



**LORDSTOWN**  
SMART LOGISTICS HUB

**USDOT BUILD Grant  
Application Narrative  
May 2020**



**WESTERN RESERVE  
PORT AUTHORITY**



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## **SUPPLEMENTAL MATERIALS**

Supplemental materials to the application are available at:

<https://neodfa.org/build-2-grant/lordstownsmartlogistics/>

## PROJECT DESCRIPTION

The Lordstown Smart Logistics Hub is an innovative, strategic initiative to capitalize on Lordstown's location at the intersection of multiple modes of transportation, broadband, and electrification and position the area as the premier regional warehousing and distribution hub. Project components include:

- **Intermodal rail connection** at Ohio Commerce Center to allow rail-truck container transfer
- **Electric automated truck circulator route** linking to the new intermodal connection
- **Integrated electrified interchange** along the Ohio Turnpike with inductive electric charging
- **Future-focused transfer yard** with electric charging and automated vehicle transition/handoff
- **Fiber optic connection between** BRITE Energy Innovators-Ohio Turnpike to enhance smart mobility.

## PROJECT LOCATION

The project is located along the Trumbull County-Mahoning County border in rural Eastern Ohio Appalachia with access to the Ohio Turnpike (I-80), I-76, and the CSX National Gateway, proximate to high speed fiber optic connections, a 940MW power plant, and 3,000 acres of shovel ready sites.

## GRANT FUNDS: SOURCES & USES

The total project cost is \$31,846,310. The **BUILD funding** request is **\$24,950,502**. A **21.7% non-federal match** of \$6,895,808 is committed to the project.

## SELECTION CRITERIA

<b>Safety</b> reduced truck crashes due to modal shift	<b>State of Good Repair</b> reduced maintenance with less truck VMT	<b>Economic</b> fuel and travel time savings	<b>Environmental</b> decrease in toxic emissions	<b>Quality of Life</b> job creation & increased property value	<b>Innovation</b> electric, automated & connected technology	<b>Partnership</b> DriveOhio collaboration model
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## ENVIRONMENTAL RISK REVIEW

The project is low risk and repurposes existing underutilized roadway corridors (4 lanes, ADT<8,000) and excess public right-of-way, while drawing upon the technical guidance of the DriveOhio Alliance.

## BENEFIT COST ANALYSIS

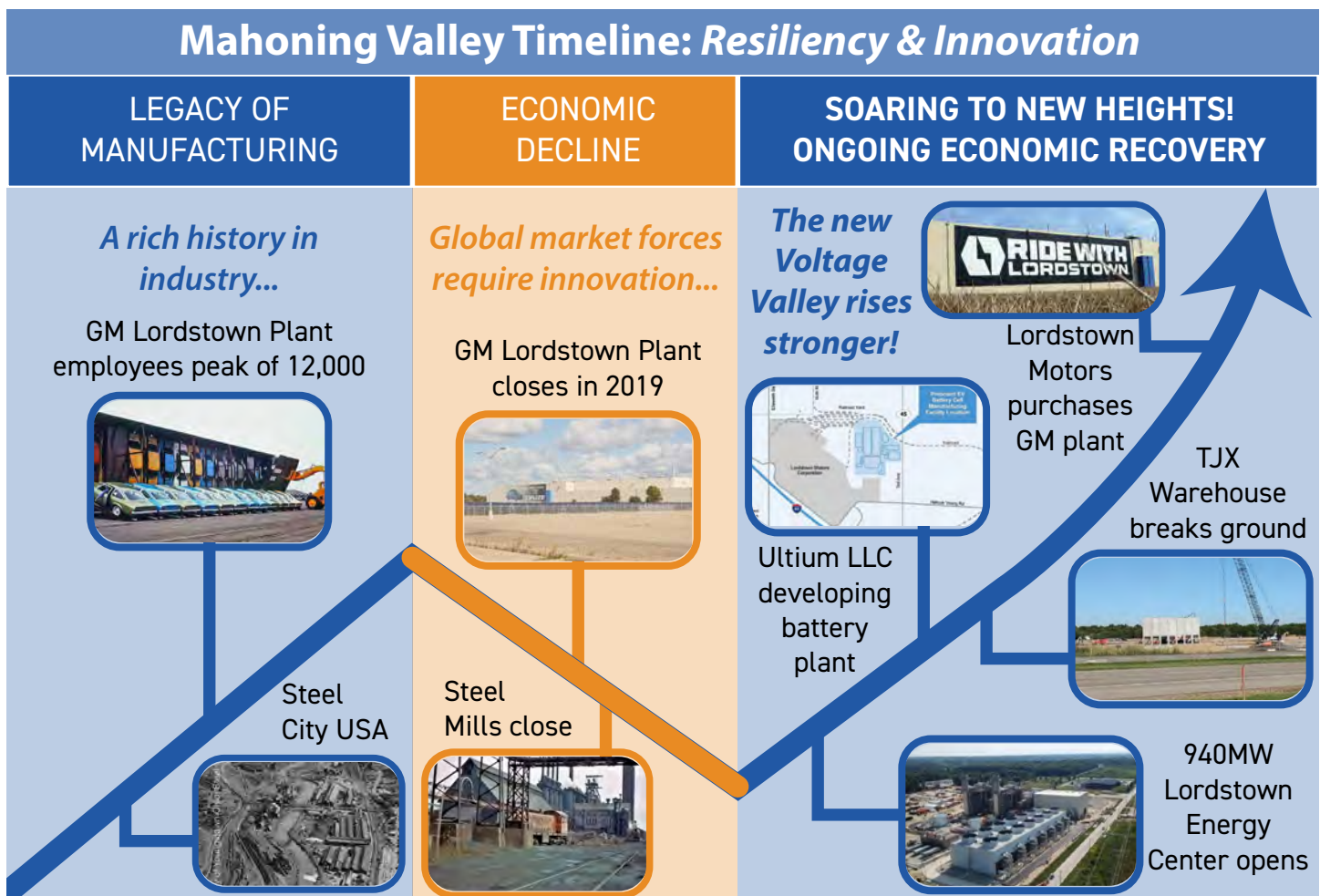
The Lordstown Smart Logistics Hub will result in quantifiable benefits totaling \$51,802,684. Quantitative benefits for the project results in a **1.74:1 Benefit-Cost Ratio**.



## PROBLEM STATEMENT

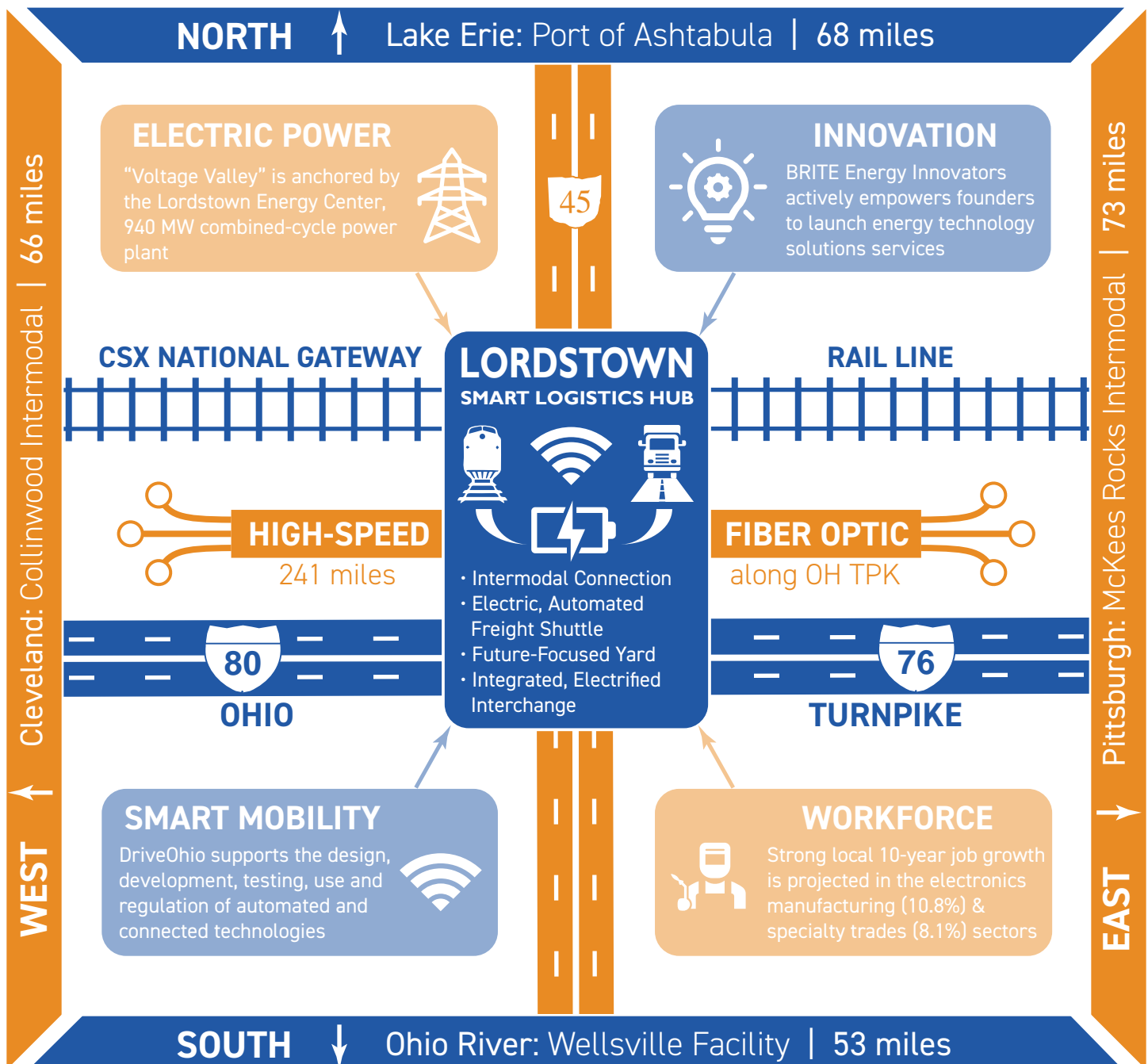
With a premier location at the crossroads of two major interstate east-west freight routes and the CSX National Gateway, Lordstown is strategically positioned to capitalize on not only superior transportation infrastructure but also on a 940-MW electric power plant and the Ohio Turnpike's high-speed fiber optic line. All Lordstown lacks to become a premier logistics hub is a technologically advanced intermodal connection between its highway and rail connections.

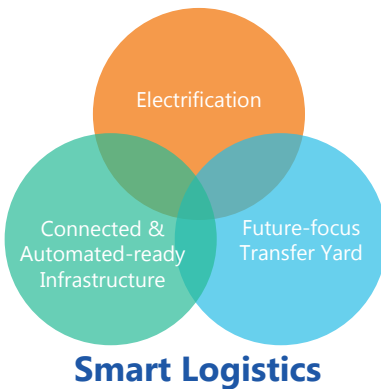
With the addition of smart mobility enhancements to its last-mile freight connections, Lordstown will be fully empowered to serve as the leading electrified regional logistics hub for Midwestern rural markets to the west and Appalachian rural markets to the east. As America responds to the COVID-19 pandemic, the need for resilient supply chains, particularly for traditionally underresourced rural markets, has only intensified. The Lordstown Smart Logistics Hub will address these problems and not only enhance rural supply chains, but also accelerate the EDA's federal investment in the ongoing economic recovery of Eastern Ohio's Mahoning Valley region as it rebrands itself as the new "Voltage Valley."



## THE SOLUTION

The Lordstown Smart Logistics Hub will facilitate the region's ongoing economic recovery through targeted investments in intermodal transfer and smart logistics that capitalize on electric, connected, and automated technologies to position Lordstown as the Mahoning Valley's premier transportation and logistics hub. The project will **better utilize infrastructure** that exists with excess capacity, and **leverage development** through investments in emerging smart mobility technologies that will spark private investment at 3,000 acres of available shovel ready sites primed for logistics and distribution.





## PROPOSED IMPROVEMENTS

The **Lordstown Smart Logistics Hub** is a strategic infrastructure initiative which capitalizes on Lordstown's location at the intersection of multimodal freight transportation, broadband, and vehicle electrification that will position the area as the **premier regional warehousing and distribution hub**.

The project embraces a three-pronged approach to smart logistics: (1) electrification, (2) connected and automated-ready infrastructure, and (3) future-focused transfer yards. The project's scope of work incorporates cutting edge technology to maximize the efficiency, reliability, and safety of freight mobility through multiple components:



An **intermodal rail connection** at Ohio Commerce Center to accommodate rail-truck container transfer along the CSX National Gateway in an underserved market located midway between the nearest existing intermodals in Cleveland and Pittsburgh;



An **electric automated truck circulator route** linking the new intermodal connection to local logistics companies, distribution centers and industrial freight users located along State Route 45, Hallock Young Road, and Bailey Road;



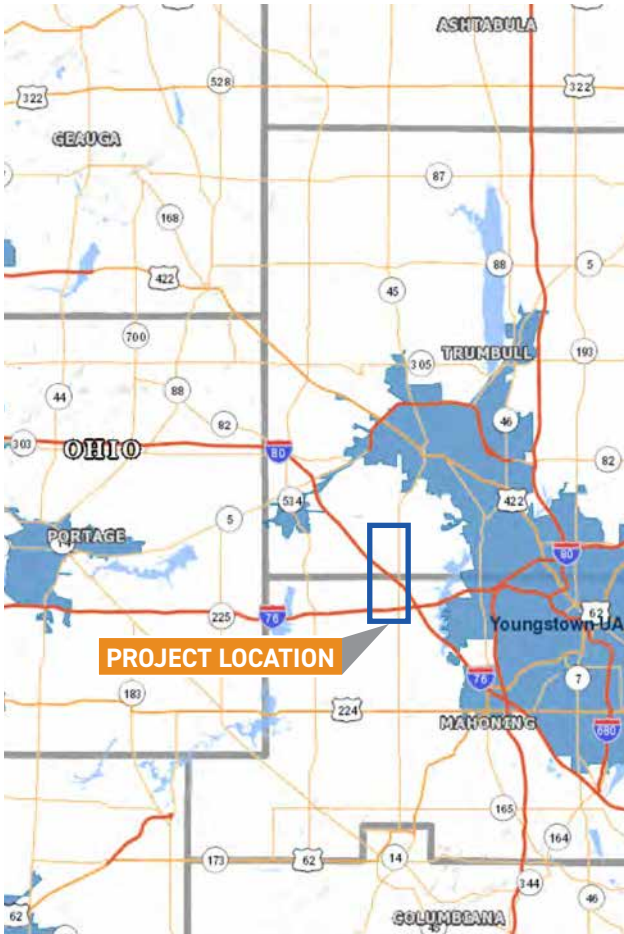
An **integrated electrified interchange** along the Ohio Turnpike at Lordstown that deploys a 1/4-mile inductive electric charging pilot project at highway speed with validated electronics charging and data technology embedded in pre-cast concrete modules with thermal management design enabling vehicle detection and data collection;



A **future-focused transfer yard** for accommodating triple trailers at the Ohio Turnpike Lordstown interchange which will include electric charging depots, automated vehicle transition and handoff systems, and software-driven automation of yard operations; and



Levering of **Ohio Turnpike Fiber Optic Corridor** along State Route 45 that interface with the Ohio Turnpike's fiber optic corridor enabling wireless communication with on-board units in trucks, while also connecting to the Voltage Valley's 19 electrification technology startups hosted at BRITE Energy Innovators, Ohio's Energy Business Incubator.



Urbanized Areas

## RURAL ECONOMIC RECOVERY

Located along the Trumbull County-Mahoning County border in rural Eastern Ohio Appalachia, the Lordstown Smart Logistics Hub will help spark the region's ongoing economic recovery by creating new jobs in logistics and distribution, electric vehicle and battery manufacturing, utilities and power generation, and construction trades.

The project complements federal investment in the area by the EDA to fund an economic recovery strategy following the recent closure of the GM Lordstown Plant, where employment once peaked at 12,000.

In a short time since then several major developments have launched in Lordstown that have marked the region's resiliency and emerging position as a leader in electrification and logistics:

- The opening of the \$900 million Lordstown Energy Center, a 940-megawatt plant containing two gas turbines and one steam turbine with capacity to supply power to 850,000 homes and businesses.
- A \$170 million investment by TJX in a new 1.2-million square foot distribution facility will bring about 1,000 new jobs to Lordstown and have an annual payroll of about \$27 million.
- Purchase of the 6.2 million square foot former GM Lordstown facility by Lordstown Motors to produce electric pickup trucks aimed at industry and government markets with annual production capacity of 420,000 vehicles.
- The announcement by Ultium LLC, a joint venture by General Motors Co. and LG Chem of South Korea, to build a \$2.3 billion battery cell manufacturing plant for GM, Honda, and other's electric vehicles.



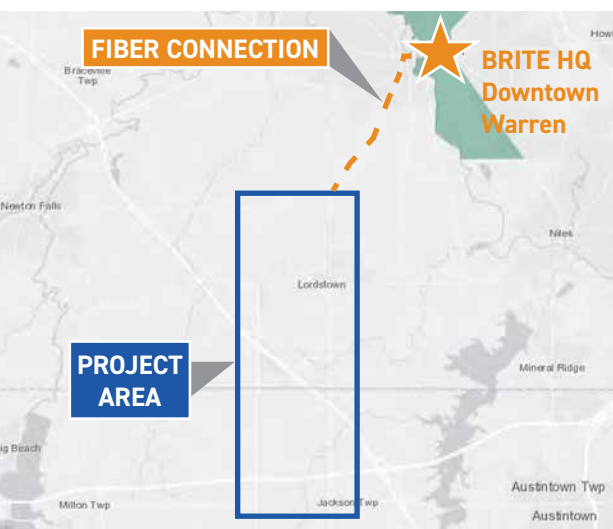




CSX Intermodal

*"The Lordstown Smart Logistics Hub will be a critical asset to the region and a strong catalyst for further economic investment. Team NEO will support the hub through data driven marketing and targeted outreach to companies across the globe that would see value in unique assets this Hub represents."*

**Bill Koehler, Chief Executive Officer at Team NEO**



Opportunity Zone

## BETTER UTILIZING INFRASTRUCTURE

The Lordstown Smart Logistics Hub sits geographically centered between the Cleveland and Pittsburgh metropolises areas, and is directly accessible by multiple national freight corridors, including the Ohio Turnpike, Interstate 76, and a CSX National Gateway rail line at the Ohio Commerce Center. Located at the doorstep of the Lordstown Energy Center in the "Voltage Valley," the project leverages large scale electric power generation, as well as a connection to the Ohio Turnpike's 241-mile high speed fiber optic corridor.

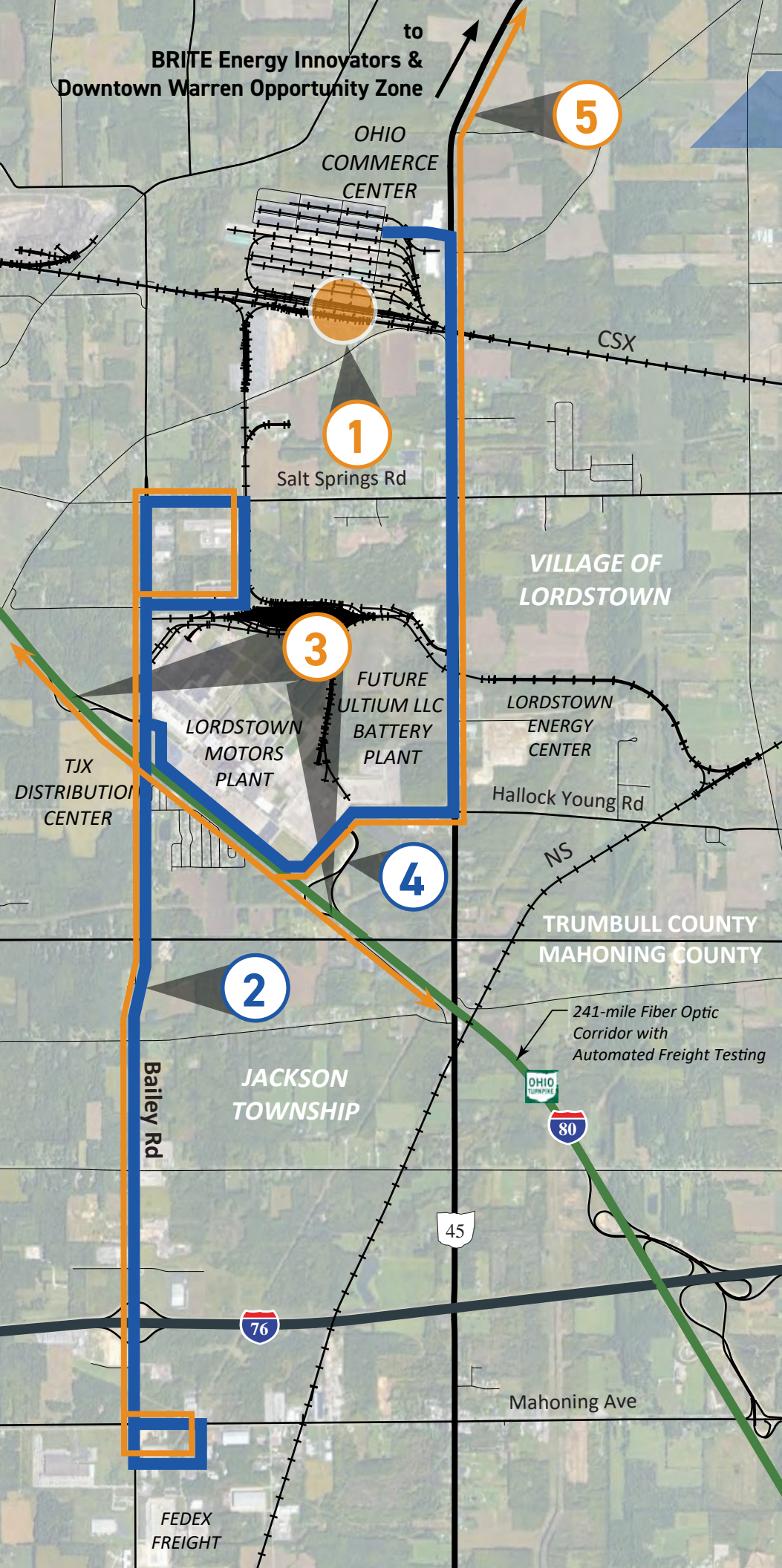
## LEVERAGING DEVELOPMENT

Abundant real estate development opportunities exist on SR 45 and Bailey Rd along the proposed electric automated freight shuttle service route. Over 3,000 acres of industrial zoned, shovel ready sites with utilities will enable future private investment in distribution and warehousing facilities which will capitalize on an intermodal connection midway between two major metro areas and providing efficient, safe, reliable, and economical last-mile logistics service.

## OPPORTUNITY ZONE NEXUS

The proposed high-speed fiber connection will link the Ohio Turnpike's 241-mile fiber corridor with BRITE Energy Innovators, Ohio's energy tech incubator, located in Downtown Warren's certified Opportunity Zone. BRITE provides energy enterprises, tech startups, entrepreneurs and small businesses with access to advanced energy technology research and development resources and professional business development support. Their nearby location in an Opportunity Zone will encourage potential investors with unrealized capital gains to infuse capital into the next wave of entrepreneurship related to electrification of the Lordstown Smart Logistics Hub.





## OVERVIEW MAP

1



INTERMODAL  
CONNECTION

2



ELECTRIC AUTOMATED  
FREIGHT SERVICE

3



INTEGRATED ELECTRIFIED  
INTERCHANGE

4



FUTURE-FOCUSED  
TRANSFER YARD

5



OH TPK - BRITE  
FIBER CONNECTION

## PROJECT COSTS

Project costs by project development category are summarized below:

Project Cost Breakdown by Development Category		
Category	Cost	Percent of Total Project
Capital Costs	\$21,152,338	66.4%
Technology Demonstration Costs	\$7,521,122	23.6%
Design & Construction Administration	\$3,172,851	10.0%
<b>Total Project Development Cost:</b>	<b>\$31,846,310</b>	

Project costs by project development category and project component are summarized below:

Project Cost Breakdown by Development Category & Component				
Category	Capital Cost	Technology Demonstration Cost	Total Cost	Percent of Total Project
Intermodal Connection	\$8,494,882	\$0	\$8,494,882	26.7%
Automated Freight Shuttle & Fiber Optic	\$3,151,850	\$1,000,000	\$4,151,850	13.0%
Inductive Electric Charging	\$4,234,271	\$6,161,679	\$10,395,950	32.6%
Future focused Transfer Yard	\$5,271,335	\$359,443	\$5,630,779	17.7%
Design & Construction Administration			\$3,172,851	10.0%
<b>Total Project Development Cost:</b>			<b>\$31,846,310</b>	

Detailed cost information by line item is provided with the supplementary information at:

<https://neodfa.org/build-2-grant/lordstownsmartlogistics/>

## SOURCE & AMOUNT OF PROJECT FUNDS

The total project cost is \$31,846,310. The BUILD funding request is \$24,950,502. A 21.7% non-federal match of \$6,895,808 is committed to the project. There are no other federal funds committed to the project. The source and amount of project funds are summarized below:

Project Funding Sources		
Funding Category	Funding Amount	Percent of Total Project
Non-Federal Funds (Match)	\$6,895,808	21.7%
BUILD Request	\$24,950,502	78.3%
Committed Federal Funds	\$0	0.0%
<b>Total Project Cost:</b>	<b>\$31,846,310</b>	

## COMMITTED NON-FEDERAL FUNDS

Non-federal funding commitments are listed below. Commitment Letters are included in the supplementary information to the application.

Non-Federal (Local) Match Summary		
Sponsor	Use of Funds	Non-Federal Funds (Match)
Ohio Commerce Center (Private)	Rail spur	\$2,750,000
Ohio Commerce Center (Private)	Land donation	\$1,000,000
Village of Lordstown	Land donation	\$630,000
SELECT	Inductive electric charging demonstration	\$2,000,005
TRC	Future focused transfer yard demonstration	\$515,803
Total Match:		\$6,895,808

## AMOUNT & USE OF FEDERAL FUNDS

Amount and use of federal funds by project component and project development category are summarized below:

Project Cost Breakdown				
Category	Non-Federal Funds (Match)	BUILD Request	Committed Federal Funds	Total
Intermodal Connection	\$4,380,000	\$4,114,882	-	\$8,494,882
Automated Freight Shuttle & Fiber Optic	-	\$4,151,850	-	\$4,151,850
Inductive Electric Charging	\$2,000,005	\$8,395,945	-	\$10,395,950
Future focused Transfer Yard	\$515,803	\$5,114,976	-	\$5,630,779
Design & Construction Administration	-	\$3,172,851	-	\$3,172,851
Funding Totals:	\$6,895,808	\$24,950,502	\$0	\$31,846,310



## Exceeding Program Expectations

The Lordstown Smart Logistics Hub will address each of the BUILD Selection Criteria as summarized below and detailed in Pages 11-23. For quantifiable benefits, detailed Benefit-Cost Analysis (BCA) calculations and methodology can be found in the BCA and BCA narrative at:

### Safety



Modal shift from truck to rail will reduce fatal & severe crashes along highways

### State of Good Repair



Modal shift from truck to rail will reduce pavement damage & maintenance

### Economic Competitiveness



Electric trucks and freight rail will decrease fuel consumption & operating costs

### Environmental Protection



Electric trucks and freight rail will increase air quality & reduce pollutant emissions

### Quality of Life



Project will aid in region's ongoing economic recovery & enhance supply chain resiliency

### Innovation



Electrification, automated vehicles/logistics will enhance Smart Mobility



### Partnership

The project includes committed support from our numerous public & private partners, including several with technical expertise in Smart Mobility:





## Safety



**\$7.4M**  
**TOTAL SAVINGS**  
**FATAL & INJURY**  
**CRASH**  
**REDUCTION**

### Decrease in Truck Crashes

Safety benefits from the proposed project resulting from an expected crash reduction are calculated by monetizing the decreased shipping costs being achieved based upon rail transportation being more cost effective than trucking

High-speed truck crashes are generally fatal and severe in nature, so the focus of this benefit cost analysis for safety is based only on fatal and severe crashes. Additional benefits can be expected from reductions in less severe crash types.

Safety benefits are estimated at \$7,392,533 in total over the 20 years after project construction is completed. These calculations are based upon the anticipated reduction of fatalities and injury crashes due to the use of rail versus truck along the 66-mile Cleveland to Lordstown freight route.

### Automation = Enhanced Safety

The use of automated trucks along the proposed freight shuttle route will increase safety by eliminating the vast majority of crashes caused by driver error. In 2016, there were more than 300,000 crashes on Ohio roads, 94 percent of which were caused by driver error. Research indicates that 80 percent of those crashes could have been avoided or mitigated with automated and connected vehicle technologies. These technologies enable vehicles and the transportation infrastructure to constantly transmit, receive, monitor and respond to signals about road conditions, traffic flow, accidents, bad weather and other driving hazards. This type of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) data sharing helps drivers avoid dangerous situations and enable safer and better driving decisions.

**State of Good Repair**

**2.64**  
**MILLION**  
**ANNUAL**  
**AVERAGE**  
**REDUCTION IN**  
**TRUCK MILES**  
**TRAVELED**

**\$3.5M**  
**MAINTENANCE**  
**SAVINGS**

**Reduced Pavement Maintenance**

The Lordstown Smart Logistics Hub will result in modal shift from truck to rail which will reduce the damage of heavy freight loads on Interstate, state highway, and local road pavement and bridges. Heavy trucks are the primary source of road damage due to the stresses imposed by heavy axle loads. A highly desirable outcome for the state of good repair of the highway system is achieved through the reduction of truck vehicle miles traveled.

Virtually all pavement damage is created by heavy trucks, but the cost of repair is paid for by fuel taxes imposed on the public at large. Though increased rail use will increase track maintenance costs, the burden of these maintenance costs rest on the railroads and their shareholders. This project places the cost of maintenance on those most responsible for wear.

An intermodal connection at the Ohio Commerce Center results in a reduction of 2.64 million truck highway miles driven per year. This corresponds to a projected total savings of \$3,467,332 in road maintenance over the 20-year post-construction analysis period.

**Enforcement of Load Limits**

The installation of high-speed fiber optic and roadside units will allow for the integration of high-speed weigh-in-motion (HS-WIM) technology to weigh vehicles dynamically in the travel lane without the need for slowing down or stopping the vehicle. HS-WIM systems can automatically record and display wheel-load weights, axle weights, gross vehicle weights (GVWs) and other parameters. HS-WIM is well-suited for weight enforcement screening and monitoring of bridge loads to ensure that overweight loads are not compromising pavement integrity.





## Economic Competitiveness



Quantifiable efficiencies in transportation costs are realized by monetizing the reduction in shipping costs due to rail transportation being more cost effective than trucking in two key areas:

- Travel Time (vehicle operators) Savings
- Vehicle Operating (fuel and vehicle maintenance) Savings

**\$32M**  
**ANNUAL**  
**TRAVEL**  
**TIME**  
**SAVINGS**

The new intermodal connection in Lordstown will enable shippers to achieve significant savings in both travel time and fuel costs versus the current “last-mile” highway freight truck drive from the nearest CSX intermodal connection located in Cleveland, some 66 miles away).

### Travel Time Savings

Travel time savings will result from truck to rail modal shift associated with the new intermodal connection and automated freight shuttle service. The total discounted travel time savings is \$32,184,183 over the analysis period.

### Vehicle Operating Costs

The project will reduce fuel usage by over 298,333 gallons of fuel annually, which will save shippers \$8,723,785 based on the April 27, 2020 average diesel fuel prices of \$2.44 per gallon.

**\$8.7M**  
**FUEL COST**  
**SAVINGS**

### Economic Development

Local property values along the project corridors will increase due the implementation of cost-effective last-mile freight automated shuttle service to and from the proposed intermodal center. Job creation will result from the construction of new transportation and warehousing facilities at 3,000 acres of shovel-ready greenfield development sites in the area. While these benefits are not quantified for the purposes of the Benefit Costs Analysis, they do represent important tangible benefits to the local economy which suffered an unemployment rate increase of 4.4% upon closure of the GM Lordstown Plant in 2019.

**Environmental Protection**

**2,494**  
**TONS**  
**CARBON**  
**EMISSIONS**  
**REDUCED**  
**ANNUALLY**

**\$34,852**  
**CARBON COST**  
**SAVINGS**

**Air Quality**

Air quality improvements will result from decreases in toxic emissions due to shifts to more fuel-efficient rail and electric truck transport.

**Greenhouse Gas Reduction**

Freight rail is nearly five times more efficient in the production of greenhouse gases per ton-mile than a large Class 8 semi-trailer, and over seven times more efficient than a medium truck. Truck to rail modal shift results in a carbon credits cost savings of approximately \$2.88 per 1,000 ton-miles.

Applying U.S. DOT's guidance for reduced carbon costs discounted at 7%, the estimated value of the improved air quality associated with these modal shifts is \$34,852.

**Improved Air Quality**

Air quality will increase and pollutants will be reduced through (1) modal shift from truck to rail and (2) reduction of diesel emissions through use of electrified trucks along the shuttle route. Due to the efficiencies from rolling resistance of steel wheels on steel rails, significantly less fuel is required per mile, resulting in lower values for nitrogen oxides and particulate matter. These emission reductions will ensure air quality standards attainment with both the Ohio Environmental Protection Agency and US EPA.

**Reduced Energy Consumption**

The use of electrified freight service will reduce reliance on fossil fuels. US Department of Energy research indicates truck-to-rail modal shifts have the greatest overall potential for energy reduction, because trucks are currently the dominant transport mode in terms of both freight tonnage and freight commodity value, while rail serves many of the same routes and uses substantially less energy.



## Quality of Life



### PROJECTED 10-YR JOB GROWTH



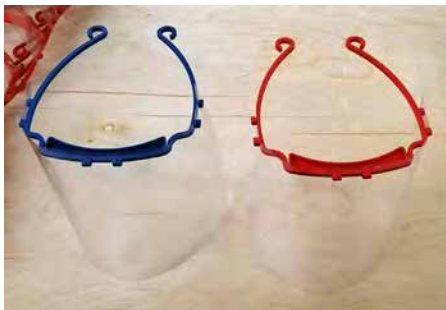
**ELECTRIC EQUIPMENT &  
COMPONENT MANUFACTURING**

### Continued Economic Recovery

The project complements federal investment in the area by the EDA to fund an economic recovery strategy following the GM Lordstown Plant closure which resulted in a 9.4% loss in Gross Regional Product. The Lordstown Smart Logistics Hub will bolster ongoing regional efforts to “get people back to work” by capitalizing on the rapidly emerging “Voltage Valley” electrification industry sector.

### Supply Chain Resiliency

One of the immediate realizations of the current COVID-19 crisis is that efficient goods movement is critical to both the national economy and the national healthcare system. The Lordstown Smart Logistics Hub will enhance supply chain resiliency and improve connections to underserved rural markets by providing an intermodal connection at a rapid growing distribution hub filling a gap between the Cleveland and Pittsburgh markets.



### COVID-19 Response

The project will leverage the Mahoning Valley's expertise in the additive manufacturing sector to locally produce medical supplies such as plastic face shields through 3D printing, then efficiently distribute the equipment nationwide.

### Context Sensitive Solutions

The Lordstown area is well-suited to leverage large-scale private investment in transportation logistics and distribution facilities based on the abundance of available undeveloped land already zoned for industrial use with utility infrastructure in place and excess roadway capacity. This is consistent with the modern trend of locating logistics hubs on the periphery of metro areas instead of their traditional location in aging urban industrial centers surrounded by residential neighborhoods and landlocked from future spinoff development.



Lordstown

**Compatible Land Uses:** Lordstown (see left) has adequate space for spinoff logistics development, while intermodals in Cleveland and Pittsburgh (see below) are landlocked in urban neighborhoods.



NS Collinwood - Cleveland



CSX McKees Rocks - Pittsburgh

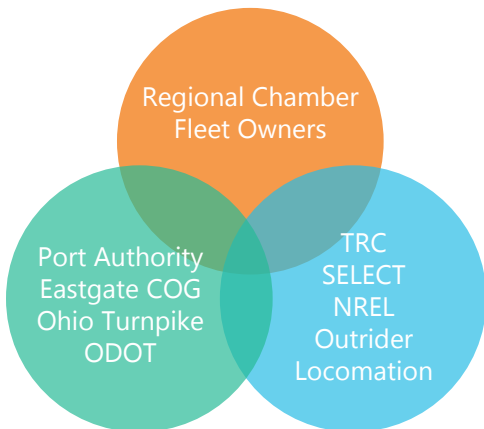
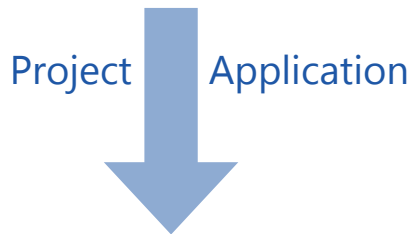




## Innovation



Smart Logistics Collaboration Model



## Collaboration Model

The Lordstown Smart Logistics Hub will apply the DriveOhio Collaboration Model to the project's Smart Mobility elements drawing upon the vast technical expertise of DriveOhio Alliance. DriveOhio – an initiative of the Ohio Department of Transportation and the state's center for automated and connected vehicles on the ground and in the air – is preparing Ohio for the future of smart mobility. The objective of DriveOhio's statewide Smart Logistics initiative is to accelerate the evolution of Ohio's logistics ecosystem by incorporating smart mobility solutions.

The DriveOhio Alliance – consisting of partners and stakeholders across industry, government, education, and communities – collaborates to identify smart mobility use cases and solutions that will deliver significant improvements in transportation safety, mobility, access, and reliability, while preparing talent across our existing and emerging workforce, aligned with economic growth in our communities.

The DriveOhio Smart Logistics Collaboration Model ensures that Ohio's smart mobility initiatives incorporate feedback from three critical groups of stakeholders:

1. Logistics Industry (Chambers & Fleet Owners)
2. Technology Providers (Solution Developers & Researchers)
3. Public Sector (Infrastructure & Economic Developers)

Balancing input from these groups ensures validation of needs with logistics industry stakeholders, understanding the capabilities and limits of emerging smart mobility technology solutions, while also considering the current and future needs of the physical and digital infrastructure assets across Ohio.

**Innovation****Innovative Technologies**

Using the DriveOhio Smart Logistics Collaboration Model, DriveOhio Alliance partners will facilitate an iterative series of “Define, Demonstrate, Deploy” smart mobility initiatives. Examples of defining, demonstrating, and deployment activities will include:

- **Electrification** - DriveOhio Alliance partners will leverage team assets and expertise to identify, evaluate, and deploy electric vehicle charging infrastructure and related technologies, with specific focus on logistics operations and electric trucks. This will include testing and deployment of inductive (in-road) and cabled (plug-in) charging systems, with offsite testing using existing assets at the Transportation Research Center (TRC) and other partner facilities prior to deployment along the Lordstown Smart Logistics Hub.
- **Connected and Automation-Ready Infrastructure** – DriveOhio Alliance partners would conduct automation readiness road audits and identify suitable infrastructure to accommodate deployment of connected and automated vehicle systems, as traffic conditions and development patterns are identified. Two main components of connected and “automation-ready” infrastructure are data and electrical conduits. Data conduits allow the installation of fiber optic cable to facilitate communication between connected vehicle technology elements that would be located along the corridor. Electrical conduit would accommodate device power needs at each intersection.
- **Future-focused Transfer Yard** – DriveOhio Alliance partners would work with logistics industry stakeholders and technology providers to develop and deploy concepts for future yard operations and systems. Examples include electric charging depots, automated vehicle transition and handoff systems, and software-driven automation of yard operations.

**DEFINE****DEMONSTRATE****DEPLOY**

## Innovation



### Innovative Project Delivery

#### **Demonstration & Deployment: Transportation Research Center**

The Transportation Research Center (TRC) is the largest independent vehicle test facility and proving grounds in the nation, strategically located in East Liberty, Ohio. TRC provides this project with a broad range of capabilities and strong industry alliances. TRC's secure location, operating continuously, with 4,500 acres of road courses, a 7.5-mile high-speed oval test track, 50-acre Vehicle Dynamics Area, and the right mix of testing areas and facilities, make TRC the optimum place to prototype, test and validate vehicles and related vehicle technologies



TRC will identify an area of their existing 4,500-acre site to serve as the "sandbox" for quickly installing and assessing various future freight yard concepts. The Freight Advanced Concept Test (FACT) Facility will be created to serve both this program as well as other future initiatives. The development of this site will leverage TRC's existing assets to the extent possible, but construction of supporting infrastructure and specific test elements will be needed. By strategically placing this is near their 7.5-mile-high speed test facility, various freight operation technologies can be deployed in a test environment for rapid feasibility and market readiness assessments.

TRC will coordinate an advanced freight technology demonstration event, inclusive of all related technology suppliers, to evaluate and assess various state-of-the-art systems. TRC and DriveOhio will host an industry forum with representatives of participating mobility technology entities and a visit to the FACT Facility to demonstrate technologies.

TRC will deploy the selected technologies in a mock freight operation using test tracks and the FACT Facility to test and evaluate systems usability, durability, and market readiness. This mock freight operation will replicate real world freight and logistics conditions, accumulating miles duty cycles on selected vehicles and systems. Results will be integrated into the final system design.



# Innovative Project Delivery

## Demonstration & Deployment: SELECT

Utah State University's Sustainable Electrified Transportation (SELECT) Center will play an advisory role throughout the project and will apply expertise from current and past projects in electrification of light duty (LD) through heavy duty (HD) vehicles and charging infrastructure development and optimization. Specifically, SELECT researchers will focus on (1) multi-modal charging management concepts and infrastructure development and (2) a dynamic wireless power transfer (DWPT) charging (i.e., powered roadway) pilot scale deployment with LD-HD compatibility.

To solve local multi-modal electrification challenges and to facilitate electrification of the LD to HD vehicles for logistics and shipping associated with the Lordstown Motors plant and its workers as well as other sites in the area (e.g., Future-focused Yard and the coming Ultium LLC battery plant), SELECT will develop a power balance and demand response system for the Lordstown Smart Logistics Hub. The system, which will include chargers with outputs up to 400 kW, will address the high cost of grid infrastructure needed for high output chargers by researching and deploying methods to adaptively manage power flow between the grid and various electric charging needs (e.g., rail, truck) and creating multi-megawatt, co-located, coordinated, and managed charging.

To realize future opportunities in deployment of charging infrastructure along the corridor to support electric trucking and passenger vehicles, SELECT will tailor development in two phases for a pilot scale DWPT deployment. Similar powered roadway pilots have been executed in France and Sweden, and the Lordstown Smart Logistics Hub will be the first in the US. The first phase will be executed in the first two project years at the USU Electrical Vehicle and Roadway (EVR) research facility and test track located in Logan, UT and will include technology/roadway integration and validation in a research infrastructure, installation of up to 120 feet of in-road charging hardware in the EVR's controlled research environment (roadway trenches, electronics cabinets, and retro-fit into pavement surface with considerations for thermal design), and accompanying on-vehicle hardware on the EVR's research EVs. The EVR Testbed activities will demonstrate the ability to install the system components at sufficient power level and quantity, will validate the pilot system components, and will provide preparation for installation on-site. The in-road pilot testbed, in cooperation with The Ohio Turnpike, will deploy a ¼ mile electrified test segment at highway speed with validated electronics embedded in pre-cast concrete modules with thermal management design connected to local utility transferring power to partner vehicles with vehicle detection and data collection. This in-road pilot will include 80+ grid-connected and road-embedded power transfer pads (i.e., coils) and inverter electronics (functioning at ~50kW output and 800 V DC bus), control system, and vehicle-side power receiving hardware for both LD (single receiving coil) and HD (multiple receiving coils) vehicles.

SELECT will also demonstrate early manufacturability for a complete modular powered roadway system, including a grid tied power distribution converter, series connected roadway transmitter modules, a vehicle detection system, and a vehicle communications and billing system. The study will also include adoption-oriented market and consumer behavior research with an intent to understand and build public and future partner interest.



## Innovation



### Regional Transportation Improvement Project (RTIP)

As a transportation infrastructure project centered almost evenly between two County lines, the Lordstown Smart Logistics Hub is a logical application of the RTIP program authorized by Ohio Revised Code Chapter 5595. This innovative financing mechanism allows a wide array of potential revenue streams to be applied towards the project:

- Payments of Lieu of Taxes (TIF proceeds)
- Municipal Income Tax
- Joint Economic Development District (JEDD) Income Tax
- New Community Authority Revenue
- Sales Tax
- License Tax

### Innovative Financing

#### Western Reserve Port Authority

Under Ohio law Port Authorities are empowered to facilitate economic development and infrastructure projects by:

- Lending monies at competitive rates and terms as a direct loan or a “pass-through” bond
- Constructing, owning and/or operating public infrastructure facilities as a component of a public-private partnership (P3)
- Providing up-front savings of Ohio sales taxes on construction materials by entering into a structured lease agreement.

The project’s “off-road” components (e.g. intermodal yard) may capitalize on Port financing through a P3 structured lease.

#### Ohio Turnpike and Infrastructure Commission

As part of its restructuring in 2013, the Ohio Turnpike and Infrastructure Commission now possesses the ability to fund not only projects along the limits of its toll road, but also infrastructure Projects with a “nexus” to the Turnpike based on the project’s:

- Physical proximity and connectivity to the Ohio Turnpike
- Impact on Ohio Turnpike traffic and revenues
- Impact on movement of goods and services in the area
- Enhancement of access between the Ohio Turnpike and connected areas of population, commerce, and industry.

The Lordstown Smart Logistics Hub has a clear nexus to the Ohio Turnpike and will play a major role in stimulating economic development and job creation in the northern Ohio Turnpike service area, making the project eligible for Turnpike funding.



## Partnership



### PUBLIC SECTOR

#### DriveOhio



DriveOhio, the state's center for smart mobility, brings all of these organizations together under one umbrella, serving as the hub for automated and connected vehicles and infrastructure in Ohio. An initiative of the Ohio Department of Transportation (ODOT), DriveOhio also works to ensure Ohio's regulatory environment and public policies are conducive to the development of the infrastructure and technologies needed for smart mobility. Simply put, DriveOhio is committed to advancing smart mobility in Ohio and being a one-stop shop for those looking to develop, test and deploy advanced mobility solutions in Ohio.

#### Ohio Turnpike and Infrastructure Commission



The Ohio Turnpike and Infrastructure Commission (OTIC) has an existing 241 miles of fiber optic cable connecting fifty-five (55) facilities along the Ohio Turnpike. A fiber equipment upgrade planned for 2021 will increase the bandwidth of the fiber network to 10/100 GB. OTIC recently installed and tested a 50-mile section of DSRC-equipped infrastructure for connected vehicle communication leveraging high-performance edge computing.

In addition, they have partnered with Ford Mobility on a cellular-vehicle to- everything (C-V2X) proof-of-concept. The first phase will include deploying a smart phone application to disseminate Traveler Information Messages (TIMs) and Turnpike Specific Messages to a fleet of Ford vehicles at the OTIC. The second phase of the engagement will involve deploying C-V2X technology at a scale along a predefined stretch of the Turnpike. Ford and partners will work together to equip a fleet of vehicles with C-V2X OBUs. Ford will work with the OTIC to install C-V2X/DSRC bridging technology and use this infrastructure to broadcast real-time information to travelers via V2X technology. The deployed RSU's and infrastructure will be used to create and test new concepts around toll fee collection and vehicle road usage calculations which will enable a futuristic approach to road usage and Turnpike access

With the infrastructure, connectivity, and related assets, the OTIC is well positioned to provide complementary technology support for the project.



## Partnership



### PRIVATE

#### Ohio Commerce Center



This 1.5 million square foot center, located on 476 acres on State Route 45 in Lordstown, Ohio, offers cost effective manufacturing, storage and distribution space that can be tailored to tenants' specific needs. Since 2010, millions of dollars of private investment has been spent to upgrade and integrate rail in order to help expand the local logistics and industrial base. In 2013, a \$3.0 million Ohio Job Ready Sites grant was used to improve rail access throughout the Ohio Commerce Center, resulting in subsequent private investment of more than \$150 million and over 300 jobs created.

#### Technology Partners

Several private sector technology project partners are at the forefront of smart mobility and will provide support in the areas of defining, demonstrating, and deployment as detailed previously on Pages 18-19:

#### Transportation Research Center



The Transportation Research Center (TRC) is the largest independent vehicle test facility and proving grounds in the nation, strategically located in East Liberty, Ohio. TRC provides this project with a broad range of capabilities and strong industry alliances. TRC's secure location, operating continuously, with 4,500 acres of road courses, a 7.5-mile high-speed oval test track, 50-acre Vehicle Dynamics Area, and the right mix of testing areas and facilities, make TRC the optimum place to prototype, test and validate vehicles and related vehicle technologies.

#### SELECT: Sustainable Electrified Transportation Center



SELECT's mission is to develop sustainable solutions for transportation electrification and to advance technologies, partnerships, standards and policies that foster widespread adoption. Located in Utah State University, SELECT focuses on the challenges associated with battery systems, charging infrastructure, and grid integration. Solutions currently in development range from megawatt scale extreme fast charging to smart powered pavements that charge vehicles while in motion.



## Partnership



### **BRITE Energy Innovators**



BITE Energy Innovators, Ohio's energy tech incubator, located in Downtown Warren's certified Opportunity Zone. BRITE provides energy enterprises, tech startups, entrepreneurs and small businesses with access to advanced energy technology research and development resources and professional business development support.. BRITE hosts 19 tenant technology companies in nearby Warren, and to date, has assisted over 250 portfolio companies to innovate and grow since 2011 resulting in the creation of over 400 jobs and an investment of over \$135 million in portfolio companies.

### **Outrider**

## Outrider

Outrider's mission is to drive the rapid adoption of sustainable freight transportation by deploying zero-emission systems. Outrider is the pioneer in automated yard operations for logistics hubs. They help large logistic-dependent enterprises improve the safety, efficiency and sustainability of their distribution yards using an integrated, three-part system, including management software, automated zero-emission yard trucks that feature vision-based robotics, and site infrastructure. The Outrider System integrates with existing supply chain software.

Outrider will contribute their technical expertise to the planning and design of the yard of the future at Lordstown and facilitate the infrastructure, vehicle systems and support required for a proof-of-concept demonstration and future scaling of autonomy in the appropriate use case(s) and private yard(s) within the logistics hub.

### **Locomotion**

 LOCOMOTION

Locomotion is the world's first trucking technology platform to combine AI-driven autonomy with driver augmentation. They deliver full vehicle automation by first incorporating human interaction with the central goals of totally eliminating all truck-involved accidents as well as radically-improved cost efficiencies and economic yield for clients. Veterans of Carnegie Mellon's National Robotics Engineering Center where they built automated vehicles and AI-driven systems for dozens of applications including commercial and defense projects, the Locomotion team includes some of the world's foremost experts in robotics technology, safety, and artificial intelligence.

## OVERVIEW

The Lordstown Smart Logistics Hub is a low risk infrastructure project that creatively repurposes existing and underutilized roadway pavement and public right-of-way to create a more efficient, resilient, and technologically advanced transportation system.

Based on engineering review and preliminary traffic analysis, no significant negative transportation/traffic effects will result from the proposed improvements. Detailed traffic studies will be completed in conjunction with project final engineering.

DriveOhio, the state's center for smart mobility, has committed to providing technical, legislative and procurement advisory support relative to implementation of electrified, connected, and automated freight vehicles and infrastructure.

The Lordstown Smart Logistics Hub is prepared to begin preliminary engineering immediately upon receipt of BUILD funds. Conceptual planning is already underway and is expected to be completed in 2021, well in advance of the obligation deadline. The entire project is located within existing public right-of-way or on properties under project partner under control.

### Maximum Flexibility: Repurposing Excess Roadway Capacity

All of the primary roadways along the electrified automated freight shuttle route currently have excess pavement width (four travel lanes) and roadway capacity with Average Daily Traffic (ADT) volumes less than 8,000. This available roadway capacity will allow for maximum flexibility to accommodate any required refinements without the need for design exceptions, utility relocations or right-of-way acquisition ensuring the project is developed on schedule and under budget.

#### SR 45



4 lanes | ADT 6,221

#### Hallock-Young Rd



4 lanes | ADT 2,041

#### Baliley Rd



4 lanes | ADT 7,333

## PROJECT SCHEDULE

The Western Port Authority brings proven track record of developing projects on time and under budget. The timeline belows indicates that all BUILD funds will be obligated well before the September 30, 2022 obligation date. The project will be completed well in advance of the September 30, 2027 deadline to expend all BUILD funds.

Milestone	Date
Notice of Funding Award	September 2020
Obligate Federal Funds (PE & Design)	March 2021
Complete Preliminary Engineering	October 2021
Complete NEPA	December 2022
Complete Detailed Design	January 2022
Advertise for Bids	February 2022
Obligate Federal Funds (Construction)	March 2022
Award Construction Contract	April 2022
Begin Construction	May 2022
Project Completion	September 2023

## REQUIRED APPROVALS

### Compliance with Local, Regional & State Plans

The Lordstown Smart Logistics Hub will **advance** redevelopment and infrastructure **goals** of the following local, regional, and statewide **initiatives**:

- Eastgate Comprehensive Economic Development Strategy, 2020
- Eastgate Regional Rail Plan, 2018
- Eastgate 2040 Metropolitan Transportation Plan Update, 2018
- Eastgate FY2019-2023 Transit Development Program, 2018
- Transport Ohio, Statewide Freight Plan, 2017
- Team NEO's Aligning Opportunities in Northeast Ohio, 2017
- Northeast Ohio Development Finance Agency Rail Plan, 2016
- Fund for Our Economic Future's Northeast Ohio Additive Manufacturing Cluster, 2016
- Northeast Ohio's Sustainable Communities Consortium's Vibrant NEO 2040, 2014

## REQUIRED APPROVALS

### No Additional Legislation Required for Smart Mobility

#### Governor's Executive Order 2019-26D

Lordstown Smart Logistics Hub electric automated truck circulator route can be implemented without the need for additional state or local legislation through Ohio Governor Mike DeWine's Executive Order 2019-26D signed on October 24, 2019 that authorizes automated vehicle testing in Ohio and lays out a roadmap for how the automotive industry can test their technologies in the state.

Executive Order 2018-04K establishes guidelines for testing automated vehicles testing on any Ohio public road or highway. Companies that want to test automated vehicles must register with DriveOhio, assure their vehicle can operate safely, and comply with all traffic laws. There must be a designated operator onboard who is responsible for the vehicle at all times.

This initiative enables DriveOhio to connect Lordstown to companies looking for the optimum locations in Ohio, to deploy their advanced transportation and logistics technologies.

## Executive Order 2019-26D

*October 24, 2019*

WHEREAS, Ohio has always been a leader in transportation innovation because the safe and easy movement of people and goods from place to place is a cornerstone of our economic success; and

WHEREAS, DriveOhio's mission is to advance connected and self-driving vehicle technology on the ground and in the air to increase safety, enhance mobility, expand access, improve reliability, and attract, prepare and retain Ohio's talent; and

NOW THEREFORE, I, Mike DeWine, Governor of the State of Ohio, by virtue of the authority vested in me by the Constitution and laws of this State do hereby order and direct that:

1. DriveOhio is hereby reauthorized as a statewide center for advancing smart mobility solutions under five pillars: Safety, Mobility, Access, Reliability, and Talent (SMART) in order to:



## INBOUND FREIGHT ORIGINS

Cleveland  
Pittsburgh  
Long Beach  
Baltimore  
New England



## OUTBOUND FREIGHT DESTINATIONS



Pittsburgh  
Detroit  
Mexico  
UK  
China

## REQUIRED APPROVALS

### Stakeholder Engagement:

#### Transportation Logistics Survey

The Youngstown/Warren Regional Chamber of Commerce enjoys a longstanding working relationship with private freight logistics operations along the project corridors in Trumbull and Mahoning Counties. As part of the stakeholder discovery process, and in the initial stages of project development, the Regional Chamber developed a 38-question transportation logistics survey that was distributed to freight users in and around the project corridors. The survey included questions regarding the business operation, employment levels, future expansion plans, shipping challenges/needs, primary trade partners, modes of transport, vehicle types, delivery frequency, and shipping costs. The results of the survey were used to scope this project. Consensus user requirements include efficient first-mile/last-mile transport of containers, real-time delivery data, and adequate space and infrastructure to support on-site or local expansion, all of which addressed in this proposal.



**89%**  
**DESIRE  
REALTIME  
ETA**



**78%**  
**RECEIVE  
PACKAGED  
PRODUCTS**



**2 of 3**  
**HAVE PLANS  
FOR LOCAL  
EXPANSION**

## Smart Mobility Support

DriveOhio is committed to providing technical, legislative, and procurement support of the Lordstown Smart Logistics Hub project and will:

- Convene P3s with prospective electrified automated freight service vendors and fiber and wireless carriers to connect infrastructure within the Lordstown Smart Logistics Hub;
- Work with vendors to implement best practices for the incorporation of an electrified automated freight shuttle and placement of any necessary roadside charging equipment and sensors;
- Coordinate roles and responsibilities for collection and dissemination of traffic monitor information and performance data with the Port Authority, Eastgate, Ohio Turnpike, and other project partners;
- Advise the Port Authority in developing the project in accordance with the Governor's Executive Order avoiding the need for local legislative/regulatory action;
- Assist in the procurement process for AV and technology vendors; and
- Guide the region in preparing for connected and automated vehicles.

## ASSESSMENT OF PROJECT RISKS & MITIGATION STRATEGIES

The Lordstown Smart Logistics Hub is a low-risk project from the environmental, technical feasibility, and project development perspectives:

- Work limits are located in existing public right-of-way or land controlled by project partners.
- The Port Authority has a proven track record of project management, development & financing
- The region's MPO, Eastgate Regional Council of Governments, will provide technical assist with respect to NEPA aspects of project.
- Project partner DriveOhio will champion Smart Mobility initiatives (see left) and technology partner recruitment.

### Low Risk Project

There is essentially no risk to timely completion and delivery of the project, as the Lordstown Smart Logistics Hub utilizes low-volume roadways with excess vehicular capacity. DriveOhio will provide Western Reserve Port Authority with technical, legislative and procurement support relative to automated vehicles. Eastgate Regional Council of Governments will assist with project administration and NEPA compliance..

### Lack of Environmental Red Flags

The Project limits are within public right-of-way and property controlled by project partners thus reducing real estate easement acquisition costs and minimizing schedule delays. The Project has received letters of support from and letter of intent to contribute land necessary to complete the project. No additional right-of-way acquisition is required.

**1.74:1**  
**BENEFIT-COST**  
**RATIO**

## DEMONSTRATED RETURN ON INVESTMENT

A Benefit Cost Analysis (BCA) of the project was performed in accordance with USDOT's Benefit Cost Analysis Guidance for Discretionary Grant Programs, dated January 2020.

The Lordstown Smart Logistics Hub will address each of the BUILD Selection Criteria. Quantitative benefits for the project results in a 1.74:1 Benefit-Cost Ratio as detailed in the BCA.

A breakdown of project benefits by Selection Criteria is summarized in the table below. The BCA Narrative and Spreadsheet can be found at:

<https://neodfa.org/build-2-grant/lordstownsmartlogistics/>

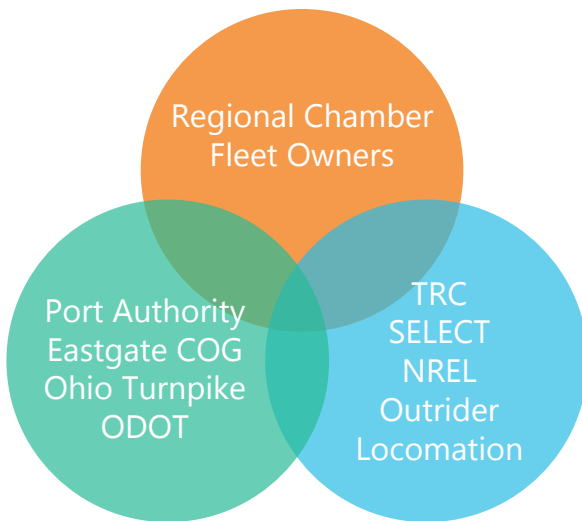
Selection Criteria	Benefits	Quantifiable Total Benefits Discounted (7%)
Safety	Reduced truck crashes resulting from truck to rail modal shift & automation	\$7,392,533
State of Good Repair	Reduced maintenance costs resulting from truck to rail modal shift	\$3,467,332
Economic Competitiveness	Fuel savings from electrification & modal shift Travel time savings from modal shift	\$40,907,968
Environmental Protection	Improved air quality & reduced pollutant emissions	\$34,852
Quality of Life	Increased employment & property values Enhanced supply chain resiliency	n/a
Innovation	Higher multiplier effect for innovation industries resulting in regional economic growth	n/a
Partnership	Efficiencies in project development through coordinating design, testing & deployment	n/a

## WORTHY OF BUILD INVESTMENT

### Meets & Exceed Program Goals

The Lordstown Smart Logistics Hub will facilitate the region's ongoing economic recovery through targeted investments in intermodal transfer and Smart logistics that capitalize on electric, connected, and automated technologies to position Lordstown as the Mahoning Valley's premier transportation and logistics hub. The project will **better utilize infrastructure** with available excess capacity, and **leverage development** through investments in emerging smart mobility technologies that will spark private manufacturing, logistics, and distribution investment at the 3,000 acres of available shovel ready prime sites.

The Lordstown Smart Logistics Hub will accelerate the region's economic recovery by creating new jobs in logistics and distribution, electric vehicle and battery manufacturing, and utilities and power generation, while expanding opportunities for the construction trades.



**Collaboration  
Model in Action!**

Federal investment in the Lordstown Smart Logistics Hub will accelerate the Mahoning Valley's economic recovery and bring jobs, supply chain resiliency, and expand much needed prosperity to Appalachia.

