



Report for Battlefield, MO

# ROUTE FF CORRIDOR STUDY

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PREPARED BY



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## Executive Summary

The Route FF corridor within the City of Battlefield serves a key function to move people through and within the community, as well as to the greater Springfield region. As such, the Route FF corridor needs a vision that focuses on the corridor as a community asset, which when developed correctly, can enhance livability, drive economic development, and better connect residents to goods and services within Battlefield. As a key artery within the community, the Route FF corridor should be well planned and match the future vision for the growth of Battlefield.

We know that streets serve several purposes within the built environment. Mobility, first and foremost is at the heart of our transportation system. Connecting people to destinations keeps our communities going. Additionally, the movement of goods serves an important purpose in connecting people to their basic needs as well as working to sustain the economy. When designed and developed correctly, streets can also promote a better quality of life within communities through factors such as improved health outcomes, better air quality, sustainable design features, and placemaking/branding components. All these items were considered when embarking on this study for the Route FF corridor.

There were several key goals of the project. First, the goal of slowing down motor vehicles travelling through Route FF is a priority. It is also important that Route FF help foster the vision of the Battlefield community. Another goal is to enhance intersections throughout the corridor, with roundabouts being a preferred treatment. Finally, there is a need to better accommodate pedestrian connectivity, as well as plan for future needs of the Trail of Tears trail crossing and the future Farm Road 190.

The recommendations for the Route FF Corridor are divided into two groups: design and planning. Design recommendations were based on traffic modeling in multiple scenarios to project future vehicular traffic volumes along Route FF. Planning recommendations are based on the vision of the corridor as a key component in the creation of Downtown Battlefield. The design recommendations are specific to roadway cross section and intersection enhancements, as well as potential traffic calming along the corridor. Planning recommendations focus on policy solutions and branding opportunities on the Route FF corridor.

We heard several times throughout the study process that Battlefield lacked an identity or that there seemed to be a tale of 'two Battlefields' (one to the north and one to the south). Through this planning process and recommended transportation updates, Route FF can foster a stronger sense of cohesion within Battlefield, and better connect the components of the local fabric.

## KEY PROJECT GOALS



Reduce speeds  
(not to exceed 35mph)



Foster vision of the local  
Battlefield Community



Traffic calming  
corridor wide



Intersection  
enhancements



Pedestrian connectivity



Accommodate future  
trail crossings



Accommodate future  
FR 190



This study process included detailed traffic analysis to better understand future growth within the community and how traffic volumes on the corridor will be impacted, and what this increase in volume will do to efficiency and safety of the roadway. The process included the development of sample typical sections based on the findings of the traffic analysis. The typical sections were vetted with the public at a public meeting and needs/opportunities of the corridor were prioritized with an online survey. Key ideas were then considered and reviewed with a team consisting of consultant representatives, Ozark Transportation Organization (OTO) staff, Missouri Department of Transportation representatives (MoDOT), and City of Battlefield staff to finalize recommendations outlined within this report.

The goal of this report is two-fold – to outline specific projects that can move to next steps for design, and two, provide items for policy updates as the corridor develops. Specific projects have been identified that are directly related to updated roadway design needs. These projects should be included and prioritized on the State Transportation Improvement Program (STIP) when developing needs for Route FF through the City of Battlefield. Design recommendations, policy ideas and regulatory recommendations are included so that Battlefield is well prepared to handle any future growth and development pressures along the Route FF corridor. No funding is been identified for implementation, but this plan positions Battlefield to be competitive for funding for corridor design projects.

Route FF can be a key destination for the City of Battlefield, serving residents and visitors alike, and this is the vision found in this report.

This study was prepared in cooperation with the USDOT, including FHWA and FTA, as well as the Missouri Department of Transportation. The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Missouri Highways and Transportation Commission, the Federal Highway Administration, or the Federal Transit Administration.

## Recommendations

### DESIGN

- 3 – lane typical section (80' ROW Weaver to Blue Springs)\*
- Design speed 35 mph (secondary arterial status)
- Multimodal - 10 ft' Shared Use Path (east) & sidewalk (west)
- Roundabouts at Weaver, 3rd, Azalea, Blue Springs
- Updated ped crossings at intersections & Trail of Tears crossing near Somerset
- Corridor wide traffic calming enhancements (narrowed lanes/ raised medians)
- 80' ROW to accommodate typical secondary arterial design standards

### PLANNING

- Reclassify FF as a secondary arterial on OTO Major Thoroughfare Plan (MTP)
- Update Battlefield Subdivision Regulations
  - 405.390 Access Management
  - 405.400 OTO MTP update text
  - 405.400 Design standards
  - 405.410 sidewalk provisions
- Assign roadway improvement needs for future development
- Explore street renaming & branding
- Corridor wide traffic calming

\* 4-lane typical section recommended from FR 123 to Weaver; 3-lane section may incorporate center medians in future downtown Battlefield for traffic calming and access management

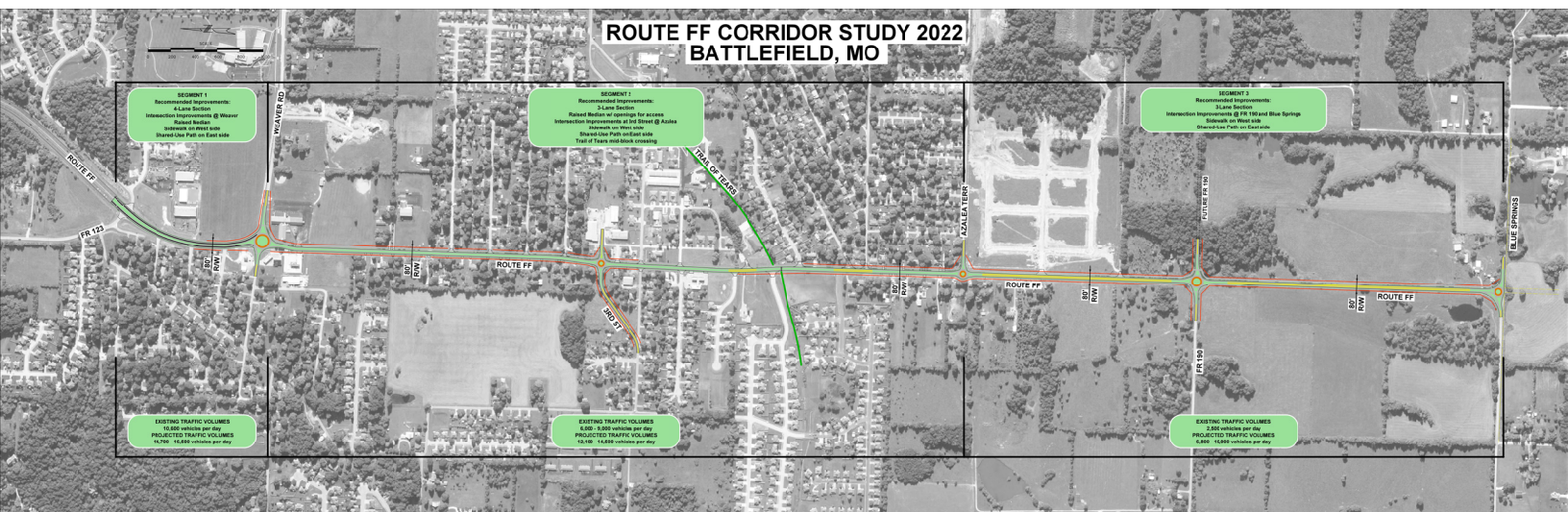


Figure 1- Route FF Corridor Wide Design Needs Map

## Introduction

The City of Battlefield is the fourth largest city in Greene County. Located adjacent to the City of Springfield, the city has experienced significant residential growth since 2000. According to the 2000 US Census, the population in Battlefield was 2,385. The population more than doubled by 2010, reaching 5,590 people. The 2020 population grew slightly and is now 5,990. From 2020 - 2022, 104 building permits were issued for new single family residential units. Growth pressures and a developing sense of identity require a focus on planning for the future vision of the community.

The Southwest Missouri Council of Governments (SMCOG) in 2021 updated the City's 2002 comprehensive plan. In response to the updated Comprehensive Plan, the City of Battlefield developed a plan implementation committee to work toward implementing several of the recommended items from the outlined goals and objectives for the City of Battlefield. In conjunction with that planning effort, the Ozark Transportation Organization (OTO) collaborated with the City to develop a scope of work for studying the future of the Route FF corridor within its boundaries. The Missouri Department of Transportation (MoDOT) was engaged in the process as the roadway owner. Together, all three agencies collaborated on needs and opportunities along the corridor, coupled with growth and development demand, to develop concepts for the future of the roadway through the community.

The Route FF Corridor Study process kicked off in January 2022. Integral to the study process are members of the Core team, comprised of consulting team members (CMT), OTO staff, City of Battlefield Representatives and MoDOT staff. The core team met regularly throughout the study process to review key milestones and project development. The goal of the Route FF corridor study is to determine the future vision for the corridor. From the City perspective, local Battlefield officials are concerned with how the road develops in the future, and primarily answering the question if it looks more like an expressway or corridor that develops as more of a place with the characteristics of a live/work/play environment. MoDOT staff are interested in project specific upgrades along the corridor as well as at key intersections. And finally, OTO staff are interested in the corridor from a planning perspective and seek to better understand how the region's transportation system can support desired growth in Battlefield.

The Route FF Corridor Study began with a detailed look at existing conditions along the corridor. Traffic volumes, typical section, right-of-way space, environmental considerations, future developments, and many other items were reviewed. For study purposes, Route FF was broken down into three segments, based on initial review of the roadway characteristics, coupled with adjacent land uses. These three segments are:

1. FR 123 to Weaver Road
2. Weaver Road to Azalea Terrace
3. Azalea Terrace to Blue Springs Road





*Figure 2- Trail of Tears Park*

After initial review of the traffic analysis, potential typical sections were examined, as well as what intersection upgrades may look like along the FF corridor. Cross sections were examined by corridor segment, as each segment may require different needs in the future based on development patterns. Roundabouts are preferred treatment on the corridor by agency officials. In addition to serving to move traffic efficiently along the corridor, roundabouts can be an effective treatment for traffic calming, as well as provide an opportunity to serve as a gateway feature with a possible branding opportunity. The core team meeting reviewed the initial findings and concepts were finalized to take to the public.

Public engagement started in August 2022 with a public open house where concepts by segment were presented. Interactive voting exercises were completed, and an online survey was launched. The online survey was open for two weeks following the public open house. Feedback from the public was compiled and taken to the core team in September for review of final recommendations.

Using the input from the public, coupled with the existing conditions analysis and input from Battlefield, MoDOT and OTO, the team finalized recommendations for the future vision for the Route FF corridor. These recommendations are included in this report and are intended to help inform infrastructure decisions for Route FF that can foster a strong community with potential for growth and development. At the time the Route FF Corridor study was wrapping up, the City of Battlefield started an economic development and housing plan as an outgrowth of the 2021 Comprehensive Plan implementation strategy. The goal of that study is to determine market capacity for various types of new commercial uses as well as future housing needs within the Battlefield Community.

The recommendations for Route FF have been structured to encourage collaboration between local and state officials. Design recommendations highlight potential construction projects on which the city and MoDOT can collaboratively develop design concepts and reliable cost estimates. Additionally, policy recommendations have been crafted to ensure future development supports the efficient operation of Route FF.

The goal of these recommendations, both design and planning are to enhance safety along the corridor, reduce motorists speeds, and respond to demand based on 2045 future traffic projections.





Figure 3- City of Battlefield Sign

## Existing Conditions

The first step in the Route FF study involved reviewing existing conditions of the corridor, as well as any plans or known future developments on the route. Because the corridor was broken into three segments during the study process, the existing conditions section discusses each component in those same three segments.

- FR 123 to Weaver Road
- Weaver Road to Azalea Terrace
- Azalea Terrace to Blue Springs

## General Corridor Needs

Located adjacent to Springfield, the Battlefield community is a mainly residential community that offers an appealing setting to locate within the area, but outside of the City of Springfield. Given the growth of Battlefield since 2000, it is evident the community continues to attract residents. At the same time, this growth means increased development pressures within the City of Battlefield. On the heels of the comprehensive plan, the need to study and plan for the future of Route FF is an important next step.

Route FF is the critical north/south, state-owned roadway through Battlefield. As a state-owned road, the Missouri Department of Transportation (MoDOT) owns and maintains the road but collaborates locally with the City of Battlefield and the Ozark Transportation Organization (OTO) on priority projects given the local context. The limits of the Route FF study are from FR 123 on the north to Blue Springs Road on the south. Just north of the study area two fairly new residential developments have been built. Silverleaf apartments and condos opened spring of 2021 and is located in the northeast quadrant of the intersection at Republic Road and Route FF. The Township Senior Living opened in the spring of 2019 and is located in the southwest quadrant of Republic and Route FF. Wire Road Brewery is located north of Farm Road 172 and opened in January 2022. The brewery is a popular destination for many residents of the Springfield metro area.



Figure 4- (left to right) FR 123 to Weaver Road, Weaver Road to Azalea Terrace, Azalea Terrace to Blue Springs

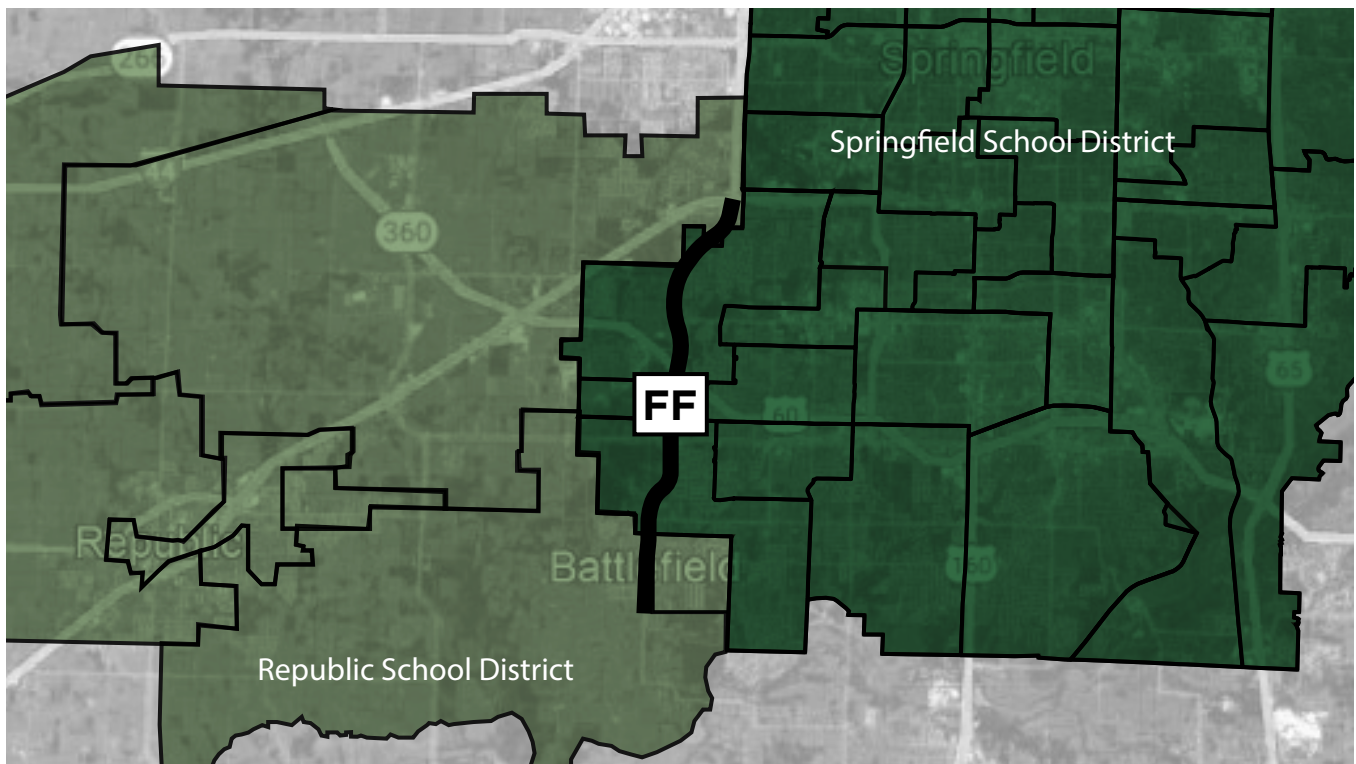


Figure 5- Map of Republic & Springfield School Districts

The City of Battlefield is serviced by eight schools within both the Republic and Springfield School districts. Route FF encompasses children from McCulloch and Lyon Elementary (Republic schools), and McBride Elementary (Springfield schools). Additionally, Republic Middle School (Republic schools), Wilson's Creek Intermediate (Springfield schools) and Cherokee Middle School (Springfield schools) service the area. Finally, both Republic High School (Republic schools) and Kickapoo High School (Springfield schools) serve Battlefield. Figure 5 shows Republic School District in light green and Springfield School District in dark green. Pedestrian connectivity for children walking to school is a concern for the Battlefield community. Some students can walk to school on Weaver. Others have to drive to Republic. With the potential for a new school to serve the growing Battlefield population, providing safe routes to school for children is a priority.

The corridor serves to move vehicles efficiently through the Battlefield community. However, with limited wayfinding and signage along the corridor, one might not be clear when they have arrived in Battlefield. Posted speed limits at the north and south of the study area are 55 mph, whereas the posted speed limit is 45 mph within the Battlefield City limits. A continuous sidewalk exists consistently on the east side of Route FF from Weaver to Green Ridge Terrace, but no striped crossings exist to cross Route FF. Most of the current uses along Route FF are residential, with a few commercial nodes located at Republic Road, Weaver Road, 3rd Street and 2nd Street. A comprehensive plan for Battlefield completed in 2021 outlined existing land uses but did not provide a future land use map. At the time the Route FF study is culminating, the City of Battlefield is launching an economic development and housing study to develop a future land use map and examine the market for various retail and housing needs within Battlefield.

Traffic control along Route FF is primarily side street stop control except for a traffic signal at Republic Road. Intersection traffic control on the Route FF corridor is an important question of this study. MoDOT, OTO and City officials are very interested in understanding what traffic control makes the most sense at some of the important commercial nodes along the corridor, including the assessment and feasibility of potential roundabouts.

Limited driveways exist in segments 1 and 3, however, many driveways access Route FF in segment 2. These driveways serve single-family residential homes, as well as the limited commercial lots currently adjacent to Route FF. Overhead utilities exist throughout the study area, alternating sides of Route FF. Mailboxes to the residential houses along the corridor face FF. Finally, with any major roadway changes or expansion of existing pavements, drainage will need to be considered.



## Functional Classification

Roadway functional classification is governed by federal guidelines and refers to the process by which roads, streets and highways are grouped into classes according to the type of vehicular service they are intended to provide. The functional classification network outlines the role a particular street or road is intended to serve within the transportation network. Because the functional classification refers to the role a particular road, street or highway is to have within the system, it also carries with it expectations about roadway design, including speed, capacity, and relationship to future land use development. Roadways serve two primary travel needs: access to and from specific locations and mobility. The classification of roadways progresses from a lower classification, handling these shorter trips with more access, to a higher classification, intended for longer trips to connect regional traffic. Functional classification is assigned based on how the roadway currently functions and is maintained by MoDOT. OTO endorses any functional classification changes within their planning region and maintains the OTO Major Thoroughfare Plan. That plan shows how OTO sees function changing over time.

The hierarchy of the functional classification system, from highest mobility to greater access is:

- Interstate – highest level of mobility and designed with long distance travel in mind
- Freeway/expressway – designed to maximize mobility with specific on/off ramp locations for access to local transportation networks
- Principal Arterial – provides high level of mobility within urban areas, including access to local driveways.
- Minor Arterial – serving moderate length trips, connecting principal arterials in an urban setting
- Major Collector – moves traffic from local roads to arterials
- Minor Collector – moves traffic from local roads to arterials, shorter in length and lower posted speed than their major counterpart
- Local road – most access, short trips on the local roadway network, within neighborhoods.

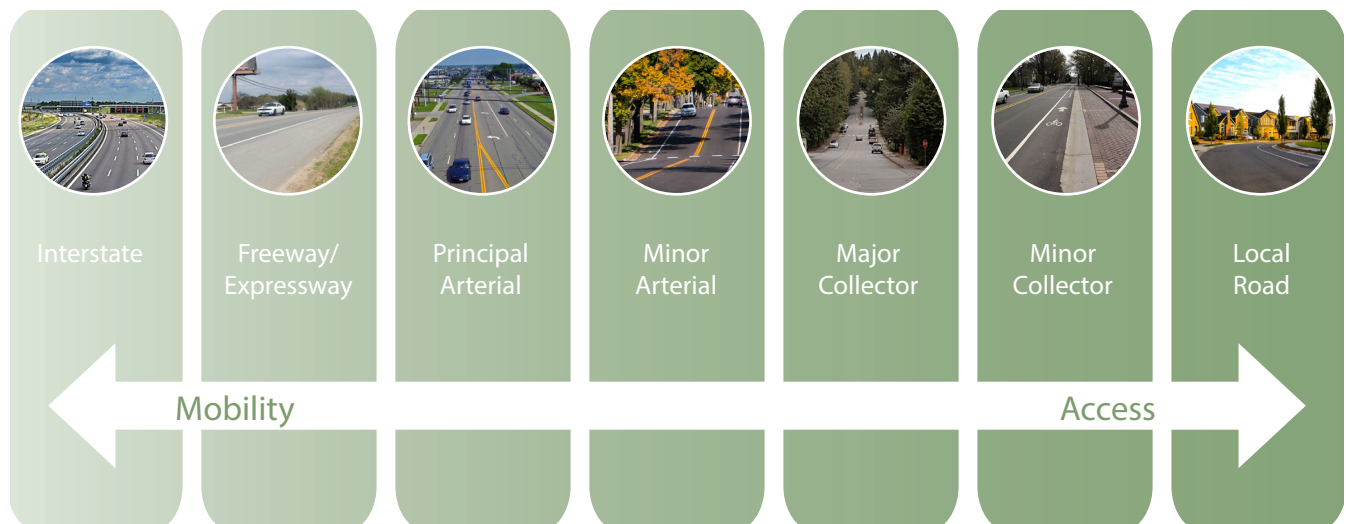


Figure 6- Hierarchy of the Functional Classification System

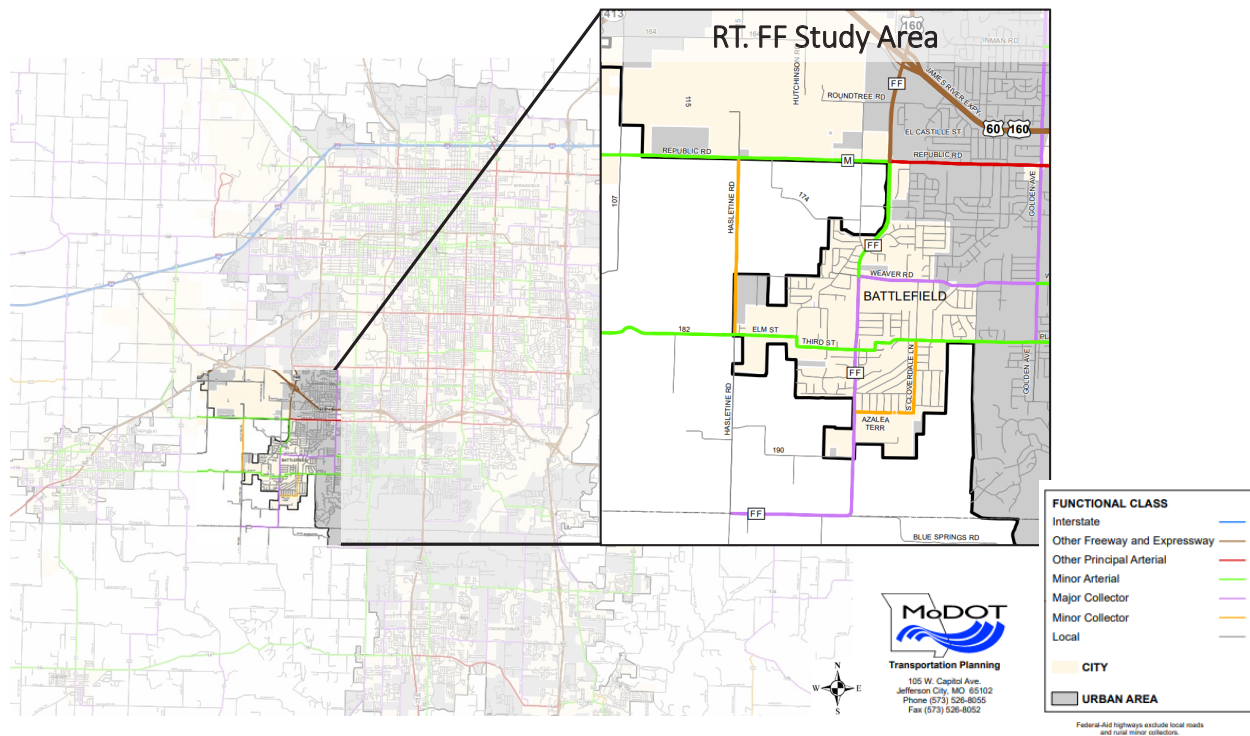


Figure 7- Route FF Study Area

Route FF from FR 123 to Weaver Road is classified as a principal arterial, which means it currently functions to provide a high level of mobility within the Springfield metro area, but still provides direct access to driveways for adjacent land uses. Route FF from Weaver Road to Blue Springs Road is classified as a Major Collector. This segment of the road is intended to connect trips from the local roadway network to the arterial system.

Republic Road is classified as a minor arterial west of Route FF and a principal arterial east of Route FF. Weaver Road is classified a major collector east of Route FF. Third Street is classified as a minor arterial east and west of Route FF. Azalea Terrace is classified as a minor collector east of Route FF.

## Roadway Design/Typical Section

Existing typical sections are described here.

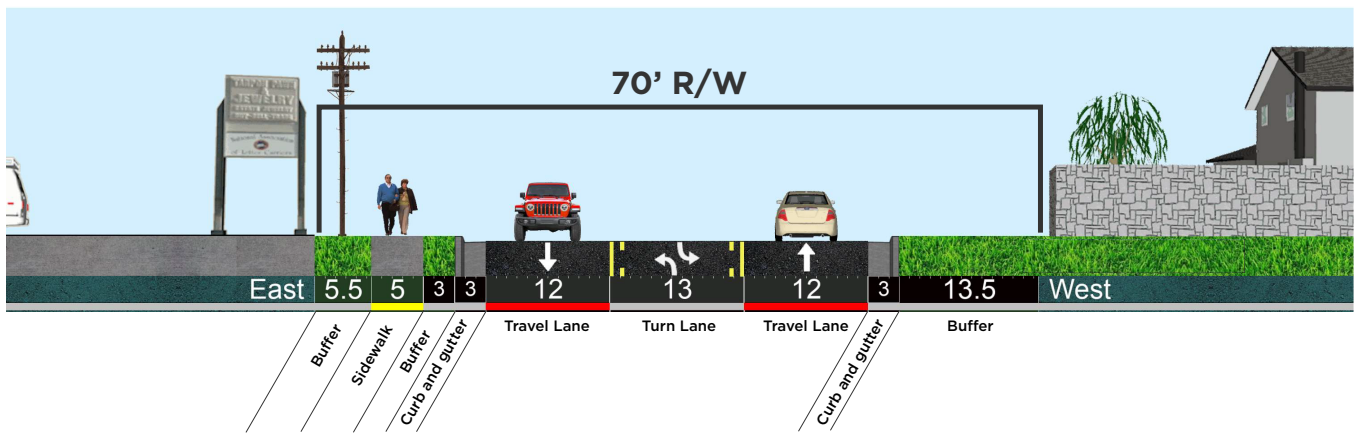
### SEGMENT 1: REPUBLIC ROAD TO WEAVER ROAD

\* Study area begins at FR 123, but for the purposes of corridor transitions the section is described starting at Republic Road

The intersection at Republic Road and Route FF is the only signalized intersection within the study area. There are two thru lanes and a left turn lane (protected signal) in the north and south direction, as well as channelized right-turn lanes to access Republic Road from Route FF. On Republic Road there is one thru lane and a left-turn lane (protected/permissive) in the east/west direction. Route FF from Republic Road to FR 123 is divided four-lane segment. The posted speed limit is 55 mph and there is an outside shoulder on each side of the street. Existing right-of-way (ROW) is 220 ft. No pedestrian or bicycle facilities exist in this segment of the road and directional signage is limited. There are no driveways and only access to intersecting roads, where turn lanes exist.

At FR 123, the typical section transitions to a three-lane section with two-thru lanes and a center two-way-left-turn-lane (TWTL) for more access to driveways. The posted speed limit changes to 45 mph. One sidewalk segment exists from the Freedom Health Systems development to Weaver Road on the east side of Route FF. Overhead utilities are located on the east side of Route FF.

Figure 8- Route FF - Segment 1 - Existing



#### SEGMENT 2: WEAVER ROAD TO AZALEA TERRACE\*

The intersection at Weaver Road and Route FF is side street stop control. The posted speed east of Route FF is 30 mph and the posted speed west of Route FF is 25 mph. The intersection is a commercial node along the corridor with a convenience store/gas station (SW), a real estate agency (NW) and a church (SE). The typical section is a two-lane road with a single lane in each direction. A newer sidewalk has been installed on the east side of the road from Weaver to Green Ridge Terrace and is in good condition. The existing ROW is 70 ft. Overhead utilities transition from the east to the west side of the road from Weaver to 3rd Street and are located on both sides of Route FF south of 3rd. This segment of the corridor is primarily residential with driveways off Route FF serving single-family homes. Commercial nodes exist at 3rd (side street stop) and 2nd (side street stop) streets. The posted speed is 45 mph. Limited wayfinding and directional signage exists, and residential mailboxes abut Route FF. There is a future trail crossing planned across Route FF near Somerset in this section of the study area.

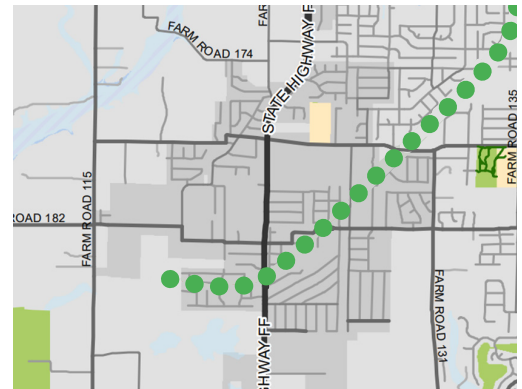
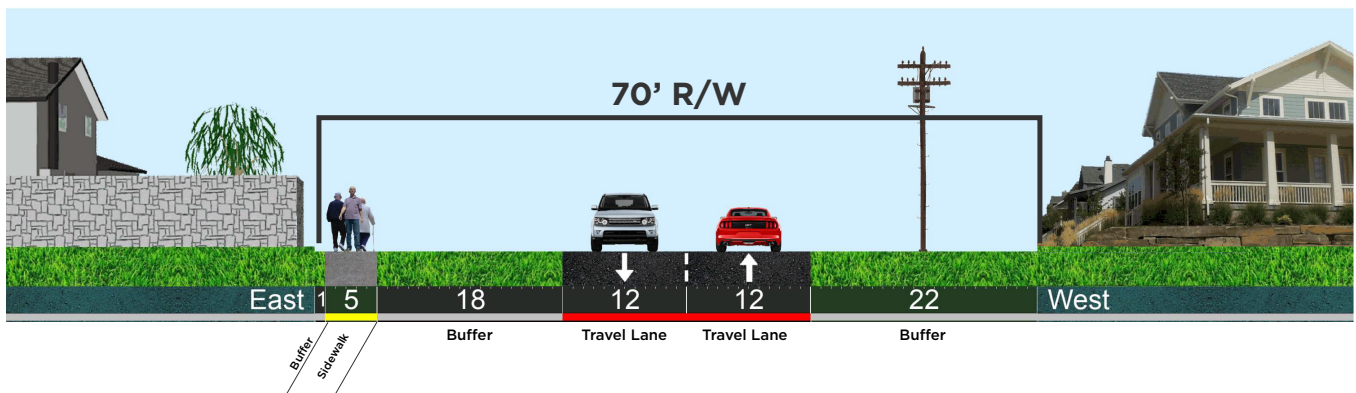


Figure 9- Future trail crossing over Route FF

Figure 10- Route FF - Segment 2 - Existing

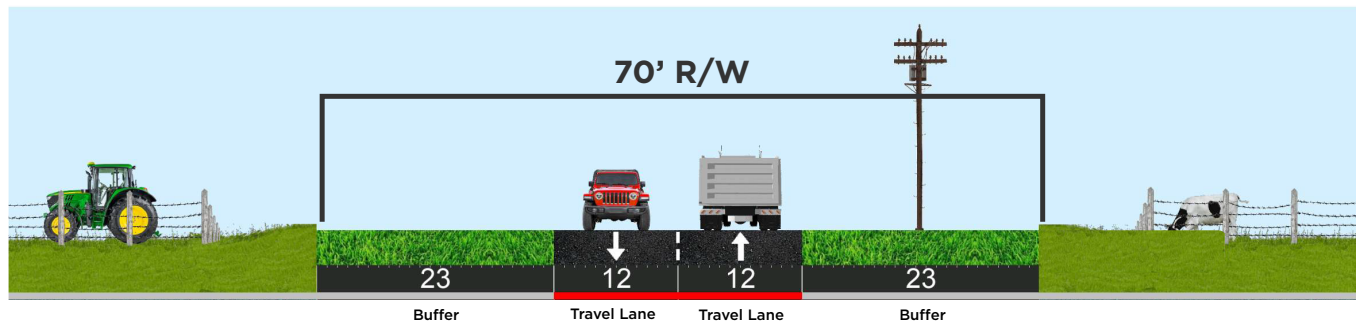


#### SEGMENT 3: AZALEA TERRACE TO BLUE SPRINGS ROAD

The intersection at Azalea Terrace is a T-Intersection connecting to Route FF and is a side-street stop. South of Azalea Terrace Route FF is a two-lane segment with one thru lane of traffic in each direction. This segment of road is mostly residential land uses, with the potential for developable land south of Green Ridge Terrace. The driveways on the northern part of this segment function to serve the single-family residential homes located adjacent to Route FF. Existing ROW is 70 ft. The

posted speed limit is 45 mph from Azalea Terrace to Farm Road 190, where the posted speed changes to 55 mph. The only pedestrian facility that exists is the continuation of the new sidewalk on the east side of Route FF from Azalea Terrace to Green Ridge Terrace. No bicycle facilities exist, and directional signage and wayfinding is minimal. Overhead utilities are on both sides of Route FF until Farm Road 190 where they transition to the west side of Route FF. The road curves to the west as it meets Blue Springs Road with no stop for vehicular traffic on Route FF, and only stop signs for those continuing on Blue Springs Road or entering Route FF from Blue Springs Road.

Figure 11- Route FF- Segment 3 - Existing



## Traffic Volumes

Battlefield has significantly grown in population since 2000. Additionally, the Springfield Metropolitan area is continuing to experience significant growth, adding over 100,000 residents since 2000. According to the 2020 US Census, the Springfield Metropolitan area increased in population by nearly 9%. As such, projecting future traffic volumes associated with development patterns is key for determining the future buildout of Route FF.

OTO provided existing travel demand data for analysis of three different scenarios impacting the future volumes along Route FF. Modeling traffic patterns in these scenarios assisted with making informed decisions about the future mobility needs along Route FF. The three scenarios modeled are:

- Completion of Kansas Expressway south of James River Freeway (US60) – The Kansas Expressway scenario included shifting N/S travel patterns to the new 4-lane Kansas Expressway extension. (This project is currently under construction)
- Farm Road 190 Extension (E/W arterial connector) – This scenario included the addition of an E/W arterial road connection somewhere near FR 190 on the east side of FF.
- Route FF extension to Route 14 (N/S connection extension) – This scenario included FF as a direct connection to Nixa via south expansion. The scenario modeled both the 2-lane and 4-lane section to test latent demand on the corridor.

In all of these scenarios the future traffic volumes did not necessitate 4-lanes of vehicular traffic on Route FF.



## Route FF Corridor Study



Figure 12- Route FF Corridor Study

TABLE 1- TRAFFIC PROJECTIONS

Roadway Segment	Existing Traffic Volumes	Future Traffic Projections*
Segment 1 - FR 123 to Weaver Rd	10,600 ADT	14,700 ADT to 16,500 ADT
Segment 2 - Weaver Rd to Azalea Terr	6,000 ADT Weaver to 3rd 9,000 ADT 3rd to Azalea	12,100 ADT to 14,500 ADT
Segment 3 - Azalea Terr to Blue Springs Rd	2,500 ADT	6,800 ADT to 10,900 ADT

\*Future Traffic projections based on the following traffic scenarios:

1. The extension of Kansas Expressway to the South
2. Construction of an East-West connector roadway near FR 190
3. Extending Route FF to the South and connecting to Route 14

ADT- Average Daily Traffic Volume



Safety

Safety along the corridor is another key factor in the Route FF Study Process. A high level review of crashes was completed and those heat maps are shown here. Crash data pulled for the past 5 years shows there were 132 crashes within the study area. Of those crashes, 10 were serious injury crashes, and 32 were minor injury crashes. There were no fatalities.

By intersection Weaver had the most crashes (37), followed by 3rd (21), Blue Springs (9) and FR 190 (3).

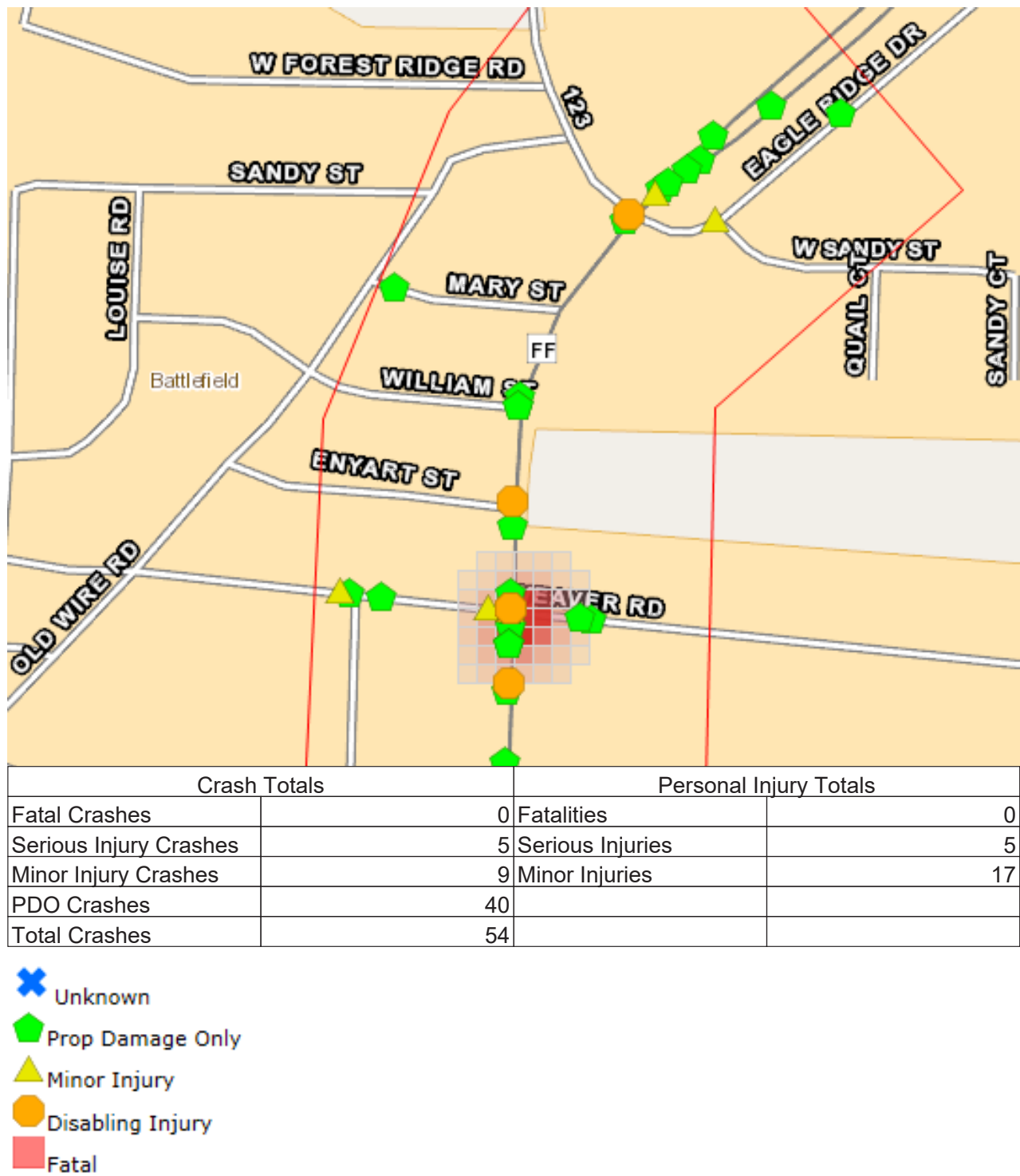
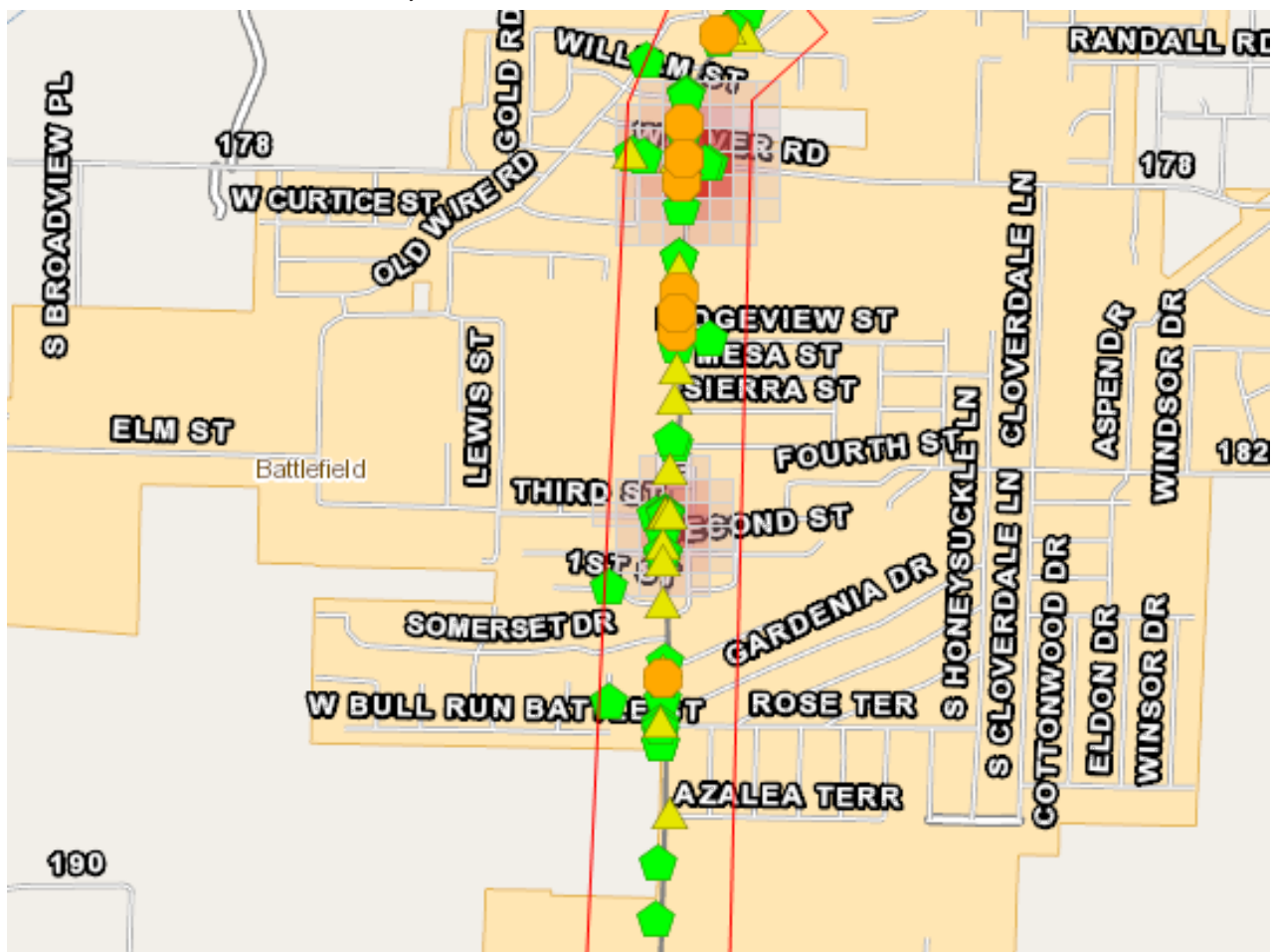


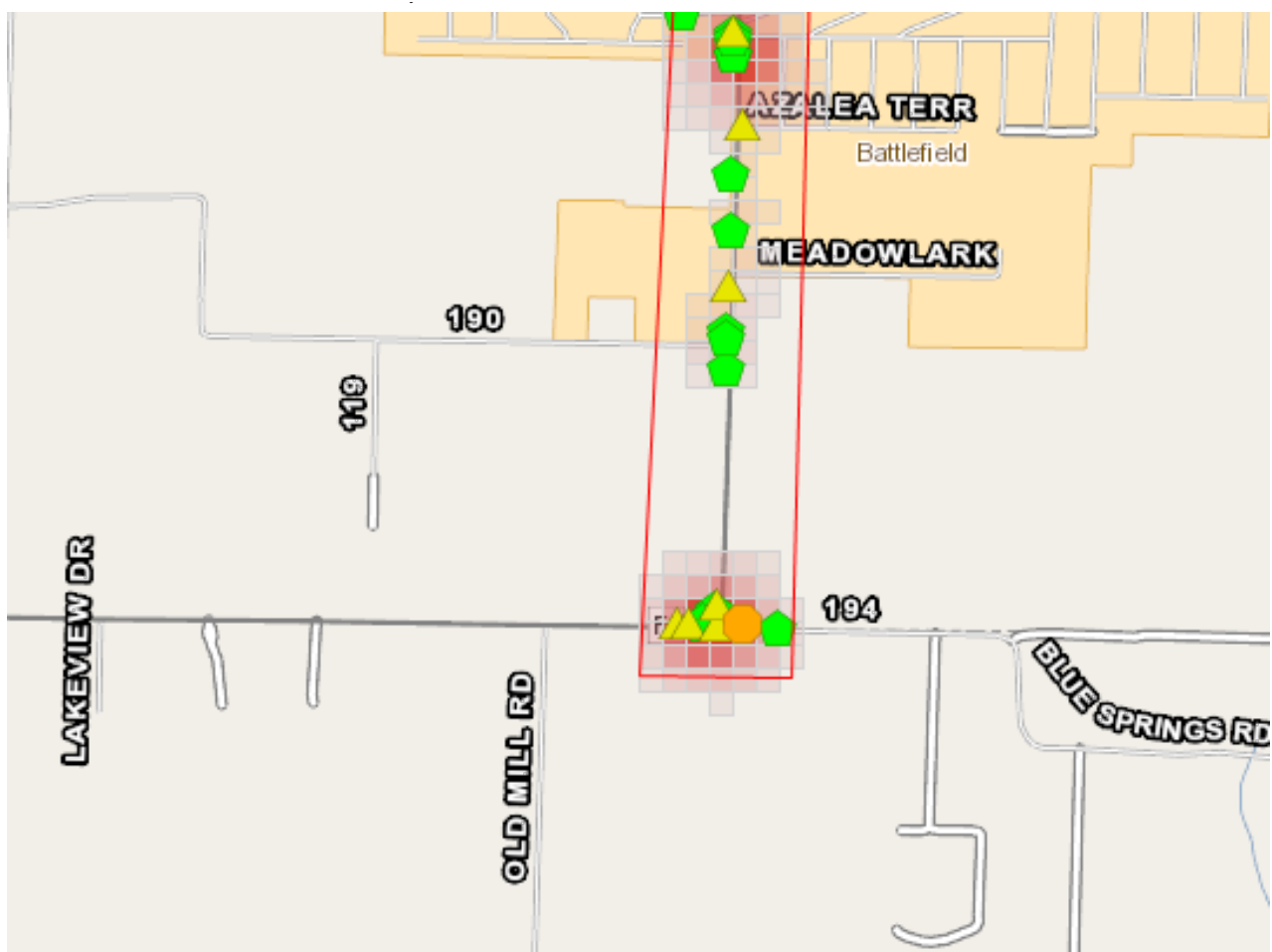
Figure 13- Crashes for Segment 1 (FR 123 to Weaver Road)



Crash Totals		Personal Injury Totals	
Fatal Crashes	0	Fatalities	0
Serious Injury Crashes	8	Serious Injuries	8
Minor Injury Crashes	24	Minor Injuries	39
PDO Crashes	71		
Total Crashes	103		

- ✕ Unknown
- ▬ Prop Damage Only
- ▲ Minor Injury
- Disabling Injury
- Fatal

Figure 14- Crashes for Segment 2 (Weaver Rd to Azalea Terrace)



Crash Totals		Personal Injury Totals	
Fatal Crashes	0	Fatalities	0
Serious Injury Crashes	1	Serious Injuries	1
Minor Injury Crashes	6	Minor Injuries	7
PDO Crashes	9		
Total Crashes	16		

- ✖ Unknown
- ⬠ Prop Damage Only
- ▲ Minor Injury
- Disabling Injury
- Fatal

Figure 15- Crashes for Segment 3 (Azalea Terrace to Blue Springs Road)

## Adjacent Land Use

The Battlefield Comprehensive Plan from 2021 outlined existing commercial land use along the Route FF corridor. In addition to outlining the adjacent land uses, goals were outlined related to economic development and attracting new businesses to the city, including the area of Downtown Battlefield. Currently, little of the land along Route FF is used for commercial uses, but there is room for potential development or redevelopment along the corridor.

The Future Land use Map is included here, but does not address potential uses outside of existing Battlefield City Limits. As an outgrowth to the 2021 Comprehensive Plan process, the City of Battlefield is starting a housing and economic development study to address land consumption needs for future residential and commercial uses. The area around Route FF that is not within the city limits will be included in that work.

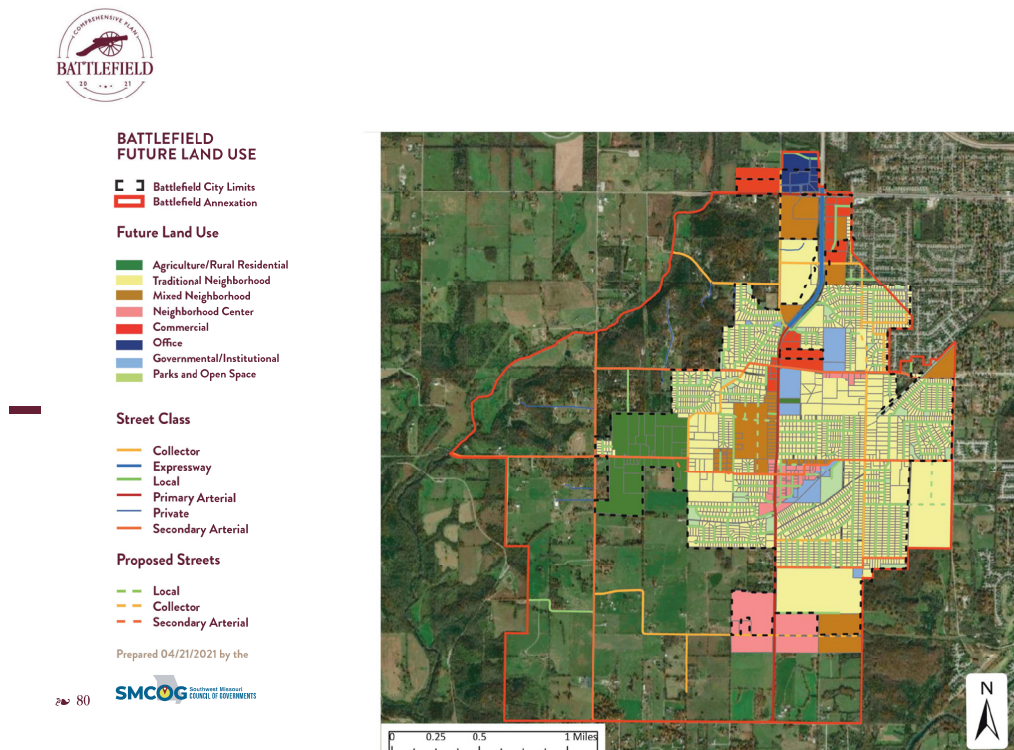


Figure 16- Battlefield Comprehensive Plan 2021

## Environmental Considerations & Constraints

A desktop review of environmental considerations for the study corridor was completed. These impacts should be considered with any future design modifications to the corridor. Full environmental documentation is included in the appendix with key takeaways summarized here.

### WETLANDS/STREETS (404 PERMITTING)

Multiple National Hydrography Dataset (NHD) streams and National Wetland Inventory (NWI) wetlands are mapped within the study area boundaries. These include: two mapped intermittent streams, seven freshwater ponds, and one freshwater emergent wetland. Based on aerial imagery, some of these features may no longer be present along the alignments. Field investigation will be required to determine if streams and wetlands are present. Impacts to federally jurisdictional streams and/or wetlands will require compliance with 404/401 permitting.

### THREATENED & ENDANGERED SPECIES

According to USFWS Information for Planning and Consultation (IPaC) review, the following federally listed species may occur in the study area:

- Indiana bat (*Myotis sodalis*, endangered), Northern long-eared bat (*Myotis septentrionalis*, threatened), Tricolored Bat (*Perimyotis subflavus*, proposed endangered)

- During any future roadway projects on Route FF, tree clearing of suitable habitat will require seasonal restrictions (November 1- March 31)
- Gray bat (*Myotis grisescens*, endangered)
  - The final project alignment will need to be assessed for suitable cave habitat
  - MDNR GeoSTRAT reports no sinkholes in study area
- Ozark cavefish (*Amblyopsis rosae*, threatened)
  - Based on a desktop review, cave streams are not likely to be located within the study area
- Alligator snapping turtle (*Macrochelys temminckii*, proposed threatened)
  - Candidate, no current recovery plans or special rules, no critical habitat identified
  - The final project alignment will need to be assessed for suitable aquatic habitat
- Virginia sneezeweed (*Helenium virginicum*, threatened)
  - No critical habitat identified, currently only found in Virginia, historical range in Missouri
  - The final project alignment will need to be assessed for habitat- shores of shallow, seasonally flooded ponds/ wetlands

Further coordination will be required to MDC Natural Heritage Review to determine if there are records of federally- or state-listed species or state-ranked species near the project boundaries.

#### CULTURAL RESOURCES

No National Register sites are located within the project area. During future project design, the area will likely need to be reviewed for buildings and structures that are over 45 years of age.

#### HAZARDOUS WASTE SITES

- Operating UST with no known releases: 3 (orange)
- Facility closed prior to implementation of 2004 tanks RBCA: 1 (Purple)
- Administrative closure: 1 (Black)
- If right-of-ways or easements will be required from these properties, additional investigation will likely be necessary.

#### FLOODPLAIN

Most of the project area is outside of the floodplain. There are two small areas toward the Southwestern edge of the study area that are in Zone A (1% annual chance of flooding). Any construction within a floodplain will require a floodplain development permit.

#### PARKLAND/4(F) PROPERTIES

There are no parks or potential recreation 4(f) properties were identified within the study area.

#### FARMLAND

The study area encompasses farmland in the southern portion. Impacts to farmland may require coordination with NRCS.

#### NOISE

If the project is classified as a Type I or Type II project, a noise analysis may be required.



# Utility Considerations & Constraints

A preliminary MO One Call search was performed along the Route FF corridor from north of Weaver Road to the Greene/Christian County Line. The results of the search revealed the following companies as possibly having facilities within the project limits:

- AT&T Distribution – Copper & Fiber Communications
- City of Battlefield – Sanitary Sewer
- Brightspeed – Fiber Optic Communications
- City Utilities – Electric (Power)
- City Utilities – Gas
- SpringNet – CU Fiber Optic Communications
- Greene County PWSD1 – Water
- Verizon – Fiber Optic Transmission
- Ozark Electric Cooperative – Power
- Southern Star Central Gas Pipeline – Gas Transmission
- Mediacom – Coaxial and Fiber Communications

Most of the facilities noted above are used for distribution. City Utilities has overhead 3 Phase running parallel to Route FF along the majority of the corridor. Ozark Electric also has parallel 3 Phase from 3rd Street going south to the County Line. It appears CU’s distribution power is within existing public R/W but Ozark Electric’s facilities are in private easement beyond public R/W. AT&T’s and Mediacom’s facilities appear to be within public R/W. Greene County PWSD#1 has parallel water mains ranging from 4” to 10” dia. along the corridor. It should be assumed that the majority of the water facilities are within private easement beyond the limits of public R/W. City Utilities has a parallel 6” steel gas main along Route FF. Mapping indicates this facility falls within existing R/W.

The three known transmission facilities include Southern Star’s gas main crossing on the north side of Weaver Road, Verizon’s toll fiber crossing approximately 1650 ft south of 3rd Street, and City Utilities’ 161kV powerline crossing approximately 1050 ft south of Azalea Terrace. It should be assumed that all three of these transmission facilities fall within private easements. The relocation of gas transmission mains are typically limited to the summer months when demand is low. Likewise, electrical transmission relocations are typically performed during the spring or summer months when the demand is low. It should be noted that the relocation of gas or electrical transmission facilities can impact project schedule.

The topographic survey should be compared to the individual utility mapping to make sure that all known utilities have been accounted for on the survey. Any missing facilities are to be located utilizing the MO One Call system and picked up on the topographic survey. The individual utility companies should be informed as the roadway design progresses. The roadway design should make an effort to eliminate or minimize the impacts to all high-profile facilities. Any reimbursable utility relocation should be accounted for within the overall project budget. The individual utility owners need to be apprised of the project schedule so they can budget for any non-reimbursable relocation expenses.

## KEY TAKEAWAYS

- 3 known transmission facilities
- Relocations typically during spring or summer months when demand is low
- Can impact project schedule
- Will have to move overhead utility power due to expanded roadway footprint

## Right of Way Considerations & Constraints

Typically, the corridor is 70 ft of ROW along Route FF. There are a few exceptions at points throughout the corridor. At a minimum, 5 ft of ROW will need to be acquired on both sides of Route FF for the recommended design treatments and accommodate recommended update to functional classification . In some cases, more will be required, including at the intersections where additional space will be needed to accommodate site distance. Exceptions to the 70 ft ROW along Route FF include:

- Narrows to 50 ft just south of Monterrey, widens to 70 ft approx. 265 ft north of 3rd
- 80 ft south of 3rd and widening to 95 ft midway between 2nd and 1st
- 75 ft narrowing to 70 ft between 1st and Sommerset
- 65 ft between Sommerset and Azalea

## Existing Plans

Existing plans that included Route FF within their planning area were reviewed to get a better sense of the planned growth and development along the corridor. As indicated previously, at the culmination of the Route FF study, the City of Battlefield was working on an economic development and housing study to better understand the market needs related to commercial and housing needs.

### BATTLEFIELD COMPREHENSIVE PLAN

In 2021, the City of Battlefield collaborated with the Southwest Missouri Council of Governments (SMCOG) to update the City's 2002 Comprehensive Plan. This document is to serve as the official guide for the community's future growth, land use and developments. Future policy and infrastructure decisions should be consistent with what is included in the adopted comprehensive plan. The City of Battlefield has a plan implementation team that has been meeting regularly to get items from the comprehensive plan accomplished. Items related to Route FF Include:

- Improve traffic flow in Battlefield (identify intersections for improvement; maximize capacity by maintaining good access and bike/ped facilities
- Provide all modes of transportation to reduce the number of vehicles on the roadway
- Create a Downtown Battlefield area as one of the major economic centers and attractive urban lifestyle center (improve infrastructure to include pedestrian friendly environment

### DESTINATION 2045

(Long Range Transportation Plan (LRTP) for the OTO Planning area)

Adopted in 2021, Destination 2045 lays out priorities for the transportation network in the Springfield Metropolitan area. The LRTP is updated every 5 years and maintained by OTO. Included in Destination 2045 was a major throughfare plan for the region, as well as design standards for typical sections by roadway classification. Route FF is included in this throughfare plan and is identified as an expressway and a minor arterial. Route FF is also included as a priority route for sidewalks on both sides of the street. Recommendations for how Route FF should be classified in future OTO thoroughfare plans is included in this report.

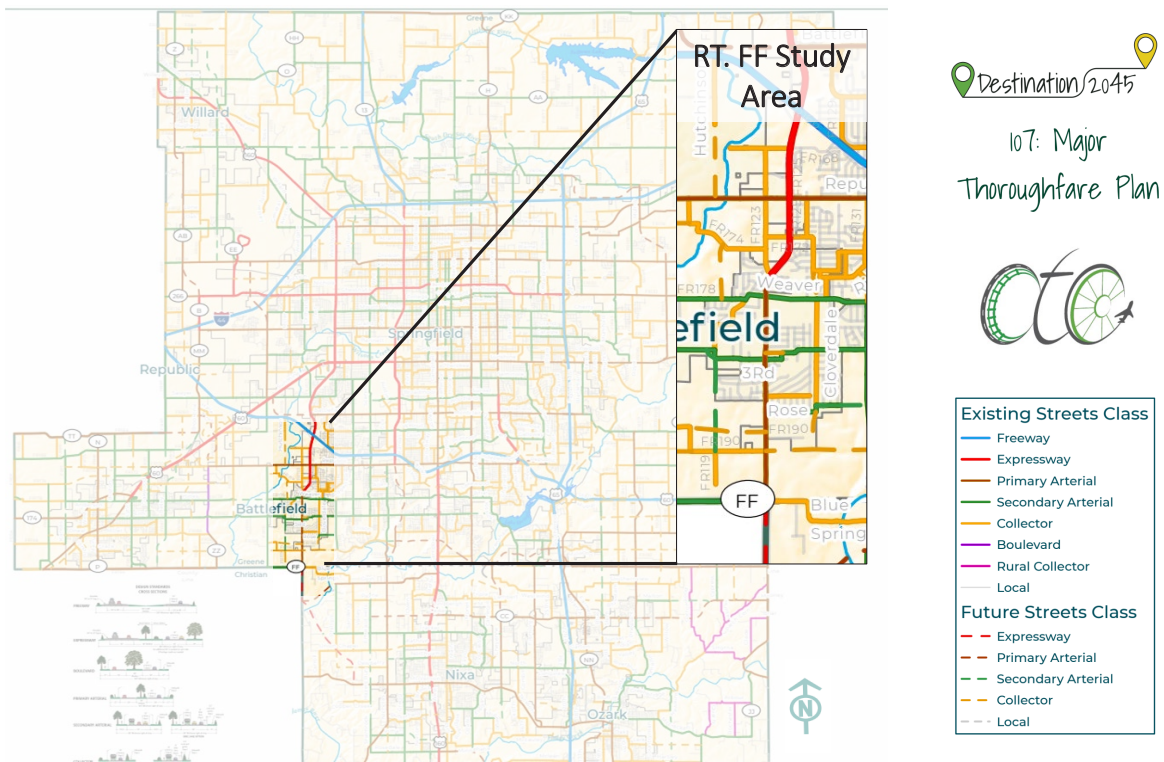


Figure 17- Destination 2045 Major Thoroughfare Plan

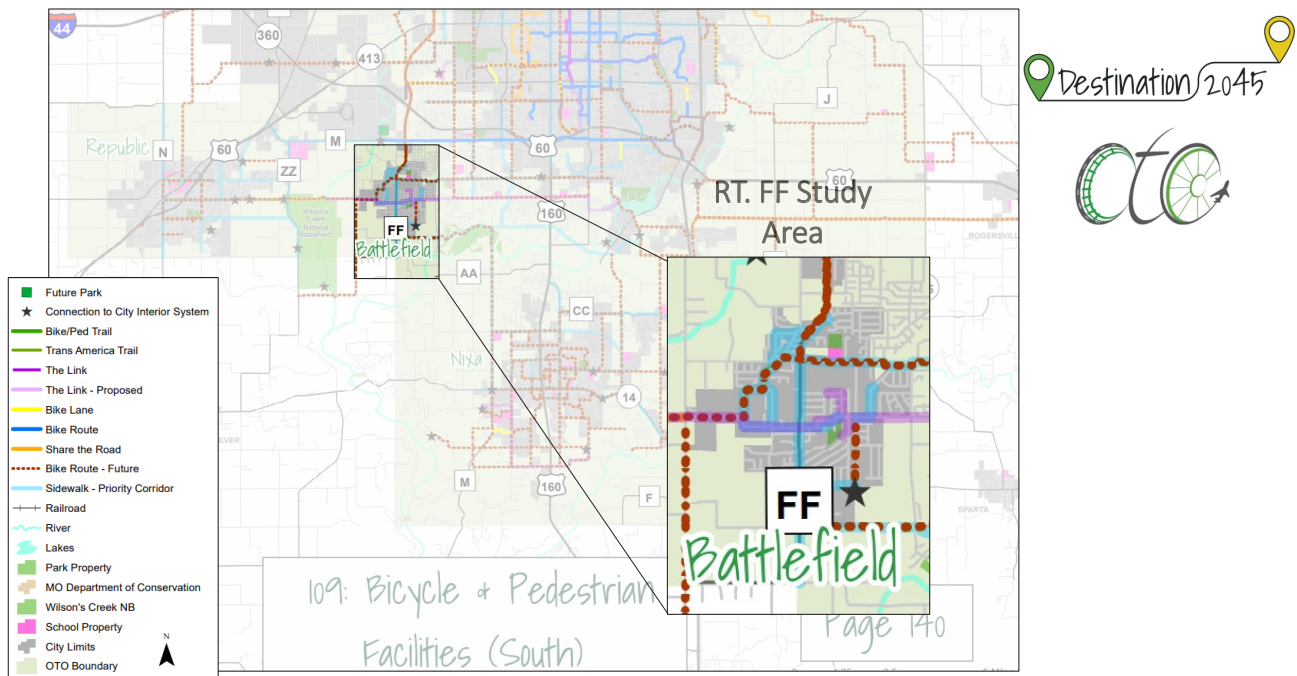


Figure 18- Destination 2045 Bicycle & Pedestrian Facilities

# Engagement

The Route FF study included a multipronged approach to engagement with routine checks on milestones with a technical committee, and an outreach to the public that included online engagement and in-person project discussion.

## Core Team

The core team met key milestones during the Route FF corridor study. Agencies represented on the core team included members of the consulting team, as well as representatives from OTO, MoDOT and the City of Battlefield. The first meeting of the core team was held in January 2022 to review the study scope and review project needs and expectations.

The second core team meeting reviewed existing conditions, including traffic volumes and projections. Additionally, the corridor was reviewed in more detail using the 3-segment discussion, and potential options for the roadway concepts were discussed. Dates and times for the public open house and survey launch were set. Core team meeting 3 discussed potential roadway design updates to present to the public.

A public meeting on August 2nd.

The fourth core team meeting was held in September 2022 and reviewed public input from both the survey and the open house. Priorities with all agencies were discussed and final steps to close out the study were detailed. Information garnered from the public input did not indicate a clear preference about roadway design. However, using the general feedback with core team input, the recommendations were developed.

The complete public input presentation reviewed at the fourth core team meeting is included here as an appendix to this report.

## Online Survey

An online survey was launched on August 2, 2022, and open for two weeks. Between participants taking the survey online and individuals that filled out the survey at the public meeting, 59 respondents participated in the Route FF corridor study. A blank copy of the survey is included in the engagement section appendix of this report. The survey was mostly completed by those that live in Battlefield and use Route FF regularly (80%). Additionally 41% of survey respondents were aged 65 – 74, with the next largest age group of respondents being ages 35 – 54 (32%).

The survey asked participants questions about how frequently they travelled along Route FF, as well as how they traveled (car, bike, walk, other) and for what type of reasons they travelled. In addition to usage patterns and basic demographic information, the survey asked questions by each of the 3 segments related to concerns, their perceived necessary transportation improvements, and the type of development the respondents were interested in along the Route FF corridor. Additionally, people were also asked to leave general comments or concerns. All of these responses are detailed in the engagement appendix attached to this report.

## Public Meeting

A community open house was held on Tuesday, August 2, 2022, from 4:30 – 6:30pm at Battlefield City Hall. The meeting was advertised to Battlefield residents and those individuals that use Route FF. The meeting was held prior to the City's celebration of National Night Out. Eighty-six people attended that meeting and listened to the project team discuss the Route FF study, including existing conditions and initial options/concepts for the future design on Route FF. After a brief presentation, members of the public were asked to review project boards and vote on their preference for what vision of Route FF most inspired them. The public engagement summary from Core Team Meeting 4 is included in the engagement appendix attached to this report.

There were five boards that were available for the public to view following the Route FF study presentation. Participants were encouraged to leave post-it notes with their thoughts and opinions as well as were provided with dots to vote on treatments or concepts they were interested in seeing along the Route FF corridor. An outline of these boards is included here and the images of the boards with comments is included in the engagement appendix.

- BOARD 1: General Corridor Information – mapping by segment, as well as existing and projected traffic volumes
- BOARD 2: Route FF Major Intersection Concepts – Concepts on treatments available for major intersections (roundabout, signalized, limited access or no improvement)



- BOARD 3: Segment 1 design options & voting on specific treatments individuals liked from each option (multi-use path, sidewalks on both sides, landscaped median, access control)
- BOARD 4: Segment 2 design options & voting on specific treatments individuals liked from each option (sidewalks on both sides, walkable business district, multi-use path, bike lanes, raised median, access control)
- BOARD 5: Segment 3 design options & voting on specific treatments individuals liked from each option (multi-use path, sidewalk on one side, sidewalks on both sides, bike lanes, landscaped median, access control).

The feedback from the public meeting was generally mixed and provided no strong opinion on preferred design concepts for the Route FF corridor. Most attendees at the public meeting lived on Route FF and had a higher level of interest in the project due to their property being adjacent to the corridor. Based on input from the city, the level of response received for the Route FF corridor study is similar to the level of engagement received during the update to the comprehensive plan. Using this information, the Core Team was able to finalize concepts to move forward after the FF study, as well as possible implementation of timing of future roadway projects. The recommendations for the future vision of Route FF are included in the next section.



Figure 19- Public Meeting Pictures



## Corridor Recommendations

Recommendations for this corridor have been separated into two categories. Both categories are framed with the overall recommendation Route FF should be classified as a secondary arterial. First, we offer a set of design focused recommendations to enhance safety, while efficiently moving people through the corridor. These design concepts focus on vehicular traffic, as well as those walking or biking within the local Battlefield community. These design concepts are governed by the re-classification of Route FF as a secondary arterial. The primary benefits of the updated cross section, as well as the roundabout treatments are to reduce vehicular speeds and increase safety.

The second set of recommendations is planning focused solutions. Given the future development potential along the corridor, including the focus on a future Downtown Battlefield, these policy solutions are necessary, so infrastructure improvements match mobility needs in the future. The idea of a rebranding is also included as a way to foster more of a place within Battlefield.

Based on future traffic projections, a 3-lane section is sufficient to serve capacity on Route FF and move people efficiently within and through the corridor. This requires 80' ROW with a design speed of 35mph as governed by the status as a secondary arterial on the OTO MTP. Four lanes are recommended north of Weaver Road. In segment 2 (downtown), a 2-lane section is recommended using a center median to provide additional traffic calming and access management.

TABLE 2- ROUTE FF CORRIDOR RECOMMENDATIONS

Recommended Design Treatments	Timing	Recommended Planning Treatment	Timing
3-lane typical section; 80' ROW (secondary arterial design guidance)	ADT threshold of 11,000 is reached	Reclassify Route FF as a secondary arterial on the MTP (OTO)	Early 2023
Design speed 35mph (governed by secondary arterial)	During corridor redesign (ADT threshold reached)		
10' SUP on E Side & sidewalk on W side	During corridor redesign (ADT threshold reached)	Explore a name change/ street rebranding	Start now
Roundabouts at Weaver, 3rd, Azalea, & Blue Springs	(1st) Weaver -high crash location (2nd) 3rd-high crash location & complement to R/A at Weaver	Update Battlefield Street Design Standards/subdivision regulations	2023
Trail of Tears crossing at Somerset	During corridor redesign (ADT threshold reached)		
Updated high visibility crosswalks throughout	During corridor redesign (ADT threshold reached)	Assign roadway improvements for future development needs	After subdivision regulation updates
Corridor-wise traffic calming	Depending on specific treatment, during corridor redesign or as adjacent developments occur		

## Design Focused

### CORRIDOR TYPICAL SECTION

Given the future growth along the corridor and traffic volume projections, a three-lane section is sufficient to serve capacity on Route FF and move people efficiently through and within the corridor for most segments. However, from FR 123 to Weaver Road 4-lanes is recommended. In the downtown area, a 2-lane segment is recommended, with the installation of a center turn lane to provide additional traffic calming and access management. More details about these segments are included here.

Future traffic volumes are projected to be between 6,800 ADT (segment 3) and 16,500 ADT (segment 1). According to the OTO Destination 2045, these volumes fall well within the range of what is classified as a secondary arterial and require a minimum of 80 ft of ROW.

The corridor re-design is important as Route FF reaches a threshold of 11,000 ADT. The 3-lane section will accommodate an ADT up to 20,000. In some segments of the Route FF corridor, where traffic calming treatments are recommended, such as center medians, the 2-lane segment can accommodate the future project traffic volumes. On roadways with access management and roundabouts at intersections, 2-lane sections can accommodate higher volumes of traffic (18,000 – 20,000 ADT). Access management/median location and median openings will require further study during the design phase. As indicated in the typical sections included here, 11 ft lanes are recommended throughout Route FF. Designing thru lanes at this width is a strategy to slow down vehicular traffic on the corridor as it travels through Battlefield.

Within the 80 ft of ROW, the typical section should accommodate three lanes, one thru-lane in each direction and a center two-way-left-turn lane (TWTL), and curb and gutter. The TWTL will more safely accommodate turning movements off Route FF. A 10ft. shared use path is recommended on one side of the street and a 5 ft sidewalk is recommended on the other side of the street. The implementation of the sidewalk and shared use path should be a priority in segments of the corridor where no pedestrian facility currently exists, as well as in the future Downtown Battlefield area.

The only segment of the Route FF within the study area that is recommended for a 4-lane section is Segment 1, from Weaver Road to Farm Road 123. The recommendation for that segment is to continue the typical section north of FR123, with 4 vehicular travel lanes and a center median, with the installation of a 5ft sidewalk on west side and 10 ft shared use path (SUP) on east side of the road.

Designing for this typical section allows for some flexibility in terms of additional traffic calming or access management along the corridor. A center median may be installed in the future where a turn lane is not needed to prohibit certain turning movements, or used as a physical deterrent to slow down motorists as they travel through Battlefield on Route FF.

Figure 20- Route FF- Section 1 - Proposed

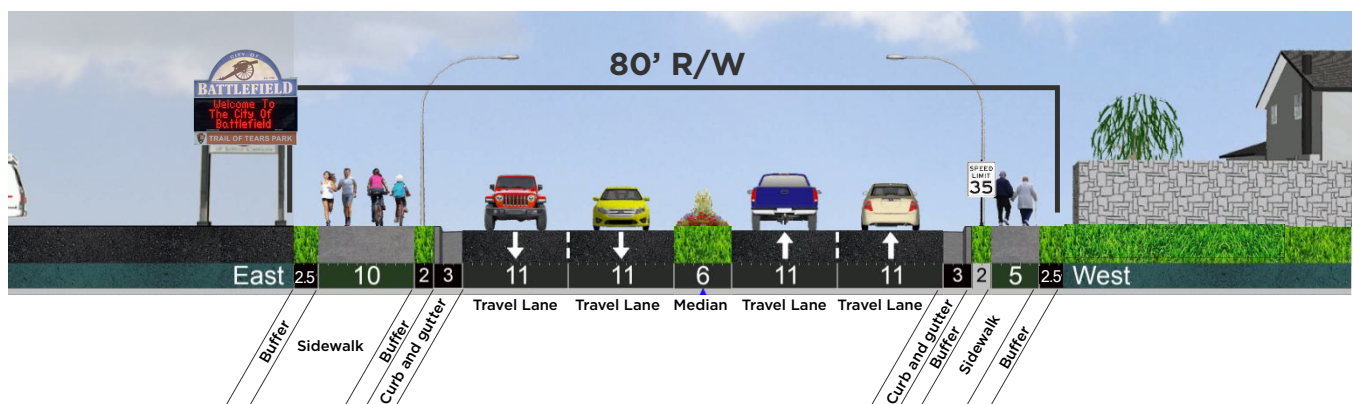
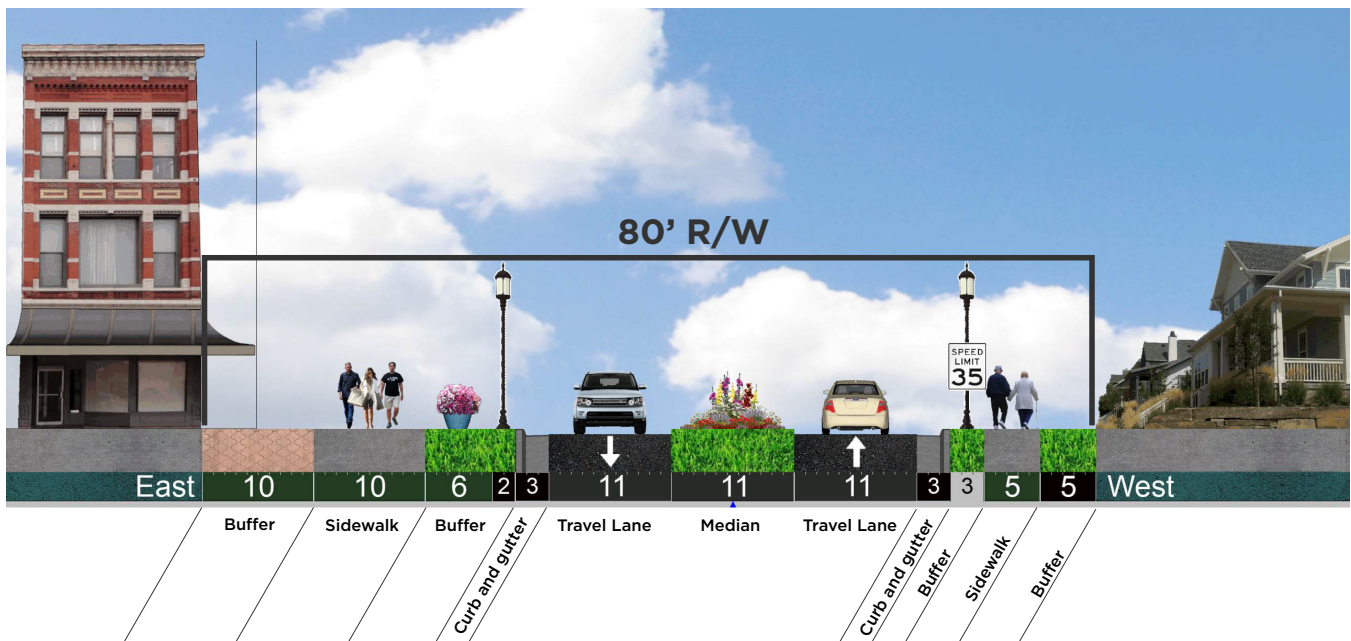
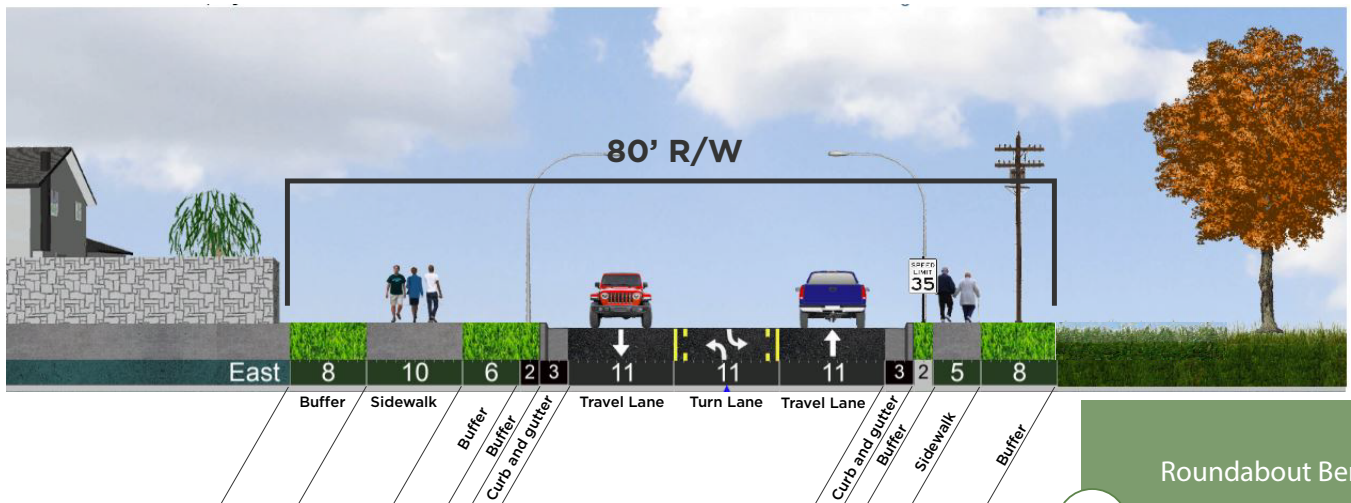


Figure 21- Route FF - Section 2 - Proposed



As seen here, a center median is taking up the space of the 3rd lane. This treatment is recommended in the Downtown area, where traffic calming, and access management will be important for increased pedestrian volumes.

Figure 22- Route FF - Section 3 - Proposed



## DESIGNS AT INTERSECTIONS

Currently all the intersections along Route FF are side stop controlled, meaning that vehicular traffic along Route FF travelling north or south does not stop at any intersection within the study area. We heard several times during the study process that crossing Route FF as a motorist, or a pedestrian is difficult. Furthermore, we heard that crossing the street for children is nearly impossible. Additionally, no marked crossings to get across Route FF as pedestrians currently exist.

## Roundabout Benefits



Crash reduction  
(76% injury crash reduction)



Lower vehicle speeds  
(2.5mph lower at intersection entry)



Lower long-term  
maintenance costs

Redesigning the traffic control at key intersections will assist with slowing traffic down as it moves through the corridor, as well as provide for safer crossings (motorists and pedestrians) to get across Route FF. Updating key intersections along the Route FF corridor will also provide the opportunity for gateway treatments at development nodes within the City of Battlefield. Intersection enhancements will provide for better access at key nodes for commercial activity.

Conceptual intersection updates are identified here, as well as key next steps toward implementation to move these concepts to design. The final section of this report is an implementation plan. Locations have been prioritized based on input from the core team as well as what feedback was received during the public meeting.

Roundabouts provide significant safety benefits. In addition to reducing crashes, these promote slower speeds. According to Federal Highway Administration, Roundabouts are found to decrease speeds coming through intersections by 2.5 mph.

### Safety Benefits of Roundabouts\*

90% reduction in fatalities

76% reduction in injury

30-40% reduction in pedestrian crashes

10% reduction in bicycle crashes

\*Institute for Highway Safety



#### Weaver Road (Initial Priority)

The Weaver Intersection Improvements are recommended as an initial project for multiple reasons including having the most number of crashes and the planned development between Weaver and 3rd. The intersection is a priority for MoDOT to enhance safety. The location of Weaver Road makes updates to the intersection an important gateway for motorists travelling south from Springfield on Route FF. The updated intersection can provide a visual cue to people that they have arrived at a place. This visual cue can help improve motorist behavior while travelling through the Battlefield Community.

In addition to serving as an important gateway for the area, the intersection is considered a priority due to the lack of opportunities to cross Route FF, either in a car or on foot. The updated intersection here will provide a safe crossing opportunity on the northern end of the corridor. Given the vision for a downtown Battlefield in Segment 2 of the corridor, the ability to safely cross Route FF at Weaver is critical to the economic vitality of the businesses at this node. The location of Wilson's Creek Intermediate School off Weaver Road and the safety concerns expressed at the August 2, 2022, open house meeting in enabling children to safely cross make this location as an immediate need for updates on the Route FF corridor. It should be noted that Weaver Road currently meets signal warrants. However, a roundabout here, coupled with a roundabout proposed at 3rd street, serves as an effective intersection treatment for safety and efficiency, while serving as a gateway treatment for the Battlefield community.

A roundabout at Weaver and Route FF will assist with safely and efficiently moving motor vehicle from all directions, while providing safe crossing opportunities for Route FF. Additionally, the roundabout treatment provides more branding and gateway treatment opportunities within the infrastructure updates. To advance this project, the City of Battlefield should work with MoDOT on advancing conceptual level designs at this location. The concepts should examine utility impacts, specific location with ROW, and what ROW needs to be purchased to advance the concept toward implementation. In collaborating with MoDOT and OTO, the City of Battlefield can advance this project as a priority project for the district. These improvements are estimated to cost approximately \$3.8 million, and a complete detailed cost estimate is located in the appendix.



### 3rd Street (Initial Priority)

Like Weaver Road, the intersection at 3rd Street is a priority for advancing the vision for a Downtown Battlefield. The addition of a new residential development presents an opportunity to update efficiency at the intersection and provide better opportunities to cross Route FF. The location of 3rd Street near Weaver Road presents an opportunity to effectively calm traffic in a repetitive way along the corridor. Traffic calming is an effective strategy when used in repetition, due to the need for motorists to alter their travel behavior.

The 3rd Street intersection is another gateway opportunity for the City of Battlefield as it works toward a downtown development. Thus, the location is ideal location for another roundabout. This roundabout, when coupled with the roundabout at Weaver will serve as effective corridor transition points from other locations on Route FF to the downtown area. The vision is that while Weaver Road serves as the gateway to downtown Battlefield from the north, 3rd Street serves as the gateway to downtown Battlefield from the south. Working together, the branding treatments at these intersections enforce the idea that you have arrived at a place, as opposed to a 'pass-thru' town.

A roundabout will functionally serve to move traffic safely and efficiently in all directions, as well as people across route FF. Aesthetically, a roundabout treatment provides gateway and branding opportunities that are in line with the future vision for downtown Battlefield. The installation of roundabouts throughout the corridor will require ROW acquisition. Existing space constraints may necessitate alternative roundabout design, such as mini roundabouts. These are smaller scale traffic circles that serve as traffic calming tools and efficiently move vehicular traffic at intersections. These mini roundabouts can be designed in a way that allows for the design vehicle (large trucks) to traverse over the roundabout mountable area, but so that cars still circle around them.



Figure 23- Trail of Tears alignment



Figure 24- Azalea Terrace

190. A roundabout will functionally serve to move traffic safely and efficiently in all directions, as well as people across Route FF. Aesthetically, the roundabout treatment provides gateway and branding opportunities that are in line with the future vision for downtown Battlefield. To advance this project, the City of Battlefield should work with MoDOT on advancing conceptual level designs at this location. The concepts should examine utility impacts, specific location with ROW, and what ROW needs to be purchased to advance the concept toward implementation. In collaborating with MoDOT and OTO, the City of Battlefield can advance this project as a priority project for the district.

\*only necessary if the connection of Azalea Terrace is built

### Trail of Tears/Route FF Crossing (Initial Project)

The future Trail of Tears alignment crosses Route FF at Somerset. Thus, some sort of enhanced crossing to allow for connections across Route FF should be included. This design should include high visibility crosswalk markings for improved safety. Additionally, the installation of a center median at this crossing will allow for a refuge area for people crossing FF using the trail. Enhanced signage should be included, and possible the addition of Rectangular Rapid Flashing Beacon (RRFB). The RRFB is a pedestrian activated signal that is routinely used at pedestrian crossings located outside of an intersection.

### Azalea Terrace (Secondary Priority)\*

A roundabout at Azalea terrace should follow the intersection upgrades downtown at Weaver and 3rd Street. As the next intersection goes to the south, this continues to build on the idea that you are entering a place. Visual cues like this work to improve more awareness among motorists and enhance the sense of place within a community. In addition to serving our mobility needs, streets are spaces within a community that can foster vibrant, healthy, and economically successful places. Building concepts such as these are important for the future development of Battlefield along Route FF.

The location at Azalea is important due to the new residential development between Azalea Terrace and Future Farm Road



### FR 123 and Blue Springs (final priority)

As northern and southern entry points into Battlefield, updating intersections at FR 123 and Route FF, as well as Blue Springs and Route FF, are important for efficiency along the corridor. The recommended treatment at Blue Springs and Route FF is a roundabout. This unconventional intersection would be a candidate for a roundabout as well. The free movement southbound to westbound could be maintained with a bypass lane to the northwest quadrant of the roundabout allowing for that movement to maintain the existing free flow, while increasing safety for the other movements.

### Future FR 190 (final priority)

The intersection at FR 190 should be designed to accommodate a future E/W collector route to the east of Route FF. As development happens in this area, access should be designed connecting to the E/W arterial rather than Route FF. The still unknown preferred alignment and traffic projections for this FR 190 E/W collector will guide the design of this intersection. Future development in the area will require additional study of this intersection and roadways to determine the most effective intersection type.

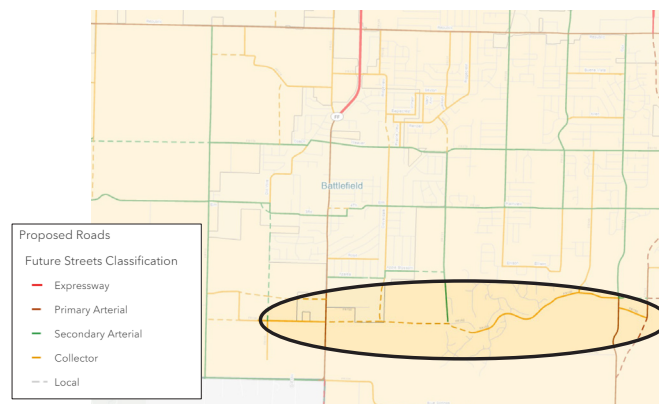


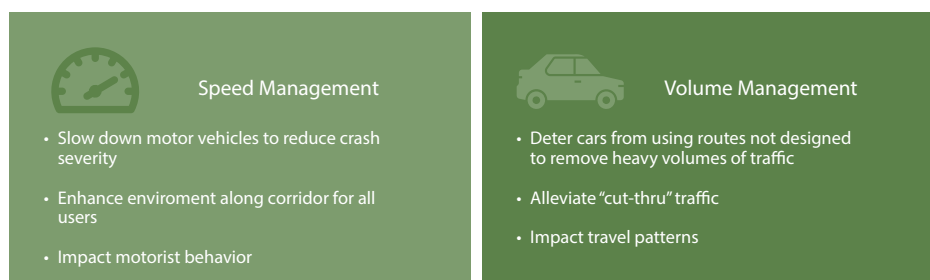
Figure 25- Proposed Future Roads

## CORRIDOR WIDE TRAFFIC CALMING

Traffic calming is the combination of mostly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users. The goals of traffic calming along a corridor include enhancing the quality of life along and within the corridor, creating safe and attractive streets, and promoting walking and biking as more viable modes of transportation. Objectives of traffic calming include slowing down motor vehicles, reducing crashes, increasing the safety of the road for non-motorized users, increasing access for all modes of transportation, and reducing cut-thru traffic.

Traffic calming is accomplished by focusing on (1) Speed management and/or (2) volume management. Speed management focuses on slowing down motorists on the roadway to minimize severity in any crashes. Speed management strategies focus on impacting motorists' behavior in how they are operating their vehicle on the roadway. Volume management strategies focus on deterring 'cut-thru' trips, or trips not specifically designed for how a road is to operate within the functional classification system. These strategies are physical ways to alter individual travel patterns.

Based on input from the core team, as well as input received at the public meeting, Route FF will benefit from corridor wide traffic calming tools that focus on speed management.



## Speed Management Strategies

Within the traffic calming category of speed management, treatments are broken down by horizontal deflection, vertical deflection and signage and striping.

- Horizontal deflection devices encourage drivers to slow down by introducing a physical obstacle in the road that drivers must carefully navigate, resulting in slower travel speeds. The horizontal shift in the geometry of the roadway may also provide an optical narrowing of the roadway. An example of a horizontal deflection is a center median island or a curb extension. These are optimal treatments for the Route FF corridor.
- Vertical deflection devices encourage slower speeds by introducing raised sections of pavement within the road that vehicles have to drive over. Examples of these devices include speed humps and speed tables, as well as raised intersections or crosswalks. Vertical treatments are not preferred on arterial roads. Horizontal deflection devices are more likely preferred on arterial roads.

Signage and striping reinforce rules of the road. Examples of signing and striping include marked crosswalks, edgeline striping, or speed radar signs. These tools are low cost, but also low impact as there is no physically enforcing component to signage and striping.

## Recommended Route FF Traffic Calming Tools

In order to achieve the desired aesthetics and traffic calming along Route FF, specific recommendations for corridor wide traffic calming are included here. These traffic calming treatments should be done in a repetitive manner that reinforces the need to travel slowly through Battlefield. When designed in a consistent and aesthetically pleasing way, these treatments can also add to the branding and sense of place along Route FF. Specific treatments recommended for Route FF are center medians, marked crosswalks, gateway/branding, and a sidewalk on both sides of the street



Figure 26- Center median

### CENTER MEDIANS

Center medians are horizontal deflection that will visually and physically narrow the roadway during key segments along route FF. These medians can be installed where a TWLT is not needed. Due to the use of medians and access management within the Route FF corridor, reducing from 3-lanes to 2-lanes in key segments, such as Downtown, is feasible for an ADT up to 20,000. Where these are installed, mid-block crossings may be considered with appropriate signage, such as a rectangular rapid flashing beacon (RRFB) to allow for more crossing points for people across Route FF. For example, between Weaver and 3rd, where traffic should be moving slowly in Downtown, a mid-block crossing connecting to a center median may make sense at the time of future development. Medians may also be landscaped to add to the overall environment on Route FF. Any landscaping added would be maintained by the City of Battlefield, according to relevant maintenance agreements. Center medians should be installed in the future Downtown area and at pedestrian crossings outside of intersections (trail connection at Somerset).

### MARKED CROSSWALKS

Due to the lack of locations to cross Route FF currently, the addition of marked crossings is key to enhancing mobility along the corridor for all users. The addition of highly visible, continental crosswalk markings will provide a space for people on foot to cross, as well as serve as a visual cue to motorists to be more aware of the activity in the area. As Route FF develops with more commercial properties, crossing the road will become increasingly necessary for people travelling on foot. Crosswalks should be striped at each approach to all major intersections, as well as considered at a few important mid-block locations, coupled with a center refuge median. Marked crosswalks should be installed at all intersections along the corridor and at the trail crossing at Somerset.



Figure 27- Marked crosswalk



Figure 28- Gateway branding

#### ON-STREET PARALLEL PARKING

The City of Battlefield should consider the addition of on-street parallel parking on Route FF in the Downtown area as it develops. On-street parking adds another layer of friction to thru motorists and can serve as a traffic calming tool when designed and used properly. Coordination with MoDOT will be necessary in allowing on-street parking. On-street parking would be recommended if a downtown area were to develop. This would require additional right of way at a future date once the area is more developed.

#### GATEWAY/BRANDING

While more traditional traffic calming tools (horizontal and vertical deflection strategies) are important treatments in slowing down traffic, the identity or sense of place surrounding a corridor is also an important component of a safe street. Developing Route FF as a place where people feel they have arrived, versus a pass-through corridor on the map, is a strategy to use when it comes to aesthetic treatments within traffic calming features along the

corridor. Examples of placemaking/branding ideas include decorative pedestrian scale lighting, branded wayfinding and signage, monumental treatments in roundabout locations, and the potential for enhanced landscaping within median space near intersection plantings. All of these components work together to provide a Route FF that is comfortable and safe, and a destination for people to visit and stay, not just drive through. Any gateway/branding treatments will need to be approved by MoDOT. Gateway branding treatments should be included at corridor entry points and within the Downtown area.

#### SHARED USE PATH (SUP) & SIDEWALK

Enhancing mobility on Route FF for users of all ages and abilities is another important component of the future growth in Battlefield. Walking is a proven strategy to enhance health within our communities, and houses located in walkable neighborhoods are more attractive for purchasing. A continuous sidewalk (5ft) along the Route FF on one side of the road, and a continuous SUP (10ft) along the other side of the road within the corridor is necessary to better connect neighborhoods adjacent to Route FF to future development that transpires along the corridor. This is an important project for the corridor as Route FF is identified as a priority corridor for sidewalks in OTO's Destination 2045 Bicycle & Pedestrian facilities map. Additionally, the sidewalk is a visual cue to motorists that people have space here, and thus driving behaviors should reflect the corridor as a shared space.



Figure 29- Shared use path

## Planning Focused

Design focused recommendations are important for identifying necessary transportation and infrastructure projects along the Route FF corridor. While those projects should be prioritized with both the OTO and MoDOT, policy recommendations are vital for the long-term success of Route FF as a vibrant corridor. These planning and policy recommendations will ensure Route FF develops as a safe and functional corridor that efficiently moves traffic and serves the mobility needs of users of all ages and abilities.

#### UPDATE ROUTE FF ON OTO MAJOR THOROUGHFARE PLAN

Currently in the OTO Major Thoroughfare Plan, Route FF is identified as a primary arterial. A primary arterial in OTO design standards is described as a corridor with a design service volume between 10,000 and 30,000 ADT and a design speed of 35 – 45mph. Additionally the required minimum ROW is 110 ft to accommodate corridor mobility needs.

Given the future forecasted ADT along Route FF between 6,800 on the south end and 16,500 on the north end, the designation of primary arterial does not reflect the mobility needs of the corridor. The OTO Major Thoroughfare Plan should be

## Subdivision Regulation Updates

- Section 405.390 - access management standards
- Section 405.400 - OTO MTP text adherence update
- Section 405.400 - design standards compared to MoDOT
- Section 405.410 - sidewalk code provision

updated to reflect Route FF as a SECONDARY ARTERIAL. According to the OTO design standards, a secondary arterial service between 6,000 and 20,000 ADT. The design speed of secondary arterials is 30 – 35mph and the minimum ROW required for proper facility design is 80ft.

Given the future vision of Route FF as a vibrant corridor that feels more like a place, the design components associated with the secondary arterial classification fit the future needs of Route FF. The goal to enhance Route FF as a safe street for users of all ages and abilities is more achievable when planning the road as a secondary arterial. For example, a design speed of 30 – 35mph for a secondary arterial is more compatible for active transportation users (walking or biking) as opposed to the design speed of 35 – 45mph on a primary arterial. Additionally, a narrower curb to curb roadway cross section includes more friction within the driving space, which will slow down motorist speeds along Route FF. Updating this standard is a necessary first step in developing the roadway design of Route FF moving forward.

### UPDATE BATTLEFIELD SUBDIVISION REGULATIONS & STREET DESIGN STANDARDS

In achieving the long-term Route FF Corridor Study objectives detailed in this report, it is important that the City of Battlefield's Land Use Regulations (Chapter 405 of the Municipal Code) be amended to allow for consistency and effective implementation of these objectives as land develops or re-develops in the years ahead.

In assessing Battlefield current Subdivision Regulations, it is important to note that this review is narrowly focused on potential subdivisions which have frontage on Route FF or will derive public street access to Route FF corridor in the future. It is recommended that the City's Planning and Zoning Commission and Council give further consideration as to how recommended Subdivision Code changes for Route FF may impact subdivisions elsewhere in Battlefield.

By way of background, the majority of Battlefield's Subdivision Regulations were adopted in October 2002 by Ordinance No. 02-19 §§ 1 — 5. Numerous additional changes have been made to these regulations since 2002, the most significant of them being Ord. No. 08-16 § 1 from August 2008 and Ord. No. 10-10 §§ 1 — 3 from July 2010.

A full review of the language to the subdivision code is included in the appendix, but key regulations for review include:

- Section 405.390 – adopt OTO Access Management standards for secondary arterials
- Section 405.400 – amend text to reflect adherence to OTO MTP
- Section 405.400 – review Battlefield design standards and address any major differences in MoDOT standards where ownership transitions (impacts to FF)
- Section 405.410 – Update exterior sidewalk code provision to include installation of SUP and clarify responsibility of constructing or adopt corridor overlay district clearly detailing needs specific to FF

### ASSIGN ROADWAY IMPROVEMENT NEEDS FOR FUTURE DEVELOPMENT

As the City of Battlefield embarks on its current land use and economic development study, development processes should be reviewed for requirements associated with impacts of new developments. The right mix of uses will work in tandem to create a healthy and vibrant Route FF. However, these new uses, as they create more trips, will have higher impacts on the transportation infrastructure along the corridor. Reviewing development standards and potential impact fees is important for providing necessary upgrades in the future as they are needed with new developments.

As an example, the City of Battlefield may assess a development impact fee as new developments are working through



the planning process. This impact fee then goes back into the street improvements along the Route FF corridor, to make infrastructure enhancements needed for the increase in trips. These enhancements do not have to be specific to vehicular trips but could also provide for updated pedestrian and bike facilities.

Another consideration is to review Battlefield Parking Standards. Traditional parking minimums are barriers to mode shift as they are likely to cause an oversupply of parking and create underutilized spaces (reserved for parked cars) within communities. In a mixed-use development model, typical parking standards may not be needed for each use when viewed as a separate entity. As the City embarks on its economic development and land use plan, these fees and standards should be updated to reflect the type of growth that is desired along the Route FF corridor.

MoDOT access management standards should also be reviewed to ensure vehicular access to future commercial businesses is appropriate. Driveways should be minimized to reduce the number of conflict zones where the sidewalks cross driveways along Route FF. In creating a walkable and healthy street, minimizing conflicts between people walking/biking or driving is important. The city should review the current standards and ensure design guidance will match the planned characteristics along the route.

#### EXPLORE THE POTENTIAL FOR STREET REBRANDING

Several times throughout the course of the planning process, the comment was made that Battlefield lacks an identity. City staff indicated that individuals that live in Battlefield consider themselves Springfield Residents, which adds challenges to planning for the future of the community. When planned and designed appropriately, streets can function as community spaces that are vibrant and attractive destinations. People can stop travelling through a place and start travelling to a place.

The city should explore the possibility of renaming Route FF to a name that draws more on the history and culture of the community within the Battlefield City limits. This renaming process will re-brand the street from a pass-through corridor to a place that can foster a stronger sense of community.

With the future idea of a Downtown Battlefield along Route FF, the corridor emerges as the destination corridor within the Battlefield community. As a key north/south route within the Springfield area, the corridor has the potential to attract not only residents within Battlefield, but individuals from the larger region.

Design treatments and streetscape enhancements are one component of turning Route FF into a place you travel to versus travel through, but branding is also a critical component. Route FF gives the connotation of a state-owned route, a pass through that connects you from place to place, but in and of itself is not a place you travel to.

## Implementation Plan

In order to move toward implementing these recommendations, the City of Battlefield should approach achieving both the design and planning recommendations concurrently.

For design recommendations, continued collaboration with MoDOT and OTO is necessary for advancing the projects. With the initial priorities being Weaver Road and 3rd Street (for safety concerns and speed management), the City of Battlefield should engage with MoDOT on the scope of work for developing concept plans at both of these locations. These concept plans should include proper identification of any ROW needs, as well as utility coordination for the future roundabout design. Battlefield should identify this project as a priority need for the community that can move through the Transportation Improvement Program within OTO.

A potential timeline for implementation is:

- MTP amendment (primary to secondary arterial)– first half of 2023 (initial need)
- FF & Weaver Upgrades– prioritize for inclusion in 2024-28 MoDOT Statewide Transportation Improvement Program (STIP) (winter/spring 2023) - pending available funding
- 3rd & Azalea – push for inclusion in next MoDOT unfunded road and bridge needs (summer/fall 2023)
- Battlefield policy timeline – TBD pending economic development study

For planning recommendations, the first priority is to update the functional classification of Route FF on the major thoroughfare plan to a secondary arterial (first half of 2023). This will be needed before any improvements can be made so that infrastructure is being designed in accordance with the Metropolitan Planning Organization (MPO) street functional classification system.

The second priority is to review existing transportation improvement standards that accompany the development process. These standards should be updated within the Downtown District in order to achieve the look and feel of that part of the community that Battlefield desires. This is a key first step in assuring new development requirements will support enhanced infrastructure and mobility needs.

Next, the City of Battlefield should review the OTO Street Design Standards and consider adopting those standards within their community. Not only is it important to provide mobility needs on FF, but it is also important to ensure connections within the community to Route FF exist for users of all ages and abilities. During this process, Battlefield should review existing sidewalk network and gaps, ensuring sidewalk connectivity along Route FF.

Finally, it is important that Route FF recommendations work in conjunction with the Battlefield Economic and Housing Study (starting October 2022), especially those areas that are currently outside city limits but are likely to develop over the next 10-20 years. Road, bicycle, and pedestrian connections to the Route FF corridor from these new developments will be critical.

Ensuring a vibrant, safe and efficient Route FF will require approaching implementation for the design and planning recommendations in tandem. When done properly, Route FF will be an efficient and vibrant place for Battlefield and the entire region. A place that people travel to and not just through.

This study was prepared in cooperation with the USDOT, including FHWA and FTA, as well as the Missouri Department of Transportation. The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Missouri Highways and Transportation Commission, the Federal Highway Administration, or the Federal Transit Administration.