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**Project Description**
The City of Manchester, New Hampshire is requesting $19.52 million in BUILD 2020 Grant funding from the United States Department of Transportation (USDOT) for the **BUILD Manchester: Connecting the Future** project, which includes roadway, bridge, bicycle, and pedestrian infrastructure improvements at a total cost of $24.4 million, which includes $4.88 million in local match. The project consists of four integrated components:

A. South Commercial Street Extension  
B. South Willow Street-Queen City Avenue Intersection Reconfiguration  
C. New Multimodal Transportation Corridor  
D. Pedestrian Connection Improvements

The BUILD investment in these project components will create critical system connections that will unleash development, enabling $1.8 billion of private investment within the 125-acre project area, including adaptive redevelopment and new construction opportunities for 9.4 million square feet of mixed-use development. This public-private opportunity is validation of the investments and substantial progress already achieved by the City, major employers, and local development partners in the revitalization of the Millyard and Downtown Manchester. The project’s integrated transportation infrastructure improvements will mitigate existing traffic congestion, increase driver and pedestrian safety, improve critical rail crossing and freight mobility, and provide improved and expanded transportation options.

**Project Location**
The Project Area is focused around the South Millyard district, immediately to the southwest of the City’s historic Downtown and Millyard areas. Geographically, the area is bounded by the:

- Granite Street corridor on the north  
- Queen City Avenue corridor on the south  
- Elm Street (US Route 3) and South Willow Street corridors on the east  
- The east bank of the Merrimack River

The project is located within the boundary of the US Census-designated Urbanized Area 53740 (Manchester, NH). The northern portion of the project area is located in Manchester’s only designated Opportunity Zone.

![Figure 1: Project Area](image-url)
Statement of Work - Detailed Description of Project Components

An overview of the Project Components and their location is shown in Figure 2. The proposed infrastructure improvements are essential to reconnect the project area with the city and regional transportation network by providing multimodal connectivity for passenger drivers, freight drivers, cyclists, and pedestrians. Each proposed improvement reinforces the larger objectives of providing reconnection and creating development opportunities while preserving corridor mobility, enhancing safety, and mitigating congestion.

Figure 2: Manchester, NH BUILD Grant Application Project Components
Project Component A: South Commercial Street Extension

The project will extend the dead end of South Commercial Street to create a direct connection to US Route 3 (Elm Street). This new configuration will cross an existing rail line by replacing an existing at-grade rail crossing at Bedford Street with a safer, state-of-the-art crossing for the new roadway. It will also provide a safer rail crossing for pedestrians by providing a much-needed direct route with pedestrian and bike facilities along the new roadway extension. The City is partnering with the owner of the rail line, Pan Am Railways, who are actively supporting this project.

Historically, there were several east-west connections between South Commercial Street and Elm Street that provided multiple means of ingress/egress through the area. Over time, these connections have been eliminated, forcing traffic from South Commercial Street to Granite Street, thus choking off access. The railroad now forms a barrier to east-west movement. The South Commercial Extension provides that missing east-west connection and will reconnect the city across the barrier of the railroad.

The intersection of South Commercial, Commercial and Granite Streets is one of the busiest in the City of Manchester with average daily traffic of over 50,000 vehicles. It serves as the primary entrance and exit for the Millyard and Downtown area, which is the home to businesses that form the heart of Manchester’s economy. It is also the only current connection from the South Millyard area to the regional road network. Over time, the South Millyard has developed into a vibrant hub of activity with some of the highest traffic generators in the City:

i. Southern New Hampshire University (SNHU) online education facility and its more than 1,800 employees
ii. Northeast Delta Dental Stadium (capacity of 7,500) which regularly hosts minor league baseball games and large events/concerts
iii. Hilton Garden Inn Hotel with 125 rooms
iv. Riverwalk residential development with a total of 150 apartments and 42 condominiums located to the south of the stadium
v. WMUR-TV – the State of New Hampshire’s primary television news station

With this density of uses in the South Millyard, and the fact that the Granite Street/Commercial/South Commercial intersection is only 800 feet from the I-293 Exit 5 interchange, gridlock conditions often develop on the ramps of I-293 during peak traffic hours and major events. The additional entrance and exit of the South Commercial Extension will provide relief. To fully understand traffic patterns on City streets and supplement traditional traffic signal models for the BUILD Project application, the City has contracted with StreetLight Data, which uses smartphones as sensors and proprietary RouteScience® to interpret and illuminate how vehicles and people interact on Manchester’s streets. Based on the resulting StreetLight travel data, from the start of the
off-ramp to the project area, it takes vehicles an average of 12 minutes to travel less than a mile in the peak periods, which is more than double the travel time during non-peak conditions.

There are also high levels of congestion on South Commercial Street, Commercial Street, and Elm Street, which is part of the National Highway System. Due to the redistribution of traffic to Elm Street with variable arrival patterns, an adaptive signal system will be extended to all intersections down Elm Street from Granite Street to Queen City Avenue. Doing this will connect two current City adaptive signal/signal performance measure systems projects occurring on Granite Street and South Willow Street. This will help mitigate the increased traffic volumes from rerouting vehicles from Granite Street to Elm Street to access the new connection to South Commercial Street.

Currently the Manchester Transit Authority does not service a route to the South Millyard, as stated in their letter of support, because in the current road network, there is no way to drive through the area without forcing a U-turn. With the connection of the South Commercial Extension, there is an opportunity for bus transit into the South Millyard. A shuttle service is currently under study as part of the City’s Transit Oriented Development (TOD) district planning.

Project Component B: South Willow Street-Queen City Avenue Intersection Improvements
This element will reconfigure this important intersection as a gateway junction, which will include a new roundabout system and opportunities for infill development of multi-use buildings. The project will improve functionality and clarity of the intersection into a true urban gateway. The component includes the construction of a new roundabout system, improved bike lanes and sidewalks, and an integrated connection to the Multimodal Corridor, connecting with the South Millyard area, Downtown, and Millyard beyond, as shown in Figure 4.

The existing intersection is the remaining fragment of highway-scale infrastructure from the 1980s when larger, higher-speed intersections and feeder roads were seen as the solution to development woes. Roadway conditions are unfriendly for bicyclists and pedestrians due to the lack of crosswalks and sidewalk connectivity, which is also hindered by the presence of many lanes of traffic with high design speeds. The wide lane widths and confusing layout of this intersection has led to unsafe conditions. In the summer of 2019, there was a fatal crash at this intersection which was a result of high speed. The reconfiguration of this intersection to a low-speed roundabout will help mitigate this type of crash.

Additionally, the proposed design of this intersection will improve freight operations by reducing signal delay for trucks on National Highway System roads, particularly for trucks accessing I-293 Exit 4 and trucks serving the NH Route 28 (South Willow Street) commercial/industrial corridor. StreetLight data shows that currently trucks traveling through this intersection during peak periods experience double the travel time than during non-peak times. By reducing the control delay, the roundabout condition will reduce truck delay and enhance freight mobility.
Project Component C: Multimodal Transportation Corridor
The historic rail corridors in the project area are underutilized resources. The Manchester-Lawrence Railroad (MLRR) corridor runs from the South Commercial Street area at the baseball stadium south to Queen City Avenue and has been abandoned and neglected for over 50 years. The .68 mile long segment is currently overgrown with scrub brush, serves as an illegal dumping ground for trash, and is a hidden zone for undesirable behavior. The Concord-Portsmouth Railroad (CPRR) corridor parallels the MLRR to the east is in similar condition.

The retired railbeds will be converted to a multimodal transportation connector configured for two lanes of vehicular traffic, a separated paved path for cyclists and pedestrians, and cutting-edge, nature-based stormwater infrastructure. The corridor will use the CPRR railbed to link the South Millyard project area to the successful Millyard area to the north for vehicles, cyclists and pedestrians. This is a critical multimodal connection as the South Millyard is slated to become the location for a regional multimodal rail and city shuttle facilities and a surrounding high-density Transit Oriented Development (TOD) District.

The corridor will use the adjoining MLRR railbed to link cyclists and pedestrian to the reconfigured intersection/gateway at Queen City Avenue/Cilley Road/South Willow Street and provide access to adjacent manufacturing, retail facilities, and the Manchester-Boston Regional Airport. It will also connect to the existing South Manchester Rail Trail which terminates 400 feet to the south of Queen City Avenue. This trail network includes several sections where engineering and construction are progressing to complete a connection south of the Massachusetts border.

The connector will provide a critical additional north-south access route from the South Millyard area for drivers, cyclists, and pedestrians to connect more efficiently at southern connection points without needing to travel on Granite Street or Elm Street. This will also provide a much-needed shorter route for emergency services vehicles. For Manchester's large and active cycling community (both commuting and recreational), the new corridor fills one of the most significant gaps in the established system of local and regional bike paths and routes.

Project Component D: Pedestrian Connection Improvements
The City will construct a new pedestrian bridge that provides a north-south crossing of Granite Street, funneling pedestrian traffic to a single safe location with a grade-separated crossing for the many pedestrians who walk to places of employment, and for the large events that take place in the project area. The bridge’s north entry will be integrated into the pedestrian infrastructure of the Millyard, and the south entry will have direct access to the South Millyard and Gaslight District.
Currently, the pedestrian crosswalks that run north-south along Commercial Street are the most direct path from the Millyard to the South Millyard areas and attractions, including the 7,500 seat Northeast Delta Dental Stadium, SNHU facilities, hotels, residential developments, and other businesses. In its current form, there are multiple lengthy at-grade pedestrian crossings of Granite Street (more than 100 feet) which are uninviting as they cross up to seven lanes of dense urban traffic. The required pedestrian crossing time allotment within the traffic signal phasing contributes to reduced capacity of the intersection for vehicles and frequent, dangerous queuing of traffic onto the Interstate system.

Furthermore, during peak hours, drivers and pedestrians pour out of the busy Millyard district onto local intersections of the street network, causing further congestion in these areas. Based on 2017 counts, there were over 200 pedestrians in each of the AM and PM peak hours at the Granite Street and Commercial Street intersection alone, resulting in activation of the long exclusive signal phase every cycle. The proposed South Commercial Extension provides additional relief for all users of the area and would encourage walking and biking for shorter distance trips.

**Transportation Challenges the Project Addresses**
Manchester has experienced significant success in revitalizing its city center area over the past 30 years. In the past, vacant mills and commercial buildings comprised the area formerly occupied by the Amoskeag Manufacturing Company, now known as the Millyard, which is adjacent to the beautiful Downtown. Thanks to the vision of private entrepreneurs, investors, and city leaders, these areas are now filled with thriving businesses, innovative start-ups, and successful educational institutions. Areas that had been underutilized industrial sites are now popular residential complexes, stadiums and restaurants.

For all of the success in the Millyard area and the Downtown, development of the South Millyard faces significant challenges. Creating private mixed-use development of a dense district requires high-quality transportation options providing connectivity and congestion mitigation for the increased traffic demand that comes with new development. With success comes the necessity and responsibility to adapt outdated transportation systems to 21st century standards to enable continued job creation, local investment and development.

Success has impacted the local transportation system and created several challenging conditions. The following identifies the transportation challenges that have resulted from growth and development of downtown:

1. Significant traffic impacts:
   a. Traffic congestion on Granite Street is significant during peak hours and for downtown events, impacting the safety of drivers, pedestrians, and cyclists seeking to move north-south along Commercial Street; a street that connects major employers, educators and attractions. During the peak hours, the average travel speed on Granite Street is 16 mph while the posted speed is 30 mph.
b. During peak hours, this congestion affects mobility on the adjacent Interstate System (I-293). Granite Street is a Principal Arterial, is part of the National Highway System, and is one of the three entrances into Downtown Manchester from the Interstate system, as well as one of four crossings of the Merrimack River. It is the major east-west thoroughfare connecting from Downtown across the Merrimack River to important regional roads and the Interstate Highway System.

c. Canal Street is a high-capacity arterial with a four-lane cross-section that provides access to downtown and the Millyard. It also provides connectivity between the I-293 Exit 5 (Granite Street) and Exit 6 (Amoskeag Circle) interchanges. At the busiest location, as it services 13,000 vehicles a day. There are nine traffic signals in the 0.9 mile segment from Commercial Street to Granite Street that contributes to corridor delay despite being coordinated with time-based offsets.

d. Elm Street (US Route 3) is a primary arterial that is part of the National Highway System, and is the main downtown street through Manchester’s Central Business District. Several traffic calming measures have been implemented such as bumpouts, narrowing lanes to install on-street angled parking, and installation of high-visibility crosswalks to slow traffic through the Downtown.

2. Vehicular and pedestrian safety:

   a. The safety of drivers and pedestrians in the area of the Granite Street/Commercial Street intersection is compromised by the fact that the intersection is only 800 feet from the I-293 Exit 5 interchange. Gridlock conditions often develop on the ramps of I-293 during traffic peak hours and major events which results in traffic congestion that causes queuing onto roadways with high design speeds.

   b. The Queen City Avenue and South Willow Street intersection experiences safety concerns due to its current configuration and design speed. The crash rate for the analysis period 2015-2018 was 1.4 crashes per million entering and one fatality in July 2019. With no existing crosswalks or pedestrian signals at the intersection, the lack of pedestrian infrastructure creates a barrier for pedestrians crossing the intersection.

3. Lack of east-west connectivity: Over time, the development of large land parcels and the presence of the Pan Am Railroad have reduced the number of east-west streets that connect the South Millyard with Elm Street (see Figure 7, Page 9). When land uses were less dense in the project area, this condition was inconvenient but tolerable. With redevelopment now spreading southward from Downtown and the Millyard, there is an opportunity for Southern Elm Street to become a dense, multi-use corridor with a complete streetscape for all users. East-west connections are needed to empower further redevelopment and economic growth.

4. Abandoned rail line right of way: The abandoned Manchester-Lawrence Railroad corridor currently runs from the heart of the project area – southeast under Elm Street to South Willow Street – and continues to the Manchester-Boston Regional Airport. South Willow Street is one of the largest commercial shopping districts in the state, with three miles of commercial/retail space anchored by the Mall of New Hampshire (792,000 SF per owner, New England Development). Currently, to travel between the project area and the South Willow Street Shopping district, traffic must go around the city using I-293, or use Elm Street and Queen City Avenue, passing through more than 10 signalized intersections. The bridge that carries Elm Street (Bridge #144/075) across this railbed is over 100 years old. Although in a safe condition for vehicular traffic, the bridge is awaiting repair for known deficiencies, including spalling from its underside, making travel below prohibited for safety reasons.
5. Fragmented transit systems: Manchester is the regional center for southern New Hampshire, yet its regional transit systems are fragmented across the city center, making it difficult for travelers to transition from modes of travel. The nearly-completed Manchester TOD Plan has established broad consensus around the creation of a centralized transportation hub within the BUILD Grant project area and provides the opportunity to create a center where rail, bus, trolley, auto, bicycle, and pedestrians can connect. The ongoing Capitol Corridor initiative being led by the NH Department of Transportation aims to restore passenger rail service linking Manchester and Boston.

6. Gaps in bicycle infrastructure system: The City has been working to establish an integrated bicycle system through rail trail projects currently on the NHDOT Statewide Transportation Improvement Program (STIP), including improving bike pavement markings on shared roadways. However, there are several “gaps” in the system that prevent cyclists from riding regionally in a safe, direct manner. Several of these missing connections are in the project area, and force cyclists to ride on existing roadways without dedicated cycling infrastructure.

The proposed transportation infrastructure improvements of the BUILD Manchester: Connecting the Future project will enhance mobility and safety for passenger vehicles, freight, bicycles, and pedestrians. The improvements will also mitigate congestion, implement proven safety countermeasures, and enable new mixed-use/mixed-income development. Should these challenges go unattended, there could be far-reaching consequences to the no-build alternative. Along with continued traffic congestion and lost potential economic development, this area would maintain pockets of negative social behavior that would remain disconnected to the local community. Public safety and public transportation currently face challenges serving this area, and continued lack of action to address the needs of this zone will only deepen the social disconnect.

**Project History and Context**

Manchester is the social and economic center of southern New Hampshire, and is growing in both population and economic significance. Since 1980, Manchester’s population has grown by more than 20%, from 90,936 to a 2017 population of 111,196. Economic growth in the life sciences, cutting edge bio-medical engineering, advanced manufacturing, information technology, education, and service industries are supporting new job growth. In addition, Manchester is the most ethnically diverse community in the State, and in northern New England [U.S. Census Bureau].

During the 19th century, the Amoskeag Manufacturing Company in Manchester, NH was the industrial heart for the region’s economic success. The Millyard, located along the Merrimack River, provided jobs for thousands. To the east of the Millyard, Downtown Manchester along Elm Street was the regional urban commercial center. To the south, the area below Granite Street contained important rail lines, heavy industrial sites and warehousing facilities. However, like many manufacturing communities in the United States, Manchester’s original, defining industries were diminished by changes in global and national economics and demographics. After a period of decreased use and decay in the twentieth century, many of Manchester’s vast mills and commercial buildings were underutilized or completely vacant, and became areas of blight.
Figure 7 is a street map of Manchester from 1873, which shows how the city once had multiple east-west street connections to Elm Street. Now, after years of development and growth, zero east-west connections remain in the South Millyard district, leaving the Granite Street/Commercial Street intersection the only entrance and exit point.

Manchester reinvented its economy through innovation, persistence and grit. The success of Manchester’s Millyard in particular has been the result of decades of dogged, incremental progress. During the 1980s, the neighborhood was connected to I-293 at Granite Street through a standard interchange, which allowed connection for workers and deliveries. In 2008, the ramp intersection was upgraded to a single-point diamond interchange. Land use zoning for the Millyard was changed to encourage a mix of uses, which resulted in the reuse of several large and important former mill structures. The City also introduced diagonal parking to Elm Street in downtown and Commercial Street in the Millyard district, resulting in increased parking capacity and accelerated redevelopment.

Private vision and investment have been crucial to the success of Manchester’s recovery. The revitalized Mill District is now known as a fertile ecosystem for technology firms and innovative businesses, as described in articles from The New York Times and Politico. Mill buildings that were once filled with mechanical fabric looms are now home to offices for companies such as Texas Instruments, Autodesk, DEKA Research and Development, and Eversource Energy. Other buildings are filled with engineering firms, architects, professional offices, college classrooms and restaurants. In response to these improvement areas, the Downtown experienced a 19.7% increase in residents between 2000 and 2010. The success in business activity and the need for additional housing is attracting developers who see opportunities to build apartments and hotels within the center of the city. For further information of Manchester’s success, follow this link.

The South Millyard area is slowly evolving with new mixed uses, including educational institutions such as Southern New Hampshire University (SNHU) and University of New Hampshire (UNH-Manchester), multi-unit housing, restaurants, shopping, sports and entertainment, among other dynamic activities, making Manchester an attractive place for students and young professionals. The City is actively encouraging this evolution, supported with actions by both the public and private sectors, working in partnership. While some redevelopment is occurring, the project area still has high levels of disinvestment and is part of Manchester’s only designated Opportunity Zone. In order to restore the capacity for continued private sector investment and development, Manchester must reconnect the South Millyard area to the surrounding highway and street networks, expanding the revitalized urban fabric and quality of life thereby unifying the City’s urban fabric south of Downtown and the Millyard.

**Building on Success – Completed Plans and Projects**

This BUILD grant application is not the City’s first step towards this vision of a more connected city and South Millyard area. The City’s 2006 Downtown Strategic Development Plan and the 2009
Manchester Master Plan articulated many of the central ideas embodied in this BUILD project. The Manchester Connects - Multimodal Transportation and Land Use Planning Initiative, completed in 2017, was initiated by civic leaders, community groups, businesses, non-profit organizations and residents. It was funded through a Public/Private Partnership supported by the Southern New Hampshire Planning Commission (SNHPC), and focused on increasing connectivity to help people move within and through the area on foot, by bike, car, bus, and train. The project is now moving into its implementation phase with the 2019 Millyard Arms Park enhancement project that coincided with the dedication of former Manchester resident and "The Father of Video Games", Ralph Baer statue all completed using private funds in partnership with the City.

Over the past two decades, the City and its State and regional partners have completed several projects that expanded connectivity and urban livability:

- Construction of 1,700 car parking garage at South Commercial Street, completed July 2019
- Rehabilitation of five structurally deficient bridges and improved ramp system connecting Manchester to Interstate 293, completed 2017
- Revitalization and improvements to the Elm Street Gaslight District, completed 2018, included pedestrian and streetscape elements, as well as new curbing and pavement overlay along Elm Street between Granite Street and Green Street.
- Implementation of Zagster Bike share in June 2017, which now has eight docking stations within the downtown area, and one in the South Millyard.
- Implementation of bike lanes in Downtown and extending south along Elm Street, made possible by the policy document of the 2016 Manchester Bicycle Plan.
- Widening of Granite Street Bridge, completed 2008, which included the completion of the single-point diamond interchange at Exit 5 of I-293
- Construction of the Hands Across the Merrimack Pedestrian Bridge, the only dedicated multi-use trail currently across the Merrimack River, completed 2008
- Construction of Riverwalks on the east bank of the Merrimack River, completed in phases during the early 2000s

Mutually Supporting Planning and Implementation

The overall BUILD Project and its components are consistent with several long-term planning initiatives by the City of Manchester and its regional partners. The three simultaneous and coordinated planning efforts all work seamlessly together:

- Manchester Transit Oriented Development (TOD) Plan: Led by the Southern New Hampshire Planning Commission (SNHPC) and supported by the NHDOT Community Technical Assistance Program (CTAP) and private local funders as a strategy to mitigate impacts associated with the expansion of I-93 between Salem and Manchester. TOD is a development model focused on the creation of compact, walkable, pedestrian-oriented, mixed-use communities centered around well-connected and high-quality mobility systems. The Plan provides a broadly-supported framework for redevelopment and implementation within a realistic market context. Manchester's TOD project area encompasses this BUILD grant application project area and the two projects are well-coordinated. The process has determined that the most feasible location for the new multimodal transportation hub will be within the BUILD grant project area, meaning the impacts of the BUILD grant can be expanded. The improvements to overall transportation systems and connectivity funded by
The BUILD grant is critical infrastructure necessary for the development of transit-oriented development in Manchester. The TOD Plan will be complete in fall 2020.

- **City of Manchester Comprehensive Master Plan (CMP):** This Plan involves intensive stakeholder and public engagement process, and will be completed and adopted by the City in fall 2020. The Plan sets the vision and recommends concrete policies for regulatory reform and incentives for positive development. For the BUILD Grant project area, the CMP has the same vision of high-density development within the TOD district and along the Elm Street corridor and increased connectivity between the South Millyard through the development of new roadways. Planners are currently integrating the elements of the BUILD grant into the Master Plan to assure legal coherence.

- **New Hampshire Capitol Corridor Project** is within the State’s Ten-year Transportation Plan and will study bringing rail transit directly into the project area.

- The City of Manchester is currently in the design phase to implement an Adaptive Signal Control (ASC) system on Granite Street and to upgrade the communication between signals with Signal Performance Measures (SPM) on South Willow Street. More detailed discussion about the ASC system can be found in the Innovation section of this application.

In preparation to apply for the BUILD Grant, the City convened a day-long charrette in 2019 in which stakeholders, property owners and the public worked together in a facilitated sessions. The eighty (80) participants learned about ongoing planning and transportation projects, worked in groups to identify key issues in the project area that should be improved, and set priorities for key recommendations in the area.
**Project Schedule**

The **BUILD Manchester: Connecting the Future** project will complete all design, permitting and funding obligation in a time frame to synchronize with the completion of City plans and improvements. The City is positioned to execute the completion of design and permitting and start construction in accordance with the funding requirements of the BUILD program. All requirements of the State and Federal oversight of the project elements will be complete before the June 30, 2022 deadline and all funding can be obligated by September 30, 2022. Per requirements, all funds will be expended by September 30, 2027.

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Figure 10: Manchester BUILD Grant Project Schedule

**Grant Funds, Sources and Uses of all Project Funding**

The City of Manchester seeks USDOT BUILD funding for **BUILD Manchester: Connecting the Future**. The proposed improvements to be funded under this application will improve conditions on roadways that are part of the National Highway System, reduce congestion, improve driver, cyclist and pedestrian safety, and empower economic competitiveness by increasing transportation access for redevelopment. Figure 11 shows the cost and funding allocation of each proposed improvement:
### Figure 11: Manchester BUILD Grant Project Budget

The City has secured funding commitments totaling 20% of the project cost. The Mayor’s Community Improvement Program for the fiscal year 2020 includes $4 million dollars to move forward with the South Commercial Street Extension. Additional local funds are planned for the 2022 fiscal year to supplement the construction phase.

### Figure 12: Manchester BUILD Grant Funding Source Allocation

**Summary of Potential Private Investment and Job Creation**

- **Office/Light Manufacturing:** 1.5 million square feet
- **Retail:** 1.1 million square feet
- **Residential:** 6.8 million square feet totaling 5,146 units
- **Parking:** to support development/land uses
- **Total Development Program:** 9.4 million square feet at anticipated 75% build-out
- **Total Private Investment:** $1.8 billion private investment

To support integrated mixed-use development, all components of the **BUILD Manchester: Connecting the Future** project are interrelated. Successful commercial, office, retail, educational, entertainment, residential, restaurants and activated public space require pedestrian and vehicular
traffic, convenient access, and visibility to thrive. These amenities create value and increase the quality of life for all who live, work, and visit Manchester and the region. Providing multimodal access to a diversity of uses and users ensures the project area remains active at all times of the day, week and year, supporting a sustainable economy.

Summary of Private Job Creation Leveraged by BUILD FY2020 Funding (See more detail in our Economic Competitiveness section in this application)

- Sustains 746 construction jobs annually during a 30-year build out period
- Creates 7,588 permanent jobs in newly constructed and redeveloped buildings

Selection Criteria

The BUILD Manchester: Connecting the Future project meets the BUILD FY20 Selection Criteria by providing long-term benefits to the area’s transportation systems, improving safety, providing options for mobility-challenged populations, and generating significant economic stimulus.

Primary Criteria A: Safety

The project will improve safety within the project area by constructing key components of the transportation system to enhance the movement of goods and people by improving the roadways, intersections, multimodal connections, and pedestrian and bicycling facilities. In the aggregate, these projects will reduce the number, rate, and consequences of transportation-related accidents, serious injuries, and fatalities, and will provide safer pedestrian access and mobility.

The project will foster a safe transportation system for the movement of goods and people resulting in measurably improved safety outcomes within the project area and the wider transportation network. The reconfigurations and improvements will reduce the number, rate, and consequences of transportation-related crashes, fatalities and injuries among transportation users. Project components that will specifically improve safety:

- South Commercial Street Extension: Current conditions necessitate all traffic moving into and out of the project area through the intersection at Granite and South Commercial Street, resulting in a higher volume of traffic at this intersection. The extension of South Commercial Street to Elm Street and beyond will disperse vehicular traffic more efficiently through the project area and will reduce the traffic pressure on this key intersection. Currently the intersection is over capacity operating at Level of Service (LOS) F, with no potential to increase roadway width for additional lanes. With this improvement providing an alternative access point, more than 300 vehicles would be removed from this intersection during peak hours.
  - From 2016-2018 there were 38 crashes at the intersection with a crash rate of 1.2 per million entering vehicles. Removing traffic and being able to improve coordination of traffic flow on Granite Street can reduce crashes up to 21% (CMF for Coordinate Arterial Roadways).
  - The addition of adaptive traffic control (ASC) signals on Elm Street will provide both safety and mobility improvements for the corridor. From 2016-2018 there were 103 crashes at the five signalized intersections where ASC technology is proposed. Addition of ASC can reduce crashes up to 17% (CMF for Adaptive Signals)
• The project will provide shorter travel distances for first responders, resulting in significant positive safety implications for the general public. Currently, there is only one route into and out of the South Commercial Street area. As the South Milliard area has developed, users with a higher need for emergency services have located there: large employers (e.g. SNHU with approximately 1,800 employees), large entertainment venues (e.g. Northeast Delta Dental Stadium has a capacity of 7,500) and high-density residential developments. After the project improvements, there will be two available routes for emergency access, resulting in major reductions in response travel distance (50% for Police, 28% for EMS and 5% for Fire). In addition, all responders will have fewer intersections to pass through on the way to calls; 75% of all EMS accidents occur during "hot" response (source: Virginia Department of Health, Academy of Emergency Medicine 2005 Jul; 12(7):594-600).

• South Willow Street-Queen City Avenue Intersection Reconfiguration: From 2016-2018 there were 38 crashes at this intersection with a crash rate of 1.3 crashes per million entering vehicles. The reconfiguration of this intersection with a roundabout system will have an immediate effect on vehicular safety, since replacement of a signalized intersection with a roundabout in similar locations has been shown to result in a 70% reduction in all crash types (source: Crash Rate Modification Clearinghouse).

• New Multimodal Transportation Corridor: Currently, Elm Street (US Route 3) is the only contiguous north-south through-corridor in the project area, requiring traffic to use Granite Street and Elm Street to access the residential, commercial and institutional uses served by South Willow Street and Queen City Avenue. The construction of the new Multimodal Transportation Corridor to directly connect South Commercial Street to South Willow Street for vehicles will improve accessibility in the Project Area. The entire Corridor will have a separated multi-use path for cyclists, increasing the rate of cycling and walking. This will also increase safety for cyclists; research from 13 years of crash date in several US cities found that providing a separated bike lane on city streets has resulted in 44 percent fewer deaths and 50 percent fewer serious injuries than an average city.

• Pedestrian Connection Improvements: A primary concern is the current condition for pedestrians crossing Granite Street in all directions. This intersection is problematic for both pedestrian safety at a high-volume intersection, and for drivers negotiating the intersection during periods with heavy pedestrian usage. New Hampshire State law does not allow vehicles to make a right turn on red during ‘walk’ and ‘flashing don’t walk’ phases, but due to signal delay at this intersection, there are several violations resulting in safety concerns. The attached Technical Memorandum of Traffic Documentation supporting this application details the recent accident history in the project area, including all affected intersections, including three pedestrian-related crashes on Granite Street from 2016-2018. By constructing a dedicated pedestrian bridge over the intersection, it will allow for the uninterrupted flow of pedestrian movement separate from vehicle traffic. Constructing a dedicated pedestrian bridge over the intersection also eliminates the exclusive pedestrian phase, which uses 40 seconds during each signal cycle. This will reduce queue due to over 200 pedestrians that use this 100-foot crossing in both the AM and PM peak. Currently, there is a safety issue for vehicles at this intersection as the pedestrian phase creates vehicular and pedestrian conflicts. With just the removal of the pedestrian phase, the overall intersection delay is reduced from 145 seconds to 91 seconds.
The project will eliminate unsafe highway/rail grade crossings, specifically through these project components:

- **South Commercial Street Extension**: There are existing at-grade railroad crossings in the project area, on Granite Street and Depot Street. The crossing at Depot Street will be eliminated, and a new crossing will be installed on the South Commercial Street Extension. Smart crossing technology with virtual fence and alert zone surveillance will control both Granite Street and the new South Commercial Street crossing. The Granite Street Railroad crossing is less than 100 feet from the congested intersection of Canal Street, where vehicles heading eastbound toward downtown are queued across the tracks most of the day. With the improvements of the South Commercial Street Extension and the Multimodal Transportation Corridor Improvements, approximately 400 vehicles in the peak traffic hours would shift from using the Granite Street crossing to the lower speed and volume road of the South Commercial Street Extension, in which queuing on the tracks should not be an issue.

### Primary Criteria B: State of Good Repair

A State of Good Repair is defined as “Improving the condition of existing transportation facilities and systems, with particular emphasis on projects that minimize life-cycle costs.” Maintaining a State of Good Repair is essential for historic city centers like Manchester to grow and adjust to changing economic conditions. The roadways in the project area have evolved over time and are not currently well-configured to support the redevelopment and allow the area to fully participate in Manchester’s modern economy. The project ensures the good condition of infrastructure that supports transportation network efficiency, mobility of goods and people, and commerce and economic growth. Specific project components will have measurable impacts on distinct elements of the project area, the city and the region:

- **South Commercial Street Extension**: Existing intersections along Granite Street, Queen City Avenue, and South Willow Street, are at or near capacity during peak commute times. This improvement would remove 5,200 vehicle per day from Granite Street to Elm Street intersection, thus providing additional capacity to service existing and future travel demands, and providing options for pedestrians and bicyclists, the impacts on any one street or intersection can be better distributed throughout the local transportation network, essentially extending the design life of the local and regional transportation network. Such improvements would also complement any TOD that may be contemplated with the potential advent of commuter rail from the Boston area into southern New Hampshire.

- **South Willow Street-Queen City Avenue Intersection Reconfiguration**: The reconfiguration of this intersection would allow the removal of the existing signal equipment while reducing congestion with additional benefit of improving air quality. This will eliminate the need for operations and maintenance costs including electric consumption by signals, signal retiming, and signal maintenance. The only anticipated added costs are roundabout landscaping and signage maintenance. The Virginia Department of Transportation has estimated that the operational and maintenance costs of a traffic signal are more than four times the cost of a roundabout.

- **Multimodal Transportation Corridor**: The Elm Street Bridge (Manchester 144-075), constructed in 1915, is a critical link in the transportation network allowing for efficient north-south travel, mobility of goods, accessibility and mobility of people. Under the National Bridge Inventory (NBI) Appraisal Ratings (July 2018 Inspection Report) it is
functionally obsolete for its Underclearances (rated at 2), and its Structural Evaluation is rated at 5 (Above Minimum - Tolerable). Currently the blast plates are deteriorating and pieces are falling from under the bridge. The bridge span itself is included in New Hampshire Department of Transportation’s Ten-Year Transportation Improvement Plan, and is slated for replacement in 2028. The structural retaining walls supporting the roadway approaching the bridge on Elm Street and concrete guardrails along the sidewalk are in poor condition, and will require replacement.

In its current state of repair, the bridge will require repair/replacement to address structural deficiencies in the near term. As part of this project, there is a unique opportunity to reconstruct the bridge to new dimensions to improve its functionality both above and below the structure itself. The existing bridge structure does not provide adequate width to accommodate the proposed Multimodal Transportation Corridor with two lanes of north-south vehicular traffic and a separated bike/pedestrian path. We propose to replace the existing bridge with a new structure that will allow construction of the Corridor below and improved travel conditions along Elm Street above for vehicles, appropriate travel lanes for bicycles, and sidewalks for pedestrians. In this way, the project is consistent with City and State plans to maintain existing transportation facilities in a state of good repair while addressing current vulnerabilities.

All project components are consistent with relevant plans to maintain transportation facilities or systems in a state of good repair and address current and projected vulnerabilities. The City of Manchester and SNHPC have completed several initiatives and programs and are actively collaborating on more at the present time:

- The proposed project area falls within Manchester’s designated NH Neighborhood Revitalization Strategy Area (NRSA) as approved by HUD in the City’s Consolidated Plan for 2020-2024. This is a targeted low income and underserved area, and is designated by HUD and the City as a primary target for economic and public infrastructure improvement such as creating greenspace, walkable communities, and multimodal transportation options to assist lower income residents with better access the economic opportunities of the City.
- The Queen City Bridge is on the NHDOT’s list of structurally-deficient bridges. Bids have been accepted for the rehabilitation of this bridge with a pending award and construction scheduled for 2020 and 2021. Funding is provided on this NHS corridor by the City of Manchester and an 80% reimbursement through the NHDOT State Aid Bridge Program.

The project will use asset management approaches that optimize its long-term cost structure, and the City of Manchester Department of Public Works (DPW) plans to maintain the transportation infrastructure in a state of good repair. The DPW’s posture on asset management is the foundation built to modernize aging infrastructure in this city. Important tenets of the approach are a focus on critical elements as well as the application of preventive maintenance to manage the lifecycle of an asset. New construction is expensive, but the perfect opportunity to apply regular service and lower long term infrastructure costs. With an established asset management program already in place and a consistent commitment to investing in maintenance and capital improvements, this project will benefit from reduced lifecycle costs over a long period of growth.

All multimodal infrastructure items constructed during this project and owned by the City will be captured as assets in the ESRI database and populated in the IBM Maximo Asset Management
BUILD Manchester: Connecting the Future

(v.7.5) system. The DPW utilizes this system to conduct predictive, preventative, and corrective maintenance activities for all city assets under its purview. The assets populated are comprehensive and plentiful (130,000 assets and 31,000 locations), and they include roads, bridges, sidewalks, sewers, playground equipment in parks, even boilers and chillers in schools. The asset management system is integrated with the City’s ESRI GIS system using a software engine (GeoWorx) that provides two-way updates on a nightly basis. All work orders, purchasing, cost accounting, permitting and capital projects utilize this system.

Citizens have a mobile application (Manchester, NH Connect) through the See Click Fix platform where reports of problems with trash, graffiti, street light outages, potholes and other related problems are automatically escalated into Maximo service requests and routed to the appropriate team. Supervisors and superintendents use a mobile iPad solution that includes the fully integrated EZMAX Mobile application to manage open work orders, track resources and labor, update asset history, and inform cost accounting. The Manchester DPW is a national leader in this area and has made presentations on asset management systems for municipalities at the IBM Pulse National Convention, as well as the Maximo for Utilities Work Group (MUWG) National Convention. The assets contemplated for construction within this BUILD grant would be seamlessly integrated into this system, along with the Departments’ work process management.

Transportation infrastructure assets are subjected to a robust inspection program to inform a predictive approach to maintenance. The DPW is directly responsible for the maintenance of 403 miles of local streets, 35 municipal bridges, 248 miles of sidewalk, 164 traffic signals, 9,000 street lights, 364 miles of sanitary sewer, and 203 miles of storm drainage. The City uses both regular network and project-specific inspections to document distresses and identify required maintenance.

Over $18M has been spent in the last 4 years on road paving and street preservation with 100 miles of road surface treatments such as paving, chip sealing, microsurfacing, and asphalt recycling with another 90 miles of crack sealing to preserve recent investments. Plans for 2020 include another 40 miles of surface treatments and crack sealing. A two-year bridge maintenance and repair project was completed in 2019 using $800,000 in City funds to extend the life of several bridges with a variety of concrete and joint repairs. There are two bridge rehabilitation projects scheduled for 2020 construction with an $11.5M investment, and another three bridges in the engineering design stage for rehabilitation in the next five years with an estimated $17.0M value. These projects are included in the State of New Hampshire Bridge Program for an 80% reimbursement of local costs. Updated capital planning based on 2020 inspections will be used to continue programing preservation projects in the next several years and rehabilitation projects through 2040.

Primary Criteria C: Economic Competitiveness
Manchester is a dynamic and growing city, located at the geographic and intellectual center of innovation, education, healthcare, and business in northern New England, as well as being within an hour of the Boston metropolitan area. As the largest city in New Hampshire, with a population of 110,865 (NH Office of Strategic Initiatives), Manchester is the economic center of a broader MSA region of 400,721 people (2010 US Census) where innovation and economic growth are increasing as a result of strong collaboration between private business, educational institutions, City and State government, and non-profit organizations. The growth of Manchester's institutions and industry
clusters is important for the economic health of the nation, not just Manchester and New Hampshire. Click here and here for examples.

The project area is central to the employment base of Manchester, and immediately in and around the project area are the other major economic anchors for the region. Directly north is the heart of Manchester and the University of New Hampshire’s Manchester campus. To the south and southeast is the South Willow Street commercial corridor, anchored by the Mall of New Hampshire and its surrounding retail facilities, which continue to be resilient in the face of changing retail trends. The Manchester-Boston Regional Airport provides not only passenger air transport, but also freight and logistical support with companies like UPS/Pratt & Whitney and FedEx, which businesses in the South Millyard project area rely on for goods and services.

As shown by continuing patterns of redevelopment and business location, there is intense interest by the private sector to locate close to the Millyard and the businesses located therein. The so-called “Eds and Meds” (education, medical, bio-science, and research/development) employment sector continues to grow, led by local inventor Dean Kamen’s ARMI (Advanced Regenerative Manufacturing Institute) private-public partnership with the United States Department of Defense. At full build-out, the redeveloped parcels in the project area have the potential to generate more than 7,588 new jobs. Educational opportunities in the vicinity of South Millyard and the overall project area are extensive – there are nine higher education institutions in Manchester, with the University of New Hampshire-Manchester and Southern New Hampshire University immediately adjacent to the South Millyard development parcels.

The City is committed to creating the conditions for growth and investment, and these efforts have achieved positive results. The City’s effective economic development strategy has attracted millions in development projects in the past ten years. These recent developments have included the following recent public and private investments in the areas in and adjacent to the South Millyard:

- SNHU at 33 South Commercial Street
- UNH-Manchester
- Elliot at River’s Edge Medical Center
- Arms Park
- Residences at Riverwalk
- Market Basket Grocery Store
- ARMI (Advanced Regenerative Manufacturing Institute)

However, the project area is currently disconnected from the Manchester’s economic success because of its outdated transportation infrastructure. It is recognized as an economically-distressed area is designated as one of New Hampshire’s only Opportunity Zones in order to encourage and enable new construction and redevelopment of underutilized structures/lots. This BUILD project enhances economic competitiveness by unlocking access to land area for redevelopment in close proximity to the already successful Downtown and Millyard areas.

In an historic city such as Manchester, there are limited areas of developable land remaining in the city center in close proximity to major economic drivers and close to existing and potential transit hubs. The City needs to encourage development to remain competitive, attract new jobs, and increase the tax base to provide necessary City services for the current residents while steering development to the right locations to take advantage of the synergistic aspects that have fueled the Millyard’s growth while protecting the look and feel of the existing neighborhoods.
The project directly addresses congestion through increased access resulting in decreased transportation costs and improved access to employment centers and job opportunities, specifically:

- **South Commercial Street Extension**: The South Commercial Street Extension will provide alternative access to the Project Area which will provide drivers options, reducing traffic volumes on Granite Street. Delay reductions are estimated to be 25 seconds per vehicle at the Granite Street intersection. For commuters coming from east of the project area, this improvement will reduce travel time by 13 minutes in the AM peak and 8 minutes in the PM peak.

- **South Willow Street-Queen City Avenue Intersection Reconfiguration**: Synchro analysis shows that the existing delay at the intersection in the PM Peak hour is 44.4 seconds per vehicle, with all delay related to signal control. Eliminating the signal and building a roundabout will reduce delay to 28.1 seconds/vehicle, improving travel time through the intersection.

- **Multimodal Transportation Corridor**: Several studies have shown how construction of off-road bicycle facilities will increase bicycle modal split. A 2012 study of bike lanes and bike paths in over 90 American cities showed that the supply of bikeways per capita is a statistically significant predictor of bike commuting. With the anticipated mixed-use development in the project area, it provides opportunity for people to live close to work and commute via bicycle or walking, reducing the vehicular demand on the roadways.

Increased transportation choices and decreased congestion reduces burdens of commuting to improve overall well-being of workers.

- **South Commercial Street Extension**: Currently there is no north-south connection from the project area to the parcels and land uses to the south except using Granite Street to Elm Street. The component creates a direct route for pedestrians and bicycles by providing sidewalk and bike lanes.

- **South Willow Street-Queen City Avenue Intersection Reconfiguration**: Currently, there is no pedestrian phasing in the traffic signal and no crosswalks at the intersection. If a pedestrian wanted to safely cross South Willow Street, the closest crosswalk is at the South Willow Street and South Beech Street intersection, 460 feet to the south. Walking down to the crosswalk and back up at 3.5 feet per second would add over 4 minutes in travel time. Similarly, to cross Cilley Road, the closest crossing at Cilley Road and Beech Street is 260 feet to the east, adding approximately 2.5 minutes in travel time. By constructing the roundabout with pedestrian accommodations, it will reduce travel times for pedestrians.

- **Multimodal Transportation Corridor**: From StreetLight data, Manchester neighborhoods near the project area have an average commute time is 25 minutes. With this multi-use corridor, overall travel distance is greatly decreased by the removal of multiple signals, resulting in a new commute time of 5 minutes. If commuters choose to bike to work, their commute time would be approximately 15 minutes, and if commuters choose to walk, their trip would take approximately 25 minutes. Therefore this improvement could encourage a healthier lifestyle. With the multi-use path included in this improvement, it will allow for commutable bicycle access into the project area from the nearby towns of Auburn, Hooksett, Londonderry, and Goffstown via Manchester’s trail networks.

- **Pedestrian Connection Improvements**: Due to the high vehicle and pedestrian demand at the Granite Street and Commercial Street intersection, if pedestrians arrive at the start of a
cycle, it could take them up to 130 seconds to cross the street. The proposed pedestrian bridge will help alleviate pedestrian volume at this intersection.

The project will improve long-term efficiency, reliability or costs in the movement of workers and goods thereby reducing costs of doing business.

- South Commercial Street Extension: Based on StreetLight data, in the AM Peak it currently takes drivers 12 minutes to travel the half mile from the I-293 off-ramp to the Project Area, opposed to 6 minutes in non-peak periods. Travel speeds on average are 16 mph, opposed to the posted speed limit of 30 mph. According to the Texas Transportation Institute, the cost of traffic congestion is **$87.2 billion in wasted fuel and lost productivity**, which translates to $750 per traveler.

- South Willow Street-Queen City Avenue Intersection Reconfiguration: StreetLight data shows that trucks traveling through this intersection during peak periods experience double the travel time than during non-peak times. By reducing the control delay, the roundabout condition will reduce truck delays and enhance mobility.

- Multimodal Transportation Corridor: This provides a multimodal connection between downtown and the South Willow Street Corridor; two of the City’s most significant business/employment areas.

The project addresses congestion in major urban areas through the deployment of advanced technology. As part of the South Commercial Street extension, the City will be implementing adaptive signal control technology at five signalized intersection on Elm Street as part of the FHWA “Every Day Counts” initiative (see Innovation Criteria for more information). On average ASC Technology improves travel time by more than 10 percent. In areas with particularly outdated signal timing, improvements can be 50 percent or more.

The project will promote the expansion of private economic development to support local or regional economic competitiveness. There is continued interest from the private sector to locate close to the Millyard’s businesses and educational institutions. However, there is limited access to the sites with redevelopment potential in the project area. The development potential can be unlocked by increasing transportation access and options to the area through the construction of the project components.

The cumulative impacts of the project components will measurably increase the economic productivity of land, new investment capital and provide long-term job creation:

- Enhance the value of the underutilized parcels (totaling 5.4 million square feet of land area) in the area by extending and creating connecting roadways with access to/from the Elm Street corridor and frontages within the South Millyard area
- Maximize the value of the developable parcels in the area and enable the development of:
  - 1.5 million square feet of office/light manufacturing space
  - 1.1 million square feet of retail space
  - 6.8 million square feet of residential space (5,146 units)
- Enable a total of $1.8 billion in private investment within the project area, if built out in accordance with zoning and development regulations. This level of investment has both local and regional implications for improved economic competitiveness
- Sustain 746 construction jobs annually during a 30-year build-out period
• Create redeveloped and new construction space for 7,588 permanent jobs
• Create expanded and improved accessibility to job opportunities by increasing connections that will reduce congestion at key locations in the project area, improving the Level of Service at the Granite Street/South Commercial Street intersection from an F to a D
• Decrease transportation costs and improve access, especially for the residents of the rural communities outside Manchester who work in the project area, as well as improve/provide non-vehicular transportation options for mobility-challenged populations to the east and south of the project area

The project directly improves freight connectivity, which will help Manchester’s industries to compete in a global economy by facilitating efficient and reliable freight movement. Specific project components that will improve freight connectivity:

• South Commercial Street Extension: Currently, based on StreetLight data, it takes trucks up to 3.5 minutes longer to travel from Granite Street to Elm Street in peak periods than non-peak periods. The new connection will shorten travel distance by approximately 500 feet and reduce the number of signals passed through from four to two, reducing time waiting at signal by approximately 2 minutes. By improving travel time for trucks, the connection will improve freight mobility and access to the National Highway System.

• South Willow Street-Queen City Avenue Intersection Reconfiguration: StreetLight data shows that trucks traveling through this intersection during peak periods experience double the travel time than during non-peak times. By reducing the control delay, the roundabout condition will reduce truck delays and enhance mobility.

• Multimodal Transportation Corridor: For freight traveling from South Willow box store area to Downtown during the peak hour it takes 4 times longer than during non-peak. By providing the alternative route via this corridor freight mobility would significantly improve.

• Pedestrian Connection Improvements: The construction of the new pedestrian bridge will permit the removal of pedestrian phase in the Granite Street intersection, reducing wait times for freight vehicles entering the City.

Primary Criteria D: Environmental Sustainability:
The project will reduce energy use and air or water pollution through congestion mitigation strategies. The most environmentally sound and economically sustainable community is compact, connected, and complete. Manchester was planned and built as a factory town with manufacturing, commercial and residential uses in close proximity to each other. However, modern transportation systems and large block planning have eroded that walkable fabric and system. As Manchester reconnects its urban fabric, greater development intensity can be achieved to create a community with land use patterns that reduces energy consumption, generates fewer vehicle miles traveled, and cuts greenhouse gases.

The USDOT/FHWA Emissions Calculator Toolkit was used to determine the expected reduction in congestion-related delay and emissions for specific project components, quantifying reductions in energy use and air and water pollution;

• South Commercial Street Extension: With the reduction of traffic volumes at the signalized intersection within the corridor, there will be a reduction in emissions due to the signal synchronization on Granite Street between Elm Street and South Main Street. Optimization
of signal operations will result in a reduction of 7.787 kg/day of Carbon Monoxide, 1.296 kg/day nitrogen oxide, and 0.462 kg/day volatile organic compounds.

- South Willow Street-Queen City Avenue Intersection Reconfiguration: This improvement will remove the idling of vehicles/control delay with the removal of the signal, which will result in a reduction of emissions. Installation of a single-lane roundabout at this intersection will result in a total roundabout delay reduction of 116.2 hours a day and a reduction of 0.851 kg/day of Carbon Monoxide, .236 kg/day nitrogen oxide, and 0.084 kg/day volatile organic compounds.

- Multimodal Transportation Corridor and Pedestrian Connection Improvements: The project area is compact and should be readily walkable, but requires improved connections to the existing street grid, and alternative route enhancements to optimize the functionality of the existing infrastructure. These improvements reducing reliance on single-occupant auto use, subsequently reducing energy consumption and improving air quality. By creating a multi-use path providing a direct route to the South Millyard from the Queen City Avenue/Cilley Road area, the mode shift of travel from passenger vehicles to biking and walking will increase by 1% (from the National Average). Additionally, the Alliance for Biking and Walking estimates that there are $11.80 of benefits for every $1 invested in biking and walking, emphasizing the importance of alternate modes.

- Pedestrian Connection Improvements: Improvements to the area’s pedestrian systems (especially the Granite Street area) and resulting efficiency at the vehicular intersections will mitigate adverse environmental impacts to air quality through congestion mitigation. Currently, the majority of traffic is funneled to a single point of ingress and egress, resulting in significant congestion and increases in idling time and congestion-related emissions. Connecting the project area with the surrounding street grid through two new vehicular and pedestrian/bicycle routes will provide residents and workers with increased options and improved transportation system connectivity.

The project will provide environmental benefits in brownfield redevelopment by increasing access and connectivity to the documented and potential brownfield sites in the project area. There are 57 identified environmental remediation sites in the project area (NH Department of Environmental Services). Increasing the development potential in the area through improved transportation systems increases the value of the properties, as well as the pace of redevelopment and remediation.

The project will improve water quality and other environmental benefits through innovative stormwater runoff reduction and mitigation. Several of the project components will have integrated green systems in their design and construction. In the Multimodal Transportation Corridor, stormwater management will be an integral part of the corridor design because of its low-lying location. Site developments abutting this corridor have used the abandoned railbed as a drainage swale creating a wetland area, and the project allows for area-wide stormwater management. Wetland survey for this corridor has been completed, and the project design envisions bio-filtering swales and rain gardens to accommodate and treat the stormwater expected from precipitation events in the future.

**Primary Criteria E: Quality of Life**
The BUILD Manchester: Connecting the Future project increases quality of life by increasing transportation choices for individuals to provide more freedom on transportation decisions. During grant and project area discussions during the City of Manchester’s 2019 Community Charrette, one
of the most commonly heard sentiments about the project area was that “it seems designed only for cars.” Subsequent planning for the Comprehensive Master Plan and TOD District have set a vision for a truly multimodal city with a focus on the project area as the center for rail, shuttles, complete streets, linked bicycle trails and lanes, and sidewalks.

Each of the BUILD project components is specifically designed to increase transportation choices while creating safer and more human-scaled environments. The reimagined project area is highlighted by urban streets, transportation alternatives and accessibility, including complete streets with bicycle lanes, sidewalks, and safe pedestrian crossings, especially for local populations where the personal vehicle is not their primary mode of transportation.

Beyond any single project component, the project supports larger efforts to increase transportation choices in Manchester. There are ongoing efforts to connect Massachusetts Bay Transit Authority (MBTA) rail service that currently terminates in Lowell northward through Nashua to Manchester and then, potentially to Concord as part of the Capital Corridor initiative. The Manchester TOD Project has identified the BUILD project area as the best potential location for a multimodal regional transportation hub.

Overall development within the South Millyard, Elm Street, and South Willow Street corridors will be within a quarter-mile walk of the new transportation hub; an extremely important transit-oriented redevelopment opportunity for the City. This new hub will provide new residential and commercial space in close proximity to a station that can have regional bus and rail services. By increasing connectivity to this area, the project improves access for all potential users.

The development of rail connections and the density of existing and future redeveloped space in Manchester makes it possible to allow those unable to own a vehicle to have many commuting and travel options. In many cities, not owning a car and still having complete mobility is a source of pride. A push to a more transit-oriented community and a balanced mix of uses will make Manchester more accessible and economically competitive.

Transportation costs play a key role in housing affordability. Improved access to transit is vital for Manchester’s population at all income levels. The Manchester housing market currently has a miniscule apartment vacancy rate of 0.5%, compared with a national rate of 7% (2019 New Hampshire Residential Rental Cost Survey, NH Housing), indicating a large unmet demand for quality housing, particularly near the Millyard and Downtown core where employment opportunities are located. By connecting more sites to transportation options they become more likely for redevelopment; thus allowing for the potential increase of housing supply in the area.

The project area has the capacity to create over 5,100 residential units, based on the City’s planning and development vision and development trends. Because of the diversity of lot sizes and street types in the area, the residential program has the potential for a mix of unit sizes and types, and can integrate some affordable and/or workforce housing. Given the location of the project area to the future Transportation Hub and regionally connected bicycle facilities, the housing units will have easy access to multiple modes of transit, and allow vehicle ownership to be optional rather than mandatory. Without the expense of purchasing and maintaining a car, the new residents will have increased options on the size and type of housing they choose.
The project will increase transportation choices (and result in measurable Change in Mode) for individuals which provides the opportunity access the areas where jobs are rapidly growing and where housing will be developed. It will also improve access to Manchester’s healthcare facilities. Specific project components that increase transportation choice and access:

- **South Commercial Street Extension**: The extension of South Commercial Street creates a second connection route between Granite Street and Elm Street while providing direct access that to both for users of the South Millyard.

- **South Willow Street-Queen City Avenue Intersection Reconfiguration**: The Queen City Avenue/South Willow Street intersection with a roundabout system and redeveloped lots will increase the safety and efficiency of travel through the area while also creating a gateway for a sense of arrival to Downtown Manchester. With no current pedestrian or bicycle accommodations at the signalized intersection, the replacement of a traffic signal with a roundabout suits the specific configuration of the road system, and is an opportunity to create a focus for pedestrian-scaled development.

- **Multimodal Transportation Corridor**: The new multimodal corridor and shared-use path between the City’s two largest business/employment centers (downtown and the South Willow Street Corridor) also establish Manchester as a place for all modes of transportation, and sets the conditions for development commensurate with the importance of Elm Street as one of the City’s Main entry points.

- **Pedestrian Connection Improvements**: The construction of the Granite Street pedestrian bridge increases access by creating a safe connection between Downtown, the Millyard and the project area.

The project will increase access and connectivity to fiber or other broadband infrastructure systems by developing dense land uses around the existing fiber optic systems. Manchester and the project area are well-served by existing networks.

**Secondary Criteria A: Innovation**

**Innovative Technology**

The project deploys innovative technology that supports surface transportation to significantly enhance the operational performance of the transportation system. To provide connectivity of these corridors through the Project Area and improve traffic flow with innovation, this project will add adaptive signals and additional detection at five signalized intersections on Elm Street to be able to address variability of traffic flow due to the new access to commercial, retail, residential, and entertainment areas. By having the ability to make real-time adjustments to traffic patterns, it will enhance the operational performance of the transportation system.

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**Figure 13: Adaptive Signals within BUILD Grant**

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South Commercial Street Extension: The addition of the adaptive signals along Elm Street as part of this project, will provide a connection between the systems on Granite Street and South Willow. The adaptive signal systems will compatible with connected vehicle infrastructure, making this system ready for future changes in transportation. The proposed system will have conflict detection with communication to DPW for any detection faults, conflicts, or signal on flash for faster response time to signal issues. There is existing aerial fiber on Elm Street in the project area, so it is anticipated that wireless communication could be implemented for connectivity between the Elm Street adaptive signals and it can tie into the existing fiber network to provide communication back to DPW. Traffic signal controllers on the corridor are primarily Econolite ASC-2 and ASC-3. These will be updated to modern controllers compatible with connected vehicle infrastructure.

The City is aware of United States Department of Transportation (USDOT) requirements described in 23 CFR 940.11 which mandate that a systems engineering analysis be performed for all ITS projects (including traffic signal systems) deployed using Federal/CMAQ funds and that the level of effort be commensurate with the scale of the project. Ongoing systems engineering analysis documentation will be expandable to the study area.

On September 27, 2019, FHWA issued a final rule in the Federal Register rescinding the longstanding regulatory provisions for patented or proprietary products in 23 CFR 635.411(a)-(e). This rule provides greater flexibility and encourages innovation in the selection of proprietary or patented materials. It eliminates the requirements limiting the use of Federal funds in paying for patented or proprietary materials, specifications, or processes. As a result, it is expected that the technology chosen though the ongoing systems engineering study will be able to be used at BUILD Grant intersections without a significant federal review process.

The project deploys railroad smart crossing technology that increases the efficiency and protection coverage by using cameras equipped with virtual fence and alert zone that triggers an alarm for motion across the line or unattended object. This mitigation, and documentation of safety risks at the new South Commercial Street rail crossing and the existing Granite Street rail crossing.

**Innovative Financing**

The project incorporates innovations in transportation funding and finance. The City of Manchester is exploring the creation of a Tax Increment Financing (TIF) District to fund infrastructure improvements in the project area, which has recently been successful in the nearby Towns of Bedford, Hooksett, and Londonderry. This would be used for debt service on bonding, used for up-front capital expenditures for initial construction, and funding the life cycle costs of maintaining the proposed improvements.

**Secondary Criteria B: Partnership**

The project demonstrates strong collaboration among a broad range of stakeholders in the formulation, development and funding of the **BUILD Manchester: Connecting the Future** project. In particular, the project is being developed through the close coordination of a diverse group of municipal, regional and State transportation and planning agencies and pursuing interlocking objectives.

- City of Manchester – The City of Manchester will be the grant recipient and be responsible for administering the project. The City’s Department of Public Works will be the lead agency for implementation, and will oversee the planning, design and construction of all project
components. The City currently has designated and trained professional staff responsible for federal grant administration and reporting procedures.

- Southern New Hampshire Planning Commission (SNHPC) – As the Metropolitan Planning Organization for Manchester, the SNHPC has collaborated closely with the City of Manchester in regional planning initiatives, urban planning such as Transit-Oriented Development and transportation planning. SNHPC has been a partner in the formulation of the ideas embodied in The **BUILD Manchester: Connecting the Future** project and a collaborator in the creation of this application.

- NHDOT Bureau of Turnpikes – The Bureau of Turnpikes should coordinate closely with the City on improvements related to Granite Street and the Exit 5 area.

The City has received unequivocal support for the project from political, economic and social leaders, as well as State and regional agencies. More than 40 key leaders across the Granite State view this project as a positive for the local community and State of New Hampshire. This distinguished group includes US Senators and members of Congress, State Senators and Representatives, State transportation agency leaders, transportation and business advocacy groups, rail advocates, local civic organizations, and advocacy groups (See Appendix for Letters of Support).

**Planning and Public Outreach**

Because ongoing planning and transportation initiatives have been taking place over 2019 and 2020, there has been extensive public participation by a diverse group of stakeholders, business owners and residents. The 2019 BUILD community charrette brought together more than eighty key stakeholders, business leaders and abutters, as well as the general public to discuss key issues, constraints and ideas for the project area. The City of Manchester Comprehensive Master Plan has involved hundreds of residents and has focused on all of the components of the BUILD Grant Application as part of the Vision for Manchester’s future. Finally, the SNHPC Transit Oriented Development project has identified the BUILD Grant project area as the Preferred Alternative for a new transportation hub, Shuttle to service the South Millyard, Millyard and Downtown and high density redevelopment throughout this area of the City. All of these efforts are in synch with the Vision and Project Components of the 2020 BUILD Grant application.

**Demonstrated Project Readiness**

**Environmental Permits and Reviews**

The project’s Environmental Risk assessment shows that the required environmental approvals have a high likelihood of approval in time for project obligation. It is anticipated that all of the project components will meet the criteria for Programmatic Categorical Exclusions. Environmental and historic impacts have been researched for the project area, and the findings are included in the Appendix, which includes the Statement of Significance, and location maps. Additionally, those documents can be accessed by clicking here or here. During preliminary design, all appropriate resource agencies will be contacted and coordination efforts will be completed to meet Federal and State requirements.

- South Willow Street-Queen City Avenue Intersection Reconfiguration: It is anticipated that these improvements will stay within the existing ROW and as much as possible within the existing pavement area with possible adjustments to drainage and stormwater treatment. For stormwater permitting, the Multimodal Transportation Corridor and the Queen City Avenue Intersection would be permitted together.
- Multimodal Transportation Corridor: The railroad corridor is considered historic, and there is an historic switch station that will be maintained. The City intends to purchase and adaptively reuse the switch station as a coffee shop or small specialty food establishment. Right-of-Way (ROW) strip acquisitions and construction easements are anticipated, although no full parcel takes or residential/non-residential displacements are expected.

A community charrette was held prior to the development of this grant application to gather input from the public, abutters and stakeholders on their thoughts of the issues in the South Millyard area, and their vision and ideas to address them. This was the first public engagement for these project components. Moving forward, the contact information from charrette participants provides a starting point for the City to re-engage and inform the abutters and stakeholders of all additional public meetings, along with the standard public notification process outlined in the New Hampshire Department of Transportation LPA Manual.

**Technical Capacity**

As the transportation hub of New Hampshire, the City of Manchester is uniquely qualified to support the regulatory and technical aspects of the project. Experienced staff participates in transportation planning efforts in order to maintain and expand a regional network of air, rail, transit, and roadway infrastructure. Important partnerships with the FAA, FTA and the FHWA as well as the NHDOT and SNHPC have been critical to project successes. When combined with a wide variety of locally managed HSIP, TE, CMAQ, SRTS, and TAP-funded projects for road, bridge, and trail, a body of experiences and knowledge is brought to bear. Technical design, regulatory and environmental compliance, right-of-way acquisition, and hazardous material mitigation as well as project and financial management are regular components the Manchester DPW Engineering Division manages in every project. There is also a wealth of nationally-recognized engineering firms with local offices offering expertise in all disciplines of engineering and construction that continue to support the City.

The design of the South Commercial Street Extension will continue to be developed by the City of Manchester. This will be the first component to be constructed, followed by the Granite Street Pedestrian Bridge, the Multimodal Transportation Corridor, and the South Willow Street-Queen City Avenue Intersection Reconfiguration. This roadway will be designed to meet roadway standards for both the City of Manchester and New Hampshire DOT, with design speed criteria meeting 30 miles per hour. The City has coordinated with Pan Am Railways on an agreement where the City will pay Pan Am to design and construct the railroad gate crossing with their engineers and construction contractors. As part of the construction, Pan Am will remove the existing Depot Street rail crossing, which is approximately 400 feet north of the proposed South Commercial Street Extension crossing. The South Commercial Street Extension crossing will have railroad pre-emption design for 30 miles per hour, good sightlines, and railroad gate system with lights for both the roadway and the sidewalk, increasing the safety of the crossing.

The location of the Granite Street Pedestrian Bridge is based on the existing grade, which will provide the shortest ramp length while meeting ADA requirements. The pedestrian bridge’s structural design requirements and vertical clearance will be provided in the construction bid special provisions, and the bridge fabricator will provide shop drawings for review by the consultant’s structural engineer. Geotechnical data will be collected and provided in the bid documents. Adjustments to the Granite Street signal phasing and timing will be included. The City of
Manchester is currently in the design phase for a contract to install adaptive signal equipment along the coordinated Granite Street signal network, which will further enhance operations of this congested intersection.

The Multimodal Transportation Corridor section of roadway will be designed for 30 miles an hour and will meet the roadway standards for the City of Manchester and New Hampshire DOT. Drainage design will be a key element, and will need to meet the New Hampshire Department of Environmental Services (NHDES) Alteration of Terrain Permitting requirements for stormwater and erosion control for construction. Currently, private development parking areas that abut the rail corridor send their stormwater runoff directly into the depressed railbed. All this runoff will need to be captured, either in formal swales or a closed drainage system, to convey water to identified treatment areas. Since the area has had substantial water sent to it over time, some areas have begun to grow wetland type plants. These areas will need to be flagged for wetlands and appropriate mitigation measures will be determined as needed.

Financial Capacity
A total of $24.4 million is required to complete the infrastructure improvements for the BUILD Manchester: Connecting the Future project. The requested BUILD FY20 Grant funding of $19.52 million is matched by a $4.88 Million (20.0%) non-Federal local contribution as shown in the Project Budget. The project also demonstrates a substantial positive benefit/cost ratio, as shown in the Benefit-Cost Analysis. The SNHPC has also committed to including this project in its Transportation Improvement Project (TIP) when it receives funding through the BUILD grant program.

Assessment of Project Risks and Mitigation Strategies:
For projects like this, typical risks include potential schedule delays due to permitting approval, Right-of-Way procurement, cost escalation and public support. The City will address potential delays due to permitting by establishing early coordination efforts with all permitting agencies, and leveraging good working relationships established, and based on prior experience with previous projects. Similar to permitting, Right-of-Way procurement efforts will early in project development, including meeting with affected property owners. Many abutters and stakeholders participated in the charrette held prior to the writing of the Grant, and many have included letters of support. The project budget includes inflation costs based on recent federally-funded projects within the area (NHDOT I-93 Northern Section 14633H and NHDOT Bedford 13953).

The project components for this grant that carry the largest risk, as with most projects, will be during construction, especially since some of the areas to be disturbed are older industrial sites with unknown subsurface conditions. Sufficient investigative explorations will occur during the design process to determine the nature and extent of such materials and the proper treatment and disposal of them during construction. Construction activities will have the proper oversight as outlined in the NHDOT LPA Manual, will follow all OSHA guidelines, and will meet all Manual on Uniform Traffic Control Devices (MUTCD) work zone requirements.

The Contract Bid Book will contain all current documents required for Federal Project, such as Buy America and Davis-Bacon Wage Rates. The City has completed numerous State and Federal-aid projects over the years and are very familiar with the various contracting requirements that need to be satisfied during the design, bidding and construction phases of the project.