Appendix A -
Benefit Cost Analysis Memorandum

Globalplex Multi-Modal Connections Project

2018 BUILD Grant Application

Prepared for Port of South Louisiana by AECOM

Table of Contents

List of Tables

Executive Summary

A benefit-cost analysis (BCA) was conducted for the Globalplex Multi-Modal Connections Project to support the grant application of the Port of South Louisiana for the USDOT's 2018 Better Utilizing Investments to Leverage Development (BUILD) program. This analysis was conducted in accordance with the 2018 USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs.

The Globalplex Multi-Modal Connections Project is located in St. John the Baptist Parish in the state of Louisiana (LA). The Project will enhance cargo operations at the POSL, allowing for several new multi-modal connections and increased cargo diversification. The Project will consist of the construction of a new high capacity dock access bridge, a laydown yard with container capabilities, and rail connections.

The Project will use federal and matching funds to leverage additional development through increased efficiency and cargo diversification. The development of an interim container facility at Globalplex will allow for the future development of a new multi-purpose terminal facility, as well as increased abilities at Globalplex as a long-term bulk and breakbulk terminal.

The methodology used for the BCA follows precisely the guidelines of the Notice of Funding Opportunity (NOFO) for the BUILD program, and the USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs. Estimates of the expected benefits for each of the long-term outcomes specified in the NOFO are presented of the full completion of the project's "alternative case" against a baseline, which has been defined as the "base case." All costs and benefits were discounted using both a 7% and 3% discount rate, as suggested by the BCA Analysis Guidance. All values are discounted back to 2018. To compute the final BCA score, benefits of the whole Project are compared to the costs of the whole Project, including costs paid for by state, local, private partners, and the Federal government.

The BCA score is **2.6** following the implementation of the Project. A 30-year life cycle of the project was used to calculate the BCA score. Each component of the project has a lifecycle greater than 30 years. 30 years was utilized as a conservative estimate of the total project's lifecycle. O&M costs were not considered as the POSL has a long-term lease agreement with a terminal operating company that requires the tenant to perform maintenance at no cost to the Port. Operations and Maintenance is assumed to be maintained at the highest quality based upon leases with POSL tenants; the tenants bore all maintenance for these facilities.

Table 1 presents the Impact Matrix as specified in the NOFO. The Impact Matrix describes the baseline, the Project, and the estimated results.

Table 1 - Impact Matrix

Project Matrix

Current Status/Baseline & Problem to be Addressed	Change to Baseline or Alternatives	Types of Impacts
Existing Globalplex facility cannot serve as an interim container facility due to inefficiencies of existing Access bridge, and lack of laydown area.	Improvements allow for Globalplex to be used as an interim container facility. After the new Multi-Modal Terminal with Container capabilities is constructed, the laydown area will be used for staging bulk/break bulk cargoes, such as steel products.	Ability to expand operations for Port. Cargo diversification.
Existing cargoes are subject to a captive shipper scenario for rail as they are only able to access the CN rail line. Rates are high due to the lack of competition. Transloading costs are too high to drive the cargo & load onto rail elsewhere.	Connection to the KCS rail line will allow for increased destinations, and the ability to utilize rail at Globalplex due to freeing from a captive shipper scenario.	A shift from truck to rail for garnet sand & other cargos
Heavy cargoes want to call at Globalplex as the dock is nearest to the final destination (nearby chemical plants). However, the existing access bridge cannot handle the loads and thus the heavy cargoes (often, large equipment) must be taken to the next nearest Port and driven on highways & local roads a further distance.	The new access bridge will be built to withstand these heavy loads. The cargo will no longer be driven on highways, and will be driven less on local roadways.	Reduced VMT due to a closer dock. Reduced safety concerns due to avoiding the heavy cargoes on the roadways.
Small trucks transporting cargo from the dock to warehouses and staging facilities are loaded only partially full due to the low capacity of the existing dock access bridge. In the event of maintenance, there is no other access to the dock.	A second dock access bridge is constructed with the ability to withstand heavier hauls, such as large, fully loaded trucks.	Reduced VMT due to more efficiently loaded trucks. Reduced loading and unloading delay. The Port experiences resiliency due to a second access bridge.

Table 2 summarizes long term outcomes of the Project. Taken in total, the Project provides $70.2 million in benefits—reduced roadway fatalities and crashes, roadway maintenance savings, travel time savings, residual savings, freight benefits, and emissions savings—over the analysis period, using a 7 percent discount rate. Compared to a similarly discounted cost estimate, the Benefit-Cost Ratio for the Project is 2.6, a solid return on this critical investment for the region. This ratio rises to 4.2 when benefits and costs are discounted at 3 percent. The net benefits of the Project are $43.2 million using a 7 percent discount rate and $91.8 million using a 3 percent discount rate.

Table 2 - Costs & Key Benefits Delivered by Long Term Outcomes (2021 - 2050; in thousands of 2017$)

BCA Summary	7% Discount Rate	3% Discount Rate
Costs		
Capital Cost	$26,976	$28,525
Total Costs	**$26,976**	**$28,525**
Benefits		
Safety Benefits		
Reduced Roadway Fatalities and Crashes	$7,878	$13,393
Sub-Total	*$7,878*	*$13,393*
State of Good Repair Benefits		
Roadway Maintenance Savings	$5,600	$9,518
Sub-Total	*$5,600*	*$9,518*
Economic Competitiveness Benefits		
Travel Time Savings	$12,794	$20,905
Truck Operating Cost Savings (Inc. Fuel)	$36,535	$62,108
Residual Savings	$1,025	$3,468
Sub-Total	*$50,354*	*$86,481*
Environmental Protection		
Emissions Savings	$6,385	$10,883
Sub-Total	*$6,385*	*$10,883*
Quality of Life		
Sub-Total	$0	$0
Net Operating & Maintenance Costs	$0	$0
Total Benefits	**$70,216**	**$120,275**
Outcome		
Net Present Value	**$43,240**	**$91,750**
Benefit-Cost Ratio	**2.60**	**4.22**

Note: Values are displayed in thousands

1. Introduction

The Globalplex Multi-Modal Connections Project would allow the Port of South Louisiana to diversify cargo, and increase efficiencies of existing cargo at the only public port facility within the nation's largest tonnage port. The Project would construct a new dock access bridge, capable of allowing heavy-loads to transit, adjacent to the existing dock access bridge. This component would allow two new types of cargoes, heavy equipment and containers, and would allow for an improved flow of cargo. Currently, smaller, partially loaded trucks must drive onto the dock one at a time, be loaded or unloaded, turn around in limited space, and return back to Globalplex on the existing narrow bridge. After construction, larger and/or fully loaded trucks will transit the new dock access bridge loaded, and the existing dock access bridge while unloaded. The cargo will move seamlessly. After transiting the dock, the cargo will then travel on a new access road into the Globalplex facility. New cargoes, such as heavy equipment, Roll-on/Roll-off (Ro/Ro), and containers will then be organized at the new laydown yard. The laydown yard was designed as part of the Port of South Louisiana's EDA Grant Container Terminal Study, which identified Globalplex as the ideal interim container facility within the Port's jurisdiction. The laydown area is a low-cost option to allow the Port of South Louisiana to diversify into the container industry prior to construction of their future multi-modal terminal. Once the new multi-modal terminal is complete, the laydown area will be used for the storage and staging of breakbulk cargoes, such as steel products. The final component is a crucial rail connection to the KCS rail line. Globalplex is currently unable to use rail as the facility has experienced a captive shipper scenario. The only existing connection is the CN rail line. With a lack of competition, rates are unaffordable. With freight movements, each transloading event increases shipping costs drastically, which makes trucking for short distances to access rail equally unattractive. Several existing tenants have expressed interest in diverting their existing cargos to rail, if a more viable alternative was available. Accessing the KCS line would spark competition within the Globalplex facility, and would allow for additional destinations to be reached. The Port's EDA Grant Container Terminal Study also identified ample rail access as a crucial component of utilizing the Globalplex facility as an Interim facility.

The Project has existing support through the State of Louisiana's Capital Outlay program grant funding. The Port has been preparing for the project by reinforcing the dock, and constructing two new mobile harbor cranes with both Port & State of Louisiana Port Priority Construction & Development Program funds. The Project is clearly utilizing existing investments and looking to leverage development in the form of more efficient multi-modal cargo movements, a diversification of cargo, and an overall goal of creating new multi-modal terminal.

2. Benefit Analysis Framework

The benefit analysis was conducted using the Benefit-Cost Analysis Guidance for Discretionary Grant Programs as a guide for preferred methods and monetized values. The parameters of the benefits analysis follow the protocols set by the Office of Management and Budget (OMB) Circular A-94, as well as the recommended benefit quantification methods by the U.S. Department of Transportation. Generally, standard factors and values accepted by federal agencies were used for the benefits calculation except in cases where more Project-specific values or prices were available. In all such cases, modifications are noted and references are provided for data sources. The analysis follows a conservative estimation of the benefits and assesses some of the benefits qualitatively. By adhering to a strict standard of what could be included in the benefits analysis, actual total benefits may be greater than depicted in the results.

3. Analysis Assumptions

A list of assumptions for the Project is provided in the BCA workbook (see Inputs tab in the file App B BCA.xls) as well as in Table 3**.**

Methodology

The baseline assumes that the Project would not be built and current conditions and operations would continue in the Project Area. Under the baseline, the purpose of and need for the Project would not be met and would generally be limited to the operation and maintenance of existing infrastructure. The Project was compared to the baseline to identify benefits and costs.

A custom model was developed to estimate the future benefits for the Project. Benefits were estimated over a 30-year period of analysis beginning in 2021 until 2050. The base year is 2018 and all values were discounted to the base year. It was assumed that 2021 would be the first year that the Project would be complete, and benefits would begin accruing in 2021.

The benefits are expressed in constant 2017 dollars, which avoids forecasting future inflation and escalating future values for benefits and costs accordingly. The gross domestic product chained price index from the OMB was used to adjust past cost estimates or price values into 2017 dollar terms (OMB, 2018).

The use of constant dollar values requires the use of a real discount rate for discounting to the present value. Projects expecting to use federal funding are required to use a 7 percent discount rate. A 3 percent discount rate was also used. All costs and benefits were discounted to 2018 (base year).

Net benefits are computed as the difference in costs between a base case (no-build) and the alternative case (full completion of the Project). In the base case, it is assumed that tonnage traffic will continue to be shipped by smaller, light loaded trucks, heavy cargoes cannot be transported, and container movements will not move through the Globalplex facility.

Under the alternative case, operations will utilize large, “off-road” trucks that are fully loaded to transport cargo in a seamless traffic pattern from the dock to the staging areas within Globalplex. This will reduce travel time savings and truck vehicle miles traveled (VMT). The alternative case also realizes the benefits associated with the movements of heavy cargoes, Ro/Ro, and containers, as well as diverting some cargos to rail.

Net benefits are computed and monetized using the assumption that all the improvements and upgrades proposed will allow cargo to be transported with reduced truck VMT and reduced travel time. The avoided truck VMT and reduced travel time will generate a reduction in maintenance costs, roadway noise, fuel consumption, probability of traffic accidents, and emissions.

Table 3 – BCA Calculation Inputs

Parameters used to estimate the BCA Score

Input	Value	Source
General		
Benefit Discount Rate (Percent)	7.00%	2018 BUILD Resource Guide
Benefit Discount Rate (Percent)	3.00%	2018 BUILD Resource Guide
Project Life Cycle (years)	30	
Deflator	See "Deflator" Sheet	https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/budget/fy2018/hist10z1.xls
Base Year Dollar	2017	
Discount Year	2018	
O&M Costs, net new annual costs, Interim Container Facility	$2,815,227	EDA Grant, Container Terminal Study, POSL (Includes Maintenance, Energy, Fixed & Variable Labor Costs)
Vehicle Occupancy - Trucks	$1	2018 BUILD Resource Guide
Vehicle occupancy - Passenger Vehicles	1.39	2018 BUILD Resource Guide
Occurrences of Heavy Cargo - Currently Turned Down - Per Year	2	
Heavy Cargo - Baseline	26.5	Google Maps - Distance PONO to Norco
Heavy Cargo - New Access Bridge	12.5	Google Maps - Distance POSL to Norco
Cargo Diverted to Rail - Highway Miles	638	Truck distance was calculated at 85% of rail distance. Rail distance is the median distance for Medium Hauls as defined by the Surface Transportation Board's Distance Category.
Cargo Diverted to Rail - Rail Miles	750	Truck distance was calculated at 85% of rail distance. Rail distance is the median distance for Medium Hauls as defined by the Surface Transportation Board's Distance Category.
Percent of Cargo Shifted to Rail	5%	Assumption based on previous discussions with stevedores about existing tenants needs
Tonnage per Train	10,000	Unit Train
Average tons per truck - Current (short tons) - VIIIa	17	
Average tons per truck - New Access bridge (short tons)- VIIIb	50	
Average TEU per truck - Current	1	
Average TEU per truck - New Access Bridge	2	
Average Miles per Gallon Heavy Duty Trucks	7	US DOT RITA Table 4-13
Distance Trucks Travel loading/unloading (Existing)	3.0	
Distance Trucks Travel loading/unloading (New Access Bridge)	2.9	
Time to Load 1 Truck (Existing, in Minutes)	25	
Time to Load 1 Truck (New Access Bridge, in Minutes)	19	
State of Good Repair		
Roadway Maintenance Cost (1997$/mi)	$0.10	Calculated from: http://www.fhwa.dot.gov/policy/hcas/addendum.htm
Roadway Maintenance Cost (2017$/mi)	$0.15	Calculated from: http://www.fhwa.dot.gov/policy/hcas/addendum.htm, Adjusted by GDP Deflator
Maintenance Cost per Train Mile	$4.44	AMTRAK Access Fees Final redacted3 pdf
Economic Competitiveness		
Average price of gallon of diesel fuel	$3.24	U.S. average price of gallon of diesel from the Energy Information Agency (as of July 8, 2018)
Vehicle Operating Costs per VMT	$0.90	Recommended Value per Mile (2017$) - 2018 BUILD Resource Guide (includes fuel costs, truck lease, maintenance, etc.)
Rail operating Costs - Fuel per VRM	$3.60	http://reasonrail.blogspot.com/2013/03/how-much-does-it-cost-to-run-train.html?_sm_au_=iHVVWMPVJqp7T067

VTTS - Crane Operations - BLS Crane and Tower Operators - Median Hourly Wages (2017$)	$25.10	https://www.bls.gov/oes/current/oes_nat.htm#53-0000
VTTS - Truck Drivers	$28.60	2018 BUILD Resource Guide
VTTS - Locomotive Engineers	$44.90	2019 BUILD Resource Guide
VTTS - All Business	$26.50	2020 BUILD Resource Guide
Safety		
2016 Large Truck Fatal Crashes	4,213	
2016 Large Truck Injury Crashes	87,000	
2016 Large Truck Miles Traveled	287,895,000,000	
Crash Costs - Cents Per Mile - 60 kil 4 axle Truck Interstate	$0.01	1997 Federal Highway Cost Allocation Study Final Report, USDOT FHWA, May 2000
Crash Costs - Cents Per Mile - 60 kil 4 axle Truck Interstate	$0.01	1997 Federal Highway Cost Allocation Study Final Report, USDOT FHWA, May 2000, Adjusted by GDP Deflator
Rail Crashes - Injuries per VRM	34.90	https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/Rail%20Safety%20Statistics%20Report.pdf
Rail Crashes - Fatalities per VRM	1.86	https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/Rail%20Safety%20Statistics%20Report.pdf
AIS 0 (2017$) per vehicle	$4,327	2018 BUILD Resource Guide
AIS 1 (2017$)	$28,800	2018 BUILD Resource Guide
AIS 2 (2017$)	$451,200	2018 BUILD Resource Guide
AIS 3 (2017$)	$1,008,000	2018 BUILD Resource Guide
AIS 4 (2017$)	$2,553,600	2018 BUILD Resource Guide
AIS 5 (2017$)	$5,692,800	2018 BUILD Resource Guide
AIS 6 (2017$)	$9,600,000	2018 BUILD Resource Guide
Environmental Protection		
Truck VOC emissions (grams per mile)- Existing (VIIIa - [Smaller Trucks])	0.46	Average In-Use Emissions from Heavy-Duty Trucks - Emission Facts
Truck THC emissions (grams per mile) - Existing (VIIIa - [Smaller Trucks])	0.46	Average In-Use Emissions from Heavy-Duty Trucks - Emission Facts
Truck CO emissions (grams per mile)- Existing (VIIIa - [Smaller Trucks])	2.40	Average In-Use Emissions from Heavy-Duty Trucks - Emission Facts
Truck NOx emissions (grams per mile) - Existing (VIIIa - [Smaller Trucks])	9.19	Average In-Use Emissions from Heavy-Duty Trucks - Emission Facts
Truck PM2.5 emissions (grams per mile) - Existing (VIIIa - [Smaller Trucks])	0.22	Average In-Use Emissions from Heavy-Duty Trucks - Emission Facts
Truck VOC emissions (grams per mile) - New Access Bridge (VIIIb - [Larger Trucks])	0.55	Average In-Use Emissions from Heavy-Duty Trucks - Emission Facts
Truck THC emissions (grams per mile) - New Access Bridge (VIIIb - [Larger Trucks])	0.55	Average In-Use Emissions from Heavy-Duty Trucks - Emission Facts
Truck CO emissions (grams per mile) - New Access Bridge (VIIIb - [Larger Trucks])	3.11	Average In-Use Emissions from Heavy-Duty Trucks - Emission Facts
Truck NOx emissions (grams per mile) - New Access Bridge (VIIIb - [Larger Trucks])	10.99	Average In-Use Emissions from Heavy-Duty Trucks - Emission Facts
Truck PM2.5 emissions (grams per mile) - New Access Bridge (VIIIb - [Larger Trucks])	0.24	Average In-Use Emissions from Heavy-Duty Trucks - Emission Facts
Rail NOx emissions (grams per mile)	0.65	Average In-Use Emissions from Heavy-Duty Trucks - Emission
Rail Particulate Matter (PM) emissions (grams mile)	0.02	Federal Railroad Administration. "Comparative Evaluation of Rail and Truck Fuel Efficiency on Competitive Corridors" Final Report written by ICF International. November 19, 2009
VOC Value of Emissions (2017$) per short ton	$1,905	2018 BUILD Resource Guide
NOx Value of Emissions (2017$) per short ton	$7,508	2018 BUILD Resource Guide
PM Value of Emissions (2017$) per short ton	$343,442	2018 BUILD Resource Guide
SOx Value of Emissions (2017$) per short ton	$44,373	2018 BUILD Resource Guide
Conversion rate for Metric tons to Short Tons	1.1015	2018 BUILD Resource Guide

4. Benefits

The methodology used to estimate the benefits of the Project are described in the following sections.

General

Within the POSL jurisdiction, Globalplex is the only public port facility. Since the development of the facility in 2002, growth has been exponential. In the last 10 years, Globalplex tonnage increased by 9.6%. In 2015, the facility experienced throughput of 2,199,900 short tons – a record for the facility. The decrease from 2015 to 2016 was not due to lack of demand, but instead due to crane reliability. In 2015, the Port's stevedores, Associated Terminals, brought in temporary cranes on barge to facilitate the increased cargo movement. These temporary cranes can only be available to Globalplex when they are not in use elsewhere. These cranes were not available in 2016, and the existing cranes at the Globalplex facility could not keep up with demand. The facilities' tenants have expressed their need to increase cargo throughput, which would require crane improvements. The Port received a Port Priority Construction & Development Program grant from the State of Louisiana and is currently working on reinforcing the dock and ordering new mobile harbor cranes. They are expected to be on-dock in 2019.

Table 4 - Globalplex Non-Containerized Cargo (Short Tons)

Year	Project Year	Total Inbound (Short Tons)	Total Outbound (Short Tons)	Grand Total (Short Tons)
2007	-13	185,000	306,000	491,000
2008	-12	287,000	317,000	604,000
2009	-11	155,000	386,000	541,000
2010	-10	271,000	382,000	653,000
2011	-9	348,000	482,000	830,000
2012	-8	355,000	455,000	809,000
2013	-7	182,000	583,000	765,000
2014	-6	26,000	1,493,000	1,519,000
2015	-5	849,000	1,351,000	2,200,000
2016	-4	478,000	752,000	1,230,000
2017	-3	N/A	N/A	1,337,000
2018	-2	N/A	N/A	1,454,000
2019	-1	N/A	N/A	1,581,000
2020	0	N/A	N/A	1,719,000
2021	1	N/A	N/A	1,869,000
2022	2	N/A	N/A	1,869,000
2023	3	N/A	N/A	1,869,000
2024	4	N/A	N/A	1,869,000
2025	5	N/A	N/A	1,869,000
2026	6	N/A	N/A	1,869,000
2027	7	N/A	N/A	1,869,000
2028	8	N/A	N/A	1,869,000
2029	9	N/A	N/A	1,869,000
2030	10	N/A	N/A	1,869,000
2031	11	N/A	N/A	1,869,000
2032	12	N/A	N/A	1,869,000
2033	13	N/A	N/A	1,869,000
2034	14	N/A	N/A	1,869,000
2035	15	N/A	N/A	1,869,000
2036	16	N/A	N/A	1,869,000
2037	17	N/A	N/A	1,869,000
2038	18	N/A	N/A	1,869,000
2039	19	N/A	N/A	1,869,000
2040	20	N/A	N/A	1,869,000
2041	21	N/A	N/A	1,869,000
2042	22	N/A	N/A	1,869,000
2043	23	N/A	N/A	1,869,000
2044	24	N/A	N/A	1,869,000
2045	25	N/A	N/A	1,869,000
2046	26	N/A	N/A	1,869,000
2047	27	N/A	N/A	1,869,000
2048	28	N/A	N/A	1,869,000
2049	29	N/A	N/A	1,869,000
2050	30	N/A	N/A	1,869,000

Associated Terminal Data

Table 5 - Globalplex Forecasted Containerized Cargo (TEU)

Year	Project Year	Total Inbound (TEU)	Total Outbound (TEU)	Grand Total (TEU)
2018	-2	0	0	0
2019	-1	0	0	0
2020	0	0	0	0
2021	1	10,000	15,000	25,000
2022	2	19,000	25,000	44,000
2023	3	28,000	35,000	63,000
2024	4	36,000	45,000	81,000
2025	5	45,000	55,000	100,000
2026	6	45,000	55,000	100,000
2027	7	0	0	0
2028	8	0	0	0
2029	9	0	0	0
2030	10	0	0	0
2031	11	0	0	0
2032	12	0	0	0
2033	13	0	0	0
2034	14	0	0	0
2035	15	0	0	0
2036	16	0	0	0
2037	17	0	0	0
2038	18	0	0	0
2039	19	0	0	0
2040	20	0	0	0
2041	21	0	0	0
2042	22	0	0	0
2043	23	0	0	0
2044	24	0	0	0
2045	25	0	0	0
2046	26	0	0	0
2047	27	0	0	0
2048	28	0	0	0
2049	29	0	0	0
2050	30	0	0	0

EDA Grant Study Assumptions

Table 6 - Reduced VMT

Project Year	Year	Total Reduced VMT
2018	-2	0
2019	-1	0
2020	0	0
2021	1	3,773,000
2022	2	3,802,000
2023	3	3,831,000
2024	4	3,860,000
2025	5	3,889,000
2026	6	3,889,000
2027	7	3,734,000
2028	8	3,734,000
2029	9	3,734,000
2030	10	3,734,000
2031	11	3,734,000
2032	12	3,734,000
2033	13	3,734,000
2034	14	3,734,000
2035	15	3,734,000
2036	16	3,734,000
2037	17	3,734,000
2038	18	3,734,000
2039	19	3,734,000
2040	20	3,734,000
2041	21	3,734,000
2042	22	3,734,000
2043	23	3,734,000
2044	24	3,734,000
2045	25	3,734,000
2046	26	3,734,000
2047	27	3,734,000
2048	28	3,734,000
2049	29	3,734,000
2050	30	3,734,000
TOTAL:		**112,671,000**

Table 7 presents the computation of truck travel time savings associated with the improved traffic pattern of the new dock access bridge. Currently, only 1 truck can cross the single lane, low capacity access bridge. It must drive across the bridge, be loaded or unloaded, turn around, and cross the access bridge back towards Globalplex before a second truck can enter. Under the alternative scenario, trucks will be able to follow each other in a circular pattern; transiting loaded on the new dock access bridge, and unloaded on the existing. This traffic pattern will not require trucks to wait for others to travel. Once a truck is loaded or unloaded, the next truck can immediately pull forward into position while the first truck is transiting the bridge.

Table 7 - Travel Time Savings

Project Year	Year	Bridge Truck Trips (Existing) (Excludes Heavy Cargo)	Bridge Truck Trips (New Access Bridge) (Excludes Heavy Cargo)	Travel Time (Existing flow of cargo, in Minutes)	Travel Time (New Access Bridge, in Minutes)	Total Travel Time (Existing, In Minutes)	Total Travel Time (New Access bridge, In Minutes)	Travel Time Savings (Minutes)
-2	2018	86,000	86,000	0	0	2,138,000	2,138,000	0
-1	2019	93,000	93,000	0	0	2,325,000	2,325,000	0
0	2020	101,000	101,000	0	0	2,528,000	2,528,000	0
1	2021	135,000	48,000	0	0	3,374,000	900,000	2,474,000
2	2022	154,000	57,000	0	0	3,843,000	1,076,000	2,767,000
3	2023	172,000	67,000	0	0	4,311,000	1,252,000	3,059,000
4	2024	191,000	76,000	0	0	4,780,000	1,428,000	3,352,000
5	2025	210,000	86,000	0	0	5,249,000	1,603,000	3,645,000
6	2026	210,000	86,000	0	0	5,249,000	1,603,000	3,645,000
7	2027	110,000	36,000	0	0	2,749,000	666,000	2,083,000
8	2028	110,000	36,000	0	0	2,749,000	666,000	2,083,000
9	2029	110,000	36,000	0	0	2,749,000	666,000	2,083,000
10	2030	110,000	36,000	0	0	2,749,000	666,000	2,083,000
11	2031	110,000	36,000	0	0	2,749,000	666,000	2,083,000
12	2032	110,000	36,000	0	0	2,749,000	666,000	2,083,000
13	2033	110,000	36,000	0	0	2,749,000	666,000	2,083,000
14	2034	110,000	36,000	0	0	2,749,000	666,000	2,083,000
15	2035	110,000	36,000	0	0	2,749,000	666,000	2,083,000
16	2036	110,000	36,000	0	0	2,749,000	666,000	2,083,000
17	2037	110,000	36,000	0	0	2,749,000	666,000	2,083,000
18	2038	110,000	36,000	0	0	2,749,000	666,000	2,083,000
19	2039	110,000	36,000	0	0	2,749,000	666,000	2,083,000
20	2040	110,000	36,000	0	0	2,749,000	666,000	2,083,000
21	2041	110,000	36,000	0	0	2,749,000	666,000	2,083,000
22	2042	110,000	36,000	0	0	2,749,000	666,000	2,083,000
23	2043	110,000	36,000	0	0	2,749,000	666,000	2,083,000
24	2044	110,000	36,000	0	0	2,749,000	666,000	2,083,000
25	2045	110,000	36,000	0	0	2,749,000	666,000	2,083,000
26	2046	110,000	36,000	0	0	2,749,000	666,000	2,083,000
27	2047	110,000	36,000	0	0	2,749,000	666,000	2,083,000
28	2048	110,000	36,000	0	0	2,749,000	666,000	2,083,000
29	2049	110,000	36,000	0	0	2,749,000	666,000	2,083,000
30	2050	110,000	36,000	0	0	2,749,000	666,000	2,083,000
TOTAL:		**3,991,000**	**1,551,000**	**0**	**0**	**99,769,000**	**30,836,000**	**68,933,000**

Table 8 represents the computation of the tonnage of emissions that would occur due to a reduction in truck VMT over the next 30 years. A total of 1,129 tons of NOx, 56 tons of VOCs, 293 tons of CO2, and 26 tons of PM can be saved due to a reduction in truck VMT over the next 30 years.

Table 8 - Reduced Emissions (Short Tons)

Project Year	Year	TOTAL:			
		Reduction in NOx (Short Tons)	Reduction in VOCs (Short Tons)	Reduction in CO (Short Tons)	Reduction in PM (Short Tons)
-2	2018	0	0	0	0
-1	2019	0	0	0	0
0	2020	0	0	0	0
1	2021	38	2	10	1
2	2022	38	2	10	1
3	2023	38	2	10	1
4	2024	38	2	10	1
5	2025	38	2	10	1
6	2026	38	2	10	1
7	2027	38	2	10	1
8	2028	38	2	10	1
9	2029	38	2	10	1
10	2030	38	2	10	1
11	2031	38	2	10	1
12	2032	38	2	10	1
13	2033	38	2	10	1
14	2034	38	2	10	1
15	2035	38	2	10	1
16	2036	38	2	10	1
17	2037	38	2	10	1
18	2038	38	2	10	1
19	2039	38	2	10	1
20	2040	38	2	10	1
21	2041	38	2	10	1
22	2042	38	2	10	1
23	2043	38	2	10	1
24	2044	38	2	10	1
25	2045	38	2	10	1
26	2046	38	2	10	1
27	2047	38	2	10	1
28	2048	38	2	10	1
29	2049	38	2	10	1
30	2050	38	2	10	1
Total:		**1,129**	**56**	**293**	**26**

Safety

The Project would result in safety benefits by removing auto trips from the region's roads. The methodology for calculating this benefit is described in this section.

Reduced Roadway Fatalities and Crashes

Reducing truck VMT reduces the probability of truck crash costs. According to the National Highway Traffic Safety Administration (NHSTA), there were 4,213 fatal crashes and 87,000 injury crashes over 287,895 million VMTby large trucks in 2016. Using the recommended values of statistical life from the BCA guidance, this translates to a crash cost of approximately $0.19 per mile. The crash costs are monetized by multiplying this cost per mile by the reduced truck VMT produced by the project.

The total annual value for crash severity is based on USDOT guidance and the National Highway Safety Council estimates for the value of avoiding a crash. These estimates are applied to the number of crashes avoided to estimate the total value of crashes avoided from auto VMT avoided. Table 3 provides the estimated cost of different types of crashes.

Based on the value of accidents avoided, the value of safety incidents avoided due to the reduction in VMT is estimated. ***The total reduction in highway fatalities and crashes results in $7.9 million, discounted at 7 percent.***

State of Good Repair

The Project would result in state of good repair benefits by removing truck VMT from roadways. The methodology for calculating this benefit is described in this section.

Roadway Maintenance Savings

A reduction in VMT incurs long-term maintenance benefits in the form of roadway maintenance savings, such as painting and paving. The roadway maintenance cost of $0.15 per VMT was obtained from an FHWA Addendum and then updated by the GDP deflator. Multiplying the VMT avoided by the maintenance cost savings per VMT results in state of good repair benefits. ***Roadway maintenance savings amount to $5.6 million, discounted at 7 percent.***

Economic Competitiveness

The Project would result in economic benefits by creating efficiencies in cargo flows, resulting in travel time savings, residual value, and freight benefits. The methodologies for calculating these benefits are described in this section.

Travel Time Savings

The new access bridge induces travel time savings in two ways. First, the ability to use larger, more efficient trucks means that truck drivers must spend less time driving fewer trucks for the same amount of cargo. Additionally, the new access bridges creates a new, more efficient travel pattern that does not require backing up, and allows for multiple trucks to stage at the same time as they travel in a seamless, circular pattern on and off the dock.

Summing up the travel time savings elements in hours and multiplying by the value of time, as found in Table 3, yields the total travel time savings. ***The total travel time savings for the Project amounts to $12.8 million discounted at 7 percent.***

Freight Benefits

The Project would result in freight benefits in the form of operating savings. The methodologies for calculating these benefits are described in this section. Freight operating savings result from the Project as a result of a reduction in truck VMT. It was assumed that half of the capital costs for site work and land acquisition is right of way. The remaining discounted value of the platform, track, bridge, and right of way acquired was summed. ***Freight operating savings amount to $36.5 million, discounted at 7 percent.***

Residual Value

Construction of the access bridge, laydown yard, and rail spur connection has residual value after the end of the 30-year analysis period, because the useful life of these elements is longer than 20 years. The access bridge has a useful life of 75 years, and as a result, the remaining value was estimated for after the analysis period ends and discounted at 7 percent and 3 percent. The laydown yard has a useful life of 40 years, and the rail spur connection has a useful life of 38 years. ***The value of the remaining useful life for the Project discounted at 7 percent is $1.02 million.***

Environmental Protection

The Project would result in environmental protection benefits by removing auto trips from the region's roads. Offsetting these savings is the addition of a new train that adds emissions. The methodology for calculating this net result is described in this section.

Emissions Savings

The reduction in truck VMT will result in a reduction in emissions, however, the added new rail trips will result in new emissions. The two are netted in this analysis .Shifting freight from many small trucks, to less, more efficient large trucks reduces the amount of total greenhouse gas emissions. Emissions released by truck class and VMT was reported by the EPA report on Average In-Use Emissions from Heavy-Duty Trucks. Net benefits are estimated by multiplying the emissions savings by the provided cost of emissions, shown in Table 3. Over the 30 year period, the full completion of the Project would result in an avoidance of 1,129 tons of NOx, 56 tons of VOCs, 293 tons of CO, and 26 tons of PM from a reduction in truck traffic. ***In total, emissions savings amount to $6.4 million, discounted at 7 percent.***

Quality of Life

Finally, there are non-quantifiable benefits that the Project provides. The improved efficiency in cargo flow at the Globalplex facility will reduce noise pollution for the nearby neighborhoods by reducing truck traffic.

Additionally, when economic development is sparked in an area, there are intangible, induced benefits associated with the project growth. The Port of South Louisiana is the economic heartbeat of St. John the Baptist, St. Charles, and St. James parishes. With the improvements to Globalplex, the Port of South Louisiana only grows stronger, and allows the Port to continue supporting the quality of life of nearby residents.

5. Costs

The Project components capital costs are used in the analysis are described in this section.

Capital Costs

The capital costs for the Project include the costs for access bridge, ramp and road construction, terminal upgrades and laydown yard, refrigerated container clubs, maintenance building, new track for the rail spur connection, and switches. The capital costs are applied over the 24-month construction period for the Project, beginning in 2019 and ending in 2020. Capital costs were provided in 2017 dollars. The capital costs for the Project discounted at 7 percent total to $27 million.

Table 9 - Project Schedule – Spending (2017$)

Project Costs	2019	2020	Totals
Design/NEPA	$2,561,000	$213,000	$2,774,000
Rail	$0	$5,339,000	$5,339,000
Laydown Yard	$5,835,000	$3,890,000	$9,725,000
Access Bridge	$5,374,000	$3,583,000	$8,957,000
TOTAL	**$13,770,000**	**$13,025,000**	**$26,795,000**

Table 10 - Construction Costs (in 2017$)

Item Description	Quantity	Unit of Measure	Unit Cost	Item Total
Access Bridge & Inter-facility Heavy-Load Access Road				
Railing	1	Lump	$239,000	$239,000
120' Long Piles	160	Each	$14,000	$2,210,000
Bents	1	Each	$724,000	$724,000
8" Slabs	15	Each	$103,000	$1,548,000
70' Girders	1	Each	$1,445,000	$1,445,000
Incidentals	1	Lump	$568,000	$568,000
Contingency (10%)	1	Lump		$973,000
Subtotal – Access Bridge Construction				$7,707,000
Subtotal – Access Bridge Design				$973,000
Subtotal- Access Bridge				$8,680,000
Access Road with Ramp	1	Lump	$1,000,000	$1,000,000
Contingency (25%)	1	Lump		$250,000
Subtotal – Inter-facility Access Road Construction				$1,250,000
Subtotal – Inter-facility Access Road Design				$100,000
Subtotal - Inter-facility Access Road				$1,350,000
TOTAL – Access Bridge & Road Construction				**$8,957,000**
TOTAL – Access Bridge & Road Design				**$1,073,000**
TOTAL- Access Bridge & Road				**$10,030,000**
Container Terminal Upgrades & Laydown Yard				
Wheeled reefer plugs	100	ea.	$3,000	$300,000
CY paving (wheeled)	4	acre	$870,000	$3,480,000
CY paving rehab	10	acre	$100,000	$1,000,000
TOS and IT	0.5	ea.	$3,000,000	$1,500,000
Buildings (maint+admin)	5000	sf	$300	$1,500,000
Contingency				$1,945,000
TOTAL – Laydown Yard Construction				**$9,725,000**
TOTAL – Lay Down Yard Design				**$1,167,000**
TOTAL- Laydown Yard				**$10,892,000**
Rail Spurs & Rail Connection				
New Track	10,100	Lin Ft	$250	$2,525,000
#11 Switches	2	Each	$250,000	$500,000
#9 Switches	6		$125,000	$750,000
Embankment	41,320	cu yd.	$12	$496,000
Contingency (25%)	1	lump	$1,067,710	$1,068,000
TOTAL – Rail Construction				**$5,339,000**
TOTAL – Rail Design				**$534,000**
TOTAL- Rail				**$5,873,000**
TOTAL PROJECT - DESIGN				**$2,774,000**
TOTAL PROJECT - CONSTRUCTION				**$24,021,000**
PROJECT TOTAL:				**$26,795,000**

6. BCA Results

The BCA results in a BCA ratio of **2.6** when discounted at a rate of 7 percent, and increases to **4.2** when discounted at 3 percent. The Project provides benefits for freight, remaining highway users, taxpayers, and the general public. It will also provide a source of non-federal revenue for a state entity, the Port of South Louisiana. The Project benefits cover the key benefit categories: safety, state of good repair, economic competitiveness, environmental protection, and quality of life. Table 11 displays a summary of the BCA results.

Table 11 - BCA Summary (2021 - 2050; in thousands of 2017$)

BCA Summary	7% Discount Rate	3% Discount Rate
Costs		
Capital Cost	$26,976	$28,525
Total Costs	**$26,976**	**$28,525**
Benefits		
Safety Benefits		
Reduced Roadway Fatalities and Crashes	$7,878	$13,393
Sub-Total	*$7,878*	*$13,393*
State of Good Repair Benefits		
Roadway Maintenance Savings	$5,600	$9,518
Sub-Total	*$5,600*	*$9,518*
Economic Competitiveness Benefits		
Travel Time Savings	$12,794	$20,905
Truck Operating Cost Savings (Inc. Fuel)	$36,535	$62,108
Residual Savings	$1,025	$3,468
Sub-Total	*$50,354*	*$86,481*
Environmental Protection		
Emissions Savings	$6,385	$10,883
Sub-Total	*$6,385*	*$10,883*
Quality of Life		
Sub-Total	$0	$0
Net Operating & Maintenance Costs	$0	$0
Total Benefits	**$70,216**	**$120,275**
Outcome		
Net Present Value	**$43,240**	**$91,750**
Benefit-Cost Ratio	**2.60**	**4.22**

Note: Values are displayed in thousands

List of Supporting Documents

BEA Rate of Depreciation, Service Lives, Declining-Balance Rates, and Hulten-Wykoff Categories, http://www.bea.gov/scb/account_articles/national/wlth2594/tableC.htm

FHWA Highway Cost Allocation Study, 2000 Addendum, Table 13, https://www.fhwa.dot.gov/policy/hcas/addendum.cfm

National Highway Traffic and Safety Administration. Corporate Average Fuel Economy for MY2017-2025 Passenger Cars and Light Trucks. 2012 (page 922). http://www.nhtsa.gov/staticfiles/rulemaking /pdf/cafe/FRIA_2017-2025.pdf

USDOT BCA Guidance for Discretionary Grant Programs https://www.transportation.gov/sites/dot.gov/files/docs/mission/office-policy/transportation-policy/284031/benefit-cost-analysis-guidance-2018_0.pdf

USDOT Bridge Preservation guide, Maintaining a State of Good Repair Using Cost Effective Investment Strategies, August 2011, page 2, https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiv-8XR8cLLAhVV5WMKHYZ6Ap8QFggcMAA&url=http%3A%2F%2Fwww.fhwa.dot.gov%2Fbridge%2Fpreservation%2Fguide%2Fguide.pdf&usg=AFQjCNEf26d_7T9a9n7jxVGGtwyGvq2zQg&sig2=Z8jY2-M9fT0zre_vXvSplg&bvm=bv.116954456,d.cGc

US Energy Information Administration, Gasoline and Diesel Fuel Update, http://tonto.eia.doe.gov/oog/info/gdu/gasdiesel.asp

White House Office of Management and Budget. Historical Tables, Table 10.1 – Gross Domestic Product and Deflators Used in the Historical Tables 1940-2021. https://www.whitehouse.gov/omb/budget/Historicals

Federal Railroad Administration. "Comparative Evaluation of Rail and Truck Fuel Efficiency on Competitive Corridors" Final Report written by ICF International. November 19, 2009

US. DOT, FHWA. May 2000 Addendum to the Federal Highway Cost Allocation Study Final Report, May 2000 (available at http://www.fhwa.dot.gov/policy/hcas/addendum.htm)

Forkenbrock, D.J., 1999. External costs of intercity truck freight transportation. Transportation Research A 33 (7/8), p. 505-526

Forkenbrock, David J., External Costs of Truck and Rail Freight Transportation," University of Iowa, 1998, Page 27.

US DOT RITA Transportation Statistics Table 4-13-5 https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/index.html#chapter_4

Large Truck Emission Rates
https://nepis.epa.gov/Exe/ZyNET.exe/P100EVY6.txt?ZyActionD=ZyDocument&Client=EPA&Index=2006%20Thru%202010&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C06THRU10%5CTXT%5C00000033%5CP100EVY6.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=5

Bureau of Labor Statistics Median Wage
https://www.bls.gov/oes/current/oes_nat.htm#53-0000

National Highway Transportation Safety Association
https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812373