

Appendix E: Cost Estimates and Funding

June 30, 2022

PREPARED FOR:









Southeast to Danbury Rail Link Capital Cost Quantites Estimates

Southeast Alternative BB	-CENTERLINE LENGTHS
TRACK CONSTRUCTION TYPE TOTAL CENTERLINE LENGTH	
CONSTRUCT NEW BALLASTED TRACK	1400
TRACK RELOCATION UP TO 14 ft.	2050
TRACK RELOCATION UP TO 1/2 GAUGE	3950
RESURFACE TRACK	
TRACK REMOVAL	750

Southeast Alt BB-SPECIAL TRACK WORK			
		IN EXISTING TRACK	CONSTRUCT
TURNOUT TYPE	TURNOUT LOCATION	(YES/NO)	NEW/DEMOLISH
#15 RH - cut in new	N.Main St Brewster, Beacon Line Connection	YES	CONSTRUCT NEW
#15 RH XO - cut in new	Prospect Hill Rd, for NB/SB moves	YES	CONSTRUCT NEW
#15 LH XO - cut in/install new	Prior to I-84 connection to NB Harlem and ALT BB	YES	CONSTRUCT NEW
#15 RH XO - cut in/install new	Prior to I-84 connection to NB Harlem and ALT BB	YES	CONSTRUCT NEW
SE #15 RH install new	Prior to I-84 connection to NB Harlem	NO	CONSTRUCT NEW
#15 LH - replace existing	Prior to I-84 connection to NB/SB Harlem	YES	CONSTRUCT NEW
SE #10 LH - remove	Prior to I-84 connection to NB Harlem	YES	DEMOLISH

SPECIAL FEATURES NEEDED

Grade Crossing, Main Street Grade Crossing, Crosby Ave Bikeway Overpass

Southeast Alternative D-CENTERLINE LENGTHS		
TRACK CONSTRUCTION TYPE	TOTAL CENTERLINE LENGTH (FT)	
CONSTRUCT NEW BALLASTED TRACK	5050	
TRACK RELOCATION UP TO 14 ft.	2250	
TRACK RELOCATION UP TO 1/2 GAUGE		
RESURFACE TRACK		
TRACK REMOVAL	600	

	Southeast Alt D-SPECIAL TRACK WORK		
		IN EXISTING TRACK	CONSTRUCT
TURNOUT TYPE	TURNOUT LOCATION	(YES/NO)	NEW/DEMOLISH
#15 LH - cut-in new	After I-84 - Beacon Line	YES	CONSTRUCT NEW
#15 RH XO - cut in/install new	Under I-84 - Harelm Line to ALT D	YES	CONSTRUCT NEW
#15 LH - replace existing	Prior to I-84 connection to NB/SB Harlem	YES	CONSTRUCT NEW
SE #10 LH - remove	Prior to I-84 connection to NB Harlem	YES	DEMOLISH
SE #15 RH X/O - install new	Prior to I-84 connection to NB Harlem and ALT D	NO	CONSTRUCT NEW
SE #15 RH - cut-in new	South of SE Platform - from Harlem to ALT D	YES	CONSTRUCT NEW
#15 XO - cut in new	Prospect Hill Rd, for NB/SB moves	YES	CONSTRUCT NEW

Bikeway Overpass

Southeast Alternative DD-CENTERLINE LENGTHS			
TRACK CONSTRUCTION TYPE	TOTAL CENTERLINE LENGTH (FT)		
CONSTRUCT NEW BALLASTED TRACK	6250		
TRACK RELOCATION UP TO 14 ft.	2500		
TRACK RELOCATION UP TO 1/2 GAUGE			
RESURFACE TRACK			
TRACK REMOVAL	675		

	Southeast Alt DD-SPECIAL TRACK WORK		
		IN EXISTING TRACK	CONSTRUCT
TURNOUT TYPE	TURNOUT LOCATION	(YES/NO)	NEW/DEMOLISH
#20 LH - cut in new	After I-84 - Beacon Line	YES	CONSTRUCT NEW
#15 RH XO - cut in new	Under I-84 - Harelm Line to ALT DD	YES	CONSTRUCT NEW
#15 LH - replace existing	Prior to I-84 connection to NB/SB Harlem	YES	CONSTRUCT NEW
SE #10 LH - remove	Prior to I-84 connection to NB Harlem	YES	DEMOLISH
SE #15 RH X/O - install new	Prior to I-84 connection to NB Harlem and ALT DD	NO	CONSTRUCT NEW
SE #15 RH - cut-in new	South of SE Platform - from Harlem to ALT DD	YES	CONSTRUCT NEW
#15 XO - cut in new	Prospect Hill Rd, for NB/SB moves	YES	CONSTRUCT NEW

Bikeway Overpass

Danbury Alt B Track-CENTERLINE LENGTHS		
TRACK CONSTRUCTION TYPE	TOTAL CENTERLINE LENGTH (FT)	
CONSTRUCT NEW BALLASTED TRACK		
TRACK RELOCATION UP TO 14 ft.		
TRACK RELOCATION UP TO 1/2 GAUGE	2050	
RESURFACE TRACK	2430	
TRACK REMOVAL	1750	

Passing Siding-CENTERLINE LENGTHS		
TRACK CONSTRUCTION TYPE	TOTAL CENTERLINE LENGTH (FT)	
CONSTRUCT NEW BALLASTED TRACK	2244	
TRACK RELOCATION UP TO 14 ft.		
TRACK RELOCATION UP TO 1/2 GAUGE		
RESURFACE TRACK		
TRACK REMOVAL	300	

Double Track Extension-CENTERLINE LENGTHS			
TRACK CONSTRUCTION TYPE TOTAL CENTERLINE LENGTH (ET)			
I TYPE TOTAL CENTERLINE LENGTH	I (F1		

	Danbury Alt BB-SPECIAL TRACK WORK		
		IN EXISTING TRACK	CONSTRUCT
TURNOUT TYPE	TURNOUT LOCATION	(YES/NO)	NEW/DEMOLISH
#15 LH - cut in new	Prior to Maple Ave, Danbury	NO	CONSTRUCT NEW
#15 RH - cut in new	Prior to Loop Connection, Danbury	NO	CONSTRUCT NEW

Updated Maple Grade Crossing Updated Balmforth Ave Grade Crossing Updated White St. Grade Crossing

	Passing Siding-SPECIAL TRA	ACK WORK	
		IN EXISTING TRACK	CONSTRUCT
TURNOUT TYPE	TURNOUT LOCATION	(YES/NO)	NEW/DEMOLISH
#15 LH - cut in new	After Joe's Hill Road	NO	CONSTRUCT NEW
#15 RH - cut in new	Prior to Haines Pond	NO	CONSTRUCT NEW

New Grade Crossing at Joes Hill 2 new double track bridge 2 new culverts bikeway accomodation

Double Track-SPECIAL TRACK WORK			
		IN EXISTING TRACK	CONSTRUCT
TURNOUT TYPE	TURNOUT LOCATION	(YES/NO)	NEW/DEMOLISH

CONSTRUCT NEW BALLASTED TRACK	5575
TRACK RELOCATION UP TO 14 ft.	
TRACK RELOCATION UP TO 1/2 GAUGE	
RESURFACE TRACK	
TRACK REMOVAL	150

BEACON LINE UPGRADE-CENTERLINE LENGTHS							
TRACK CONSTRUCTION TYPE	TOTAL CENTERLINE LENGTH (FT)						
CONSTRUCT NEW BALLASTED TRACK							
TRACK RELOCATION UP TO 14 ft.							
TRACK RELOCATION UP TO 1/2 GAUGE							
RESURFACE TRACK	42300						
TRACK REMOVAL							

#15 LH - cut in new	Near Danbury Auto Spring/Welding - Lake Ave Ext	NO	CONSTRUCT NEW
#15 LH XO - replace existing	After Segar Street	NO	CONSTRUCT NEW
#15 LH - remove	After Segar Street	NO	REMOVAL

Updated Segar St. Grade Crossing New double track bridge after/at Segar Street bikeway accomodation

SPECIAL TRACKWORK FOR LINE						
		CONSTRUCT				
ITEM	QUANTITY	NEW/REFURB				
Typical Bridge Replacement - Precast 3-sided frame	5	CONSTRUCT NEW				
Typical Bridge Replacement - RR Bridge (steel or conc) long- or multi-span	5	CONSTRUCT NEW				
Typical Bridge Replacement - RR Bridge (steel or conc) medium to short single-span	2	CONSTRUCT NEW				
Truss Bridge over Croton River	1	REFURB				
Typical Bridge Replacement - Precast concrete box	3	CONSTRUCT NEW				
Bikeway Fencing	length of corridor	CONSTRUCT NEW				
Drainage Improvements	length of corridor	CONSTRUCT NEW				
Signalization	length of corridor	CONSTRUCT NEW				





Select Southeast to Danbury Rail Link Capital Unit Costs

		2021 ESTIMATED
ITEM	UNIT	UNIT COST (\$)
Resurface Track	FT	\$ 45
Track Relocation/ Shift Track Up to 2'	FT	\$ 145
Track Relocation	FT	\$ 305
Track Removal	FT	\$ 100
New Ballasted Track	FT	\$ 430
Drainage	FT	\$ 400
New #15 Turnout	Allow	\$ 250K
New #20 Turnout	Allow	\$ 275K
New #24 Crossover	Allow	\$ 800K
Old TO Removal	Allow	\$ 40K
Interlocking Controls	Allow	\$ 4.5M
Signalization	MI	\$ 2.75M
Electrification	Allow	Varies depending on Type
Bikeway Fencing	FT	\$ 35
Bikeway Overpass	Allow	\$ 600K
Commuter Rail Stations	Allow	Varies: \$15 - \$20M
LRT Stations	Allow	\$ 12M
Bridge Replacement - Precast 3-sided frame	Allow	\$ 700K
Bridge Replacement - RR Bridge (steel or		
conc) long- or multi-span	Allow	\$ 3.9M
Bridge Replacement - RR Bridge (steel or		
conc) medium to short single-span	Allow	\$ 2.1M
Major Bridge Rehabilitation	Allow	\$ 17.7M
Precast concrete box cuvert	Allow	\$ 400K
Construction Staging	Allow	\$ 2.9M
Grade Crossing Improvements	Allow	\$ 2M



Southeast to Danbury Rail Link Operations Estimates

	Weeko	lay SB Train	s Wee	kday NB Train	s Weekday	Trainsets for				
	Rev	NR	Rev	NR	Round Trip	s* headway	Num	iber of Cars	Number of Locos	
Alt 1		14	5	14	5	7	2	8 EMU or Coach	2	Assumes 19 hour day, service to meet SE service
Alt 2a		19	3	20	5	10	6	36 EMU or Coach	6	Assumes 19 hour day, service to extend peak SE service
Alt 3		19	3	20	5	10	9	72 EMU or Coach	9	Assumes 19 hour day, service to extend SE service
Alt 4		38	0	38	0	19	4	8 LRT Car	0	Assumes 19 hour day, 15 minute headway

*Assumes 2 round trips per unit

	Train Mileag	e	Car Milea	ge	
ALT	BB D	D	BB	DD	
Alt 1	25.6		102.4		one way, trip
Alt 2a	76.8	82.8	460.8	496.8	one way, trip
Alt 3	115.2	124.2	921.6	993.6	one way, trip
Alt 4	51.2		102.4		one way, trip

260 annualization			only week	days	
Annual	Train Mileag	е	Car Milea	je	
ALT	BB D	D	BB	DD	
Alt 1	13312		53248		both ways, number of trips
Alt 2a	39936	43056	239616	258336	both ways, number of trips
Alt 3	59904	64584	479232	516672	both ways, number of trips
Alt 4			106496		both ways, number of trips



Select Southeast to Danbury Rail Link Operating/Maintenance Unit Costs

5	5	202	1 ESTIMATED
ITEM	UNIT	UNI	T COST (\$)
Train Operations	per train per revenue hour	\$	220
Diesel Locomotive/DM Maintenance	per train mile	\$	5
Diesel Propulsion	per train mile	\$	8
Multilevel Coach or SL Comet V Coach			
Maintenace	per train mile	\$	1
EMU Maintenance	per car mile	\$	3
Electric Propulsion	per car mile	\$	2
LRT Maintenace	per car mile	\$	5
Stations Maintenace (includes elevators)	per station	\$	50K
Security	per station	\$	25K
Right-of-way SOGR, Commuter Rail	per track mile	\$	75K
Right-of-way SOGR, LRT	per track mile	\$	50K



Federal Funding Options Table

TABLE 1. FEDERAL FUNDING OPTIONS

PROGRAM/SOURCE	AGENCY	ELIGIBILITY REQUIREMENTS	APPROPRIATED/ AVAILABLE FUNDING ELIGIBLE PHASES	MATCHING REQUIREMENTS
Local and Regional Project Assistance (RAISE) Transportation Grants	USDOT	 Capital projects that have a significant impact on the nation, a region, or a metropolitan area including road, rail, transit, port, and intermodal improvements Eligible Applicants include state, county, and local governments, transit agencies, and MPOs; applicant is expected to administer and deliver the project 	 \$1 billion appropriated in FY2021; deadline to apply was July 12th, 2021; \$1.5 billion authorized FY2022- 2026 FY2022 NOFO has been released, deadline to apply is April 14, 2022 DOT intends to award 50% of available funding for rural projects The maximum award for all projects is \$25 million, no more than \$225 million to a single State 	For urban projects, federal share may not exceed 80% of total project costs; minimum of 20% non-federal match may be public and/or private sector funding, including federal financing repaid with local funds



PROGRAM/SOURCE	AGENCY	eligibility Requirements	Appropriated/ Available funding	ELIGIBLE PHASES	MATCHING REQUIREMENTS
National Infrastructure Project Assistance (NIPA) Grants	USDOT	 Multi-modal, multi- jurisdictional capital projects that generate national or regional economic, mobility, or safety benefits, including road, rail, transit, and intermodal improvements Eligible Applicants include state, county, and local governments, transit agencies, and metropolitan planning organizations 	 \$5 billion in advance appropriations between FY 2022 and FY 2026, with an additional \$10 billion in advance authorizations between FY 2022 and FY 2026 50% of program funds for projects with a total cost between \$100 million - \$500 million 	 Details to become available following first NOFO from the federal government, release date unknown 	
Consolidated Rail Infrastructure and Safety Improvements (CRISI) Program Rail Transportation Grants	FRA	 Capital projects that improve the safety, efficiency, and reliability of intercity passenger and freight rail, including new or improved rail corridors Eligible Applicants include state, county, and local governments, transit agencies, and Amtrak or another passenger rail carrier 	 \$360 million appropriated in FY2021; deadline to apply was November 29th, 2021; \$1 billion authorized FY2022- 2026 25% of available funding is set aside for rural projects At least \$25 million in grants for projects that support the development of new intercity passenger rail service routes 	 Planning Environmental Construction Equipment Procurement 	Federal share may not exceed 80% of total project costs, with selection preference for applications where the federal share is 50% or less; minimum of 20% non-federal match may be public and/or private sector funding, including fare revenues, but excludes any federal financing



PROGRAM/SOURCE	AGENCY	eligibility Requirements	Appropriated/ Available funding	ELIGIBLE PHASES	Matching Requirements
Railroad Crossing Elimination Program Grants	FRA	 Projects that remove or make safety improvements to highway-rail at-grade crossings that are frequently blocked by trains Eligible Applicants include state, county, and local governments, transit agencies, port authorities, and metropolitan planning organizations 	 \$3 billion in advance appropriations between FY 2022 and FY 2026, with an additional \$2.5 billion in advance authorizations between FY 2022 and FY 2026, with a minimum award size of \$1 million 20% of program funds is set aside for rural projects No more than \$220 million for a single state 	government, release date unknown	



PROGRAM/SOURCE	AGENCY	eligibility Requirements	Appropriated/ Available funding	ELIGIBLE PHASES	MATCHING REQUIREMENTS
Section 5309 Fixed Guideway Capital Investment Grants (CIG) – Small Starts	FTA	 New fixed guideway projects, extensions to existing fixed guideway systems, or corridor-based bus rapid transit projects Total estimated capital cost of less than \$400 million and that are seeking less than \$150 million in CIG program funds Eligible Applicants include state, county, and local governments and transit agencies 	Projects in FY 2021 ¹	 Planning Environmental Final design Construction 	For urban projects, federal share may not exceed 80% of total project costs; minimum of 20% non-federal match may be public and/or private sector funding
Section 5309 Fixed Guideway Capital Investment Grants (CIG) – New Starts	FTA	 New fixed guideway projects or extensions to existing fixed guideway systems Total estimates capita cost of \$400 million or more, or that are seeking \$150 million or more in CIG funds Eligible Applicants include state, county, and local governments and transit agencies 	Starts Projects in FY 2021 ² I — \$4.4 billion in advance	 Design Construction 	 New Starts maximum CIG share of 60% of total project costs Federal share may not exceed 80% of total project costs

¹ Source: <u>https://www.govinfo.gov/content/pkg/FR-2021-07-22/pdf/2021-15576.pdf</u> ² Source: <u>https://www.govinfo.gov/content/pkg/FR-2021-07-22/pdf/2021-15576.pdf</u>



PROGRAM/SOURCE	AGENCY	eligibility Requirements	Appropriated/ Available funding	ELIGIBLE PHASES	MATCHING REQUIREMENTS
CIG Pilot Program for Expedited Project Delivery – 3005(b)	FΤΑ	 New Capital projects that utilize public- private partnerships, are operated and maintained by employees of an existing public transportation provider, and have a federal share not exceeding 25% of the project capital cost Eligible Applicants include state, county, and local governments and transit agencies 	 \$100 million available in FY2021³ \$800 million in advance appropriations between FY 2022 and FY 2026, with an additional \$15 billion in advance authorizations between FY 2022 and FY 2026 for the full CIG program 	 Design Construction 	 Federal share may not exceed 25% of project capital cost
Congestion Mitigation and Air Quality (CMAQ)	FHWA	 Transportation projects and programs that reduce congestion and improve air quality in designated air quality maintenance or non- attainment areas for carbon monoxide and/or ozone 	\$48.2 million apportioned to Connecticut and \$199.6 million to New York in FY2022 ⁴ —	 Construction Procurement of Medium/Heavy-duty Zero Emission Vehicles Operations and Maintenance for New Transit Services 	 Federal share must not exceed 80% of total project costs Minimum of 20% non-Federal match may be public or private sector funding.

³ Source: <u>https://www.govinfo.gov/content/pkg/FR-2021-07-22/pdf/2021-15576.pdf</u> ⁴ Source: <u>https://www.fhwa.dot.gov/legsregs/directives/notices/n4510858/n4510858_t1.cfm</u>



PROGRAM/SOURCE	AGENCY	eligibility Requirements	Appropriated/ Available funding	ELIGIBLE PHASES	MATCHING REQUIREMENTS
Surface Transportation Block Grant (STBG)	FHWA	 A range of transportation projects including transit safety infrastructure improvements for existing services and transit capital funding for new projects 	\$170.6 million apportioned to Connecticut and \$555.6 million to New York in FY2022 ⁵	 Planning Design Property Acquisition Construction 	 Federal share must not exceed 80% of total project costs (90% for projects on the Interstate System) Minimum of 20% non-Federal match may be public and/or private sector funding

⁵ Source: <u>https://www.fhwa.dot.gov/legsregs/directives/notices/n4510858/n4510858_t1.cfm</u>



Existing State Funding Options Table

TABLE 2. EXISTING STATE FUNDING OPTIONS

PROGRAM/SOURCE	AGENCY/STATE	ELIGIBILITY REQUIREMENTS	APPROPRIATED/ AVAILABLE FUNDING	ELIGIBLE PHASES	MATCHING REQUIREMENTS
State Omnibus and Transit Appropriation	New York	 Transit capital investments financed in part through federal funding 	 \$18.5 million appropriated annually 	 Planning Engineering and Design Environmental Property Acquisition Construction 	50% of the non-federal share (not to exceed 10% of the project cost), with local sponsors required to provide the remaining local share
State Multi-Modal Program	New York	 Reimbursement funding for Intercity rail passenger facilities and equipment 	— N/a	 Construction 	N/a
Passenger and Freight Rail Assistance Program (PFRAP)	New York	 Capital investments in freight and passenger rail corridors Eligible applicants include railroads, state agencies, and local governments 	 \$85.5 million in 2020- 2021. 	 Planning Engineering and Design Environmental Property Acquisition Construction 	Up to 100% of project costs, but with preference given to applications that provide a greater local share



PROGRAM/SOURCE	AGENCY/STATE	ELIGIBILITY REQUIREMENTS	Appropriated/ Available funding	ELIGIBLE PHASES	MATCHING REQUIREMENTS
Public Transportation Modernization and Enhancement Program (MEP)	New York	 Vehicle rehabilitation and/or replacement, fleet enhancement, deployment of new technologies, and passenger amenities and maintenance facilities. Eligible applicants include Local and county governments and transit agencies 		 Vehicle Procurement Passenger and maintenance facility construction 	MEP funds may not be used to supplant the required Local Share of a federally funded project.

⁶ Source: <u>https://www.dot.ny.gov/divisions/policy-and-strategy/public-transportation/funding-sources/modernization-enhancement</u>



Federal Financing Options

TABLE 3. FEDERAL FINANCING OPTIONS

PROGRAM/SOURCE	AGENCY/ STATE	ELIGIBILITY REQUIREMENTS	Appropriated/ Available funding	ELIGIBLE PHASES	MATCHING REQUIREMENTS
Transportation Infrastructure Finance and Innovation Act (TIFIA)	USDOT	 Any project that is eligible for federal assistance through existing surface transportation programs is eligible for the program. Additional project types include but are not limited to: intercity passenger bus and rail facilities and vehicles; publicly owned freight rail facilities; service improvements on or adjacent to the National Highway System. 	 Minimum Project Costs \$10 million for TOD, Local, and Rural Projects \$15 million for Intelligent Transportation System Projects \$50 million for all other eligible Surface Transportation Projects Credit Assistance limited to 33% of project costs 	 Planning Environmental Final design Construction 	Total federal share may not exceed 80% of total project costs; minimum of 20% non-federal match may be public and/or private sector funding



PROGRAM/SOURCE	AGENCY/ STATE	ELIGIBILITY REQUIREMENTS	Appropriated/ Available funding	ELIGIBLE PHASES	MATCHING REQUIREMENTS
Railroad Rehabilitation and Improvement Financing (RRIF)	USDOT	 Acquire, improve, or rehabilitate intermodal or rail equipment or facilities, including track, components of track, bridges, yards, buildings and shops, and including the installation of positive train control systems; Develop or establish new intermodal or railroad facilities; Reimburse planning and design expenses relating to activities listed above; Refinance outstanding debt incurred for the purposes listed above 	 \$7 billion reserved for projects benefiting freight railroads other than Class I carrier 	 Construction 	Up to 100 percent of project costs.