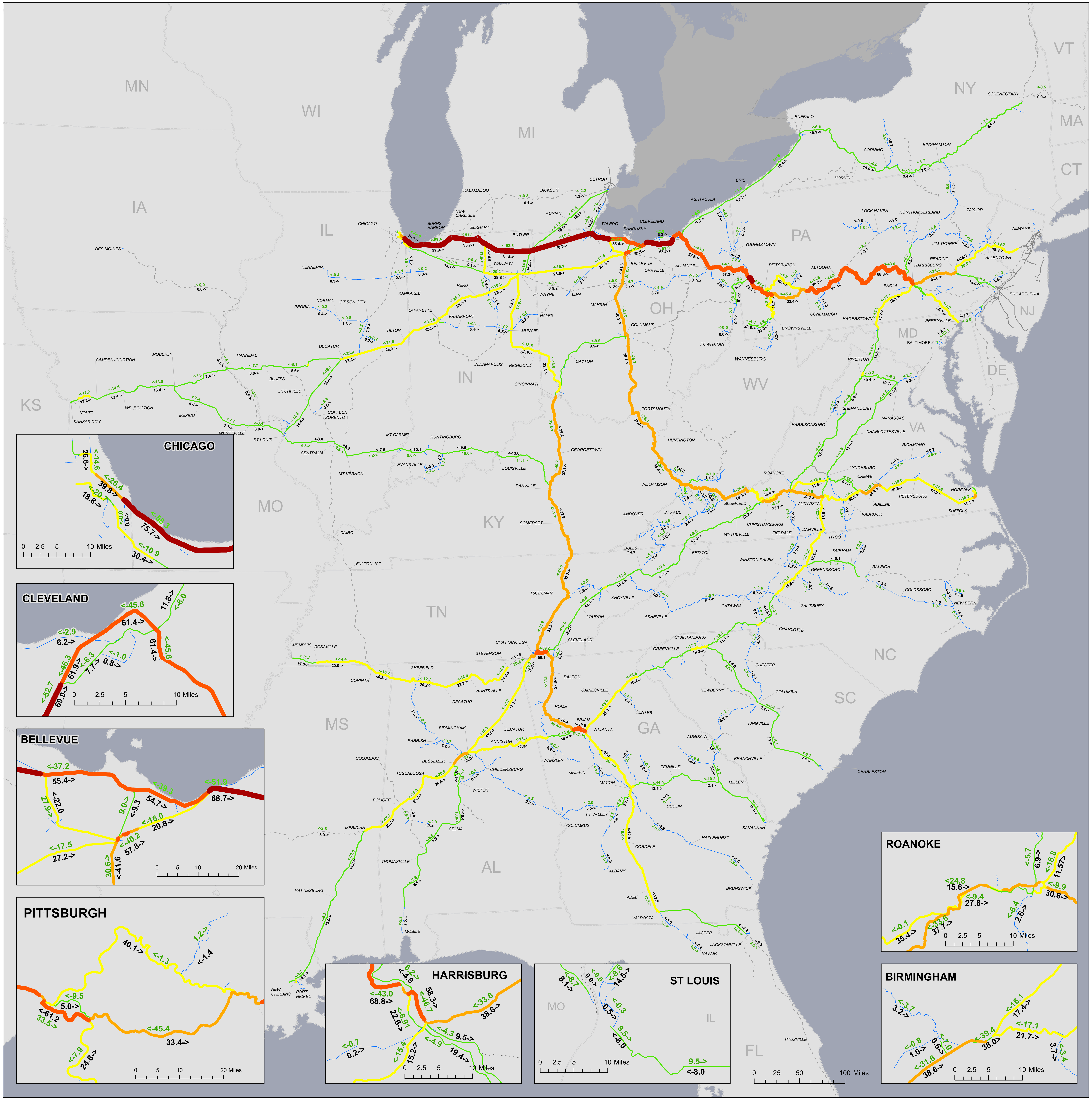
GROSS TON MILES OF FREIGHT TRAIN CARS. CONTENTS AND LOCOMOTIVES HANDLED IN MILLIONS OF TONS.

TONNAGE FIGURES PROVIDED BY INFORMATION TECHNOLOGIES

NOTE: BNSF FOREIGN TONNAGE UPDATED IN 2024.
KCS FOREIGN TONNAGE UPDATED IN 2020.
ALL OTHER FOREIGH TONNAGE REFLECTS MOST RECENT DATA AVALIABLE.

BUILDING AMERICA®

NORFOLK SOUTHERN 2024 DENSITY CHART



The Thoroughbred of Transportation

NORFOLK SOUTHERN

Norfolk Southern's Corporate Vision

Be the safest, most customer-focused and successful transportation company in the world

TOTAL MILLION GROSS TONS

- 0.0 - 9.9
- 10.0 - 29.9
- 30.0 - 59.9
- 60.0 - 89.9
- 90.0 - 119.9
- 120.0 - 209.5
- Shared Assets
- Trackage/Leased

* Numbers in map show direction of traffic represented by <- or ->; Green labels represent direction of increasing mileposts

Traffic Density Map

*Based on 2024 Data

For Full Detail of Traffic, See Engineering Technology Publication "GROSS TRAFFIC DENSITY"

NORFOLK SOUTHERN ENGINEERING
MAINTENANCE OF WAY & STRUCTURES

Updated: 3/27/2024

T. A. Morgan