



Dunedin Causeway Bridge Project Development

Dunedin, FL

B. Benefit-Cost Analysis Spreadsheets

Bridge Investment Program (BIP)
Grant Application

SEPTEMBER 2022

Contact

Pinellas County Board of County Commissioners







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Dunedin Island Bridge Replacement





Pinellas County, FL

This model contains all calculations used in the Benefit Cost Analysis for this project. The legend below provides guidance on the role of each tab, and the meaning of different colors and shading throughout the model.

Tab Reference

	Aqua Shading - Intro Materials
	Lime Green Shading - Standard Input Values, reflecting guidance from USDOT and other sources
	Orange Shading - Project Input Values and intermediate calculations, reflecting project-specific information
	Light Pink Shading - Calculations
	Purple Shading - Aggregated Values, Benefits, and Costs
	Blue Shading - Output Tables and Charts

Cell Reference

	Light Green Cell Shading - Model Owner Input Value
	Light Yellow Cell Shading - User Input Value
	Blue Text - Import from Another Sheet
	Red Text - Exported to Another Sheet
	Purple Italicized Text - Additional Model Guidance

Source: <https://www.transportation.gov/site:https://apps.bea.gov/iTable/iTable.cfm?reqid=19&step=3&>

Base Year of Nominal Dollar	Multiplier to Adjust to Real 2020\$	Implicit Price Deflator for GDP	Future Year Inflation Estimate
2001	1.4245	79.7830	
2002	1.4026	81.0260	
2003	1.3755	82.6250	
2004	1.3395	84.8430	
2005	1.2988	87.5040	
2006	1.2599	90.2040	
2007	1.2267	92.6420	
2008	1.2037	94.4190	
2009	1.1960	95.0240	
2010	1.1818	96.1660	1.2% 0.024084975
2011	1.1577	98.1640	2.1%
2012	1.1365	100.0000	1.9%
2013	1.1169	101.7510	1.8%
2014	1.0964	103.6540	1.9%
2015	1.0856	104.6910	1.0%
2016	1.0748	105.7400	1.0%
2017	1.0548	107.7470	1.9%
2018	1.0302	110.3210	2.4%
2019	1.0121	112.2940	1.8%
2020	1.0000	113.6480	1.2%
2021	0.9601	118.3710	4.2%
2022	0.8800	129.142761	9.1% https://www.b
2023	0.8582	132.4336717	2.55% https://www.n
2024	0.8368	135.8084439	2.55% https://www.n
2025	0.8160	139.2692144	2.55% https://www.n
2026	0.7958	142.8181749	2.55% https://www.n
2027	0.7760	146.4575725	2.55% https://www.n
2028	0.7567	150.189712	2.55% https://www.n
2029	0.7379	154.0169566	2.55% https://www.n
2030	0.7196	157.9417298	2.55% https://www.n

Source: EMFAC2021 (v1.0.1) Emission Rates

Region Type: Statewide

Region: California

Calendar Year: 2022, 2050

Season: Annual

Vehicle Classification: EMFAC202x Categories

Units: miles/day for CVMT and EVMT, g/mile for RUXEN, PMBW and PMTW, mph for Speed, kWh/mile for Energy Consumption, gallon/mile for Fuel Consumption. PHEV calculated based on total VMT.

Table with columns: Region, Calendar, Vehicle, C, Model, Ye, Speed, Fuel, Total VM, CVMT, EVMT, NOx, PM2.5, PM10, CO2, CH4, N2O, ROG, TOG, CO, SOx, NH3, PM10_P, PM2.5_P, Fuel Con, Energy Consumption. Rows include Statewide entries for 2022 and 2050 across various vehicle models and fuels.

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Table with 20 columns: Statewide, 2050, LDT1, Aggregat, 70, Gasoline, 3E+06, 3E+06, 0, 0.0208, 0.0005, 0.0005, 285.19, 0.0011, 0.0033, 0.0031, 0.0045, 0.375, 0.0028, 0.0417, 0.0026, 0.0009, 0.0332, 0. This table lists emission data for various vehicle categories and fuel types.

Source: EMFAC2021 (v1.0.1) Emission Rates

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	Variable	Source	Units	Constant (Likely Case)	Baseline	Low	High	
GENERAL								
	Scenario	User Input		BASELINE				
	Model Start Year		year	2021				
	Base Year (for Base Year)		year	2020				
	Base Year (for Base Year Unit)		year	2020				
				2020\$				
	Average Vehicle	USDOT BCA Guidance	Figure	1.67				
	Average Vehicle	USDOT BCA Guidance	Figure	1.48				
	Average Vehicle	USDOT BCA Guidance	Figure	1.58				
	Average Vehicle	USDOT BCA Guidance	Figure	2.02				
	Average Vehicle	USDOT BCA Guidance	Figure	1				
FACTORS								
	Million			1,000,000				
	Grams to metric ton conversion		Factor	0.0000100000				
	Grams to short ton conversion		Factor	0.00000110231				
	Lbs to metric ton conversion		Factor	0.000454				
VALUE OF TIME								
	Value of time Real	USDOT 2014	annual rate	0.00%				
	<u>Surface Modes (except HSR) Values</u>							
	Local Travel							
	Personal Share of Total	USDOT BCA Guidance	percent	88.20%				
	Business Share of Total	USDOT BCA Guidance	percent	11.80%				
	Personal VTTS	USDOT BCA Guidance	2020\$ per person-	16.20	16.20	11.49	19.53	
	Business VTTS	USDOT BCA Guidance	2020\$ per person-	29.40	29.40	20.85	35.45	
	All Purposes	USDOT BCA Guidance	2020\$ per person-	17.80	17.80	12.62	21.46	
					LO VOT	HI VOT		
	Intercity Travel							
	Personal Share of Total	USDOT Value of Travel	percent	78.60%				
	Business Share of Total	USDOT Value of Travel	percent	21.40%				
	Personal VTTS	USDOT BCA Guidance	2020\$ per person-	22.70	22.70	16.10	27.37	
	Business VTTS	USDOT BCA Guidance	2020\$ per person-	29.40	29.40	20.85	35.45	
	All Purposes	USDOT BCA Guidance	2020\$ per person-	24.13	24.13	17.12	29.10	
	Bicyclists/Pedestrians/ Waiting/Standing/Transfer Time							
	Personal VTTS	USDOT BCA Guidance	2020\$ per person-	32.40	32.40	22.98	39.06	
	<u>Air and HSR Values</u>							
	Intercity Travel							
	Personal Share of Total	USDOT Value of Travel	percent	59.60%				
	Business Share of Total	USDOT Value of Travel	percent	40.40%				
	Personal VTTS	USDOT BCA Guidance	2020\$ per person-	43.20	43.20	30.64	52.09	
	Business VTTS	USDOT BCA Guidance	2020\$ per person-	73.20	73.20	51.91	88.26	
	All Purposes	USDOT BCA Guidance	2020\$ per person-	55.32	55.32	39.23	66.70	
	<u>Other Values</u>							
	Truck Drivers VTTS	USDOT BCA Guidance	2020\$ per person-	32.00	32.00	22.70	38.58	
	Bus Drivers VTTS	USDOT BCA Guidance	2020\$ per person-	33.60	33.60	23.83	40.51	
	Transit Rail Operators	USDOT BCA Guidance	2020\$ per person-	50.70	50.70	35.96	61.13	
	Locomotive Engineers	USDOT BCA Guidance	2020\$ per person-	52.50	52.50	37.23	63.30	
	Airline Pilots and	USDOT Value of Travel	2020\$ per person-	94.12	94.12	66.75	113.48	

[EIAA Presentation](#)
 Contact Sebastian
 Guerrero to discuss

FUEL

Cost of Unreliability	NCHRP 07-24:	2020\$ per person-	\$165
	From "Annual Energy Outlook 2022" Table		
Dollar Year of EIA IEA	US EIA Annual Energy	year	2021
EIA IEA Forecast End Year	US EIA Annual Energy Outlook 2022	year	2050
	From "Annual Energy Outlook 2022" Table 12. Petroleum and		
Motor gasoline price growth (after 2050)	CAGR from 2020-2050 EIA Forecast	Percent Annual Growth	0.1%
Diesel price growth (after 2050)	CAGR from 2020-2050 EIA Forecast	Percent Annual Growth	0.3%
Jet fuel price growth (after 2050)	CAGR from 2020-2050 EIA Forecast	Percent Annual Growth	1.0%
	Transportation Energy Efficiency Indicators		
Auto fuel efficiency	CAGR from 2020-2050	Percent Annual	0.8%
Truck fuel efficiency	CAGR from 2020-2050	Percent Annual	1.1%
Aircraft fuel efficiency	CAGR from 2020-2050	Percent Annual	0.8%
Rail fuel efficiency	CAGR from 2020-2050	Percent Annual	0.6%
	https://www.bts.gov/		
Energy intensity of	Bureau of	thousand BTUs per	138.70

EMISSIONS COSTS

[Emissions Costs - USD](#)
[\(see InpR tab for forecast values\)](#)

Forecast End Date	USDOT BCA Guidance	year	2050
	Mar 2022		
Discount Rate for Long-	USDOT BCA Guidance	percentage	3%
CO2 Emissions Costs After Forecast Period		Percent Annual Growth	0%
Grams of CO2	EPA Greenhouse Gas	factor	8,887
Grams of CO2	EPA Greenhouse Gas	factor	10,180

[Emissions Costs - Non CO2 \(see InpR tab for forecast values\)](#)

Forecast End Date	USDOT BCA Guidance	year	2050
	Mar 2022		
Non-CO2 Emissions Costs After Forecast Period		Percent Annual Growth	0%

[Passenger Rail Emissions Values](#)

Light-Duty Passenger Rail GHG emissions (CO2 equivalents)	USDOT BCA Guidance	Passenger Rail Energy Consumption with	lbs / passenger mile	0.122
Medium-Duty Passenger Rail GHG emissions (CO2 equivalents)	USDOT BCA Guidance	Passenger Rail Energy Consumption with	lbs / passenger mile	0.282

VEHICLE OPERATING COSTS

Vehicle Operating	USDOT BCA Guidance	2020\$ / VMT	0.450
Vehicle Operating	USDOT BCA Guidance	2020\$ / VMT	0.940

NOISE & CONGESTION COSTS

[Congestion](#)

Light-Duty Vehicles -	USDOT BCA Guidance	2020\$ / VMT	0.124
Light-Duty Vehicles -	USDOT BCA Guidance	2020\$ / VMT	0.026
Light-Duty Vehicles -	USDOT BCA Guidance	2020\$ / VMT	0.104
Buses and Trucks -	USDOT BCA Guidance	2020\$ / VMT	0.310
Buses and Trucks -	USDOT BCA Guidance	2020\$ / VMT	0.067
Buses and Trucks - All	USDOT BCA Guidance	2020\$ / VMT	0.212

All Vehicles - Urban	USDOT BCA Guidance	2020S / VMT	0.138
All Vehicles - Rural	USDOT BCA Guidance	2020S / VMT	0.033
All Vehicles - All	USDOT BCA Guidance	2020S / VMT	0.115
Auto Average Congestion Cost	calc	2020S / VMT	0.026
Truck Average Congestion Cost	calc	2020S / VMT	0.067

Noise

Light-Duty Vehicles -	USDOT BCA Guidance	2020S / VMT	0.002
Light-Duty Vehicles -	USDOT BCA Guidance	2020S / VMT	0.000
Light-Duty Vehicles -	USDOT BCA Guidance	2020S / VMT	0.001
Buses and Trucks -	USDOT BCA Guidance	2020S / VMT	0.039
Buses and Trucks -	USDOT BCA Guidance	2020S / VMT	0.003
Buses and Trucks - All	USDOT BCA Guidance	2020S / VMT	0.020
All Vehicles - Urban	USDOT BCA Guidance	2020S / VMT	0.005
All Vehicles - Rural	USDOT BCA Guidance	2020S / VMT	0.001
All Vehicles - All	USDOT BCA Guidance	2020S / VMT	0.003
Auto Average Noise Cost	calc	2020S / VMT	0.000
Truck Average Noise Cost	calc	2020S / VMT	0.003

PAVEMENT DAMAGE

Autos/Rural Interstate	FHWA 2000	2020S / VMT	0.000
Autos/Urban Interstate	FHWA 2000	2020S / VMT	0.002
40 kip 4-axle S.U.	FHWA 2000	2020S / VMT	0.014
40 kip 4-axle S.U.	FHWA 2000	2020S / VMT	0.044
60 kip 4-axle S.U.	FHWA 2000	2020S / VMT	0.080
60 kip 4-axle S.U.	FHWA 2000	2020S / VMT	0.259
60 kip 5-axle	FHWA 2000	2020S / VMT	0.047
60 kip 5-axle	FHWA 2000	2020S / VMT	0.150
Auto Average Pavement Cost	calc	2020S / VMT	0.000
Truck Average Pavement Cost	calc	2020S / VMT	0.047

MORTALITY
REDUCTION BENEFITS
OF ACTIVE
TRANSPORTATION

Walking	USDOT BCA Guidance	2020S / Induced-Trip	7.08
Cycling	USDOT BCA Guidance	2020S / Induced-Trip	6.31

AMENITY/FACILITY
VALUES

Public Transit Facility

Bus Stop

Clocks	USDOT BCA Guidance	2020S / trip	0.03
Electronic Real-Time Information/Emergency PA System	USDOT BCA Guidance	2020S / trip	0.29
Platform/Stop Seating	USDOT BCA Guidance	2020S / trip	0.22
Platform/Stop	USDOT BCA Guidance	2020S / trip	0.29
Platform/Stop	USDOT BCA Guidance	2020S / trip	0.18
Restroom Availability	USDOT BCA Guidance	2020S / trip	0.24
Retail/Food Outlet	USDOT BCA Guidance	2020S / trip	0.14
Staff Availability	USDOT BCA Guidance	2020S / trip	0.10
Step-free Access to	USDOT BCA Guidance	2020S / trip	0.07
Step-free Access to	USDOT BCA Guidance	2020S / trip	0.30
Surveillance Cameras	USDOT BCA Guidance	2020S / trip	0.39
Temperature	USDOT BCA Guidance	2020S / trip	0.29
Ticket Machines	USDOT BCA Guidance	2020S / trip	0.59
Timetables	USDOT BCA Guidance	2020S / trip	0.10
Bike Facilities	USDOT BCA Guidance	2020S / trip	0.22
Car Access Facilities	USDOT BCA Guidance	2020S / trip	0.09
Elevator	USDOT BCA Guidance	2020S / trip	0.11
Escalators	USDOT BCA Guidance	2020S / trip	0.07
On-Site Ticket Office	USDOT BCA Guidance	2020S / trip	0.04
Taxi Pickup/Dropoff	USDOT BCA Guidance	2020S / trip	0.09
Waiting Room	USDOT BCA Guidance	2020S / trip	0.05
			0.19

Light Rail/Streetcar
Stop

Clocks	USDOT BCA Guidance	2020S / trip	0.03
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	Electronic Real-Time	USDOT BCA Guidance	2020S / trip	0.14
	Information/Emergency	USDOT BCA Guidance	2020S / trip	0.22
	PA System	USDOT BCA Guidance	2020S / trip	0.05
	Platform/Stop Seating	USDOT BCA Guidance	2020S / trip	0.13
	Platform/Stop	USDOT BCA Guidance	2020S / trip	0.15
	Restroom Availability	USDOT BCA Guidance	2020S / trip	0.14
	Retail/Food Outlet	USDOT BCA Guidance	2020S / trip	0.10
	Staff Availability	USDOT BCA Guidance	2020S / trip	0.03
	Step-free Access to	USDOT BCA Guidance	2020S / trip	0.30
	Step-free Access to	USDOT BCA Guidance	2020S / trip	0.07
	Surveillance Cameras	USDOT BCA Guidance	2020S / trip	0.29
	Temperature	USDOT BCA Guidance	2020S / trip	0.59
	Ticket Machines	USDOT BCA Guidance	2020S / trip	0.10
	Timetables	USDOT BCA Guidance	2020S / trip	0.09
	Bike Facilities	USDOT BCA Guidance	2020S / trip	0.09
	Car Access Facilities	USDOT BCA Guidance	2020S / trip	0.11
	Elevator	USDOT BCA Guidance	2020S / trip	0.07
	Escalators	USDOT BCA Guidance	2020S / trip	0.04
	On-Site Ticket Office	USDOT BCA Guidance	2020S / trip	0.09
	Taxi Pickup/Dropoff	USDOT BCA Guidance	2020S / trip	0.05
	Waiting Room	USDOT BCA Guidance	2020S / trip	0.19

Rail Station

	Clocks	USDOT BCA Guidance	2020S / trip	0.06
	Electronic Real-Time	USDOT BCA Guidance	2020S / trip	0.82
	Information/Emergency	USDOT BCA Guidance	2020S / trip	0.10
	PA System	USDOT BCA Guidance	2020S / trip	0.09
	Platform/Stop Seating	USDOT BCA Guidance	2020S / trip	0.12
	Platform/Stop	USDOT BCA Guidance	2020S / trip	0.12
	Restroom Availability	USDOT BCA Guidance	2020S / trip	0.10
	Retail/Food Outlet	USDOT BCA Guidance	2020S / trip	0.06
	Staff Availability	USDOT BCA Guidance	2020S / trip	0.17
	Step-free Access to	USDOT BCA Guidance	2020S / trip	0.19
	Step-free Access to	USDOT BCA Guidance	2020S / trip	0.07
	Surveillance Cameras	USDOT BCA Guidance	2020S / trip	0.30
	Temperature	USDOT BCA Guidance	2020S / trip	0.59
	Ticket Machines	USDOT BCA Guidance	2020S / trip	0.06
	Timetables	USDOT BCA Guidance	2020S / trip	0.45
	Bike Facilities	USDOT BCA Guidance	2020S / trip	0.09
	Car Access Facilities	USDOT BCA Guidance	2020S / trip	0.11
	Elevator	USDOT BCA Guidance	2020S / trip	0.07
	Escalators	USDOT BCA Guidance	2020S / trip	0.04
	On-Site Ticket Office	USDOT BCA Guidance	2020S / trip	0.09
	Taxi Pickup/Dropoff	USDOT BCA Guidance	2020S / trip	0.05
	Waiting Room	USDOT BCA Guidance	2020S / trip	0.19

Public Transit Vehicle

Bus

	Electronic Real-Time	USDOT BCA Guidance	2020S / trip	0.20
	Handrails	USDOT BCA Guidance	2020S / trip	0.12
	Luggage Storage	USDOT BCA Guidance	2020S / trip	0.08
	PA System	USDOT BCA Guidance	2020S / trip	0.36
	Surveillance Cameras	USDOT BCA Guidance	2020S / trip	0.21
	Temperature Control	USDOT BCA Guidance	2020S / trip	0.30
	Wheelchair Space	USDOT BCA Guidance	2020S / trip	0.04

Light Rail/Streetcar

	Electronic Real-Time	USDOT BCA Guidance	2020S / trip	0.20
	Handrails	USDOT BCA Guidance	2020S / trip	0.12
	Luggage Storage	USDOT BCA Guidance	2020S / trip	0.08
	PA System	USDOT BCA Guidance	2020S / trip	0.36
	Surveillance Cameras	USDOT BCA Guidance	2020S / trip	0.21
	Temperature Control	USDOT BCA Guidance	2020S / trip	0.12
	Wheelchair Space	USDOT BCA Guidance	2020S / trip	0.04

Rail

	Electronic Real-Time	USDOT BCA Guidance	2020S / trip	0.21
	Handrails	USDOT BCA Guidance	2020S / trip	0.29
	Luggage Storage	USDOT BCA Guidance	2020S / trip	0.08
	PA System	USDOT BCA Guidance	2020S / trip	0.37
	Surveillance Cameras	USDOT BCA Guidance	2020S / trip	0.59
	Temperature Control	USDOT BCA Guidance	2020S / trip	0.45
	Wheelchair Space	USDOT BCA Guidance	2020S / trip	0.04
	Food Service	USDOT BCA Guidance	2020S / trip	0.03
	Restroom Availability	USDOT BCA Guidance	2020S / trip	0.18

Active Transportation

Cycling

	Average Length of	USDOT BCA Guidance	miles	2.38
	Cycling Path with At	USDOT BCA Guidance	2020S / cycle-mile	1.42
	Cycling Path with no At	USDOT BCA Guidance	2020S / cycle-mile	1.78
	Dedicated Cycling Lane	USDOT BCA Guidance	2020S / cycle-mile	1.69
	Cycling	USDOT BCA Guidance	2020S / cycle-mile	0.26
	Separated Cycle Track	USDOT BCA Guidance	2020S / cycle-mile	1.69

Pedestrian

	Average Length of	USDOT BCA Guidance	miles	0.86
	Maximum sidewalk	USDOT BCA Guidance	feet	31.00
	Expand Sidewalk (per	USDOT BCA Guidance	2020S / person-mile /	\$0.10
	Marked Crosswalk on	USDOT BCA Guidance	2020S / Use	\$0.18
	Ped Signal on Roadway	USDOT BCA Guidance	2020S / Use	\$0.46

SAFETY

KABCO Monetized Values

LO VSL

HI VSL

No Injury - O	USDOT BCA Guidance Mar 2022	2020\$ / injury	\$3,900	\$3,900	\$2,340	\$5,460
Possible Injury - C	USDOT BCA Guidance Mar 2022	2020\$ / injury	\$77,200	\$77,200	\$46,320	\$108,080
Non Incapacitating - B	USDOT BCA Guidance Mar 2022	2020\$ / injury	\$151,000	\$151,000	\$90,600	\$211,400
Incapacitating - A	USDOT BCA Guidance Mar 2022	2020\$ / injury	\$554,800	\$554,800	\$332,880	\$776,720
Killed - K	USDOT BCA Guidance Mar 2022	2020\$ / injury	\$11,600,000	\$11,600,000	\$6,960,000	\$16,240,000
Injured Severity Unknown	USDOT BCA Guidance Mar 2022	2020\$ / injury	\$210,300	\$210,300	\$126,180	\$294,420
Unknown If Injured (# Incidents Reported)	USDOT BCA Guidance Mar 2022	2020\$ / incident	\$159,800	\$159,800	\$95,880	\$223,720

Crash Type Monetized Values

Fatal Crash	USDOT BCA Guidance Mar 2022	2020\$ / crash	\$12,837,400	\$12,837,400	\$7,702,440	\$17,972,360
Injury Crash	USDOT BCA Guidance Mar 2022	2020\$ / crash	\$302,600	\$302,600	\$181,560	\$423,640
Property Damage Only Crash	USDOT BCA Guidance Mar 2022	2020\$ per vehicle	\$4,600	\$4,600	\$2,760	\$6,440



State	State Gas Tax https://www.api.org/-/media/Files/Statistics/prc_sst_2022	State Diesel Tax	Note: API's data reflects a weighted average for each
Alabama	31.3100	32.2500	
Alaska	15.1300	14.9800	
Arizona	19.0000	27.0000	
Arkansas	24.8000	28.8000	
California	68.1500	99.9100	
Colorado	22.0000	20.5000	
Connecticut	35.7500	40.1000	
Delaware	23.0000	22.0000	
District of Columbia	33.8000	33.8000	
Florida	43.5500	36.3700	
Georgia	37.5500	41.3900	
Hawaii	51.6900	52.4100	
Idaho	33.0000	33.0000	
Illinois	59.6000	67.0200	
Indiana	49.7900	54.0000	
Iowa	30.0000	32.5000	
Kansas	24.0300	26.0300	
Kentucky	26.0000	23.0000	
Louisiana	20.0100	20.0100	
Maine	30.0100	31.2100	
Maryland	36.1000	36.8500	
Massachusetts	26.5400	26.5400	
Michigan	45.1700	47.1600	
Minnesota	30.6000	30.6000	
Mississippi	18.7900	18.4000	
Missouri	19.9200	19.9200	
Montana	33.2500	30.3000	

Nebraska	25.7000	25.1000
Nevada	50.4800	28.5600
New Hampshire	23.8300	23.8300
New Jersey	50.7000	57.7000
New Mexico	18.8800	22.8800
New York	48.2200	46.9800
North Carolina	38.7500	38.7500
North Dakota	23.0000	23.0000
Ohio	38.5100	47.0100
Oklahoma	20.0000	20.0000
Oregon	38.8300	38.0600
Pennsylvania	58.7000	75.2000
Rhode Island	35.0000	35.0000
South Carolina		
South Dakota		
Tennessee		
Texas	20.0000	
Utah		
Vermont	32.1400	
Virginia		
Washington	49.4000	49.4000
West Virginia	35.7000	35.7000
Wisconsin	32.9000	32.9000
Wyoming	24.0000	24.0000
National Average	38.6900	40.2400

Calendar Year 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058

Vari: Sour Unit: Constant

FUEL

Fuel Efficiency

Table with 4 columns: Metric (Autc US E mpg, Truc US E mpg, Aircr US E seat-miles, Rail US E ton-miles) and 39 years (2020-2058). Values range from 3.51 to 24.16.

EIA I US E year ###

Autc CAGI Perc ###

Truc CAGI Perc ###

Aircr CAGI Perc ###

Rail CAGI Perc ###

Table with 4 columns: Metric (Autc EIA v mpg, Truc EIA v mpg, Aircr EIA v seat-miles, Rail EIA v ton-miles) and 39 years (2020-2058). Values range from 3.51 to 24.16.

Fuel Prices

Doll: US E year ###

0.01

Table with 4 columns: Metric (mot US E 2021\$/g, dies US E 2021\$/g, jet fu US E 2021\$/g) and 39 years (2020-2058). Values range from 1.98 to 3.11.

EIA IEA Fc year ###

Motor gas: Perc ###

Diesel prii Perc ###

Jet fuel pr Perc ###

Inflation / Factr ##

Table with 4 columns: Metric (mot EIA v 2020\$/g, dies EIA v 2020\$/g, jet fu EIA v 2020\$/g) and 39 years (2020-2058). Values range from 1.90 to 2.99.

EMISSIONS

Emissions Costs

Table with 4 columns: Metric (CO2 USD/ 2020\$/m, NOX USD/ 2020\$/m, PM t USD/ 2020\$/m, SOX USD/ 2020\$/m) and 35 years (52-86). Values range from 41,500 to 52.

Forecast E year ###

CO2 Emis: Perc ###

Table with 4 columns: Metric (CO2 USD/ 2020\$/m, NOX USD/ 2020\$/m, PM t USD/ 2020\$/m, SOX USD/ 2020\$/m) and 35 years (52-86). Values range from 41,500 to 52.00.

Auto Emissions

9 MPH
10 MPH
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CO2

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53 53 MPH #####
54 54 MPH #####
55 55 MPH #####
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57 57 MPH #####
58 58 MPH #####
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60 60 MPH #####
61 61 MPH #####
62 62 MPH #####
63 63 MPH #####
64 64 MPH #####
65 65 MPH #####
66 66 MPH #####
67 67 MPH #####
68 68 MPH #####
69 69 MPH #####
70 70 MPH #####

Freight Rail Emissions

CO emissions																																			
NOX EPA g / ton mi	0.2073	0.1954	#####																																
PM2 EPA g / VMT																																			
PM1 EPA g / ton mi	0.0052	0.0049	#####																																
SOX emissions																																			
VOC EPA g / ton mi	0.0094	0.0088	#####																																
CO2 EPA g / ton mi	19.6327	19.3520	#####																																

Variable	Source	Units	Constant (Likely Case)
General Project Details			
Scenario	User Defined		BASELINE
Discount Rate		percent	0.07
Design/Construction Start	Project Defined	year	2023
Design/Construction Period	Project Defined	years	6
Project Opening	Project Defined	year	2029
First Year Adjustment Factor	Project Defined	Adj. for partial years	
Operations Period	User Defined	years	30
Analysis Length (Including)	User Defined	years	36
Percent Rural	Project Defined	percent	1
Percent Urban	Project Defined	percent	

Individual Item Details (for Residual Value Calc)

Item	Asset Name	Expected Lifespan of Asset	Last purchase year	Analysis End Year	Item Capital Cost
Item 1	Mid-Level Moveable Bridge	50	2029	2058	77220000
Item 2	Tide Relief Bridge	50	2029	2058	9680000
Item 3	Enter Asset Name			2058	
Item 4	Enter Asset Name			2058	
Item 5	Enter Asset Name			2058	

Facility Improvements

Public Transit Facility 1 = project will make improvement; 0 = project will not make improvement

Bus Stop

Clocks	Project Defined	indicator
Electronic Real-Time Inform	Project Defined	indicator
Information/Emergency Bu	Project Defined	indicator
PA System	Project Defined	indicator
Platform/Stop Seating Avai	Project Defined	indicator
Platform/Stop Weather Prt	Project Defined	indicator
Restroom Availability	Project Defined	indicator
Retail/Food Outlet Availabi	Project Defined	indicator
Staff Availability	Project Defined	indicator
Step-free Access to Station	Project Defined	indicator
Step-free Access to Vehicle	Project Defined	indicator
Surveillance Cameras	Project Defined	indicator
Temperature Controlled En	Project Defined	indicator
Ticket Machines	Project Defined	indicator
Timetables	Project Defined	indicator
Bike Facilities	Project Defined	indicator
Car Access Facilities	Project Defined	indicator
Elevator	Project Defined	indicator
Escalators	Project Defined	indicator
On-Site Ticket Office	Project Defined	indicator
Taxi Pickup/Dropoff	Project Defined	indicator
Waiting Room	Project Defined	indicator

Light Rail/Streetcar Stop

Clocks	Project Defined	indicator
Electronic Real-Time Inform	Project Defined	indicator
Information/Emergency Bu	Project Defined	indicator
PA System	Project Defined	indicator
Platform/Stop Seating Avai	Project Defined	indicator
Platform/Stop Weather Prt	Project Defined	indicator
Restroom Availability	Project Defined	indicator
Retail/Food Outlet Availabi	Project Defined	indicator
Staff Availability	Project Defined	indicator
Step-free Access to Station	Project Defined	indicator
Step-free Access to Vehicle	Project Defined	indicator
Surveillance Cameras	Project Defined	indicator
Temperature Controlled En	Project Defined	indicator
Ticket Machines	Project Defined	indicator
Timetables	Project Defined	indicator
Bike Facilities	Project Defined	indicator
Car Access Facilities	Project Defined	indicator
Elevator	Project Defined	indicator
Escalators	Project Defined	indicator
On-Site Ticket Office	Project Defined	indicator
Taxi Pickup/Dropoff	Project Defined	indicator

	Waiting Room	Project Defined	indicator	
Rail Stop	Clocks	Project Defined	indicator	
	Electronic Real-Time Inform	Project Defined	indicator	
	Information/Emergency Bu	Project Defined	indicator	
	PA System	Project Defined	indicator	
	Platform/Stop Seating Avail	Project Defined	indicator	
	Platform/Stop Weather Prt	Project Defined	indicator	
	Restroom Availability	Project Defined	indicator	
	Retail/Food Outlet Availabi	Project Defined	indicator	
	Staff Availability	Project Defined	indicator	
	Step-free Access to Station	Project Defined	indicator	
	Step-free Access to Vehicle	Project Defined	indicator	
	Surveillance Cameras	Project Defined	indicator	
	Temperature Controlled En	Project Defined	indicator	
	Ticket Machines	Project Defined	indicator	
	Timetables	Project Defined	indicator	
	Bike Facilities	Project Defined	indicator	
	Car Access Facilities	Project Defined	indicator	
	Elevator	Project Defined	indicator	
	Escalators	Project Defined	indicator	
	On-Site Ticket Office	Project Defined	indicator	
	Taxi Pickup/Dropoff	Project Defined	indicator	
	Waiting Room	Project Defined	indicator	
Public Transit Vehicle Amenities		1 = project will make improvement; 0 = project will not make improvement		
Bus	Electronic Real-Time Inform	Project Defined	indicator	
	Handrails	Project Defined	indicator	
	Luggage Storage	Project Defined	indicator	
	PA System	Project Defined	indicator	
	Surveillance Cameras	Project Defined	indicator	
	Temperature Control	Project Defined	indicator	
	Wheelchair Space	Project Defined	indicator	
Light Rail/Streetcar	Electronic Real-Time Inform	Project Defined	indicator	
	Handrails	Project Defined	indicator	
	Luggage Storage	Project Defined	indicator	
	PA System	Project Defined	indicator	
	Surveillance Cameras	Project Defined	indicator	
	Temperature Control	Project Defined	indicator	
	Wheelchair Space	Project Defined	indicator	
Rail	Electronic Real-Time Inform	Project Defined	indicator	
	Handrails	Project Defined	indicator	
	Luggage Storage	Project Defined	indicator	
	PA System	Project Defined	indicator	
	Surveillance Cameras	Project Defined	indicator	
	Temperature Control	Project Defined	indicator	
	Wheelchair Space	Project Defined	indicator	
	Food Service Availability	Project Defined	indicator	
	Restroom Availability	Project Defined	indicator	
Active Transportation Facility				
Pedestrian	Expand Sidewalk (added w	Project Defined	feet	11 per USDOT guidance, anyth
	Facility Length	Project Defined	miles	0.5 per USDOT guidance, anyth
	Marked Crosswalk (Roadwa	Project Defined	indicator	1 = project will make imprc
	Pedestrian Signal (Roadwa	Project Defined	indicator	1 = project will make imprc
Cycling	Type of Cycling Improve	Project Defined	text	Cycling Path with no At Grade Crossings
	Cycling Facility Length	Project Defined	miles	0.5 per USDOT guidance, anyth
Vehicle Fuel Type (Emission Lookup)	Passenger Car	Project Defined	text	Gasoline
	Trucks	Project Defined	text	Diesel
	Bus	Project Defined	text	Gasoline

ring above 31 feet will not be counted
ring above 0.86 miles will not be counted

ovement; 0 = project will not make improvement
ovement; 0 = project will not make improvement

ring above 2.38 miles will not be counted

Estimated Cardiac Arrest Rate

Input	Unit	Value	Source
National Cardiac Arrest Est	People	356000	https://www.sca-aware.org/about-sudden-cardiac-arrest/facts-statistics
National Population (2021)	People	331893745	https://www.census.gov/quickfacts/t/US 4:USPST045221
Cardiac Arrest Rate	Factor	0.001072632	FEMA BCA Guidance (p. 17, formula 14): https://files.hudexchange.info/course-content/nldr-nola-bonfifi-cost-analysis-data-resources-and-exper1-tps-webinar/FEMA-19-BCAR-Resources.pdf
Honeymoon Island resident	People	1540	https://www.comaus.gov/quickfacts/fact/table/1540 https://www.fordham.edu/cew/wp-content/uploads/sites/85/2020/09/FRE_Stat
Honeymoon Island visitors	People	1610871	aParkofArchaeolPrint.pdf google maps - Honeymoon Island to Dunedin
Response Distance	miles	5.5	Hospital
Response Time	minutes	19	FEMA BCA Guidance (p. 17, formula 19): https://files.hudexchange.info/course-content/nldr-nola-bonfifi-cost-analysis-data-resources-and-exper1-tps-webinar/FEMA-19-BCAR-Resources.pdf
Survival Rate - 18 min EMS	Factor	0.008134354	FEMA BCA Guidance (p. 18, formula 24): https://files.hudexchange.info/course-content/nldr-nola-bonfifi-cost-analysis-data-resources-and-exper1-tps-webinar/FEMA-19-BCAR-Resources.pdf
Survival Rate - 15+ EMS	Factor	0.08	AHA, 120.01.7048 https://www.ahajournals.org/doi/10.1161/JAHA.120.017048
Survival Rate - 7-9 min EMF	Factor	0.14	AHA, 120.01.7048 https://www.ahajournals.org/doi/10.1161/JAHA.120.017048
Honeymoon Island resident	People	1,673,066.18	Calculator
Honeymoon Island estimat	People	4413.34205	Calculator
Honeymoon Island visitat	People	4,733,897.269	Calculator
Input	Unit	Value	Source
Average US response time	minutes	8.5	AHA, 120.01.7048 https://www.ahajournals.org/doi/10.1161/JAHA.120.017048
Study response time	minutes	6	AHA, 120.01.7048 https://www.ahajournals.org/doi/10.1161/JAHA.120.017048
Dunedin Causeway Delay	minutes	10	Conservative estimate based on lack of bridge
Honeymoon Island response	minutes	8.5	AHA, 120.01.7048 https://www.ahajournals.org/doi/10.1161/JAHA.120.017048
Honeymoon Island total re	minutes	18.5	Calculator
Applicable Trips for Bridge	factor	0.25	Conservative estimate based on population centers and location of EMS bases
Honeymoon Island Estimat	people	4,353,809.62	Calculator
Honeymoon Island Estimat	people	5,510,953.43	Calculator
Survival Rate Delta	people	0.843608639	Calculator

BCR

2.556834027			
4.6565	0.009410259	6.34691044	
2.2065	0.099168304	5.717812347	

Bike and Ped Counts		Unit	Value	Source
Input				
2021 Pinellas Trail User Co	People		488569	https://www.pinellas.gov/development-portal/pinellas-trail-usage-reports/?wpdmdl=48446&refresh=62f6bdcc6fbb61660337612&ind=16440023146711&filename=Pinellas%20Trail%20Annual%20Report%202021.pdf
Bike Share	Factor		0.5	
Ped Share	Factor		0.5	
Dunedin Counter - Honeyrr	Factor		0.25	
Dunedin Counter - Honeyrr	Factor		0.05	
Honeymoon Island Bike Us	Factor		61071.125	
Honeymoon Island Ped Us	Factor		12214.225	

Category	Unit	Value	Source
Honeymoon Island Visitation			
2020-2021 Visitation	Factor	1610871	https://www.floridamuseum.ufl.edu/wp-content/uploads/2018/08/Florida-State-Parks-and-Recreation-Annual-Report-2018-2019.pdf
Park Entrance Fee - Multip	2020\$		8 fees
Estimated Vehicle Occupancy	Factor	1.8	NHTS (recreational occupancy in Tampa-St. Pete CSA)
Estimated Bike/Ped	Factor	0.045494239	Based on Bike Calculator
Estimated Single Occupancy	Factor	0.15	Conservative Estimate
Bike/Ped Fee	2020\$		https://www.floridastateparks.org/parks-and-trails/honeymoon-island-state-park/hours-of-operation
SOV/Sunset Fee	2020\$		2 fees
Vehicle Occupancy Multiplier	Factor	4	fees
Estimated Vehicle Occupancy Calculation		0.5	
Estimated Ped/Cyclists	Calculation	2.7	Conservative Estimate
Estimated SOVs/Sunset use	Calculation	73285.35	Calculation
Estimated 2+ occupant veh	Calculation	241630.65	
Estimated Willingness to pay	Calculation	479983.3333	
		6.230927312	

GIS parcel file source: Parcels (PAO) | Parcels (PAO) | Pinellas County Enterprise GIS (arcgis.com)
 Market values source: Pinellas County Property Appraiser (pcpao.org)
 Total market value \$2020: 99312845.98
 Total area: 493563
 Count: 484
 CPI from 2022 to 2020: 0.92

Information from GIS file	JOINED	PLANID	NAME	Market value \$2022	Market value \$2020	Area sqft	
OBJECTID							
665	1	152808774990007110		316781	278773.0943		1181
2331	1	152808774980001120		224714	197752.4445		1181
2437	1	152809774930002170		237749	209223.4837		1014
3645	1	152808434640022050		354906	312323.794		1420
5965	1	152809774930002010		259680	228523.1662		1090
7353	1	152808774960002070		267311	235238.5863		1141
9623	1	152808774990007120		259752	228586.5276		1181
12317	1	152808775010007100		244422	215095.8462		975
12455	1	152808775010007120		244380	215058.8854		1181
16056	1	152808775010007010		244380	215058.8854		1181
16405	1	152808774960002050		267311	235238.5863		1141
17264	1	152808774980008090		263732	232089.0006		975
17265	1	152809774930001040		232202	204342.0219		1014
17367	1	152808774990004040		219593	193245.8705		975
19429	1	152809774900001060		148031	130269.997		606
19446	1	152808775010006030		239823	211048.6418		975
19866	1	152809774900002070		156375	137612.8701		606
22406	1	152808775010007110		298068	262305.3108		1181
29154	1	152809774930002060		188073	165507.6919		784
29155	1	152809774930002160		237749	209223.4837		1014
29433	1	152809774930002200		259680	228523.1662		1090
30802	1	152808774980001020		223440	196631.3011		1181
30808	1	152808775010007040		244422	215095.8462		975
30814	1	152808774990006120		284863	250684.6684		1181
30948	1	152809774900001080		135000	118802.4778		606
31970	1	152808774980008010		284924	250738.3496		1181
33443	1	152808774990007010		259083	227997.7953		1181
35794	1	152808775010005120		235247	207021.6778		1181
37282	1	152808775010005020		286929	252502.7864		1181
37896	1	152808774980006080		252866	222526.7212		970
39994	1	152808774980003110		259529	228390.2835		1181
41615	1	152808774960000001		0	0		
41996	1	152809774930002190		237749	209223.4837		1014
42337	1	152808774980007110		316112	278184.362		1181
43497	1	152808774960003010		288932	254265.4631		1208
43742	1	152809774930003150		207188	182329.2428		784
45020	1	152809774900001050		224227	197323.8755		1040
45125	1	152808774990007050		260054	228852.2931		975
45729	1	152809774930001010		253512	223095.213		1090
45920	1	152808775010005010		235247	207021.6778		1181
46111	1	152808775000003030		216830	190814.3798		1100
46200	1	152808774980008080		262380	230899.2158		970
47253	1	152809774900012070		128141	112766.4319		606
47434	1	152808434640014020		340388	299547.6876		1365
47577	1	152808774990002080		214628	188876.5793		975
47749	1	152808775010001030		224191	197292.1949		975
48172	1	152809774930003030		188110	165540.2526		784
48615	1	152808774990008120		264430	232703.2534		1181
48628	1	152808775000001050		183291	161299.4442		948
53597	1	152809774900012080		185105	162895.7975		897
53672	1	152808434640023050		357049	314209.6734		1420
54573	1	152808774960003090		227814	200480.5014		957
55161	1	152808775000003080		216830	190814.3798		1100
56779	1	152809774900002030		225882	198780.3059		897
59807	1	152808774960003030		227814	200480.5014		957
60739	1	152808774960003060		276565	243382.2761		1141
60818	1	152809774930003080		239088	210401.8283		1014
61343	1	152808774960001020		220954	194443.5754		957
61731	1	152808774980006030		254169	223673.3851		975
62017	1	152808774960003020		227814	200480.5014		957
62041	1	152808775010006110		292499	257404.4886		1181
63147	1	152808774990004050		219593	193245.8705		975
64266	1	152808775010008100		248835	218979.3672		975
65784	1	152808775010008010		248613	218784.0031		1181
66063	1	152808774980006120		274678	241721.6815		1181
66586	1	152809774930003200		260914	229609.1089		1090
67418	1	152808434640022070		337040	296601.3861		1365
67848	1	152809774900000001		0	0		
68034	1	152808774960001170		280501	246846.0284		1208
68135	1	152808774980007060		216180	190242.3678		802
70566	1	152808774980007020		316112	278184.362		1181
72136	1	152808774990004010		247944	218195.2708		1181
72534	1	152808774960002140		267311	235238.5863		1141
74523	1	152808774980007050		287382	252901.4347		970
74666	1	152809774930002020		237749	209223.4837		1014
75563	1	152808774990003110		260197	228978.1357		1181
76516	1	152808774960002160		226731	199527.4415		957
77484	1	152808775000002020		215792	189900.9207		1100
77705	1	152808774990003090		213523	187904.1591		975
79205	1	152808774960002080		267311	235238.5863		1141
84392	1	152808774980002110		258192	227213.6989		1181
84571	1	152809774900002080		249909	219924.5069		897
85117	1	152808774960003050		268603	236375.57		1141
86699	1	152809774930001080		232202	204342.0219		1014
86911	1	152809774900002050		259735	228571.5672		1040
87827	1	152808774980006040		280100	246493.141		975
88129	1	152808775010002080		229708	202147.2561		975
88201	1	152808774990003120		230568	202904.0719		1181
88506	1	152808774990005030		221616	195026.1476		975
89339	1	152808775010003060		192278	169208.1691		802
89492	1	152808774990005020		270222	237800.3197		1181
90043	1	152809774930003160		239088	210401.8283		1014
90531	1	152808774980003060		177302	156029.0142		802
91239	1	152808774980001040		201570	177385.2997		975
91612	1	152808774980000001		0	0		
93455	1	152808774980001010		223440	196631.3011		1181

94322	1	1 152808775010007080	244422	215095.8462	975
96829	1	1 152808775000002030	215792	189900.9207	1100
97066	1	1 152808775000003070	216830	190814.3798	1100
99126	1	1 1528084346400023060	337298	296828.4309	1365
99127	1	1 152808775010008040	248835	218979.3672	975
99707	1	1 152808775000001070	231964	204132.5775	1100
100489	1	1 152808774980002090	211500	186123.8819	975
104780	1	1 152808774960003120	268603	236375.57	1141
105080	1	1 152808774980004050	217552	191449.753	970
106691	1	1 152808774990008040	264835	233059.6609	975
109378	1	1 152808774990005100	221616	195026.1476	975
109849	1	1 152808774980006100	254169	223673.3851	975
110814	1	1 152809774930002140	237749	209223.4837	1014
112435	1	1 152808775010008050	248835	218979.3672	975
112828	1	1 15280900003200500	0	0	7042
113044	1	1 152808775010008120	248613	218784.0031	1181
113750	1	1 152809774900011060	124941	109950.3732	606
114716	1	1 152808434640022080	356782	313974.7085	1420
115374	1	1 152808775010002040	229708	202147.2561	975
116165	1	1 152808774980008030	263732	232089.0006	975
117831	1	1 152808775000002070	215792	189900.9207	1100
118909	1	1 152808434640024060	340388	299547.6876	1365
119045	1	1 152808775000001030	210800	185507.8691	1100
120816	1	1 152808775010004060	194093	170805.4024	802
121320	1	1 152809774930003170	260893	229590.6285	1014
121922	1	1 152808774990004120	247944	218195.2708	1181
122072	1	1 152808774990004020	267771	235643.3947	1181
122581	1	1 152809774930001110	151139	133005.094	784
125483	1	1 152808774980004010	274900	241917.0456	1181
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347747	1	1 152808774960002120	267311	235238.5863	1141
347814	1	1 152809774900012010	217166	191110.0659	1040

348257	1	1 152808434640023070	337298	296828.4309	1365
350118	1	1 152808775010008090	248835	218979.3672	975
350306	1	1 152808775000003060	216830	190814.3798	1100
350332	1	1 152808775000003090	247734	218010.467	1239
350886	1	1 152808774990005120	250172	220155.9517	1181
352222	1	1 152809774930003190	245974	216461.6347	1014
352607	1	1 152808775000001060	217233	191169.0272	1100
352608	1	1 152808774990005010	250172	220155.9517	1181
352646	1	1 152808774980008040	263732	232089.0006	975
353116	1	1 152808774990002090	212420	186933.4988	975
354927	1	1 152808774980004060	182445	160554.9486	802
355213	1	1 152808774980003040	212605	187096.3022	975
355480	1	1 152808774960002100	267311	235238.5863	1141
355572	1	1 152808774980005120	249504	219568.0995	1181
356625	1	1 152808775000002050	187941	165391.5295	948
357417	1	1 152808775010001020	303637	267206.133	1181
358069	1	1 152809774930002150	187223	164759.6763	784
358182	1	1 152809774900002100	286219	251877.9733	1040
358254	1	1 152808775010001110	273340	240544.217	1181
358891	1	1 152808774990008020	322573	283870.1606	1181
359095	1	1 152808774960003110	268603	236375.57	1141
359322	1	1 152808774990008090	264835	233059.6609	975
359829	1	1 152808774960002060	267311	235238.5863	1141
361222	1	1 152809774930001200	253512	223095.213	1090
361407	1	1 152809774930001160	232202	204342.0219	1014
362154	1	1 152809774930003060	188110	165540.2526	784
362349	1	1 152808434640024070	342190	301133.4806	1365
364905	1	1 152808774990002110	259083	227997.7953	1181
365117	1	1 152808774990001040	185005	162807.7956	975
365745	1	1 152808774990003080	213523	187904.1591	975
367162	1	1 152808775000003040	216830	190814.3798	1100
367282	1	1 152808774980008120	284924	250738.3496	1181
367906	1	1 152808774990007020	316781	278773.0943	1181
370901	1	1 152808774990003040	213523	187904.1591	975
371655	1	1 152808434640000001	0	0	
371767	1	1 152808774980005070	204230	179726.1485	802
371789	1	1 152808774960002030	226731	199527.4415	957
372254	1	1 152808774980004100	218674	192437.1336	975
375805	1	1 152808775000003010	247734	218010.467	1239
380727	1	1 152809774930003120	239088	210401.8283	1014
381174	1	1 152808774980006050	252866	222526.7212	970
381862	1	1 152808774990003010	230568	202904.0719	1181
381957	1	1 152808775010001120	210741	185455.948	1181
382593	1	1 152808774980005010	249504	219568.0995	1181
382920	1	1 152808774960003080	268603	236375.57	1141
383779	1	1 152808774990001080	183730	161685.7722	975
383952	1	1 152808775010003080	230812	203118.7964	975
384698	1	1 152808774990004090	243318	214124.3059	975
384905	1	1 152808774980005030	220880	194378.4541	975
386153	1	1 152808774990006030	255088	224482.122	975
386436	1	1 152809774900001040	149403	131477.3822	606
387151	1	1 152809774900011080	124941	109950.3732	606
387677	1	1 152808774990004100	219593	193245.8705	975
389400	1	1 152808775000002090	246333	216777.5613	1239
389401	1	1 152809774930002050	237749	209223.4837	1014
390746	1	1 152808434640012010	354906	312323.794	1420
391719	1	1 152808774960001040	281731	247928.451	1141
392640	1	1 152808775010003010	249281	219371.8554	1181
392653	1	1 152808774990007040	260054	228852.2931	975
392803	1	1 152808774980002120	229009	201532.1233	1181
394286	1	1 152809774900012040	128141	112766.4319	606
394287	1	1 152809774900002040	156375	137612.8701	606
394449	1	1 152808775010005030	235409	207164.2408	975
394741	1	1 152808774990005040	221616	195026.1476	975
394850	1	1 152809774900001070	195258	171830.6238	897
395048	1	1 152808775010003110	312771	275244.2207	1181
396849	1	1 152809000003200300	0	0	1168
396955	1	1 152808775010005100	235409	207164.2408	975
403251	1	1 152808775010003100	230812	203118.7964	975
403722	1	1 152809774930001020	232202	204342.0219	1014
403749	1	1 152808434640013020	337298	296828.4309	1365
404801	1	1 152808775010001040	224191	197292.1949	975
404807	1	1 152808774990001120	224108	197219.1533	1181

Scenario names

Storm surge			
	SS_Cur_201	SS_Int_204	SS_Int_2070
25YR	SS_Cur_201	SS_Int_204	SS_Int_2070_25YR_WtrElv
50YR	SS_Cur_201	SS_Int_204	SS_Int_2070_50YR_WtrElv
100YR	SS_Cur_201	SS_Int_204	SS_Int_2070_100YR_WtrElv
250YR	SS_Cur_201	SS_Int_204	SS_Int_2070_250YR_WtrElv
500YR	SS_Cur_201	SS_Int_204	SS_Int_2070_500YR_WtrElv

Cell ranges

Sheet name SS-1. Bridge DB
 Bridge column SS-1. Bridge DB\ISA3\SAS25
 Column range SS-1. Bridge DB\IS12\SAS22
 Column 9
 Count 25

STORM SURGE

Total surge height (S)

Storm surge			
Main bridge			
	SS_Cur_201	SS_Int_204	SS_Int_2070
25YR	14.041	15.252	16.574
50YR	15.522	16.754	18.078
100YR	17.745	18.997	20.319
250YR	20.422	21.694	23.015
Tide Relief bridge			
	SS_Cur_201	SS_Int_204	SS_Int_2070
500YR	22.259	23.546	24.881

Source: <https://www.pcpao.org/?p=https://www.pcpao.org/general.php?strap=15280977490001050>

Storm surge	
Main bridge	
	SS_Cur_201 SS_Int_204 SS_Int_2070
25YR	14.041 15.252 16.574
50YR	15.522 16.754 18.078
100YR	17.745 18.997 20.319
250YR	20.422 21.694 23.015
Tide Relief bridge	
	SS_Cur_201 SS_Int_204 SS_Int_2070
500YR	22.259 23.546 24.881

Inflation 006 to 2021	
Year	Rate
2006	1.31

Source: <https://www.bls.gov/data>

FEMA Use	FEMA Costs Updated 2020 Eq 14-9				FEMA 2006 Costs Table 14.10 and 14.11			
	Costs (\$/ft2)	Option costs	Owned Costs (\$/ft2)	Option costs	Owned Costs (\$/ft2)	Option costs	Owned Costs (\$/ft2)	Option costs
Multi-family	\$0.799	\$1.074	35	0.61	0.82	35	0.82	0.2135

Wave height (H)		
Hmax	ft	m
Hmax 1	0.000	0.000
Hmax 2	3.281	1.000
Hmax 3	6.562	2.000
Hmax 4	9.843	3.000
Hmax 5	13.123	4.000
Hmax 6	16.404	5.000

ft to m	Bridge height (ft)	Bridge height (m)
0.3048	Existing	New
Main bridge	27.22	43.5
Tide Relief bridge	18.66	21.2

PROBABILITY OF DECK UNSEATING
Hmax 1 - 0 m 0.000

Existing				New			
	SS_Cur_201	SS_Int_204	SS_Int_2070		SS_Cur_201	SS_Int_204	SS_Int_2070
25YR	0.000	0.000	0.000	25YR	0.000	0.000	0.000
50YR	0.000	0.000	0.000	50YR	0.000	0.000	0.000
100YR	0.000	0.000	0.000	100YR	0.000	0.000	0.000
250YR	0.000	0.000	0.001	250YR	0.000	0.000	0.000
500YR	0.001	0.002	0.006	500YR	0.000	0.000	0.000

DISPLACEMENT COSTS (Hmax 1 = 0 m) **DAMAGE COSTS** (Hmax 1 = 0 m)

Existing				New				Existing				New			
	SS_Cur_201	SS_Int_204	SS_Int_2070		SS_Cur_201	SS_Int_204	SS_Int_2070		SS_Cur_201	SS_Int_204	SS_Int_2070		SS_Cur_201	SS_Int_204	SS_Int_2070
25YR	\$7	\$15	\$37	25YR	\$0	\$0	\$0	25YR	\$71	\$157	\$397	25YR	\$0	\$0	\$0
50YR	\$18	\$42	\$113	50YR	\$0	\$0	\$0	50YR	\$189	\$452	\$1,218	50YR	\$0	\$0	\$0
100YR	\$87	\$232	\$684	100YR	\$0	\$0	\$0	100YR	\$944	\$2,501	\$7,386	100YR	\$0	\$0	\$1
250YR	\$747	\$2,238	\$7,376	250YR	\$0	\$0	\$0	250YR	\$8,056	\$24,148	\$79,598	250YR	\$1	\$1	\$2
500YR	\$3,702	\$12,106	\$43,571	500YR	\$0	\$0	\$0	500YR	\$39,942	\$130,633	\$470,164	500YR	\$1	\$2	\$3

Hmax 2 = 1 m 1.000

Existing				New			
	SS_Cur_201	SS_Int_204	SS_Int_2070		SS_Cur_201	SS_Int_204	SS_Int_2070
25YR	0.000	0.000	0.000	25YR	0.000	0.000	0.001
50YR	0.000	0.000	0.000	50YR	0.000	0.000	0.000
100YR	0.000	0.000	0.000	100YR	0.000	0.000	0.000
250YR	0.001	0.002	0.005	250YR	0.000	0.000	0.000
500YR	0.003	0.009	0.031	500YR	0.000	0.000	0.000

Hmax 2 = 1 m 1.000

Existing				New				Existing				New			
	SS_Cur_201	SS_Int_204	SS_Int_2070		SS_Cur_201	SS_Int_204	SS_Int_2070		SS_Cur_201	SS_Int_204	SS_Int_2070		SS_Cur_201	SS_Int_204	SS_Int_2070
25YR	\$34	\$75	\$190	25YR	\$0	\$0	\$0	25YR	\$364	\$811	\$2,046	25YR	\$1	\$1	\$1
50YR	\$90	\$216	\$582	50YR	\$0	\$0	\$0	50YR	\$975	\$2,331	\$6,280	50YR	\$1	\$1	\$2
100YR	\$451	\$1,195	\$3,527	100YR	\$0	\$0	\$0	100YR	\$4,867	\$12,892	\$38,027	100YR	\$1	\$2	\$3
250YR	\$3,874	\$11,522	\$37,865	250YR	\$0	\$0	\$1	250YR	\$41,511	\$124,327	\$408,591	250YR	\$3	\$5	\$8
500YR	\$19,041	\$61,913	\$219,013	500YR	\$1	\$1	\$2	500YR	\$205,463	\$658,132	\$2,111,000	500YR	\$6	\$10	\$18

500YR	0.656	0.889	0.974
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500YR	0.113	0.326	0.673
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500YR	Final displacement costs
Existing	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$2,437 \$6,922 \$23,287
50YR	\$8,051 \$24,660 \$100,560
100YR	\$67,287 \$219,013 \$706,252
250YR	\$699,384
500YR	

500YR	\$339,990	\$982,496	Total damage costs
Existing	\$,Cur_2011,\$,Int_2044,\$,Int_2070	Existing	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$906 \$999 \$2,404	25YR	\$8,906 \$24,161 \$79,701
50YR	\$909 \$2,536 \$8,426	50YR	\$27,851 \$84,640 \$342,963
100YR	\$6,438 \$19,911 \$68,820	100YR	\$229,417 \$743,981
250YR	\$68,033 \$225,397 \$722,597	250YR	
500YR	\$339,990 \$982,496	500YR	

500YR	Total damage costs
Existing	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$1,023 \$2,666 \$8,024
50YR	\$3,034 \$8,461 \$31,465
100YR	\$21,492 \$66,466 \$229,733
250YR	\$227,105 \$752,406
500YR	

Hmax 3 = 2 m 2.000

Existing	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	0.000 0.000 0.000
50YR	0.000 0.000 0.000
100YR	0.000 0.001 0.003
250YR	0.003 0.009 0.029
500YR	0.015 0.047 0.152

New	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	0.000 0.000 0.000
50YR	0.000 0.000 0.000
100YR	0.000 0.000 0.000
250YR	0.000 0.000 0.000
500YR	0.000 0.000 0.000

Hmax 3 = 2 m

Existing	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$192 \$428 \$1,080
50YR	\$515 \$1,231 \$3,314
100YR	\$2,569 \$6,801 \$20,050
250YR	\$21,862 \$65,150 \$210,497
500YR	\$107,144 \$339,278

Hmax 3 = 2 m

New	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$0 \$0 \$1
50YR	\$0 \$1 \$1
100YR	\$1 \$1 \$2
250YR	\$2 \$2 \$4
500YR	\$3 \$3 \$9

Hmax 3 = 2 m

New	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$4 \$5 \$6
50YR	\$5 \$6 \$9
100YR	\$8 \$11 \$16
250YR	\$17 \$27 \$44
500YR	\$33 \$55 \$101

Hmax 4 = 3 m 3.000

Existing	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	0.000 0.000 0.001
50YR	0.000 0.001 0.003
100YR	0.002 0.006 0.017
250YR	0.019 0.095 0.160
500YR	0.087 0.239 0.531

New	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	0.000 0.000 0.000
50YR	0.000 0.000 0.000
100YR	0.000 0.000 0.000
250YR	0.000 0.000 0.000
500YR	0.000 0.000 0.000

Hmax 4 = 3 m

Existing	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$1,211 \$2,695 \$6,796
50YR	\$3,240 \$7,742 \$20,819
100YR	\$16,144 \$42,610 \$124,398
250YR	\$135,462 \$391,349
500YR	\$625,070

Hmax 4 = 3 m

New	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$2 \$3 \$4
50YR	\$3 \$4 \$5
100YR	\$5 \$6 \$10
250YR	\$10 \$15 \$26
500YR	\$19 \$32 \$59

Hmax 4 = 3 m

New	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$25 \$30 \$38
50YR	\$31 \$40 \$54
100YR	\$50 \$69 \$104
250YR	\$107 \$161 \$280
500YR	\$207 \$339 \$636

Hmax 5 = 4 m 4.000

Existing	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	0.001 0.003 0.007
50YR	0.003 0.007 0.020
100YR	0.015 0.040 0.110
250YR	0.118 0.291 0.510
500YR	0.400 0.686 0.887

New	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	0.000 0.000 0.000
50YR	0.000 0.000 0.000
100YR	0.000 0.000 0.000
250YR	0.000 0.000 0.000
500YR	0.000 0.000 0.000

Hmax 5 = 4 m

Existing	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$8,417 \$18,711 \$47,029
50YR	\$22,486 \$53,527 \$142,404
100YR	\$110,849 \$286,355 \$784,405
250YR	\$649,090
500YR	\$3,210,910

Hmax 5 = 4 m

New	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$16 \$19 \$25
50YR	\$20 \$26 \$35
100YR	\$32 \$45 \$67
250YR	\$69 \$108 \$180
500YR	\$133 \$225 \$410

Hmax 5 = 4 m

New	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$174 \$208 \$280
50YR	\$241,021 \$523,593
100YR	\$1,000,743
250YR	\$2,996,937 \$803,723
500YR	\$9,916,977

Hmax 6 = 5 m 5.000

Existing	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	0.009 0.020 0.048
50YR	0.024 0.055 0.135

New	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	0.000 0.000 0.000
50YR	0.000 0.000 0.000

Hmax 6 = 5 m

Existing	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$64,227 \$141,425 \$346,447
50YR	\$169,369 \$392,039 \$966,494

Hmax 6 = 5 m

New	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$124 \$148 \$190
50YR	\$155 \$197 \$268

Hmax 6 = 5 m

New	Main bridge
\$,Cur_2011,\$,Int_2044,\$,Int_2070	\$,Cur_2011,\$,Int_2044,\$,Int_2070
25YR	\$1,340 \$1,600 \$2,047
50YR	\$1,675 \$2,126 \$2,897

100YR	0.108	0.243	0.486
250YR	0.508	0.756	0.911
500YR	0.837	0.944	0.984
Existing			
Wide Relief Bridge			
25YR	0.608	0.817	0.937
50YR	0.837	0.941	0.985
100YR	0.978	0.993	0.998
250YR	0.998	1.000	1.000
500YR	1.000	1.000	1.000

100YR	0.000	0.000	0.000
250YR	0.000	0.000	0.000
500YR	0.000	0.000	0.000
New			
Wide Relief Bridge			
25YR	0.163	0.337	0.605
50YR	0.367	0.618	0.858
100YR	0.804	0.927	0.978
250YR	0.978	0.994	0.998
500YR	0.996	0.999	1.000

100YR	\$772,444	#####	#####
250YR	#####	#####	#####
500YR	#####	#####	#####
Existing			
Wide Relief Bridge			
25YR	#####	#####	#####
50YR	#####	#####	#####
100YR	#####	#####	#####
250YR	#####	#####	#####
500YR	#####	#####	#####
New			
Final displacement costs			
25YR	#####	#####	#####
50YR	#####	#####	#####
100YR	#####	#####	#####
250YR	#####	#####	#####
500YR	#####	#####	#####

100YR	\$247	\$344	\$514	100YR	#####	#####	#####
250YR	\$532	\$829	\$1,387	250YR	#####	#####	#####
500YR	\$1,026	\$1,732	\$3,151	500YR	#####	#####	#####
New							
Wide Relief Bridge							
25YR	\$492,037	#####	#####	25YR	#####	#####	#####
50YR	#####	#####	#####	50YR	#####	#####	#####
100YR	#####	#####	#####	100YR	#####	#####	#####
250YR	#####	#####	#####	250YR	#####	#####	#####
500YR	#####	#####	#####	500YR	#####	#####	#####
Existing							
Total damage costs							
25YR	#####	#####	#####	25YR	#####	#####	#####
50YR	#####	#####	#####	50YR	#####	#####	#####
100YR	#####	#####	#####	100YR	#####	#####	#####
250YR	#####	#####	#####	250YR	#####	#####	#####
500YR	#####	#####	#####	500YR	#####	#####	#####

100YR	\$2,666	\$3,709	\$5,549
250YR	\$5,740	\$8,945	\$14,962
500YR	\$11,070	\$18,693	\$34,006
New			
Wide Relief Bridge			
25YR	#####	#####	#####
50YR	#####	#####	#####
100YR	#####	#####	#####
250YR	#####	#####	#####
500YR	#####	#####	#####
Existing			
Total damage costs			
25YR	#####	#####	#####
50YR	#####	#####	#####
100YR	#####	#####	#####
250YR	#####	#####	#####
500YR	#####	#####	#####

Project opening 2029
 Operations Period 30
 Analysis End Year 2058

Total losses					
Existing			New		
2018	2040	2070	2018	2040	2070
\$275,393	\$400,030	\$573,623	\$83,516	\$120,873	\$171,735

		Calendar Year																				
Period		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
Existing	Undisc. Los	#####	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$337,711.42	\$343,376.71	\$349,041.99	\$354,707.27	\$360,372.56	\$366,037.84	\$371,703.12	\$377,368.41	\$383,033.69	\$388,698.98	\$394,364.26	\$400,029.54	\$405,816.00
	Disc. Losses	#####	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$210,309.70	\$199,848.37	\$189,855.72	\$180,315.19	\$171,210.41	\$162,525.18	\$154,243.58	\$146,349.97	\$138,829.04	\$131,665.79	\$124,845.62	\$118,354.31	\$112,211.50
New	Undisc. Los	#####	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$102,194.42	\$103,892.50	\$105,590.58	\$107,288.66	\$108,986.74	\$110,684.82	\$112,382.90	\$114,080.98	\$115,779.06	\$117,477.14	\$119,175.22	\$120,873.30	\$122,568.69
	Disc. Losses	#####	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$63,641.55	\$60,466.38	\$57,434.28	\$54,540.11	\$51,778.81	\$49,145.38	\$46,634.91	\$44,242.57	\$41,963.66	\$39,793.57	\$37,727.82	\$35,762.05	\$33,891.26
Benefit	Undisc. Los	#####	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$235,517.00	\$239,484.21	\$243,451.41	\$247,418.61	\$251,385.82	\$255,353.02	\$259,320.23	\$263,287.43	\$267,254.63	\$271,221.84	\$275,189.04	\$279,156.25	\$283,247.30
	Disc. Losses	#####	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$146,668.15	\$139,381.99	\$132,421.44	\$125,775.08	\$119,431.59	\$113,379.80	\$107,608.67	\$102,107.40	\$96,865.38	\$91,872.22	\$87,117.80	\$82,592.26	\$78,320.24

2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
\$411,602.45	\$417,388.90	\$423,175.36	\$428,961.81	\$434,748.26	\$440,534.72	\$446,321.17	\$452,107.62	\$457,894.08	\$463,680.53	\$469,466.99	\$475,253.44	\$481,039.89	\$486,826.35	\$492,612.80	\$498,399.25	\$504,185.71
\$106,365.89	\$100,804.88	\$95,516.25	\$90,488.16	\$85,709.15	\$81,168.16	\$76,854.49	\$72,757.85	\$68,868.28	\$65,176.24	\$61,672.52	\$58,348.29	\$55,195.06	\$52,204.68	\$49,369.33	\$46,681.54	\$44,134.13
\$124,264.09	\$125,959.48	\$127,654.87	\$129,350.27	\$131,045.66	\$132,741.06	\$134,436.45	\$136,131.84	\$137,827.24	\$139,522.63	\$141,218.03	\$142,913.42	\$144,608.82	\$146,304.21	\$147,999.60	\$149,695.00	\$151,390.39
\$32,112.20	\$30,420.86	\$28,813.39	\$27,286.04	\$25,835.21	\$24,457.43	\$23,149.35	\$21,907.75	\$20,729.52	\$19,611.69	\$18,551.41	\$17,545.91	\$16,592.58	\$15,688.89	\$14,832.42	\$14,020.87	\$13,252.03
\$287,338.36	\$291,429.42	\$295,520.48	\$299,611.54	\$303,702.60	\$307,793.66	\$311,884.72	\$315,975.78	\$320,066.84	\$324,157.90	\$328,248.96	\$332,340.02	\$336,431.08	\$340,522.14	\$344,613.20	\$348,704.26	\$352,795.32
\$74,253.69	\$70,384.02	\$66,702.86	\$63,202.12	\$59,873.94	\$56,710.73	\$53,705.14	\$50,850.10	\$48,138.76	\$45,564.55	\$43,121.12	\$40,802.38	\$38,602.48	\$36,515.79	\$34,536.91	\$32,660.67	\$30,882.10

Calendar Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
Forecast Factor	36	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Operational Factor	30	0	0	0	0	0	0	0.00%	0.00%	#####	#####	#####	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
No-Build Factor	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	

Variable Source: UHIT

Benefits

Project Demand

Used for Emissions, Vehicle O&M/Fuel Savings, Active Transportation, and Facility and Vehicle Amenities calculations. May also be used to help calculate other benefits, such as travel time savings.



Auto

No-Build User In VMT 0 0.00%
 No-Build User In MPH 0.0%
 Build A User In VMT 0.0%
 Average User In MPH 0.0%
 VMT Re User In VMT 0

Trucks

No-Build User In VMT 0
 Average User In MPH 0
 Build A User In VMT 0
 Average User In MPH 0
 VMT Re User In VMT 0



Bus

No-Build User In Trips 0
 No-Build User In VMT 0
 Average User In MPH 0.00%
 Build B User In Trips 0.00%
 Build A User In VMT 0
 Average User In MPH 0
 VMT Re User In Ton-Mi 0

Freight Rail

Ton-Mi User In Ton-Mi 0
 Average User In MPH 0

Passenger Rail

Type of Rail	Intercity
No-Build User in Trips	0
No-Build User in Passen	0
Build R User in Trips	0
Build A User in Passen	0

Passen User in Passenger Mile 0 0 0

Light Rail/Streetcar

No-Build User in Trips 0
 Build U User in Trips 0

Pedestrians

No-Build User in Trips 91607 11,450.84 ##### 0 0 0
 Build P User in Trips 5E+05 12,214.23 ##### 12214.23 12214.23 12214.23

Variable	Value	Unit	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047
Forecast Peri	0	Factor	36	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Operations p	0	Factor	30	0	0	0	0	0	0	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
No-build end	0	Factor	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Base Year (fo	2020																													
Base Year (fo	2020																													
Chart Label	2020S Discounted to 2020																													

BENEFITS BY CATEGORY

Base

Travel Time	0	2020S in 2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Emissions	0	2020S in 2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Safety	0	2020S in 2020	0.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vehicle O&M	0	2020S in 2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pavement Da	0	2020S in 2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Congestion	0	2020S in 2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Noise	0	2020S in 2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Active Transp	1982509.87	2020S in 2020	-	-	-	-	-	-	-	-	61,890.51	62,166.37	62,443.61	62,722.24	63,002.27	63,283.69	63,566.52	63,850.76	64,136.42	64,423.52	64,712.05	65,002.02	65,293.44	65,586.32	65,880.66	66,176.47	66,473.77	66,772.55	67,072.82			
Health	239470288	2020S in 2020	-	-	-	-	-	-	-	-	271,216.81	302,662.37	334,117.71	365,582.87	397,057.92	428,542.89	460,037.84	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
Facility Amer	148733542	2020S in 2020	-	-	-	-	-	-	-	-	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
Vehicle Amen	0	2020S in 2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Property Buy	99312846	2020S in 2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*****	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual Vali	36498000	2020S in 2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Change in O&	-4650036	2020S in 2020	-	-	-	-	-	-	-	-	-75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	(225,000.00)	(225,000.00)	(225,000.00)	(225,000.00)	(225,000.00)	(225,000.00)	(225,000.00)	(225,000.00)	(225,000.00)	(225,000.00)	(225,000.00)	(225,000.00)	(225,000.00)	(225,000.00)	
Total	521347150	2020S in 2020	-	-	-	-	-	-	-	-	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****

Travel Time	0	percent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Emissions	0	percent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Safety	0	percent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vehicle O&M	0	percent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pavement Da	0	percent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Congestion	0	percent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Noise	0.00%	percent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Active Transp 0.00380267 percent

Health 0.45932981 percent

Facility Amer 0.28528696 percent

Vehicle Amen 0 percent

Property Buyout Avoided Costs
Residual Vali 0.0700071 percent

Change in O& -0.0089193 percent
Total 1 percent

TOTALS

TOTAL BENEF	521347150	2020S in 2020	-	-	-	-	-	-	-	-	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
CUMULATIVE BENEFITS			-	-	-	-	-	-	-	-	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
TOTAL COSTS	68660752.4	2020S in 2020	-	-	-	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
CUMULATIVE COSTS			-	-	-	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****

SUMMARY METRICS

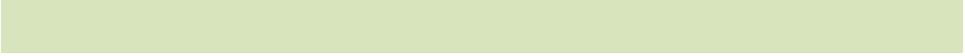
Benefit Cost r	7.59308821	ratio																														
Net Present V	452686397	2020S in 2020																														
Internal Rate	0.15399588	percent																														

Payback Peri 12 years

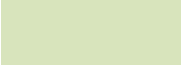
2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063
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100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



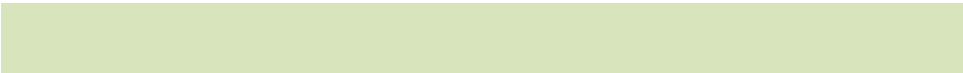
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67,374.59	67,677.88	67,982.68	68,289.00	68,596.86	68,906.25	69,217.20	69,529.69	69,843.75	70,159.38	70,476.59	-	-	-	-	-
10,302,386.62	10,304,536.87	10,306,697.87	10,308,869.67	10,311,052.34	10,313,245.91	10,315,450.46	10,317,666.02	10,319,892.67	10,322,130.45	10,324,379.42	-	-	-	-	-
5,264,844.69	5,268,935.75	5,273,026.81	5,277,117.87	5,281,208.93	5,285,299.98	5,289,391.04	5,293,482.10	5,297,573.16	5,301,664.22	5,305,755.28	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(225,000.00)	(225,000.00)	(225,000.00)	(225,001.00)	(225,002.00)	(225,003.00)	(225,004.00)	(225,005.00)	-225006	-225007	-225008	0	0	0	0	0
15,409,605.90	15,416,150.49	15,422,707.35	15,429,275.54	15,435,856.12	15,442,449.15	15,449,054.70	15,455,672.82	15,462,303.59	15,468,947.05	15,475,603.29	0	0	0	0	0



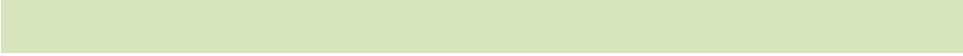
15,409,605.90	15,416,150.49	15,422,707.35	15,429,275.54	15,435,856.12	15,442,449.15	15,449,054.70	15,455,672.82	15,462,303.59	15,468,947.05	15,475,603.29	0	0	0	0	0
#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0
68,660,752.45	68,660,752.45	68,660,752.45	68,660,752.45	68,660,752.45	68,660,752.45	68,660,752.45	68,660,752.45	68,660,752.45	68,660,752.45	68,660,752.45	68,660,752.45	68,660,752.45	68,660,752.45	68,660,752.45	68,660,752.45



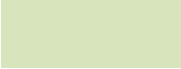
2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063
1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
10,133.29	9,512.99	8,930.69	8,384.05	7,870.88	7,389.14	6,936.90	6,512.36	6,113.80	5,739.66	5,388.42	-	-	-	-	-	0
1,549,501.74	1,448,434.71	1,353,961.19	1,265,650.93	1,183,101.77	1,105,937.82	1,033,807.69	966,382.92	903,356.52	844,441.50	789,369.61	-	-	-	-	-	0
791,844.29	740,616.44	692,702.33	647,887.63	605,971.87	566,767.55	530,099.30	495,803.09	463,725.49	433,722.99	405,661.38	-	-	-	-	-	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
(33,840.50)	(31,626.63)	(29,557.60)	(27,624.05)	(25,816.98)	(24,128.13)	(22,549.75)	(21,074.63)	-19,696.00303	-18,407,561.28	-17,203,404.76	0	0	0	0	0	0
2,317,638.82	2,166,937.52	2,026,036.60	1,894,298.55	1,771,127.54	1,655,966.38	1,548,294.14	1,447,623.74	1,353,499.81	1,265,496.588	397,373.418	0	0	0	0	0	0



2,317,638.82	2,166,937.52	2,026,036.60	1,894,298.55	1,771,127.54	1,655,966.38	1,548,294.14	1,447,623.74	1,353,499.81	1,265,496.588	397,373.418	0	0	0	0	0
96,252,900.43	98,419,837.94	#####	#####	#####	#####	#####	#####	#####	110116684.7	111382181.3	115355919.7	0	0	0	0
-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0
45,134,354.77	45,134,354.77	45,134,354.77	45,134,354.77	45,134,354.77	45,134,354.77	45,134,354.77	45,134,354.77	45,134,354.77	45,134,354.77	45,134,354.77	0	0	0	0	0



Variable	Value	Unit
B/C Ratios		
Benefit Cost Ratio	2.56	ratio
NPV		
Net Present Value	\$70,221,565	years
BENEFITS		
Operations Period	30	years
TOTAL BENEFITS	\$115,355,920	2020\$ in 2020
Average Yearly Benefits	\$3,845,197	2020\$ in 2020
COSTS		
Design/Construction Period	6	years
TOTAL COSTS	\$45,134,355	2020\$ in 2020
Average Yearly Costs	\$7,522,392	2020\$ in 2020

		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
Forecar	0 Factor	36	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Operat	0 Factor	30	0	0	0	0	0	0	0.00%	0.00%	#####	#####	#####	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Variable	Unit	ValueSum																																						

GENERAL

If the residual value is not provided by the client use this tab to calculate the associated value for your project. Your resulting value should be incorporated in line 46 of the InpR_Facility tab.

Base Year (for v. year	2020	
Design/Constn. years	6	

ITEM 1

Mid-Level Movable Bridge																																								
Expected Lifesp. years	50																																							
Last purchase } year	2029																																							
Analysis End Yr. year	#####																																							
Item Capital Co. 2020S	#####																																							
Time between c. years	#####																																							
Depreciation R. 2020S	2E-06																																							
Total Deprciat. 2020S	4E-07																																							
Remaining Cap. 2020S	3E+07																																							
Last Year Flag	flag	1																																						
Mid-Level Mov. 2020S	3E+07																																							
Discount Facto	factor	0.076																																						
Remaining Cap. 2020S	2E+06																																							
Mid-Level Mov. 2020S	2E+06																																							

ITEM 2

Tide Relif of Bridge																																							
Expected Lifesp. years	50																																						
Last purchase } year	#####																																						
Analysis End Yr. year	#####																																						
Item Capital Co. 2020S	#####																																						
Time between c. years	####																																						
Depreciation R. 2020S	2E-05																																						
Total Deprciat. 2020S	4E-06																																						
Remaining Cap. 2020S	4E-06																																						
Last Year Flag	flag	1																																					
Tide Relif of Brid. 2020S	4E-06																																						
Discount Facto	factor	0.076																																					
Remaining Cap. 2020S	3E+05																																						
Tide Relif of Brid. 2020S	3E+05																																						

ITEM 3

Enter Asset Name		
Expected Lifesp. years		
Last purchase } year	0.00%	
Analysis End Yr. year	2058	
Item Capital Co. 2020S	0	
Time between c. years	2058	
Depreciation R. 2020S	0	
Total Deprciat. 2020S	0	

