

APPLICATION OVERVIEW

What: The Call for Projects for the FY 2024-2027 Regional Transportation Operations and Technology Set-Aside

Funding Available: at least \$16,000,000

Call Dates: June 1, 2023 until July 7, 2023, 5 pm

Application Submittals: submit the items below to Jerry Luor (jluor@drcog.org)

1. REQUIRED: a **single PDF document** containing 1) this application (**before saving to PDF, press Ctrl-A to select all, and F9 to update all formulas**), 2) one location map/graphic, 3) cost estimate (your own or the CDOT [cost estimate form](#)), 4) CDOT/RTD concurrence response (if applicable), 5) completed CDOT SEA-Local Agency Template, 6) project support form(s), and 7) any required documentation based on the application text (i.e., FHWA emissions calculators). Please DO NOT attach additional cover pages, embed graphics in the application, or otherwise change the format of the application form.
2. OPTIONAL: Submit **one additional** PDF document containing any supplemental materials, if applicable.
3. REQUIRED: Submit a single zipped GIS shapefile of your project. At a minimum, the shapefile should consist of project limits and planned equipment locations.

Other Notable items:

- **Eligibility:** Projects must align with the eligibility guidelines in the [Policies for FY2024-2027 TIP Set-Aside Programs](#). Proposed work on roadways must primarily be located on the [DRCOG Regional Roadway System](#) to be eligible for funding (the DRCOG RRS can also be viewed within the [DRCOG Data Tool](#)).
- **Call-for-Projects Pre-Application Webinar:** To be eligible to submit an application, at least one person from your agency must have attended the Regional Transportation Operations and Technology Set-Aside Pre-Application Webinar on April 26, 2023.
- **Application Data:** To assist sponsors in filling out the application, DRCOG has developed the [DRCOG Data Tool](#). A link to the instructions is also included. Additionally, sponsors may download datasets to run their own analyses from this same site.
- **Project Affirmation:** The application must be affirmed by either the applicant's City or County Manager, Chief Elected Official (Mayor or County Commission Chair) for local governments, or agency director or equivalent for other applicants.
- **Evaluation Process:** DRCOG staff will post all applications. DRCOG staff will assemble an evaluation panel to review and make recommendations for funding, including a ranked waiting list. The recommended list of projects will be presented to the Regional Transportation Operations Working Group and Advanced Mobility Partnership Working Group prior to action by the DRCOG committees and Board.
- If you have any questions or need assistance, contact gmackinnon@drcog.org or jluor@drcog.org.

APPLICATION FORMAT

The Regional Transportation Operations and Technology set-aside application contains two parts: *project information* and *evaluation questions*.

Project Information

Applicants enter **foundational** information for the *project/program/study* (hereafter referred to as *project*), including a problem statement, project description, and concurrence documentation from CDOT and/or RTD, if applicable. This section is not scored.

Evaluation Questions

This part includes four sections (A-E) for the **applicant to provide qualitative and quantitative responses** to use for scoring projects. The checkboxes and data entry fields should guide the applicant's responses. They are not directly scored but provide context as reviewers consider the full response to each question. Applicants may access the [DRCOG Data Tool](#) as well as other relevant data resources.

Scoring Methodology: Each section will be scored on a scale of 0 to 5, relative to other applications received. All questions will be factored into the final score, with any questions left blank receiving 0 points. The four sections are weighted and scored as follows:

Section A. Deployment of RTO&T Initiatives in RTO&T Strategic Plan 30%

Projects will be evaluated on the degree to which they address a significant subregional problem or benefit people throughout the subregion. Relevant quantitative data should be included within narrative responses.

5	The project implements or advances several Primary initiatives.
4	The project implements or advances one Primary initiative
3	The project implements or advances several Secondary initiatives.
2	The project implements or advances one Secondary initiative.
1	The project implements or advances one or more Tertiary initiatives.
0	The project implements no initiatives.

Section B. Regional Impact of Proposed Project 25%

Projects will be evaluated on the degree to which they address a significant subregional problem or benefit people throughout the subregion. Relevant quantitative data should be included within narrative responses.

5	The project benefits will substantially address a major subregional problem and benefit people and businesses in multiple communities.
4	The project benefits will significantly address a major subregional problem primarily benefiting people and businesses in one community.
3	The project benefits will either moderately address a major subregional problem or significantly address a moderate -level subregional problem.
2	The project benefits will moderately address a moderate -level subregional problem.
1	The project benefits will address a minor subregional problem.
0	The project does not address a subregional problem.

Section C. Metro Vision Regional Transportation Plan Priorities 25%

The TIP set-aside's investments should implement the 2050 Metro Vision Regional Transportation Plan (2050 MVRTP) regional project and program investment priorities, which contribute to addressing the Board-adopted Metro Vision objectives and the federal performance-based planning framework required by the Federal Highway Administration and Federal Transit Administration as outlined in current federal transportation legislation and regulations. Therefore, projects will be evaluated on the degree to which they address the six priorities identified in the 2050 MVRTP: safety, active transportation, air quality, multimodal mobility, freight, and regional transit. It is anticipated that projects may not be able to address all six priorities, but it's in the

applicant’s interest to address as many priority areas as possible. Relevant quantitative data is required to be included within narrative responses. The table below demonstrates how each priority area will be scored.

5	The project provides demonstrable substantial benefits in the 2050 MVRTP priority area and is determined to be in the top fifth of applications based on the magnitude of benefits in that priority area.
4	The project provides demonstrable significant benefits in the 2050 MVRTP priority area.
3	The project provides demonstrable moderate benefits in the 2050 MVRTP priority area and is determined to be in the middle fifth of applications based on the magnitude of benefits in that priority area.
2	The project provides demonstrable modest benefits in the 2050 MVRTP priority area.
1	The project provides demonstrable slight benefits in the 2050 MVRTP priority area and is determined to be in the bottom fifth of applications based on the magnitude of benefits in that priority area.
0	The project does not provide demonstrable benefits in the 2050 MVRTP priority area.

Section D. Financial Leveraging5%

Scores are assigned based on the percent of other non-federal funding sources.

Score	% non-Federal Funds
5	36% and above
4	31 - 35.9%
3	26 - 30.9%
2	21 - 25.9%
1	17.9 - 20.9%*
0	17.89%

*(includes 100% eligible projects with no match)

Section E. Project Readiness15%

Be sure to answer ALL questions. While “Yes” answers will generally reflect greater readiness, opportunities are given to provide additional details to assist reviewers in fully evaluating the readiness of your project.

5	Substantial readiness is demonstrated and all known obstacles that are likely to result in project delays have been mitigated.
4	Significant readiness is demonstrated and several known obstacles that are likely to result in project delays have been mitigated.
3	Moderate readiness is demonstrated and some known obstacles that are likely to result in project delays have been mitigated.
2	Slight readiness is demonstrated and some known obstacles that are likely to result in project delays have been mitigated.
1	Few mitigation or readiness activities have been demonstrated.
0	No mitigation or readiness activities have been demonstrated.

Project Information

1. Project Title	Broadway Signal Interconnect Project (Phase 2)		
2. Project Location <i>Provide a map, as appropriate (see Page 1)</i>	Start point: Click or tap here to enter text. End point: Click or tap here to enter text. OR Geographic Area: Broadway (from Arapahoe Rd to C-470); Mineral Ave (from Southpark Terrace to Pennsylvania St); County Line Rd (from Southpark Ln to Broadway)		
3. Project Sponsor <i>(entity that will be financially responsible for the project)</i>	City of Littleton		
4. Project Contact Person:			
Name: Aaron Heumann		Title: City of Littleton Traffic Engineering Manager	
Phone: 303-795-3867		Email: aheumann@littletongov.org	
5. Required Concurrence and Project Support: Does this project touch CDOT Right-of-Way, involve a CDOT roadway, connect to a CDOT system, access RTD property, or request RTD involvement to operate service? Does this project directly involve other local agency partners.		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>If yes, provide a completed Peer Agency Support Form for each partner.</i>	
6. What planning document(s) identifies this project? <i>Provide link to document(s) and referenced page number if possible, or provide documentation in the supplement</i>	If this project is listed in the DRCOG 2050 Metro Vision Regional Transportation Plan (2050 MVRTP) , provide the staging period: Not listed		
	Local/Regional plan:	Planning Document Title: City of Littleton Fiber Optic Communications Master Plan Page 91 (Segments 2A & 2B) (Fiber master plan is available upon request) City of Littleton Transportation Master Plan https://www.littletongov.org/home/showdocument?id=21031 Page 60-62 (Projects 14,16,18, & 39) Adopting agency (local agency Council, CDOT, RTD, etc.): City of Littleton Provide date of adoption by council/board/commission, if applicable: Transportation Master Plan was adopted by Littleton City Council in October of 2019, Fiber Master Plan was reviewed by Council in 2020 but not formally adopted.	
	Please describe public review/engagement to date:	There was an extensive public engagement process for the Transportation Master Plan that included touch points with thousands of residents https://www.littletonco.gov/files/sharedassets/public/building-amp-development/documents-building/development-review/envision-littleton/envisionlittletongenagemen.pdf . There was not direct public engagement for the Fiber Master Plan	
	Other pertinent details:	N/A	
7. Identify the project's key phases and the anticipated schedule of phase milestones. (phases and dates should correspond with the "Phase to be Initiated" in the Funding Breakdown table below)			

Phases to be included:	Major phase milestones:	Anticipated completion date (based on October 2023 DRCOG approval date): (MM/YYYY)
	<input type="checkbox"/> Preconstruction <input type="checkbox"/> Construction <input checked="" type="checkbox"/> Both	
REQUIRED FOR ALL PHASES	Intergovernmental Agreement (IGA) executed with CDOT/RTD (Assumed process is 4-9 months; any work performed before execution is NOT reimbursable)	09/2024
<input checked="" type="checkbox"/> Design	Design contract Notice to Proceed (NTP) issued (if using a consultant):	10/2024
	Design scoping meeting held with CDOT (if no consultant):	10/2024
	FIR (Field Inspection Review):	03/2025
	FOR (Final Office Review):	11/2025
<input checked="" type="checkbox"/> Environmental	Environmental contract Notice to Proceed (NTP) issued (if using a consultant):	10/2024
	Environmental scoping meeting held with CDOT (if no consultant):	10/2024
<input checked="" type="checkbox"/> Right-of-Way	Initial set of ROW plans submitted to CDOT:	08/2025
	Estimated number of parcels to acquire: 0	
	ROW acquisition completed:	03/2026
<input checked="" type="checkbox"/> Construction	Required clearances:	02/2026
	Project publicly advertised:	05/2026
<input type="checkbox"/> Study	Kick-off meeting held after consultant NTP (or internal if no consultant):	Enter Date
<input checked="" type="checkbox"/> Equipment Purchase (Procurement)	RFP/RFQ/RFB (bids) issued:	08/2026
<input type="checkbox"/> Other Phase not Listed Describe: Describe	First invoice submitted to CDOT/RTD:	Enter Date

8. **Problem Statement:** What specific subregional problem/issue will the transportation project address?

As with the addition of fiber and upgrade to the signal equipment along Broadway between Powers Avenue and Arapahoe Road accomplished in the Phase 1 project, there are five primary problems this Phase 2 of fiber installation and signal equipment upgrade project will address:

1. **Signal Communications** – Within the proposed project area along Broadway (Arapahoe Road to C-470), Mineral Avenue (Southpark Terrace to Pennsylvania Street), and County Line Road (Southpark Lane to Broadway), Littleton currently has radio communication with the 15 corresponding traffic signals. However, the existing communication system is sometimes unreliable and precludes ITS upgrades.
2. **Corridor Monitoring** – The signal communications (radio) lack the capability to incorporate ITS equipment, such as pan-tilt-zoom (PTZ) cameras and travel time detectors, which are crucial for real-time monitoring of traffic operations and incidents.
3. **Outdated Signal Equipment** - The equipment installed at intersections is outdated, preventing potential safety upgrades, such as Leading Pedestrian Intervals (LPI), and excluding this section of Broadway from being included in future Automated Traffic Signal Performance Measures (ATSPM) projects or potential local or regional Transportation Management Center (TMC) efforts.
4. **System Redundancy** – The installation of fiber is essential to establish a comprehensive loop of fiber communications throughout Littleton. This fiber network will provide redundancy, enabling Littleton to maintain communication with their traffic assets even during repairs in the event of unintentional fiber damage. In addition, by sharing fiber strands with other adjacent municipalities will provide potential redundancy for those agencies, as well.
5. **Regional Communication & Coordination** – Littleton's previous RTO&T project is placing fiber on Broadway from Powers Ave to Arapahoe Rd (Phase 1) and will be connecting several jurisdictions in the area; extending fiber on Broadway will allow for additional transportation communications between a number of jurisdictions.

9. Identify the project's **key elements**. A single project may have multiple project elements.

Roadway

- ☒ Operational Improvements
- ☐ General Purpose Capacity (2050 MVRTP)
- ☐ Managed Lanes (2050 MVRTP)
- ☐ Pavement Reconstruction/Rehab
- ☐ Bridge Replace/Reconstruct/Rehab

Grade Separation

- ☐ Roadway
- ☐ Railway
- ☐ Bicycle
- ☐ Pedestrian

Regional Transit¹

- ☐ Rapid Transit Capacity (2050 MVRTP)
- ☐ Mobility Hub(s)
- ☐ Transit Planning Corridors
- ☐ Transit Facilities (Expansion/New)

☒ **Safety Improvements**

Active Transportation Improvements

- ☐ Bicycle Facility
- ☐ Pedestrian Facility

☒ **Air Quality Improvements**

☐ **Improvements Impacting Freight**

Multimodal Mobility (i.e., accommodating a broad range of users)

- ☐ Complete Streets Improvements

☐ **Study**

☐ **Other**, briefly describe: Click or tap here to enter text.

¹For any project with transit elements, the sponsor must coordinate with RTD to ensure RTD agrees to the scope and cost. Be sure to include RTD's concurrence in your application submittal.

- 10.** Define the **scope** and **specific elements** of the project (including any elements checked in #9 above). *DO NOT include scope elements that will not be part of the DRCOG funded project or your IGA scope of work (i.e., adjacent locally funded improvements or the project merits and benefits). Please keep the response to this question tailored to details of the scope only and no more than five sentences.*

This project will install fiber optic communications along Broadway from Arapahoe Road to C-470, on Mineral Avenue from Southpark Terrace to Pennsylvania Street, and on County Line Road from Broadway to Southpark Lane (see project map for details). The project will establish fiber connections to each of the 15 traffic signals within the project area. The project includes the following signal equipment upgrades:

1. Upgrade to traffic controllers, MMUs, and switches at 15 intersections
2. Video Detection Systems at 15 intersections
3. Travel Time Monitor Equipment at the 10 intersections along Broadway
3. PTZ cameras for traffic observations at 3 strategic locations on Broadway at the Fremont Avenue, Mineral Avenue, and County Line Road intersections
4. New Traffic Signal Cabinets at 2 intersections to accommodate additional equipment and wiring

These upgrades will improve operations and allow for additional safety measures to be implemented along the Broadway corridor and surrounding areas, and will reduce stops and delay resulting in reduced emissions and improved air quality.

- 11.** What is the current status of the proposed scope as defined in Question 10 above? *Note that overall project readiness is addressed in more detail in Section E below.*

The segments along Broadway, Mineral Avenue, and County Line Road were studied and identified in the City's Fiber Optic Master Plan, with the Broadway connection prioritized to create a ring around the city. A planning level cost estimate has been developed for this grant application. No work has been started on design or construction.

- 12.** Would a smaller DRCOG-allocation than requested be acceptable, while maintaining the original intent of the project?

☒ Yes ☐ No

*If yes, smaller meaningful limits, size, service level, phases, or scopes, along with the cost, **MUST** be defined.*

Smaller DRCOG funding request: \$2,525,000

Outline the differences between the scope outlined above and the reduced scope: The smaller allocation would allow for the installation of fiber, traffic signal equipment upgrades, and traffic monitoring equipment on Broadway, but would not include adding fiber, traffic signal equipment, and traffic monitoring equipment on Mineral Avenue or County Line Road.

Project Financial Information and Funding Request (All funding amounts in \$1,000s)		
<i>To update the formulas below, enter your information, highlight the formulas, and press F9 or right-click and select Update Field.</i>		
Total amount of Federal Funding Request (in \$1,000's) (Not to exceed 82.79% of the total project cost)	\$2,963	82.08% of total project cost
Match Funds (in \$1,000's) List each funding source and contribution amount.	Contribution Amount	% Contribution to Overall Project Total
City of Littleton	\$647	17.9%
Click or tap here to enter text.	\$Match Amount	0.0%
Click or tap here to enter text.	\$Match Amount	0.0%
Click or tap here to enter text.	\$Match Amount	0.0%

Click or tap here to enter text.	\$Match Amount	0.0%
Click or tap here to enter text.	\$Match Amount	0.0%
Total Match <i>(private, local, state, regional, or federal)</i>	\$ 647	17.9%
Project Total	\$3,610	

Funding Breakdown (in \$1,000s) (by program year)¹ (Total funding should match the Project Total from above)

To update the formulas below, enter your information, highlight the formulas (or Ctrl-A), and press F9. OR close and reopen the file.

	FY 2024	FY 2025	FY 2026	FY 2027	Total
DRCOG Requested Funds	\$Enter Amount	\$328	\$829	\$1,806	\$2,963
CDOT or RTD Supplied Funds ²	\$Enter Amount	\$Enter Amount	\$Enter Amount	\$Enter Amount	\$ 0
Local Funds (Funding from sources other than DRCOG, CDOT, or RTD)	\$Enter Amount	\$72	\$181	\$394	\$ 647
Total Funding	\$ 0	\$400	\$1,010	\$2,200	\$3,610
Phase to be Initiated	Select Phase	Design	Construction	Construction	
Notes:	<ol style="list-style-type: none">1. Fiscal years are October 1 through September 30 (e.g., FY 2024 is October 1, 2023 through September 30, 2024). The proposed funding plan is not guaranteed if the project is selected for funding. While DRCOG attempts to accommodate applicants' requests, final funding will be assigned at DRCOG's discretion. Funding amounts must be provided in year of expenditure dollars using a recommended 3% inflation factor.2. Only enter funding in this line if CDOT and/or RTD specifically give permission via concurrence letters or other written source.				
Affirmation:	By checking this box, the applicant's Chief Elected Official (Mayor or County Commission Chair/City or County Manager/Agency Director) has certified it allows this application to be submitted for potential DRCOG-allocated funding and will follow all local, DRCOG, state, and federal policies and regulations if funding is awarded. <input checked="" type="checkbox"/>				

Evaluation Questions

A. Deployment of RTO&T Initiatives in RTO&T Strategic Plan

WEIGHT

30%

Select the initiatives to be deployed or advanced by this proposed project. It is possible to select more than one initiative.

Primary initiatives

- Develop a Regional Situational Awareness platform. ☐
- Develop processes to share traffic camera view and control between jurisdictions and public safety. ☒
- Develop a Regional Performance Monitoring Data Archive platform. ☐
- Develop strategies and processes to coordinate performance-based management. ☐
- Deploy additional supporting transportation surveillance and control systems and infrastructure. ☒
- Develop Traffic Incident Management standard operating procedures. ☐
- Standardize and implement transit signal priority performance management and system optimization procedures. ☐

Secondary initiatives

- Develop evacuation and recovery plans and exercises. ☐
- Develop processes to coordinate traveler information messaging across the region. ☐
- Develop active work zone monitoring and management in the field. ☐
- Deploy additional safety-focused technology applications ☒
- Expand the Regional Performance Monitoring Data Archive platform. ☐
- Expand the Regional Situational Awareness platform. ☒
- Expand transit signal priority deployment. ☐

Tertiary initiatives

- Develop a Regional Multimodal Traveler Information platform. ☒
- Develop a process to monitor regional parking availability, capacity and pricing. ☐
- Develop a multimodal trip planner and reservation/ payment system. ☐
- Develop and deploy dynamic ride-sharing. ☐
- Develop and implement curbside management standards. ☐
- nd ☐

Describe how this project will deploy, advance or achieve the selected initiatives.

The primary focus of the project will be to install fiber optic communications on Broadway to establish better communications between the 15 intersections in the project area and traffic operations staff. The addition of fiber throughout the proposed project area will enable the installation of PTZ cameras along the corridor, so that Traffic Staff and Emergency Dispatch will be able to remotely view the corridor and respond effectively to incidents. Additionally, the Littleton Broadway Communications Upgrade (Phase 1) will install fiber and equipment upgrades from Powers Avenue to Arapahoe Road, connecting Littleton, Centennial, and Arapahoe County by Fall 2023. These jurisdictions will also have the ability to access the PTZ cameras as part of the Phase 2 project (Arapahoe Road to C-470). Equipment upgrades at signalized intersections will allow for phasing upgrades, including leading pedestrian intervals (LPI), as well as the ability to integrate future enhancements, such as bike signals and transit signal priority. Currently the Broadway Corridor Study (I-25 to Highlands Parkway) is examining what future enhancements will be needed and fiber installed as part of this project will make those enhancements possible much sooner than expected. The City of Littleton has also initiated discussions with CDOT regarding connecting to CDOT fiber and sharing strands to improve information sharing

and communications regionally. Additionally, equipment upgrades will incorporate travel time monitoring equipment to provide traveler information and enhance situational awareness.

The Regional Transportation Operations and Technology Strategic Plan emphasizes a data management concept that requires interagency information sharing. Describe in detail how this project will share data with other regional entities.

This project will share additional information with the agencies that Littleton Broadway Communications Upgrade (Phase 1) connected -- Littleton, Centennial, and Arapahoe County -- with the ability to add CDOT and Douglas County with the extension to C-470 as a part of this project (Phase 2).

B. Regional Impact of Proposed Project

WEIGHT

25%

Provide **qualitative and quantitative** responses to the following questions on the subregional impact of the proposed project. Be sure to provide all required information for each question. Quantitative data from is available from the [DRCOG Data Tool](#).

1. Why is this project regionally important? *Relevant quantitative data in your response is required.*
The fiber and traffic signal equipment upgrades from this project will improve transportation operations on Broadway, which is a regional arterial that provides access to a number of jurisdictions, including Arapahoe County, Denver, Douglas County, Centennial, Englewood, and Littleton. This project will provide additional fiber to Arapahoe County and Centennial through IGA's with the City of Littleton. In addition, the City of Littleton has started conversations with Douglas County, to connect with their fiber further south on Broadway, and with CDOT, who have indicated they are willing to discuss connecting the fiber from this project to the fiber network they have along C-470.
2. How will the proposed project address the specific transportation problem described in the **Problem Statement** (as submitted in Project Information, #8)? *Relevant quantitative data in your response is required.*
 1. **Signal Communications** – The installation of fiber optics will provide reliable and efficient communication for the upgraded signal equipment along Broadway (from Arapahoe Road to C-470), and proposed fiber spurs along Mineral Avenue and County Line Road. The current communication for the signals within the project area is accomplished via wireless radio antennae, which often results in a loss of communication between the signals and the Littleton Central Traffic Control System due to line-of-sight impedances and unexpected adjustments caused by weather incidents.
 2. **Corridor Monitoring** – The installation of PTZ cameras at strategic locations within the project area will enable real-time remote monitoring of traffic conditions, incidents, and congestion levels along the entire length of the Broadway corridor within Littleton, as well as portions of the Mineral Avenue and County Line Road corridors. Additionally, the implementation of travel time monitors will provide valuable data on travel times, allowing for better informed decision-making for signal timing and phasing, resulting in overall improved operational performance.
 3. **Outdated Signal Equipment** – The equipment installed at the 15 signalized intersections within the project area is outdated, preventing the ability for safety upgrades, such as LPIs, and excludes this section of Broadway from being able to be included in future ATSPM and other regional coordination efforts. This project will upgrade traffic controllers, MMUs, and switches at 15 intersections, installing video detection systems at 15 intersections, and add new traffic signal cabinets and uninterrupted power supply units at 2 intersections to accommodate additional equipment and wiring. The upgraded equipment will provide more consistency throughout Littleton for improved maintenance and management of the signal system.
 4. **System Redundancy** – This project will not only enhance the communication network but aims to develop redundancy of the City's traffic communication network, ensuring communications even if a section of the fiber is cut. The addition of fiber optics along this segment of Broadway is a key step in creating a complete fiber loop around the city, allowing Littleton to maintain communication with their traffic assets while repairs are being completed in the event of unintentional fiber damage. This means that even if one section of the fiber is cut, communication can still be maintained through alternative routes within the fiber loop. This feature significantly improves the resilience and reliability of the communication system, ensuring uninterrupted communication between the traffic signals and the Littleton Central Traffic Control System.
 5. **Regional Communication & Coordination** – This project will provide access to a larger fiber optic traffic communication network for the jurisdictions connected in Phase 1 (Littleton, Arapahoe County, and Centennial) by extending fiber down Broadway, with the ability to expand to include Douglas County and CDOT.

3. Does the proposed project benefit multiple municipalities and/or subregions? If yes, which ones and how? Also describe any funding partnerships (*other subregions, regional agencies, municipalities, private, etc.*) established in association with this project.

As an extension to the Phase 1 project, Phase 2 will also include 432 fiber strands for the ability to share with Arapahoe County and the City of Centennial. In addition, extending the fiber optics along Broadway to the C-470 interchange will provide the opportunity to connect with both Douglas County's and CDOT's fiber systems. Fiber connections with other agencies will allow sharing of signal data and PTZ camera access for future regional TMC capabilities.

4. Disproportionately Impacted and Environmental Justice Communities

This data is available in the DRCOG Data Tool. Completing the below table and referencing *relevant* quantitative data in your response is *required*.

To update the formulas below, enter your information, highlight the formulas (or Ctrl-A), and press F9. OR close and reopen the file.

	DI & EJ Population Groups	Number within ½ mile	% of Total	Regional %
Use 2015-2019 American Community Survey Data (Use a 0.5 mile buffer distance) [Equity data tab]	a. Total population	42,087	-	-
	b. Total households	17,407	-	-
	c. Low-income households	4,427	25%	9%
	d. Individuals of color	6,521	15%	33%
	e. Adults age 60 and over	12,494	30%	13%
	f. Children age 5-17	8,440	20%	16%
	g. Individuals with limited English proficiency	828	2%	3%
	h. Individuals with a disability	4,704	11%	9%
	i. Households that are housing cost-burdened	4,120	24%	32%
	j. Households without a motor vehicle	659	4%	5%

For Lines c. – i. use definitions in the [DRCOG Title VI Implementation Plan](#). For Line j., as defined in C.R.S. 24-38.5-302(3)(b)(I): “‘cost-burdened’ means a household that spends more than thirty percent of its income on housing.”

Describe how this project will improve access and mobility for each of the applicable disproportionately impacted and environmental justice population groups identified in the table above, *including the required quantitative analysis*:

This project will benefit all population groups within and traveling through the City of Littleton by improving traffic operations, reducing congestion and delay, improving safety, and improving transit service.

5. How will this project move the subregion toward achieving the shared [regional transportation outcomes](#) established in [Metro Vision](#) in terms of...

- Land Use, community, urban development, housing, employment? (*Improve the diversity and livability of communities. Contain urban development in locations designated for urban growth and services. Increase housing and employment in urban centers. Diversify the region's housing stock. Improve the region's competitive position.*)
 - While the project does not directly address land use, community, urban development, housing, and employment, the addition of fiber and upgraded signal equipment can indirectly benefit these aspects of the region by improving transportation efficiency and reducing delays, which can have positive impacts on the overall livability and economic vitality of the community.
- Multimodal transportation, safety, reliability, air quality? (*Improve and expand the region's multimodal transportation system, services, and connections. Operate, manage, and maintain a safe and reliable transportation system. Improve air quality and reduce greenhouse gas emissions. Reduce the risk of hazards and their impact.*)
 - The Broadway Corridor Study, a current multijurisdictional effort, is likely to recommend several improvements along Broadway, including bike facilities, upgrades to pedestrian infrastructure, and enhancements to transit operations on the corridor. The installation of fiber and signal equipment as part of this project will enable the implementation of these

recommendations at a faster pace than originally anticipated. Some of the anticipated recommendations include the installation of transit queue jumps, transit signal priority, bike signals, and leading pedestrian intervals. Furthermore, the upgraded communications and equipment will facilitate more efficient intersection phasing and operations, potentially leading to a reduction in greenhouse gas emissions.

- Connection/accessibility to particular locations supporting healthy and active choices? *(Connect people to natural resource and recreational areas. Increase access to amenities that support healthy, active choices. Improve transportation connections to health care facilities and service providers. Improve access to opportunity.)*
 - By enhancing traffic operations and alleviating congestion within the corridor, the project indirectly contributes to the creation of a more accessible and efficient transportation system. This, in turn, facilitates easier access to destinations that promote healthy and active choices, including parks, recreational areas, healthcare facilities, and other amenities. Moreover, the installation of fiber and signal equipment as part of this project will enhance the planned multimodal improvements, making active transportation (walking and biking) safer and improving the efficiency of transit use for individuals accessing the aforementioned destinations by bus.

6. Items marked with an asterisk (*) below are available in the DRCOG Data Tool.

- Is there a DRCOG designated urban center within ½ mile of the project limits?*
- ☒ Yes ☐ No If yes, please provide the name: [Highlands Ranch Town Center](#)
- Does the project connect two or more urban centers?*
- ☐ Yes ☒ No If yes, please provide the names: [Click or tap here to enter text.](#)
- Is there a transit stop or station within ½ mile of the project limits?*
- Bus stop: ☒ Yes ☐ No If yes, how many: [66](#)
- Rail station: ☐ Yes ☒ No If yes, how many: [Click or tap here to enter text.](#)
- Is the project in a locally-defined priority growth and development area and/or an area with zoning that supports compact, mixed-use development patterns and a variety of housing options?
- ☒ Yes ☐ No

If yes, provide a link to the relevant planning document: <https://www.littletonco.gov/Building-Development/Land-Planning-Entitlement/Plans-and-Regulations/ULUC-and-Zoning-Portal>

If yes, provide how the area is defined in the relevant planning document: Corridor Mixed Use,

Provide households and employment data* [Population and Employment tab]	2020	2050
Jobs within ½ mile	27,852	31,685
Households within ½ mile	10,963	12,133

Describe how this project will improve transportation options in and between key geographic areas including DRCOG-defined urban centers, multimodal corridors, mixed-use areas, Transit Oriented Development (transit near high-density development), or locally defined priority growth areas, *including the required quantitative analysis:*

[Click or tap here to enter text.](#) By enhancing the traffic operations and communication infrastructure within the corridor, the project will improve the efficiency of operations at intersections in the area and enhance incident management and response capabilities through the utilization of technology. Additionally, the Broadway Corridor Study is expected to recommend the implementation of dedicated bike facilities and phasing (bicycle signals), upgraded pedestrian facilities and phasing (Leading Pedestrian Intervals), and enhancements to transit operations (Transit Signal Priority, Queue Jumps). The fiber and signal equipment obtained from this project will expedite the implementation of these recommendations and provide immediate safety improvements along the corridor. These factors will significantly enhance transportation within the corridor, facilitating access to various commercial nodes and urban centers.

7. Describe how this project will improve **access** and **connections** to key employment centers or subregional destinations. In your answer, define the key destination(s) and clearly explain how the project improves **access** and/or **connectivity**.

Click or tap here to enter text.

The improvements made through this project, including fiber communications and upgraded signal equipment, will result in more efficient traffic operations, improved incident management, and enhanced safety measures such as leading pedestrian intervals (LPI) and bike signals to accommodate the likely recommendations from the Broadway Corridor Study. Additionally, transit operations will be enhanced with features like transit signal priority (TSP) and queue jumps. These upgrades will significantly improve access and connections to key employment centers such as Highlands Town Center, Downtown Littleton, Downtown Englewood, and Downtown Denver, as well as various businesses and service providers along the corridor.

8. Congestion Mitigation Process Mobility Score

*Completing the below table and referencing relevant quantitative data in your response is required. In the **DRCOG Data Tool**, use a **0.02 mile buffer distance**.*

Provide congestion mobility parameters* [Congestion Mobility Score tab]	2021
Sum: length-weighted score	74.56
Sum: miles	36.67
Congestion Mobility Score	2.03

(The Congestion Mobility Score will automatically calculate based on values entered. If this has not updated, select the box and click F9)

C. Metro Vision Regional Transportation Plan Priorities

WEIGHT

25%

- ***Qualitative and quantitative*** responses are **REQUIRED** for the following items on how the proposed project contributes to the project and program investment priorities in the adopted 2050 Metro Vision Regional Transportation Plan. ***To be considered for full points, you must fully answer all parts of the question, including incorporating quantitative data into your answer.*** (see scoring section for details). Quantitative data from is available from the [DRCOG Data Tool](#).
- Checkboxes and data tables help to provide context and guide responses, but do not account for the full range of potential improvements and are not directly scored, but are required to be completed.
- Not all proposed projects will necessarily be able to answer all questions, however it is in the applicant's interest to address as many priority areas as possible.

Multimodal Mobility

Provide improved travel options for all modes.

(drawn from [2050 MVRTP priorities](#); [federal travel time reliability, infrastructure condition, & transit asset management performance measures](#); & [Metro Vision objective 4](#))

Examples of Project Elements: combinations of improvements that support options for a broad range of users, such as complete streets improvements, or an interchange project that incorporates transit and freight improvements, etc.

- What modes will project improvements directly address?
☒ Walking ☒ Bicycling ☒ Transit ☒ SOV ☒ Freight ☐ Other: Click or tap here to enter text.
- List the elements of this project which will address the above modes (i.e., sidewalk, shared use path, bus stop improvements, new general purpose or managed lanes, etc.): [Signal equipment will allow for more efficient intersection operations, leading pedestrian intervals \(possible with equipment upgrades\) will enhance safety for pedestrians, and the ability to implement bicycle signals and transit signal prioritization in the future will improve those modes of travel.](#)
- Will the completed project be a complete street as described in the [Regional Complete Streets Toolkit](#)? [Complete Streets Typology](#) is available in the [DRCOG Data Tool](#).
☐ Yes ☒ No If yes, describe how it implements the Toolkit's strategies in your response. [The Broadway Corridor Study will likely recommend complete street improvements, this project will make many of the complete street recommendations possible.](#)
- Does this project improve travel time reliability and reduce delay?
☒ Yes ☐ No
- Does this project improve asset management of roadway infrastructure, active transportation facilities, and/or transit facilities or vehicle fleets?
☒ Yes ☐ No
- Does this project implement resilient infrastructure that helps the subregion mitigate natural and/or human-made hazards?
☒ Yes ☐ No

Question: Describe how this project will help increase mobility choices for people, goods, and/or services. Please include quantitative information, including any items referenced above, in your response. *Note that the proposed roadway operational improvements must be primarily on the DRCOG [Regional Roadway System](#) and/or [Regional Managed Lanes System](#).*

Click or tap here to enter text.

[Fiber communications for Broadway along with equipment upgrades will allow for operational efficiencies and better corridor timing that will reduce congestion and increase comfort for bikes and pedestrians. The upgrades from this project will also provide some of the necessary infrastructure in order to begin to implement likely recommendations from the Broadway Corridor Study.](#)

Question: Describe how this project will help improve asset reliability and availability. Please include quantitative information in your response (for example, reduce mean time to repair and increase mean time between failures).

[Installing fiber on the corridor will replace the use of radio communications to signals on this stretch of Broadway. Radio communications are less reliable than fiber and can be impacted by tree growth, redevelopment, and inclement weather events. Additionally, the signal equipment along this stretch of Broadway is outdated and](#)

obsolete. As the signal equipment and components need to be repaired and replaced, finding the correct parts has become more difficult. Additionally, obsolete signal equipment is preventing safety upgrades such as LPI.

Question: Describe how this project will reduce delays and improve travel time reliability. Please include quantitative information in your response (for example, vehicle-hours traveled and travel time index).

The project aims to improve traffic operations throughout the corridor, resulting in reduced congestion and improved travel time reliability. By enhancing traffic flow and reducing delays, the project is expected to lead to shorter travel times and increased predictability for commuters and travelers.

Air Quality	Improve air quality and reduce greenhouse gas emissions. (drawn from 2050 MVRTP priorities ; state greenhouse gas rulemaking ; federal congestion & emissions reduction performance measures ; Metro Vision objectives 2, 3, & 6a) Examples of Project Elements: active transportation, transit, or TDM elements; vehicle operational improvements; electric vehicle supportive infrastructure; etc.					
	<ul style="list-style-type: none"> Does this project reduce congestion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Does this project reduce vehicle miles traveled (VMT)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Does this project reduce single-occupant vehicle (SOV) travel? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (though it will place infrastructure to help reduce SOV's in the future) 					
Emissions Reduced (kg/day)		CO	NOx	VOCs	PM 10	CO₂e
		17.177	1.748	.0357	1.395	3,173.466
Use the FHWA CMAQ Calculators or a similar reasonable methodology to determine emissions reduced. Base your calculations on the year of opening. Please attach a screenshot of your work (such as the FHWA calculator showing the inputs and outputs) as part of your submittal packet. Note: if not using the FHWA Calculators, please describe your methodology and sources in your narrative below.						
Question: Describe how this project helps reduce congestion and air pollutants, including but not limited to carbon monoxide, ground-level ozone precursors, particulate matter, and greenhouse gas emissions. Please include quantitative information, including any items referenced above, in your response.						
Click or tap here to enter text. The installation of fiber along Broadway will greatly improve communication with intersections along the corridor, enabling real-time monitoring of traffic conditions. With the ability to promptly respond to changing conditions, phasing and timing plans can be efficiently transmitted to intersections along Broadway. Furthermore, the upgraded signal equipment will enhance the overall operational efficiency of these intersections. These combined improvements will result in reduced delays and congestion, ultimately leading to a significant reduction in air pollutants.						

Regional Transit	<p>Expand and improve the subregion's transit network. (drawn from 2050 MVRTP priorities, Coordinated Transit Plan, RTD's Regional Bus Rapid Transit Feasibility Study) Examples of Project Elements: transit lanes, station improvements, etc. <i>Note:</i> For any project with transit elements, the sponsor must coordinate with RTD to ensure RTD agrees to the scope and cost. Be sure to include RTD's concurrence in your application submittal.</p>
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Items marked with an asterisk (*) below are available in the DRCOG Data Tool.

- Does this project implement a portion of the regional bus rapid transit (BRT) network (as defined in the [2050 MVRTP](#))?*
☐ Yes ☒ No If yes, which specific corridor will this project focus on: [This project will install signal equipment and communications to support BRT on Broadway/Lincoln Ave.](#)
- Does this project involve a regional transit planning corridor (as defined in the [2050 MVRTP](#))?*
☒ Yes ☐ No If yes, which specific corridor will this project focus on: [Broadway \(Regional Connector Street\)](#)
- Does this project implement a mobility hub (as defined in the [2050 MVRTP](#))?
☐ Yes ☒ No
- Does this project improve connections between transit and other modes?
☐ Yes ☒ No If yes, please describe in your response.
- Does this project improve transit travel time reliability?
☐ Yes ☒ No If yes, please describe in your response.
- Does this project add and/or improve transit access to or within a DRCOG-defined urban center?*
☐ Yes ☒ No

Question: Describe how this project improves connections to or expands the subregion's transit system, as outlined in the [2050 MVRTP](#). Also describe how this project improves transit travel time reliability. Please include quantitative information, including any items referenced above, in your response. *Note that rapid transit improvements must be on the [Regional Rapid Transit System](#).*

[By improving traffic operations, the project can reduce congestion and delays, resulting in faster and more reliable transit travel times. In addition, upgraded intersection equipment will allow for TSP and queue jumps for transit vehicles in the future—something that is likely to be recommended by the Broadway Corridor Study.](#)

Safety	Increase the safety for all users of the transportation system. (drawn from 2050 MVRTD priorities , Taking Action on Regional Vision Zero , CDOT Strategic Transportation Safety Plan , & federal safety performance measures) Examples of Project Elements: bike/pedestrian crossing improvements, vehicle crash countermeasures, traffic calming, etc.							
	Items marked with an asterisk (*) below are available in the DRCOG Data Tool .							
<ul style="list-style-type: none"> Does this project address a location on the DRCOG High-Injury Network or Critical Corridors or corridors defined in a local Vision Zero or equivalent safety plan?* <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Does this project implement a safety countermeasure listed in the countermeasure glossary? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Will this project result in a reduction of average roadway clearance time and incident clearance time and/or secondary incidents? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Will this project result in a reduction of first responder struck-bys? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 								
Provide the current number of crashes involving motor vehicles, bicyclists, and pedestrians* (using the 2016-2020 period – in the DRCOG Data Tool , use a 0.02 mile buffer distance) [Crash Severity 2016-2020 tab] NOTE: if constructing a new facility, report crashes along closest existing alternative route		Sponsor must use industry accepted crash modification factors (CMF) or crash reduction factor (CRF) practices (e.g., CMF Clearinghouse , NCHRP Report 617 , or DiExSys methodology).						
<table border="1"> <tr> <td>Fatal crashes</td> <td>2</td> </tr> <tr> <td>Serious Injury crashes</td> <td>21</td> </tr> <tr> <td>Other: Non-Serious Injury and Property Damage Only crashes</td> <td>1,643</td> </tr> </table>			Fatal crashes	2	Serious Injury crashes	21	Other: Non-Serious Injury and Property Damage Only crashes	1,643
Fatal crashes	2							
Serious Injury crashes	21							
Other: Non-Serious Injury and Property Damage Only crashes	1,643							
Estimated reduction in crashes applicable to the project scope (per the five-year period used above)		Provide the methodology and sources below:						
<table border="1"> <tr> <td>Fatal crashes reduced</td> <td>0</td> </tr> <tr> <td>Serious Injury crashes reduced</td> <td>2</td> </tr> <tr> <td>Other: Non-Serious Injury and Property Damage Only crashes</td> <td>2</td> </tr> </table>		Fatal crashes reduced	0	Serious Injury crashes reduced	2	Other: Non-Serious Injury and Property Damage Only crashes	2	Application of CMF's to bike or ped and vehicle crash records
Fatal crashes reduced	0							
Serious Injury crashes reduced	2							
Other: Non-Serious Injury and Property Damage Only crashes	2							
<p>Question: Describe how this project will implement safety improvements (roadway, active transportation facility, etc.), particularly improvements in line with the recommendations in Taking Action on Regional Vision Zero. Please include quantitative information, including any items referenced above, in your response. <i>Note that any improvements on roadways must be primarily on the DRCOG Regional Roadway System.</i></p> <p>Safety improvements included in this project are protected only left turns phasing implementation, leading pedestrian intervals (LPIs), automatic travel time monitoring, and remote viewing for quicker incident response. These measures are designed to enhance safety for all users of the transportation system, including motorists, pedestrians, and bicyclists. Protected only left turns help reduce the risk of collisions at intersections, while leading pedestrian intervals give pedestrians a head start and better visibility when crossing the street. Automatic travel time monitoring allows for real-time data collection to assess traffic flow and make informed decisions, while remote viewing enables quicker incident response. These safety improvements aim to reduce traffic-related crashes and provide conditions in which more people will be comfortable walking, bicycling, and using transit.</p> <p>Question: Describe how this project will reduce average incident duration, secondary incidents and first responder struck-bys. Please include quantitative information in your response. A “responder struck-by” incident is a collision between a motor vehicle in transit and a responder working a roadway incident. The responder may be a nonmotorist, an occupant of a stopped response vehicle or an unoccupied response vehicle.</p> <p>The project includes safety improvements such as automatic travel time monitoring and remote viewing for quicker incident response, as addressed for the previous question. These measures are intended to enhance incident management and response, which could potentially contribute to reducing incident duration and the likelihood of secondary incidents. Additionally, by implementing safety measures such as protected only left turns and leading pedestrian intervals, the project aims to create a safer environment for all road users, including first responders. While the specific impact on incident duration, secondary incidents, and first responder struck-bys is not explicitly</p>								

addressed, these safety improvements are expected to contribute to overall safety and potentially mitigate these risks.

Freight	<p>Maintain efficient movement of goods within and beyond the subregion.</p> <p>(drawn from 2050 MVRTP priorities; Regional Multimodal Freight Plan; Colorado Freight Plan, federal freight reliability performance measure; Metro Vision objective 14)</p> <p>Examples of Project Elements: bridge improvements, improved turning radii, increased roadway capacity, etc.</p>
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Items marked with an asterisk (*) below are available in the DRCOG Data Tool.

- Is this project located in or impact access to a [Freight Focus Area](#)?*
☐ Yes ☒ No If yes, please provide the name: [Click or tap here to enter text.](#)
- If this project is located in a [Freight Focus Area](#) does it address the relevant Needs and Issues identified in the Plan (see text located within each Focus Area)?
☐ Yes ☒ No If yes, please describe in your response below.
- Is the project located on the [Tier 1 or Tier 2 Regional Highway Freight Vision Network](#)?*
☒ Yes ☐ No
- Check any items from the [Inventory of Current Needs](#) which this project will address:
☐ Truck Crash Location ☐ Rail Crossing Safety ([eligible locations](#))
☐ Truck Delay ☐ Truck Reliability ☐ Highway Bottleneck
☐ Low-Clearance or Weight-Restricted Bridge
Please provide the location(s) being addressed: [Click or tap here to enter text.](#)
- Does this project include any innovative or non-traditional freight supportive elements (i.e., curb management strategies, cargo bike supportive infrastructure, etc.)?
☐ Yes ☒ No If yes, please describe in your response below.

Question: Describe how this project will improve the efficient movement of goods. In your response, identify those improvements identified in the [Regional Multimodal Freight Plan](#), include quantitative information, and include any items referenced above. *Note that any improvements on roadways must be primarily on the DRCOG [Regional Roadway System](#).*

The Southpark Light Industrial area is located west of Broadway between County Line Road and Mineral Avenue. In addition, delivery trucks use Broadway as the roadway is a designated truck route through the City of Littleton. This project will improve traffic operations on Broadway, allowing for a more efficient movement of goods transported in trucks on the Broadway corridor. In addition, the completion of the fiber ring for the City of Littleton will result in improved traffic operations by eliminating the potential for an unintentional fiber damage incident knocking out communication to the City's Littleton Central Traffic Control System. This will provide more reliable operations through the city resulting in improved movement of goods.

Active Transportation	Expand and enhance active transportation travel options. (drawn from 2050 MVRTP priorities ; Denver Regional Active Transportation Plan ; & Metro Vision objectives 10 & 13) Examples of Project Elements: shared use paths, sidewalks, regional trails, grade separations, etc.	
Items marked with an asterisk (*) below are available in the DRCOG Data Tool.		
<ul style="list-style-type: none"> Does this project close a gap or extend a facility on a Regional Active Transportation Corridor or locally-defined priority corridor?* <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Does this project improve pedestrian accessibility and connectivity in a pedestrian focus area?* <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Does this project improve active transportation choices in a short trip opportunity zone?* <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Does this project include a high-comfort bikeway (like a sidepath, shared-use path, separated bike lane, bicycle boulevard)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please describe in your response. 		
Bicycle Use <i>NOTE: if constructing a new facility, report bike usage along closest existing alternative route</i> To update the formulas below, enter your information, highlight the formulas (or Ctrl-A), and press F9. OR close and reopen the file.		
1. Current Average Single Weekday Bicyclists:	44	
Bicycle Use Calculations	Year of Opening	2050 Weekday Estimate
2. Enter estimated additional average weekday one-way bicycle trips on the facility after project is completed.	44	66
3. Enter number of the bicycle trips (in #2 above) that will be diverting from a different bicycling route. (Example: {#2 X 50%} or other percent, if justified on line 10 below)	22	33
4. = Initial number of new bicycle trips from project (#2 – #3)	22	33
5. Enter number of the new trips produced (from #4 above) that are replacing a trip made by another non-SOV mode (bus, carpool, vanpool, walking, etc.). (Example: {#4 X 30%} or other percent, if justified on line 10 below)	7	10
6. = Number of SOV trips reduced per day (#4 - #5)	15.00	23.00
7. Enter the value of {#6 x 2 miles}. (= the VMT reduced per day) (Values other than 2 miles must be justified by sponsor on line 10 below)	30	46
8. = Number of pounds GHG emissions reduced (#7 x 0.95 lbs.)	28.50	43.70
9. If values would be distinctly greater for weekends, describe the magnitude of difference: Click or tap here to enter text.		
10. If different values other than the suggested are used, please explain here: Click or tap here to enter text.		
Pedestrian Use <i>NOTE: if constructing a new facility, report pedestrian usage along closest existing alternative route</i> To update the formulas below, enter your information, highlight the formulas (or Ctrl-A), and press F9. OR close and reopen the file.		
1. Current Average Single Weekday Pedestrians (including users of non-pedaled devices such as scooters and wheelchairs):	65	
Pedestrian Use Calculations	Year of Opening	2050 Weekday Estimate
2. Enter estimated additional average weekday pedestrian one-way trips on the facility after project is completed	65	98
3. Enter number of the new pedestrian trips (in #2 above) that will be diverting from a different walking route (Example: {#2 X 50%} or other percent, if justified on line 10 below)	33	49
4. = Number of new trips from project (#2 – #3)	32	49
5. Enter number of the new trips produced (from #4 above) that are replacing a trip made by another non-SOV mode (bus, carpool, vanpool, bike, etc.). (Example: {#4 X 30%} or other percent, if justified on line 10 below)	10	15
6. = Number of SOV trips reduced per day (#4 - #5)	22.00	34.00
7. Enter the value of {#6 x .4 miles}. (= the VMT reduced per day) (Values other than .4 miles must be justified by sponsor on line 10 below)	9	14

8.	= Number of pounds GHG emissions reduced (#7 x 0.95 lbs.)	8.55	13.30
9.	If values would be distinctly greater for weekends, describe the magnitude of difference: Click or tap here to enter text.		
10.	If different values other than the suggested are used, please explain here: Click or tap here to enter text.		

Question: Describe how this project helps expand the active transportation network, closes gaps, improves comfort, and/or improves connections to key destinations, particularly improvements in line with the recommendations in the [Denver Regional Active Transportation Plan](#). Please include quantitative information, including any items referenced above, in your response.

Signal equipment installed as part of this project will allow for more efficient intersection operations, leading pedestrian intervals (possible with equipment upgrades) will enhance safety for pedestrians, and the ability to implement bicycle signals provides flexibility of such a use for the future.

D. Financial Leveraging		WEIGHT	5%
What percent of outside funding sources (non-federal funds) does this project have? <i>(Match percentage will automatically calculate based on values entered in the Funding Request table. If this has not updated, select the box to the right and click F9.)</i> [*includes 100% eligible projects with no match]	Enter score: <div>17.9%</div>	36%+ outside funding sources 5 31 - 35.9%..... 4 26 - 30.9%..... 3 21 - 25.9%..... 2 17.89 - 20.9%* 1 17.89%..... 0	
E. Project Readiness		WEIGHT	15%
<i>Provide responses to the following items to demonstrate the readiness of the project. DRCOG is prioritizing those projects that have a higher likelihood to move forward in a timely manner and are less likely to experience a delay.</i>			
Subsection 1. Avoiding Pitfalls and Roadblocks			
<p>a. Has a licensed engineer (CDOT, consultant, local agency, etc.) reviewed the impact the proposed project will have on utilities, railroads, ROW, historic and environmental resources, etc. and have those impacts and pitfalls been mitigated as much as possible to date before this submittal?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A (for projects which do not require engineering services)</p> <p>If yes, please type in the engineer's name below which certifies their review and that impacts have been evaluated and mitigated as much as possible before your application is submitted:</p> <p>Aaron Heumann, PE, PTOE</p> <p>Please describe the status to date on each, including 1) anticipated/known pitfalls/roadblocks, and 2) mitigation activities taken to date:</p> <ul style="list-style-type: none"> Utilities: To be determined, but fiber will be placed on the side of the road that has the least number of utility impacts. Railroad: No railroad property exists along the corridor. Right-of-Way: ROW needs have not been completely determined; Littleton will hire a design consultant that is familiar with CDOT's ROW Clearance Process. Environmental/Historic: There are properties with potential environmental impacts (parks and trails) that are adjacent to this project. Littleton will avoid impacting these properties as part of the design, where possible, and will be hiring a consultant familiar with CDOT's Environmental Clearance Process. Other: Click or tap here to enter text. <p>b. Have additional project risks been identified?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A</p> <p>If yes, please provide a brief description of the known risks and planned mitigation activities.</p> <p>None</p> <p>c. Is this application for a single project phase only (i.e., design, environmental, ROW acquisition, construction only, study, equipment purchase, etc.)?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>If yes, are the other prerequisite phases complete? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A</p> <p>Though there is a Phase 1 to this project (construction Fall 2023) that project does not need to be completed prior to this project to accomplish the same goals. Currently Littleton leases fiber from Comcast north of Arapahoe Road, so a delay in constructing Phase 1 means Phase 2 could be constructed and connected to the leased fiber.</p>			

d. Will this project seek a Finding in the Public Interest as part of equipment procurement?

☒ Yes ☐ No

If yes, please provide an explanation of the need for a Finding in the Public Interest. Do not reference specific products trade names.

The City of Littleton will need equipment that can be implemented into the current software programs utilized for detection and signal programming, as well as for consistency and efficiency in maintenance of Littleton's signal network.

e. Has all required ROW been identified? ☐ Yes ☒ No ☐ N/A

Has all required ROW already been acquired and cleared by CDOT? ☐ Yes ☒ No ☐ N/A

Is existing equipment within ROW? ☒ Yes ☐ No ☐ N/A

Will subsurface utility engineering be a factor in this project? ☒ Yes ☐ No

Has subsurface utility engineering been accounted for in the project scoping, phasing and estimate? ☒ Yes ☐ No ☐ N/A

f. Based on the current status provided in Project Information, question 11, do you foresee being able to execute your IGA by October 1 of your first year of funding (or if requesting first year funding, beginning discussions on your IGA as soon as possible), so you can begin your project on time?

☒ Yes ☐ No

Does your agency have the appropriate staff available to work on this project? ☒ Yes ☐ No

If yes, are they knowledgeable with the federal-aid process? ☒ Yes ☐ No ☐ N/A

g. Have other stakeholders in your project been identified and involved in project development?

☒ Yes ☐ No ☐ N/A

If yes, who are the stakeholders?

Arapahoe County and City of Centennial

Please provide any additional details on any of the items in Subsection 1, if applicable.

N/A

Subsection 2. Local Match Availability

a. Is all the local match identified in your application currently available and not contingent on any additional decisions, and if a partnering agency is also committing match, do you have a commitment letter?

☒ Yes ☐ No

Please describe:

Local match for this project has been identified in Littleton's 5 Year CIP Plan

b. Is all funding for this project currently identified in the sponsor agency's Capital Improvement Program (CIP)?

☒ Yes ☐ No

Please describe:

Local match for this project has been identified in Littleton's 5 Year CIP Plan

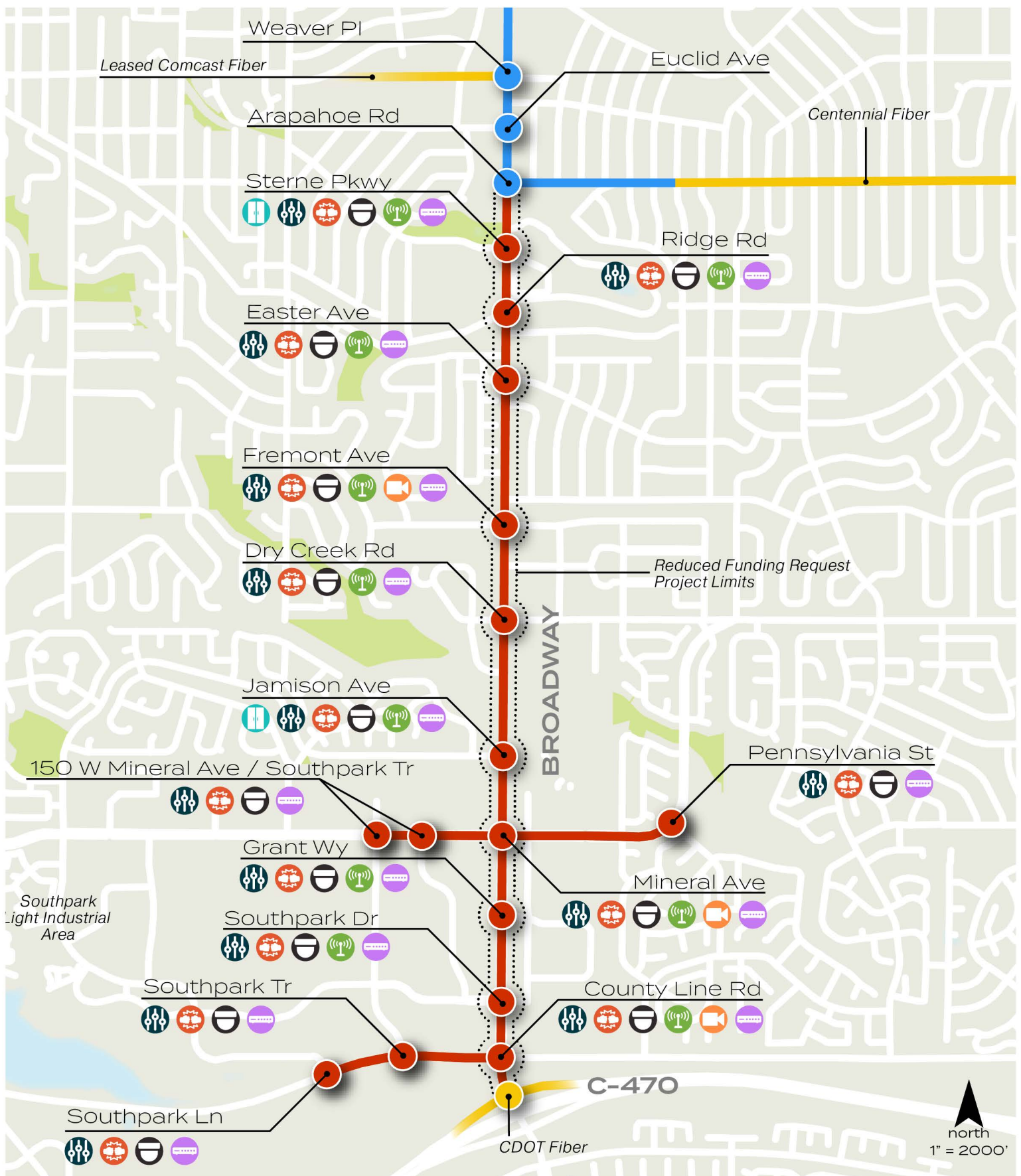
Subsection 3. Systems Engineering Analysis Documentation

Systems Engineering Analysis (SEA) is a federally required process for deployment of transportation technology projects using funds from the Highway Trust Fund. CDOT established and administers a formal [SEA process](#) for transportation technology projects in the state, including local agency projects.

Please complete at least the first seven sections of the required [SEA-Local Agency Template](#). Submit the completed form with this application.

Submit completed applications to jluor@drcog.org no later than 5pm on July 7, 2023.

Prior to submitting, press Ctrl+A to select all, then press F9 to update all formulas. You can then print to PDF.



Broadway Signal Interconnect Project (Phase 2)



CITY OF LITTLETON PUBLIC WORKS DEPARTMENT
TRAFFIC SIGNAL COMMUNICATIONS UPGRADES

HIGH-LEVEL CONSTRUCTION COST ESTIMATE - BROADWAY (ARAPAHOE RD TO C-470)
June 24, 2023

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	2023 Unit Cost	2023 TOTAL COST
202-00200	REMOVAL OF SIDEWALK	SY	20	\$166	\$3,322
203-01597	POTHOLING	HOURL	60	\$519	\$31,140
608-00006	CONCRETE SIDEWALK (6 INCH)	SY	20	\$311	\$6,228
612-00260	LOCATION MARKER (FIBER OPTIC) (DOME)	EACH	36	\$249	\$8,968
613-00206	2 INCH ELECTRICAL CONDUIT (BORED)	LF	15600	\$42	\$647,712
613-01200	2 INCH ELECTRICAL CONDUIT (PLASTIC)	LF	300	\$42	\$12,456
613-07023	PULL BOX (24"X36"X24")	EACH	21	\$3,114	\$65,394
613-07040	PULL BOX (30"X48"X24")	EACH	15	\$5,190	\$77,850
614-87010	FIBER OPTIC CABLE (SINGLE MODE) (12 FIBER)	LF	4000	\$10	\$41,520
614-87350	TEST FIBER OPTIC CABLE	LS	1	\$62,280	\$62,280
614-87496	FIBER OPTIC CABLE (SINGLE MODE) (432 STRANDS)	LF	19500	\$15	\$283,374
614-87690	ETHERNET SWITCH	EACH	15	\$2,076	\$31,140
210-00848	TRAFFIC CONTROLLER & MMU	EACH	15	\$6,228	\$93,420
614-72895	VIDEO TRAFFIC DETECTION	EACH	15	\$41,520	\$622,800
614-10121	TRAVEL TIME MONITOR	EACH	10	\$10,380	\$103,800
614-87333	PTZ CAMERA	EACH	3	\$12,456	\$37,368
614-72855	TRAFFIC EQUIPMENT CABINET	EACH	8	\$18,684	\$149,472
614	12 PORT PRE-TERMINATED PATCH PANEL AND PIGTAIL	EACH	15	\$4,152	\$62,280
614	SPLICE ENCLOSURE	EACH	15	\$3,114	\$46,710
626-00000	MOBILIZATION	LS	1	\$83,040	\$83,040
	STORMWATER MANAGEMENT PLAN QUANTITIES	EACH	1	\$72,660	\$72,660
	TRAFFIC CONTROL PLAN QUANTITIES	EACH	1	\$311,400	\$311,400
	FORCE ACCOUNT				
700-70010	=====				
700-70010	F/A MINOR CONTRACT REVISIONS	FA	1	\$72,660	\$72,660
700-70016	F/A FUEL COST ADJUSTMENT	FA	1	\$2,076	\$2,076
700-70016	F/A ON-THE-JOB TRAINEE	FA	1	\$4,152	\$4,152
700-70111	PROJECT FIRST PROGRAM	FA	1	\$2,076	\$2,076
700-70380	F/A EROSION CONTROL	FA	1	\$12,456	\$12,456
700-70589	F/A ENVIRONMENTAL HEALTH & SAFETY MANAGEMENT	FA	1	\$4,152	\$4,152
					\$0
	PROJECT DESIGN	LS	1	\$491,209	\$491,984
		Subtotal Cost:			\$2,951,906
		ROW			\$165,000
		Project Total:			\$ 3,608,890

CITY OF LITTLETON PUBLIC WORKS DEPARTMENT
TRAFFIC SIGNAL COMMUNICATIONS UPGRADES

HIGH-LEVEL CONSTRUCTION COST ESTIMATE - BROADWAY (ARAPAHOE RD TO C-470)
June 24, 2023

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	2023 UNIT COST	2023 TOTAL COST
202-00200	REMOVAL OF SIDEWALK	SY	15	\$166	\$2,491
203-01597	POTHOLING	HOURL	40	\$519	\$20,760
608-00006	CONCRETE SIDEWALK (6 INCH)	SY	15	\$311	\$4,671
612-00260	LOCATION MARKER (FIBER OPTIC) (DOME)	EACH	29	\$249	\$7,224
613-00206	2 INCH ELECTRICAL CONDUIT (BORED)	LF	10650	\$42	\$442,188
613-01200	2 INCH ELECTRICAL CONDUIT (PLASTIC)	LF	200	\$42	\$8,304
613-07023	PULL BOX (24"X36"X24")	EACH	19	\$3,114	\$59,166
613-07040	PULL BOX (30"X48"X24")	EACH	10	\$5,190	\$51,900
614-87010	FIBER OPTIC CABLE (SINGLE MODE) (12 FIBER)	LF	2600	\$10	\$26,988
614-87350	TEST FIBER OPTIC CABLE	LS	1	\$51,900	\$51,900
614-87496	FIBER OPTIC CABLE (SINGLE MODE) (432 STRANDS)	LF	13500	\$15	\$196,182
614-87690	ETHERNET SWITCH	EACH	10	\$2,076	\$20,760
210-00848	TRAFFIC CONTROLLER & MMU	EACH	10	\$6,228	\$62,280
614-72895	VIDEO TRAFFIC DETECTION	EACH	10	\$41,520	\$415,200
614-10121	TRAVEL TIME MONITOR	EACH	10	\$10,380	\$103,800
614-87333	PTZ CAMERA	EACH	3	\$12,456	\$37,368
614-72855	TRAFFIC EQUIPMENT CABINET	EACH	5	\$18,684	\$93,420
614	12 PORT PRE-TERMINATED PATCH PANEL AND PIGTAIL	EACH	10	\$4,152	\$41,520
614	SPLICE ENCLOSURE	EACH	11	\$3,114	\$34,254
626-00000	MOBILIZATION	LS	1	\$72,660	\$72,660
	STORMWATER MANAGEMENT PLAN QUANTITIES	EACH	1	\$72,660	\$72,660
	TRAFFIC CONTROL PLAN QUANTITIES	EACH	1	\$269,880	\$269,880
	FORCE ACCOUNT				
	=====				
700-70010	F/A MINOR CONTRACT REVISIONS	FA	1	\$62,280	\$62,280
700-70016	F/A FUEL COST ADJUSTMENT	FA	1	\$2,076	\$2,076
700-70016	F/A ON-THE-JOB TRAINEE	FA	1	\$4,152	\$4,152
700-70111	PROJECT FIRST PROGRAM	FA	1	\$2,076	\$2,076
700-70380	F/A EROSION CONTROL	FA	1	\$10,380	\$10,380
700-70589	F/A ENVIRONMENTAL HEALTH & SAFETY MANAGEMENT	FA	1	\$4,152	\$4,152
	PROJECT DESIGN	LS	1	\$210,086	\$210,086
		Subtotal Cost: \$2,180,693			
		ROW \$135,000			
		Project Total: \$ 2,525,779			

Shane Roberts

From: Durham - CDOT, Jonas <jonas.durham@state.co.us>
Sent: Thursday, July 6, 2023 7:21 AM
To: Shane Roberts
Cc: Aaron Heumann
Subject: Re: CDOT Concurrence for an RTO&T Grant

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Shane,

Yes your understanding is correct. The process to partner with CDOT on fiber will start with an Unsolicited Proposal, and if approved, we will require a fiber agreement to be executed in order to collaborate on the fiber project you've outlined. Let me know of any additional questions - thanks!

Jonas Durham
Fiber Development Manager



P: 303.333.1555
425C Corporate Circle, Golden CO 80401
jonas.durham@state.co.us | codot.gov | cotrip.org

On Fri, Jun 30, 2023 at 5:35 PM Shane Roberts <sroberts@littletongov.org> wrote:

Hi Jonas,

I hope this email finds you well. I wanted to express my gratitude for taking the time to chat with me last week regarding Littleton's proposed fiber project on Broadway. It was great to connect with you and discuss the potential opportunities and the CDOT process for connecting fiber networks. I wanted to recap our conversation to ensure we are on the same page:

1. **Project Overview** - Littleton's fiber project will run along Broadway from Arapahoe Rd to approximately C-470. Additionally, there will be spurs of fiber running east and west on Mineral Ave and County Line Rd.
2. **Regional Partners** - Littleton has already engaged in discussions with Arapahoe County and the City of Centennial. The plan is to share some strands of fiber with them, expanding regional traffic communications infrastructure and setting the stage for future regional coordination efforts.
3. **Potential Connection to CDOT Fiber** - If Littleton is awarded grant funding for this project, we would like to work with CDOT to discuss connecting into the fiber network at C-470. However, both parties understand that the project is in its early stages of conceptual development, and there are various aspects that need to be sorted out before firm commitments can be made. This connection aims to expand regional traffic communications and lay the groundwork for future regional coordination efforts.
4. **CDOT Fiber Connection Process** – Should Littleton and CDOT determine that moving forward with a fiber connection is mutually beneficial for each organization, Littleton will need to submit an unsolicited proposal to CDOT detailing the project.

Once again, I appreciate your time and valuable insights during our discussion. If you have any revisions to my above summary, please don't hesitate to reach out. I look forward to continuing our collaboration as we move forward with this endeavor.

Thank you once again, and I hope you have a wonderful day.

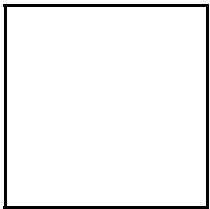
Best regards,

From: Durham - CDOT, Jonas <jonas.durham@state.co.us>
Sent: Thursday, June 29, 2023 1:06 PM
To: Shane Roberts <sroberts@littletongov.org>
Cc: Aaron Heumann <aheumann@littletongov.org>
Subject: Re: CDOT Concurrence for an RTO&T Grant

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Hi Shane - that should be fine.

Jonas Durham
Fiber Development Manager



P: 303.333.1555

425C Corporate Circle, Golden CO 80401
jonas.durham@state.co.us | codot.gov | cotrip.org

On Thu, Jun 29, 2023 at 12:19 PM Shane Roberts <sroberts@littletongov.org> wrote:

Hi Jonas,

Thanks for speaking with me last week. We (staff at Littleton) discussed the process for connecting to CDOT's fiber and feel that it is probably too early for us to submit a proposal as our project is in the early conceptual stages and there are a lot of unknowns. For the purposes of submitting the grant what we're looking for is some sort of "proof" (email chain?) that Littleton has discussed the idea of connecting the CDOT fiber on C 470 with someone from CDOT and that, generally speaking, CDOT is open to the idea. This "proof" could indicate both parties understand this project is very early in the conceptual development and that things could change and the connection may not happen. Essentially we are not asking for CDOT to commit to anything but just something saying that CDOT is aware of our project intent and willing to work with us so long as Littleton follows CDOT's process.

What are your thoughts on this?

If are okay with this, I will type up a more formal email outlining some of these points and send it over.

Thank you,

Shane Roberts

Senior Transportation Planner

Public Works

2255 W. Berry Ave

Littleton, Colorado 80120

303-795-3830 (direct)

303-795-3863 (department)

www.LittletonCO.gov



From: Durham - CDOT, Jonas <jonas.durham@state.co.us>
Sent: Thursday, June 15, 2023 12:52 PM
To: Shane Roberts <sroberts@littletongov.org>
Cc: Aaron Heumann <aheumann@littletongov.org>; Axley - CDOT, Allie <allie.axley@state.co.us>; Herrmann - CDOT, Danny <danny.herrmann@state.co.us>; Mattson - CDOT, JoAnn <joann.mattson@state.co.us>
Subject: Re: CDOT Concurrence for an RTO&T Grant

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Shane - let's chat next Weds at 9am.

On Thu, Jun 15, 2023 at 12:43 PM Shane Roberts <sroberts@littletongov.org> wrote:

Thank you Allie & Danny for the quick replies!

Jonas, I am happy to set up a call at your convenience to discuss further.

Shane Roberts

Senior Transportation Planner

Public Works

[2255 W. Berry Ave](#)

[Littleton, Colorado 80120](#)

303-795-3830 (direct)

303-795-3863 (department)

www.LittletonCO.gov



From: Axley - CDOT, Allie <allie.axley@state.co.us>

Sent: Thursday, June 15, 2023 12:37 PM

To: Herrmann - CDOT, Danny <danny.herrmann@state.co.us>; Jonas Durham - CDOT <jonas.durham@state.co.us>

Cc: Shane Roberts <sroberts@littletongov.org>; Mattson - CDOT, JoAnn <joann.mattson@state.co.us>; Aaron Heumann <aheumann@littletongov.org>

Subject: Re: CDOT Concurrence for an RTO&T Grant

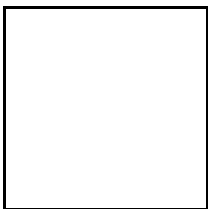
CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Thanks Danny,

Shane, I am looping in [+Jonas Durham - CDOT](#) who works on all of our fiber agreements to discuss next steps and process to document this type of partnership. He'll be your point of contact from here.

Thanks!

Allie Axley
ITS Branch Manager



P 303.512.5828

[425C Corporate Circle, Golden CO 80401](#)
allie.axley@state.co.us | codot.gov | cotrip.org

On Thu, Jun 15, 2023 at 12:35 PM Herrmann - CDOT, Danny <danny.herrmann@state.co.us> wrote:

Shane,

I believe the best contact is Allie Axley, copied here.

Allie - If you're not the best contact, can you please connect Shane with the correct person? Thanks.

Danny

On Thu, Jun 15, 2023 at 12:16 PM Shane Roberts <sroberts@littletongov.org> wrote:

Hi Danny & JoAnn,

Hope your week is going well! We are planning on submitting an RTO&T grant early next month (July 7) for fiber installation along Broadway from Arapahoe Rd to C-470. This planned fiber would connect to fiber that is currently being installed on Broadway from Powers Ave to Arapahoe Rd. With both of these Broadway segments complete this would connect Littleton, Centennial, Englewood, Greenwood Village and Arapahoe County, and, if CDOT is open to it, we would like to discuss connecting to the CDOT fiber on C-470 with the overall goal of better connecting the regional from transportation comms standpoint. Who would be the right person(s) to get in touch with regarding a quick call?

Shane Roberts

Senior Transportation Planner

Public Works

[2255 W. Berry Ave](#)

[Littleton, Colorado 80120](#)

303-795-3830 (direct)

303-795-3863 (department)

www.LittletonCO.gov



* Sender and receiver should be mindful that all incoming and outgoing emails may be subject to the Colorado Open Records Act, S 24-72-200.1, et seq.

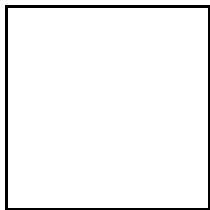
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Danny Herrmann

CDOT Region 1

Planning Program Manager

303-757-9946

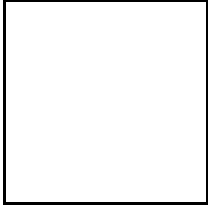


* Sender and receiver should be mindful that all incoming and outgoing emails may be subject to the Colorado Open Records Act, S 24-72-200.1, et seq.

* Sender and receiver should be mindful that all incoming and outgoing emails may be subject to the Colorado Open Records Act, S 24-72-200.1, et seq.

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Jonas Durham
Fiber Development Manager



P: 303.333.1555

425C Corporate Circle, Golden CO 80401
jonas.durham@state.co.us | codot.gov | cotrip.org

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Concept of Operations and Validation Plan

Federal Requirement: 23 CFR 940.11(c)(2) - Identification of participating agencies roles and responsibilities

Purpose: Used as a mechanism to determine applicable stakeholders and users and to understand their needs of the system. It will be used to formalize what the system's needs and requirements will be and the priority of the stakeholders' needs. This is a high level design document and should not go into too much detail on how the project will be built. It should be a vision of how the system will operate and its basic functions. The document will also have a plan on how to validate that each stakeholder's requirements has been met in the specifications and contract documents.

Benefits to CDOT: This document will formalize and document all stakeholders' and users' needs and responsibilities to implement the project. It will be the initial starting point of identifying what agreements will need to be obtained for the project. Additionally, having a plan on how to validate all agreed upon requirements and infrastructure compatibility will allow the project to ensure all commitments are met.

1. General Information:

Project:	Broadway Signal Interconnect Project (Phase 2)
Project Subaccount Number:	<i>Unknown at this time</i>
PM Name:	Aaron Heumann
PM Email:	aheumann@littletongov.org
PM Phone:	303-795-3867
Applicable Service Package(s)	TM01: 021 Local Jurisdiction Detector Surveillance TM01: 022 Local Jurisdiction Video Surveillance TM01: 023 Local Jurisdiction Travel Time Monitoring TM03: 01 Local Jurisdiction Traffic Control TM07: 01 Traffic Camera Sharing TM07: 02 Regional Traffic Signal System Integration DM01: 02 Local Jurisdiction Data Warehouse

2. **System Description:** Provide a high level description of the proposed project and key features regarding operation. This needs to be in enough detail that the [Systems Functional Requirements](#) document can be developed next, but does not need to detail how the system will be built. If this is a simple project, a paragraph may suffice. For larger, more complex, projects this may need to be several pages.



Concept of Operations and Validation Plan

The primary focus of this project is the installation of fiber optic communications on Broadway from Arapahoe Rd to C-470 which will extend fiber on Broadway from Powers Ave to Arapahoe Rd that is being construction in the summer and fall of 2023. Additionally, this project is looking to install fiber spurs along Mineral Ave and County Line Rd. The project will extend regional transportation communication capabilities between Littleton and a number of other jurisdictions with the hope of connecting to CDOT fiber on C-470, though details of the project need to be further developed before that connection can be confirmed. In addition, the project will be upgrading signal equipment at 15 intersections to improve safety and operations, the details of which are shown in the attached map.



Concept of Operations and Validation Plan

3. **Wants/Needs of Stakeholders and Users:** Document all of the discussed wants and needs of the stakeholders and users to fulfill the vision of the proposed project. It is important to document all items discussed so that there can be historical knowledge why an item was not selected. As Project Managers with similar projects go through the SEA process and reference these documents, they can learn from this document. Additionally, going through the SEA from start to finish may take months, in case it is ever asked why something was not considered, this section can be a great reference to show a topic was discussed and what was the conclusion of the discussion. Additional rows can be added as needed.

The ITS Branch has added common wants/needs of stakeholders in the below table. Should a want/need not be applicable or included in the scope of the project, document that in the “if not selected, document why” column. Having common wants/needs does not eliminate the need for stakeholder meeting with the ITS Branch.

Item #	Want/Need	Complies with Service Package (Y/N)	Stakeholder Initiating Want/Need – Include names when applicable	Responsible Stakeholder for Fulfilling	Selected (Y/N)	If not selected, document why.	If selected, rank the priority.*
1	Fiber communication is preferred.		Jill Scott, ITS RE				
2	Should cell modems be used, cell service must be verified prior to design.		Bill Boucher, Cell Modem Owner				
3	QMP must be followed. Any devices not planned to be from the QMP must be fully vetted through the SEA process.		Jill Scott, ITS RE				
4	Network diagrams will have to be submitted in the detailed level system design document.		Emma Boff, Project Dev Manager				
5	Design to allow for safe access that does not require a lane closure for device maintenance		Miguel Tovar, ITS Field Operations				
6	All devices will have hardwire power.		Jill Scott, ITS RE				
7	All technology devices must meet CDOT ITS security requirements and the OIT CISP's.		Allie Axley, ITS Branch Manager				
8	Use consistent device types throughout the State. The		Allie Axley, ITS				



Concept of Operations and Validation Plan

	technologies identified in the CDOT ITS Architecture are consistent throughout the state.		Branch Manager				
9	Have full video coverage of the project limits, depending on project purpose.		Allie Axley, ITS Branch Manager				
10	Should the project be installing a new technology or modifying the existing technology, a required system diagram (more detail than the High Level System Design) will have to be included in the Detailed Level System Design.		Matt Becker, ITS Architect				
11	If proposed devices are not on the QMP list, then the project needs to provide an evaluation model to test, assuming it passes technical and security reviews of the Detailed Level System Design Document.		Matt Becker, ITS Architect				
12	Weather station placement should be vetted by Winter Operations and the want/need for location based on the data coverage they need.		Allie Axley, ITS Branch Manager				
13	Fiber assignments and network design must be included in the Detailed Level System Design. This will require support for CDOT ITS and can be requested at cdot_its_support@state.co.us . It may take CDOT up to two months to complete this request and requires the project to schedule this time into their schedule.		Emma Boff, Project Dev Manager				
14	Consolidate devices to one switch that are near each other.		Lena Spengler, Network Team				
15	CDOT is not using Travel Time Indicators (TTIs) anymore. If the project has the opportunity, the existing TTIs can be removed.		Allie Axley, ITS Branch Manager				
16	LiveView cameras in project limits should be removed and replaced with a CDOT camera.		Allie Axley, ITS Branch Manager				
17	Any devices being used that are not on the QMP list MUST be NTCIP compliant.		Emma Boff, Project Dev Manager				
18	Should any modifications or corridor configurations be needed in OpenTMS, the Project Team will fund this effort.		Emma Boff, Project Dev Manager				
19	All roadside devices installed as a part of this project should have metered electrical services separate from lighting as part of PD		Allie Axley, ITS Branch Manager				



Concept of Operations and Validation Plan

	90.1.						
20	Project team must work with the applicable region Utility Account Coordinator and complete the Utiltiy Account Responsibility Matrix as defined in PD 90.1.		Emma Boff, Project Dev Manager				
21	All CCTV cameras installed on the project must be connected to fiber. No cell modems should be used when fiber is available and no liveview cameras should be used. Cell modems are acceptable for use when no fiber is available.		Allie Axley, ITS Branch Manager				
22	To replace Live View Cameras with CDOT cameras to minimize the Live View contract costs.		Allie Axley, ITS Branch Manager				
23	SEA documentation includes technology work in all areas of CDOT. This could include, but is not limited to, Real Time Data Hub (RTDH), Office of Innovative Mobility (OIM), Office of Data Management (ODM), Staff Traffic and Signal Program, and etc. It is up to the project teams to coordinate and document the impact to these groups in the SEA documents.		Emma Boff, Project Dev Manager				
24	Please collect the wants/needs of these technology partners within CDOT and document in this ConOps - RTDH, OIM, ODM, Staff Traffic and Signal program, Winter Operations, Region Traffic units, etc.		Emma Boff, Project Dev Manager				
25	Project should use CWDM unless told otherwise - follow up with CDOT ITS for confirmation.		Emma Boff, Project Dev Manager				

*Priority is important to establish to make it clear what must happen on the project and what would be an optional want/need.

High=Must be included and achieved.

Medium=It is not critical to include, but without there will be an impact to the project.

Low= Not a critical want/need, but would be ideal if it was able to be included.

NA = Want/Need not selected.

4. **Validation Plan:** Documenting the wants and needs of the stakeholders and users is critical to get everyone on the same page but in order for a project to be successful those wants and needs have to be fulfilled. The Validation Plan will track and



Concept of Operations and Validation Plan

confirm when each want or need is fulfilled throughout design. These will typically be documented in specifications or plans. Additional rows can be added if needed.

<p>Who will own executing the validation plan and ensuring all is met and is being tracked?</p> <p>The City of Littleton will be hiring a firm familiar with fiber design according to CDOT standards to ensure all applicable requirements are being met.</p>		
<p>What is the process for addressing wants/needs not met?</p> <p>Because the project is so early in the concept development stage, this has not been determined.</p>		
<p>What is the communication plan with stakeholders as wants/needs are confirmed complete or need additional support?</p> <p>Because the project is so early in the concept development stage, this has not been determined.</p>		
<p>Selected Want/Need from previous table in Section 3</p>	<p>Owner to confirm fulfillment</p>	<p>Reference Spec/Contract Document where the want/need is referenced and fulfilled and clear direction is provided to validate the system operates as intended. This could also include reference to a functional requirement as established in the System Functional Requirements document.</p> <p>*This column should be left blank during the submission of the Concept of Operations and will be completed as validation occurs throughout design.</p>
<p><i>All of the wants and needs in this table will be reviewed in coordination with CDOT if this project is selected for funding and after Littleton hires a fiber design consultant.</i></p>		



Concept of Operations and Validation Plan

When the Validation Plan has been executed and all wants/needs have been confirmed, submit a copy of the completed Validation Plan.

- 5. Document History Log** - ITS only, this is to have a log of all things changed in this template so that PM's are aware of the differences between versions.

Document Update Log - Information			
This is to keep users updated on how the Technology/SEA Assessment form has been updated. This section can be deleted prior to submittal of this document.			
Date	Version	Editor	Summary of Changes
4/21/2023	1.2	Emma Boff	Added common wants/needs that ITS has on projects.



July 6th, 2023

To: Denver Regional Council of Governments staff

RE: DRCOG 2024-2027 FY 2024-2027 Regional Transportation Operations and Technology
Set-Aside application for the Broadway Fiber Optic Communications and Signal Equipment
Upgrades Project (Signal Interconnect Project Phase 2)

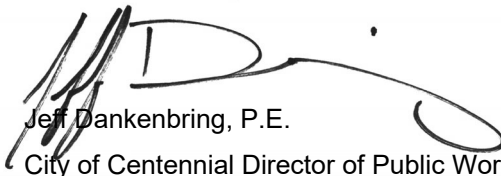
Dear Review Committee:

We are writing in support of the City of Littleton's DRCOG Transportation Improvement Program (TIP) application for the Broadway Fiber Optic Communications and Signal Equipment Upgrades project submitted as part of the DRCOG FY 2024-2027 Regional Transportation Operations and Technology Set-Aside. The project includes the following communication and signal equipment elements along Broadway from Arapahoe Road to C470, along Mineral Avenue from Southpark Terrace to Pennsylvania Street, and along County Line Road from Broadway to Southpark Lane:

- Design and construction of underground conduit including lateral connections into each signalized intersection cabinet.
- Design, purchase, and installation of signal equipment to compliment the fiber optic communications.
- Design and construction for the installation of fiber optic communication with 432 lines to be shared between agencies and connected to previously installed fiber optic lines along Broadway north of Arapahoe Road and along Arapahoe Road east of Broadway.
- Design, purchase, and installation of signal equipment to accommodate real time observation of traffic operations. We will also participate in the project as part of the team to review deliverables and design.

On behalf of the City of Centennial, we hope you will consider funding Littleton's Broadway Fiber Optic Communications and Signal Equipment Upgrades Project.

Sincerely,



Jeff Dankenbring, P.E.
City of Centennial Director of Public Works

Cc: Aaron Heuman, PE, PTOE, Littleton Transportation Engineering Manager

FY2024-2027 REGIONAL TRANSPORTATION OPERATIONS AND TECHNOLOGY SET-ASIDE PROCESS: REQUEST FOR PROJECT SUPPORT FORM

Complete the sections with green headers below, then provide this form to the agency you are requesting support from. That agency will complete the blue section and return the form.

APPLICANT INFORMATION			
1. Who is requesting project support? City of Littleton			
2. Project Sponsor: Littleton	3. Other Project Partners: Arapahoe County, City of Centennial		
4. Contact Person: Aaron Heumann Email: aheumann@littletongov.org		Title: Transportation Engineering Manager Phone: 303-795-3867	
PROJECT DESCRIPTION			
5. Project Title: Broadway Signal Interconnect Phase 2		Total Project Cost: 3,610,000	
Project Location: Broadway between Arapahoe Road and C470, Mineral Avenue between Southpark Terrace and Pennsylvania Street, and County Line Road between Broadway and Southpark Lane		Project Limits: (mileposts, intersecting roads, rivers, etc.)	
County: Arapahoe	Municipality(ies): Littleton	Project Length: 3 Miles	
<p>Brief Description of Project:</p> <p>The project includes the following communication and signal equipment elements along Broadway from Arapahoe Road to C470, along Mineral Avenue from Southpark Terrace to Pennsylvania Street, and along County Line Road from Broadway to Southpark Lane:</p> <ul style="list-style-type: none"> Design and construction of underground conduit including lateral connections into each signalized intersection cabinet. Design, purchase, and installation of signal equipment to compliment the fiber optic communications. Design and construction for the installation of fiber optic communication with 432 lines to be shared between agencies and connected to previously installed fiber optic lines along Broadway north of Arapahoe Road and along Arapahoe Road east of Broadway. Design, purchase, and installation of signal equipment to accommodate real time observation of traffic operations. 			
SUPPORT REQUEST			
<p>6. Based on who is requesting support (see #1), from whom are you are requesting support? <i>If you are requesting support from multiple entities, please fill out and send a separate form to each.</i></p> <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> Local Agency, Specify: City of Centennial <input type="checkbox"/> CDOT <input type="checkbox"/> RTD </div>			
<p>7. Type of Support Requested:</p> <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> Material Participation (e.g. staff, resources, operations responsibilities, etc.) Specify: Project coordination and communication connections <input type="checkbox"/> Financial Commitment: <div style="display: inline-block; vertical-align: top; margin-left: 20px;"> <input type="checkbox"/> Local (non-DRCOG) Funds: Amount: <input type="checkbox"/> State Funds: Amount: <input type="checkbox"/> RTD Funds: Amount: </div> </div>			
<p>8. Please type your name and date below which certifies the above information is accurate and complete:</p> <div style="display: flex; justify-content: space-between;"> Name: Aaron Heumann Date: 6/30/2023 </div>			

RESPONSE (to be completed by agency from whom support is requested)	
9.	The agency in #1 above has requested your support for their project. Who are you? City of Centennial
10.	Contact person at supporting agency: Jeff Dankenbring Title: Public Works Email: jdankenbring@centennialco.gov Phone: 303-754-3458 Director
11.	Will your agency participate in this project? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
12.	Does your agency commit financial support to this project, if requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A If yes, provide amount: \$ Fiscal year(s) funds are provided in: If yes, where are funds coming from:
13.	Please enter your name and date below which certifies the above information is accurate and complete, and your subregion/agency will honor any financial commitments made above: Name: Jeff Dankenbring Date: 07-06-2023

From: [Art Griffith](#)
To: [Shane Roberts](#)
Subject: RE: Fiber on Broadway & C-470
Date: Friday, June 30, 2023 1:56:01 PM
Attachments: [image001.gif](#)

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Shane,

I haven't heard anything about this from Aaron yet but it seems like a great opportunity to pursue funding thru RTO&T.

We support your cross-jurisdictional strategy and are willing to participate in discussions should the City of Littleton advance this project with or without RTO&T funding.

Sincerely,

Art Griffith

DC Transportation CIP Manager

From: Shane Roberts <sroberts@littletongov.org>

Sent: Thursday, June 29, 2023 3:28 PM

To: Art Griffith <AGriffit@douglas.co.us>

Subject: Fiber on Broadway & C-470

Hi Art,

I was curious if Aaron had mentioned anything about the fiber project we are submitting to the upcoming RTO&T grant opportunity? We are planning on continuing fiber on Broadway from Arapahoe Rd South to C-470. Ideally we would like to connect in to fiber from neighboring jurisdictions to be able to better share transportation information, allow for cross jurisdiction viewing of traffic cameras, and help set the stage for regional operations coordination. Do you guys have any fiber in the area of Broadway and C 470? If so are you guys open to the idea connecting fiber lines? We are not looking for any hard commitments from anyone, just want to be able to say the neighboring jurisdictions are aware of our project and are willing to participate in discussions as the project advances.

Hope you are having a great summer!

Thanks,

Shane Roberts

Senior Transportation Planner

Public Works

2255 W. Berry Ave

Littleton, Colorado 80120

303-795-3830 (direct)

303-795-3863 (department)

www.LittletonCO.gov



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Traffic Signal Synchronization

This calculator will estimate the emission reductions resulting from synchronizing the traffic signals along a previously unsynchronized corridor.

INPUT

Evaluation Year	2024	
Area Type	Urban	
Corridor Length	2	miles
Number of Signalized Intersections	15	
Number of Lanes (one direction)	2	
Posted Speed Limit	40	miles per hour (1 - 75 MPH)
Average Cycle Length	120	seconds
Truck Percentage	3%	
Annual Average Daily Traffic (AADT) (both directions)	36,000	veh/day
Peak-hour Volume (both directions)	3,600	veh/hr
Existing Corridor Travel Time	4	minutes
Total peak hours per day (AM+PM)	4	

OUTPUT

PERFORMANCE

	PEAK-HOUR	OFF-PEAK	
Volume (both directions)	3,600	1080	veh/hr
Existing Average Speed	30	16	miles per hour
Travel Time Savings	137	86	minutes
Proposed Average Speed	40	20	miles per hour

EMISSION REDUCTIONS

Pollutant	Peak-hour Kilograms/day	Off-Peak Kilograms/day	Total Kilograms/day
Carbon Monoxide (CO)	7.461	9.717	17.177
Particulate Matter <2.5 µm (PM _{2.5})	0.158	0.150	0.308
Particulate Matter <10 µm (PM ₁₀)	0.748	0.647	1.395
Nitrogen Oxide (NOx)	0.634	1.114	1.748
Volatile Organic Compounds (VOC)	0.119	0.239	0.357
Carbon Dioxide Equivalent (CO ₂ e)	927.597	2,245.870	3,173.466
Total Energy Consumption (MMBTU)	12.151	29.520	41.672