



# CHADWICK FLYER TRAIL



## DRAFT CONCEPTUAL STUDY REPORT

Springfield, Missouri

February 2024

Prepared by:



## Table of Contents

<b>1.0 INTRODUCTION</b>	<b>1</b>
<b>2.0 PURPOSE AND NEED</b>	<b>1</b>
<b>3.0 EXISTING CONDITIONS</b>	<b>2</b>
3.1 EXISTING STRUCTURES	3
<b>4.0 ALTERNATIVES ANALYSIS</b>	<b>4</b>
4.1 PROPOSED DESIGN CRITERIA	4
4.2 ALTERNATIVES DEVELOPMENT	5
4.3 OVERVIEW OF ALTERNATIVES	5
4.4 RECOMMENDED ALTERNATIVE	14
4.5 MAINTENANCE OPERATIONS	15
4.6 COST ESTIMATES	17
4.7 UTILITY IMPACTS AND RELOCATIONS	17
4.8 RIGHT-OF-WAY IMPACTS	17
4.9 PLACEMAKING & AESTHETIC ENHANCEMENTS	18
4.10 SATISFACTION OF THE PURPOSE AND NEED	18
<b>5.0 ENVIRONMENTAL CONSTRAINTS SUMMARY</b>	<b>19</b>
5.1 NOISE ASSESSMENT	19
5.2 PARKLAND/4(F) PROPERTIES	19
5.3 THREATENED AND ENDANGERED SPECIES	19
5.4 404 PERMIT – WETLANDS/STREAMS	20
5.5 CULTURAL RESOURCES	20
5.6 FLOODPLAIN	20
5.7 HAZARDOUS WASTE SITES	20
5.8 FARMLAND	21
<b>6.0 TRAILSIDE DEVELOPMENT OPPORTUNITIES</b>	<b>21</b>
<b>7.0 PUBLIC INVOLVEMENT</b>	<b>22</b>
7.1 ADJACENT LAND OWNERS OPEN HOUSE	22
7.2 PUBLIC INPUT MEETING	23
<b>8.0 ADDITIONAL TRAIL CONSIDERATIONS</b>	<b>23</b>
8.1 IMPLEMENTATION PLAN	23
8.2 FUNDING OPPORTUNITIES	26

- Appendix A – Existing Structure Evaluations**
- Appendix B – Trail Typical Sections**
- Appendix C – Alternative Conceptual Layouts**
- Appendix D – Preferred Alignment Cost Estimate**
- Appendix E - Environmental Mapping Exhibit**
- Appendix F – Trailside Development Map**
- Appendix G – Adjacent Landowner Public Meeting Summary**

DRAFT

## 1.0 INTRODUCTION

The primary goal of this study is to develop and evaluate alternative trail locations and methods for the Chadwick Flyer Trail (CFT) from Kissick Ave to Sunshine St in Springfield, MO. The trail is a vital connection piece for the Chadwick Flyer Trail which will ultimately provide an important bicycle and pedestrian corridor between the cities of Springfield and Ozark, Missouri.



*Figure 1: Chadwick Flyer Trail Study Limits*

## 2.0 PURPOSE AND NEED

In May of 2023, the Ozark Greenways contracted with Crawford, Murphy & Tilly (CMT) to determine the safest and most practical location and method for the Chadwick Flyer Trail alignment between Kissick Avenue and Sunshine Street. The purpose of the Chadwick Flyer Trail is to provide an important regional bicycle and pedestrian connection between the cities of Springfield and Ozark, Missouri. This section of the Chadwick Flyer Trail is an early priority of the Forward SGF plan.

The Ozarks Transportation Organizations's (OTO) Trail Investment Study completed in October 2017 identified the Chadwick Flyer Trail as a priority trail alignment for the region. Once a section of the former Frisco rail system named the "Chadwick Flyer," the old rail corridor was identified as a guiding alignment for the trail. However, much of the abandoned railroad right-of-way is now owned by various third parties which encouraged exploration of several crossing locations. The project is a key priority for many local and agency partners, with a focus on the following community benefits:

- Utilize an important piece of Ozarks transportation history by converting much of the former Chadwick Flyer Rail corridor as the basis for the proposed trail alignment
- Promote regional connection for multi-use transportation, connecting the cities of Springfield and Ozark, Missouri
- Provide a safe transportation corridor for all trail users through congested urban and suburban areas.

### 3.0 EXISTING CONDITIONS

The existing corridor is still owned by BNSF Railway, and still has railroad track, ties, and ballast in place north of Kissick Avenue. This segment of BNSF's system is known as the Kissick Subdivision. The existing track most recently served the James River Power Station, however coal use at this facility has been retired for a number of years. As a result, the City of Springfield is coordinating with BNSF for removal of the track, acquiring the right of way, and converting its use for the Chadwick Flyer Trail.

The corridor included in this study spans from Kissick Avenue at the south to Sunshine Street at the north, approximately 6 miles, and intersects the following local and arterial roadways at-grade:

- Kissick Avenue (Secondary Arterial)
- Republic Road
- Lone Pine Avenue
- Lacuna Street
- Battlefield Road (Primary Arterial)
- Covington Street
- Southern Hills Boulevard
- Seminole Street (Secondary Arterial)
- Sunshine Street (Primary Arterial)

The existing corridor runs along waterways and floodplains, this study evaluated erosion control and water quality issues and costs to implement these improvements have been developed to meet the City of Springfield requirements.

The study evaluated existing road crossings, rail structures, and redundancies with the existing Galloway Creek Greenway Trail to further understand opportunities for the Chadwick Flyer Trail alignment. Images of key features along the existing corridor are shown below.



*Figure 2: Springfield Lake Bridge*



*Figure 3: Ex. Crossing at Republic Rd.*



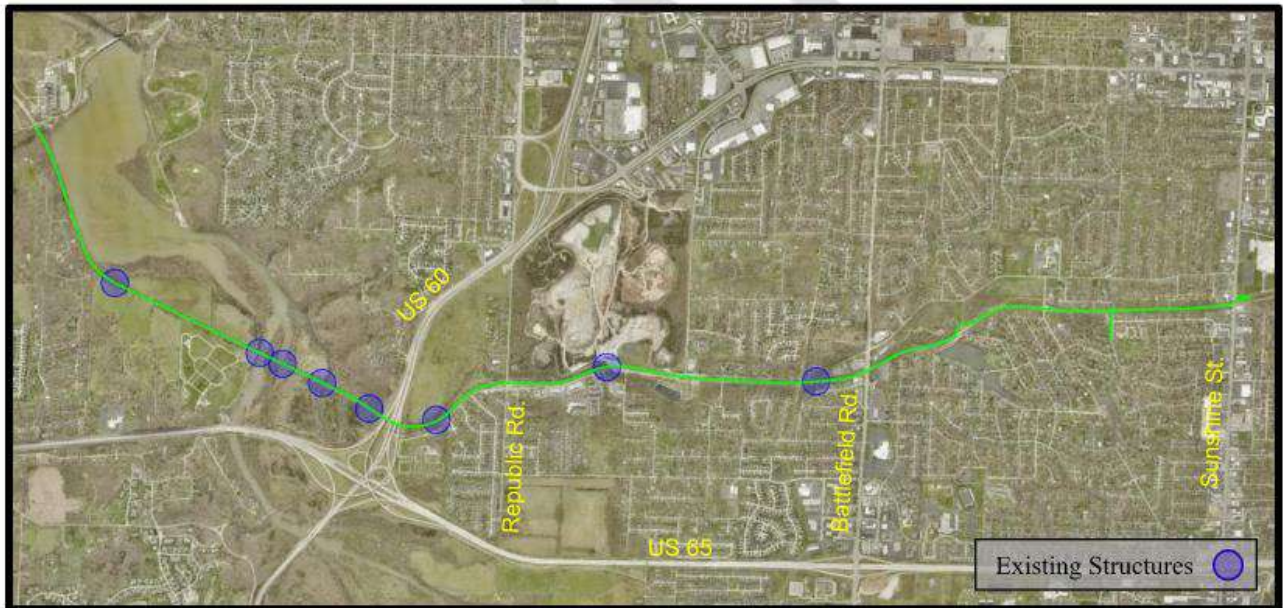
*Figure 4: Ex. Underpass at Battlefield Rd.*



*Figure 5: Ex. Rail Crossing at Battlefield Rd.*

### 3.1 EXISTING STRUCTURES

Eight (8) existing structures are located along the corridor including the Springfield Lake Bridge and seven (7) timber trestles. Each structure along the corridor was evaluated and rated based on its existing structural integrity, as listed below. The single metal truss structure over Lake Springfield is believed to have lead paint, and will require rehabilitation. All other timber structures are recommended to be replaced as they do not accommodate a concrete trail deck on top.



*Figure 2: Chadwick Flyer Trail Existing Structure Locations*

Existing Structures Conditions						
Bridge #	Location	Length	Material	Structural Rating		
				Substructure	Superstructure	Deck
2483	N of Kissick	41'	Timber	5	5	6
1101-247.6	Springfield Lake	40' Timber 104'6" Truss 151' Timber	Timber & Metal Truss	Timber (4) Truss (5)	Timber (4) Truss (6)	5
-	Springfield Lake	320'	Timber	3	4	3
2774	N of Springfield Lake	55'6"	Timber	5	4	6
2471	S of JRF	82'	Timber	5	5	6
2468	N of JRF	84'	Timber	5	5	6
2460	Conco Quarry	70'	Timber	5	5	6
2451	S of Battlefield	138'	Timber	5	5	6

## 4.0 ALTERNATIVES ANALYSIS

### 4.1 PROPOSED DESIGN CRITERIA

The proposed Chadwick Flyer Trail will be a multi-use trail facility serving predominantly bicycle and pedestrian traffic. In accordance with design criteria as noted, the following criteria will be used when designing this facility.

Criteria	Standard	Source/Remarks
Bicycle Design Speed	30 mph (max.) 18 mph (min.)	AASHTO Bicycle Facilities Guide
Design Bicycle Lean Angle	20°	AASHTO Bicycle Facilities Guide
Superstructure Clearance Over Roadway	17'-6"	MoDOT EPG (Sec. 751.1.2.6.1)
Trail Typical Section	<b>See Appendix B</b>	
Minimum Structure Width	14'-0" (10' two-way bikes & 2' shy distance)	AASHTO Bicycle Facilities Guide
Minimum Path Width	10'-0"	OTO Bicycle & Pedestrian Trail Investment Study, ADA
Minimum Path Radius	60'-0"	AASHTO Bicycle Facilities Guide, ADA
Maximum Path Cross Slope	2%	OTO Bicycle & Pedestrian Trail Investment Study, ADA
Minimum Path Shoulder Width	2'-0"	OTO Bicycle & Pedestrian Trail Investment Study
Standard Maximum Path Grade	5% (1% at structures)	AASHTO Bicycle Facilities Guide
Foreslopes (Fill)	0' to 2' - 6:1 or flatter 2' to 5' - 4:1 max. >5' - 3:1 max.	AASHTO Bicycle Facilities Guide & OTO Bicycle & Pedestrian Trail Investment Study
Backslopes (Cut)	0' to 2' - 6:1 or flatter 2' to 5' - 4:1 max. >5' - 3:1 max.	
Path Clear Zone Width	2'-0"	AASHTO Bicycle Facilities Guide

*Table 1: Proposed Design Criteria*

## 4.2 ALTERNATIVES DEVELOPMENT

In 2023, CORE team meetings were held to discuss different alignment alternatives for the Chadwick Flyer trail. Other alignments were briefly explored but dismissed due to topographic complications, residential or commercial impacts, or significant associated costs.

Alternatives were developed consistent with the AASHTO Guide for the Development of Bicycle Facilities (2012, 4<sup>th</sup> Edition), the OTO Trail Investment Study (October 2017), and MoDOT's *Engineering Policy Guide (EPG)*. **Appendix C** shows detailed conceptual layouts of the alternatives that were further analyzed. Generally, the trail will follow the historic Chadwick Flyer rail alignment, except in certain locations where special circumstances necessitate the need to either change alignment, or crossing position, as listed below:

### Location #1 - Republic Road:

- Option 1A – Trail on original Chadwick Flyer alignment
- Option 1B – Utilize existing Galloway trail at Republic Road

### Location #2 - Battlefield Road:

- Option 2A – Pedestrian Overpass at Battlefield Rd.
- Option 2B – Utilize existing underpass at Battlefield Rd.
- Option 2C – New underpass at Battlefield Rd.
- Option 2D – Cross at Lone Pine signal

### Location #3 - Sunshine Street:

- Option 3A – Pedestrian overpass at Sunshine St.
- Option 3B – Crossing at Oak Grove signal
- Option 3C – Crossing at Lone Pine signal

## 4.3 OVERVIEW OF ALTERNATIVES

### Option 1A – Trail Alignment following original Chadwick Flyer (CF) alignment

Figure 2 below shows the conceptual layout along Lone Pine Ave that will parallel the Galloway Trail along most of this section. Major features of Option 1 include:

- Removal of Galloway Trail/Republic Rd. crossing & realign to CFT
- Construct one (1) new at-grade crossing of Republic Rd. (midblock)





*Figure 2: Option 1A – Original CF Alignment*

**Benefits**

- Preserves CF alignment
- Maintains trail separation from Galloway trail (increased trail network capacity)
- Provides access for potential future trailhead at the NW corner of Lone Pine/Republic Rd.

**Disadvantages**

- Requires new midblock trail crossing of Republic Road
- Realignment of Galloway Trail
- Increased cost compared to option 1B

**Option 1B – Parallel Galloway Trail**

This option includes following the CF alignment to just south of Republic Road, then creating a joint Galloway/CF Trail to just north of Conco. Figure 3 below shows the conceptual layout. Major features of Option 1B include:

- Utilizing existing Galloway Creek trail for approx. 0.5 miles
- Replacement of existing Galloway Trail pedestrian structure south of Conco



**Figure 3: Option 1B – Joint Galloway Trail**

**Benefits**

- No new midblock crossings by utilizing existing Galloway Trail/Republic Road crossing
- Reduced cost compared to option 1A
- Enhanced access to Galloway Village

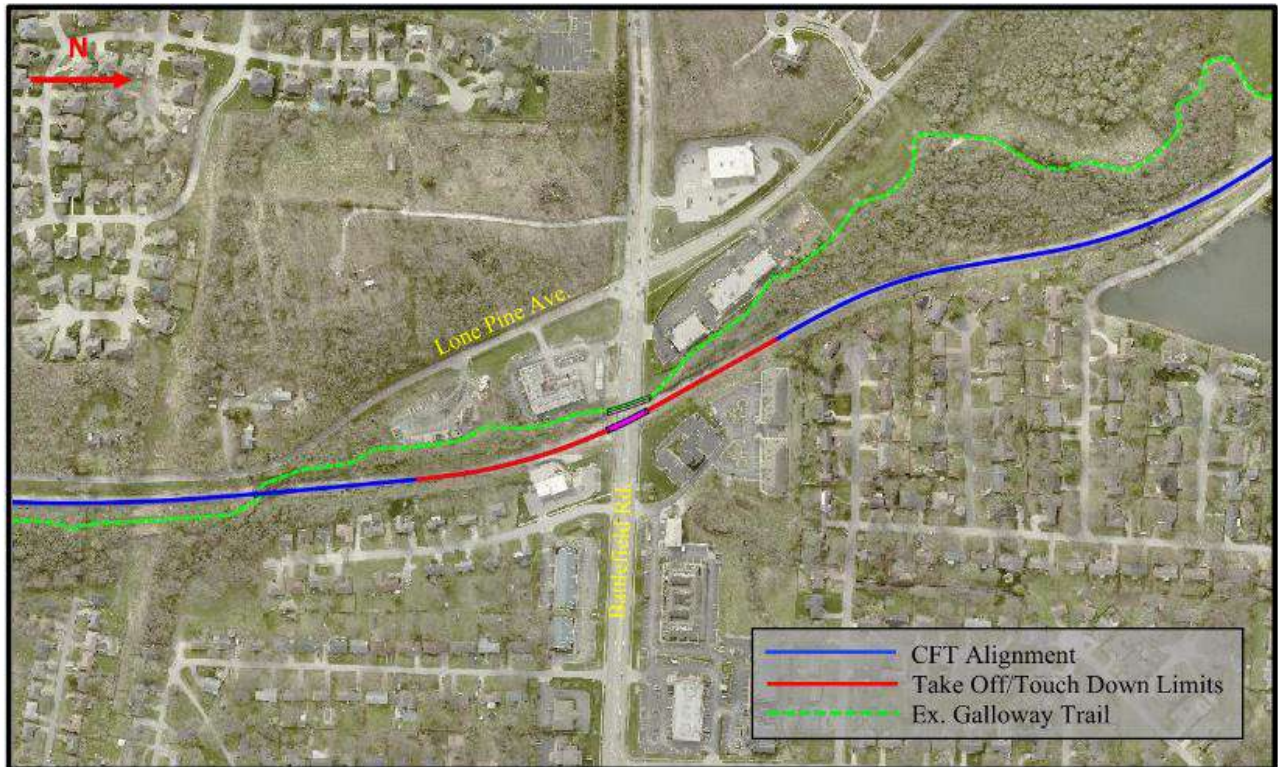
**Disadvantages**

- Requires replacement of existing pedestrian bridge south of Conco drive (existing 6.5' wide)
- Minimal Trail Separation from Lone Pine Ave.

**Option 2A – Battlefield Pedestrian Overpass**

This option includes a new pedestrian overpass over Battlefield Road on the existing CF alignment. Figure 4 below shows the conceptual layout. Major features of Option 2A include:

- Pedestrian Overpass at Battlefield Road
- Maintains parallel Galloway & Chadwick Flyer Trails



**Figure 4: Option 2A – Pedestrian Overpass**

**Benefits**

- Preserves CFT Alignment
- Separates CFT and Galloway trails
- Enhanced Aesthetic/Placemaking Opportunities on Structure
- Access to trail when Galloway Creek is flooded

**Disadvantages**

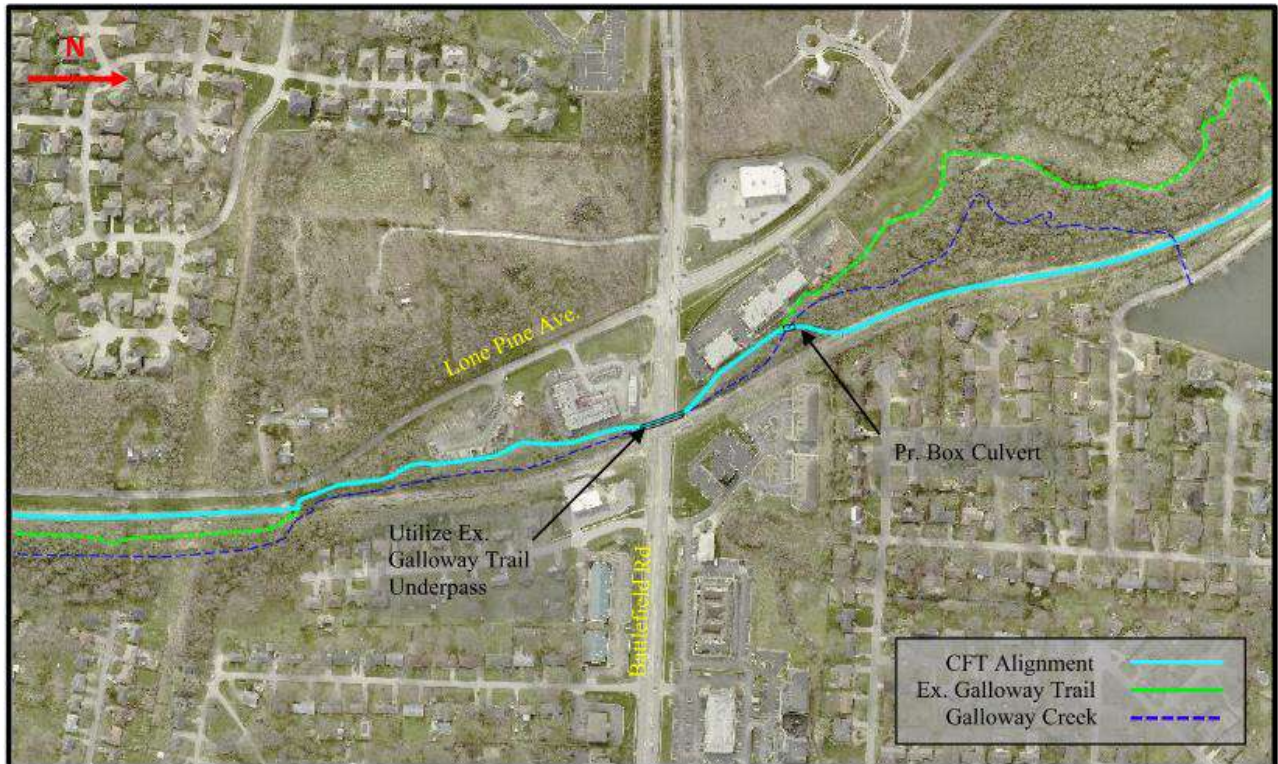
- Significant costs compared to option 2B
- Significant Utility costs (OHE)

Option 2A was determined not preferred due to anticipated costs associated with the overpass structure as well complications with existing drainage in this area.

**Option 2B – Battlefield Existing Underpass**

This option includes a joint Chadwick Flyer/Galloway Trail that utilizes the existing pedestrian underpass at Battlefield Road. Figure 5 below shows the conceptual layout. Major features of Option 2B include:

- Utilizing existing underpass at Battlefield Road
- Reconstructing portion of existing Galloway trail to concrete and increased width for joint trail
- Replacement of Underpass Lighting for enhanced safety



**Figure 5: Option 2B – Existing Underpass**

**Benefits**

- Connection with Galloway trail
- Utilizes existing infrastructure (pedestrian underpass)
- Reconstruct poor existing asphalt sections of Galloway Trail
- Significant cost savings compared to Overpass

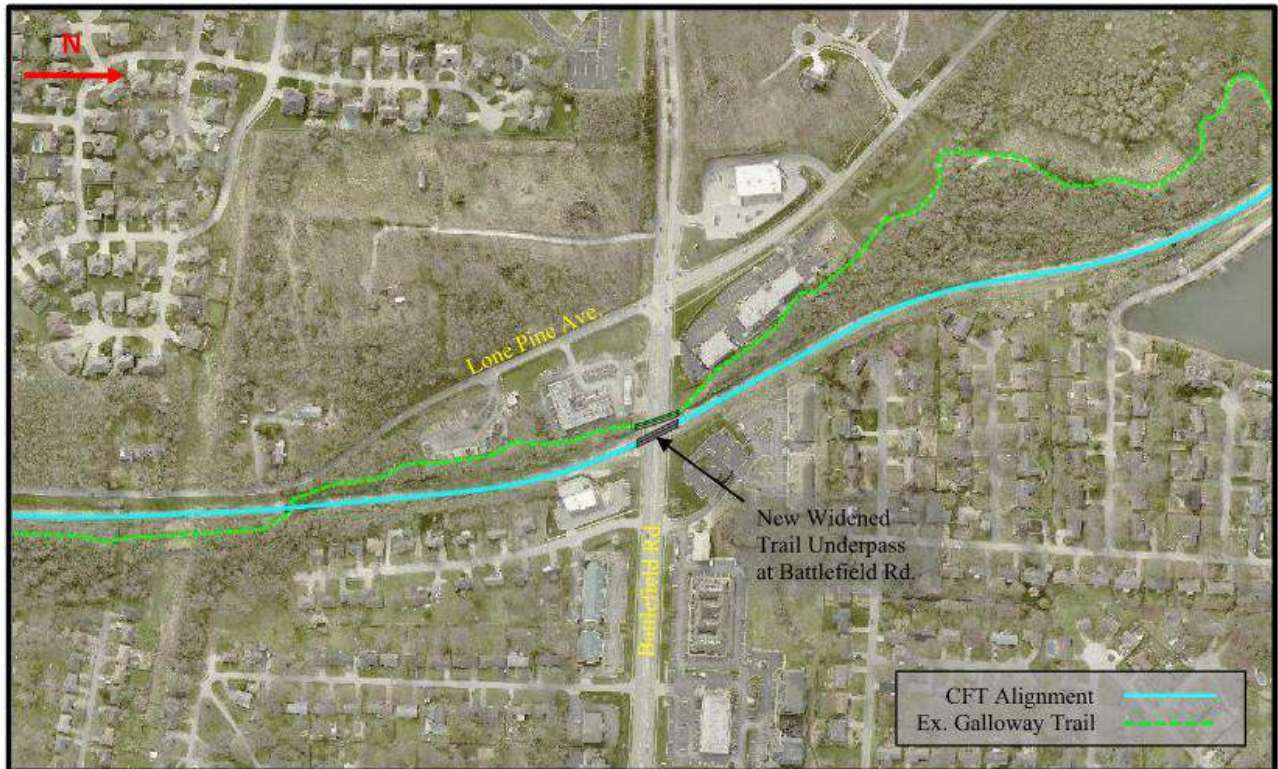
**Disadvantages**

- Increased trail congestion with joint trail & existing box only 8’ wide
- Concern for flooding conditions (pedestrian side of box frequently floods)
- Additional box culvert required for Galloway connection

**Option 2C – Battlefield New Underpass**

This option is similar to Option 2B, with a joint Chadwick Flyer and Galloway Trail Underpass, however includes constructing a new pedestrian underpass and realigned creek/separate drainage structure to reduce flooding. Figure 4 below shows the conceptual layout. Major features of Option 2C include:

- New 12’ wide pedestrian underpass at Battlefield
- Reconstructing portion of existing Galloway trail to concrete and increased width for joint trail
- New standalone drainage box culvert & creek realignment to east (facilitated through removal of Battlefield At-grade rail crossing & ballast approaches)



**Figure 6: Option 2C – New Underpass**

**Benefits**

- New 16' box underpass
- Separate drainage box/realignment of creek
- Reduces flooding for trail & improves creek capacity

**Disadvantages**

- Increased trail congestion with joint trail
- Increased cost compared to option 2B

**Option 2D – Battlefield Crossing at Lone Pine Signal**

This option includes an at-grade crossing of Battlefield utilizing the Battlefield/Lone Pine Signal, located just west of the Chadwick Flyer alignment. Figure 4 below shows the conceptual layout. Major features of Option 2B include:

- Utilize existing crossing at Lone Pine Ave
- Signal and pedestrian crossing improvements at Lone Pine Ave.
- Connection to existing sidewalk in front of businesses along Battlefield Rd.



*Figure 7: Option 2D – Cross at Lone Pine*

Benefits

- Enhanced connection to Commercial businesses
- Reduces future structure maintenance
- Signalized Pedestrian movements across Battlefield

Disadvantages

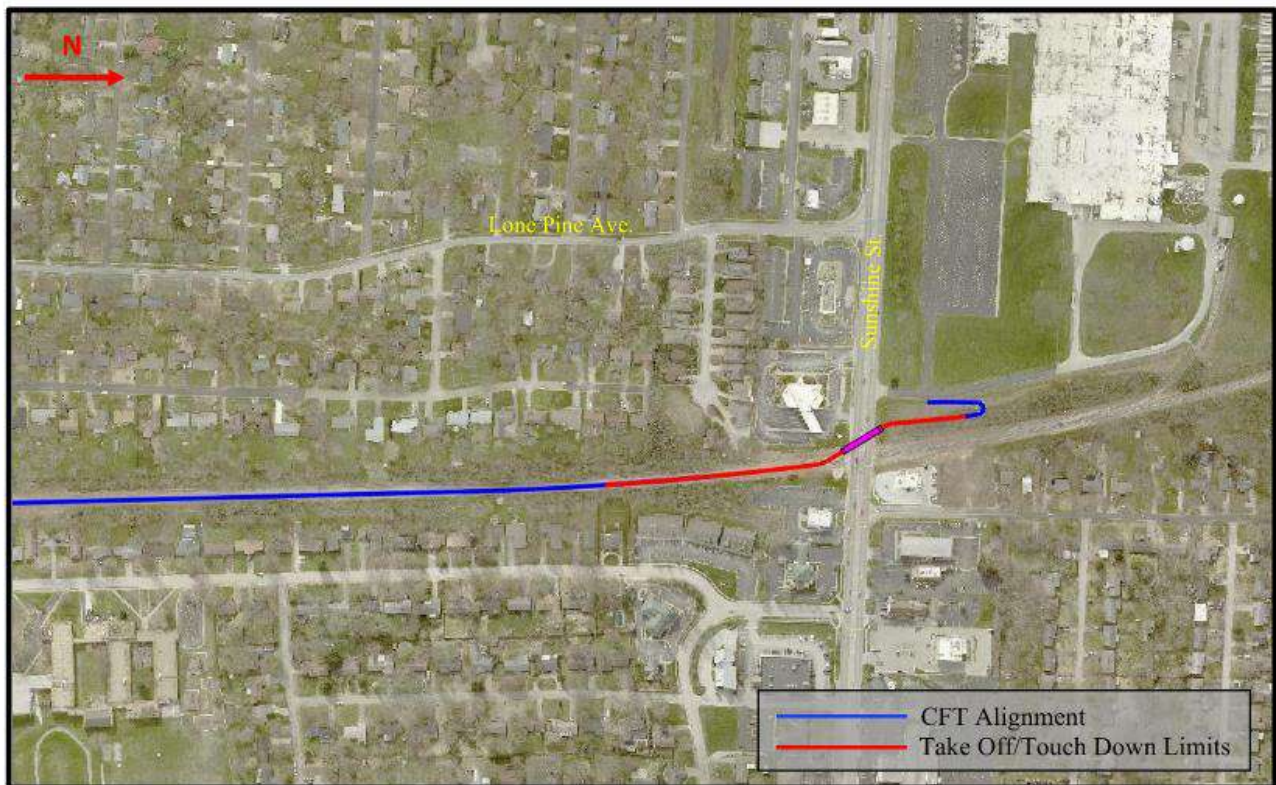
- Increased rebuild of existing sidewalk
- Requires adverse travel
- Reduced safety due to at-grade crossing
- Reduced safety with the trail crossing high-volume commercial driveways
- Requires rebuild of new Battlefield/Lone Pine Signal to accommodate multi-use trail

Option 2D was determined not feasible due to concerns for safety with an at-grade crossing, as well as adverse travel.

Option 3A – Sunshine Pedestrian Overpass

This option includes a pedestrian overpass over Sunshine Street (Route D), and connecting a future trail head at SRC. BNSF plans to keep ownership of track and right of way north of Sunshine, requiring a skewed structure and easements on private property. Figure 4 below shows the conceptual layout. Major features of Option 3A include:

- Pedestrian Overpass at Sunshine St.
- Enhanced connection to existing sidewalk in front of businesses along Sunshine St.
- Connection to future SRC Trailhead
- Relocation of overhead utility lines



**Figure 8: Option 3A – Pedestrian Overpass**

**Benefits**

- Connects to businesses and residences
- Connection to potential future SRC trailhead parking
- Increases safety at crossing (grade-separated)
- Enhanced Aesthetic/Placemaking Opportunities on Structure

**Disadvantages**

- Significant cost compared to option 3B and 3C
- Significant utility impact cost

**Option 3B – Sunshine Crossing at Oak Grove Signal**

This option includes an at-grade crossing of Sunshine Street (Route D) at the Oak Grove intersection, just east of the Chadwick Flyer Alignment. Figure 4 below shows the conceptual layout. Major features of Option 3B include:

- New trail connection to Oak Grove & to SRC Trailhead
- Reconstruct portions of existing sidewalk to be multi-use compliant
- Signal & pedestrian crossing improvements at Oak Grove intersection
- Connection to existing sidewalk in front of businesses along Sunshine St.



**Figure 9: Option 3B – Oak Grove Crossing**

**Benefits**

- Reduced costs compared to option 3A
- Connection to potential trailhead parking
- Opportunities for placemaking north of Sunshine at trailhead

**Disadvantages**

- Increased rebuild of existing sidewalk
- Requires adverse travel
- Reduced safety due to at-grade crossing
- Utility Impacts along Sunshine

**Option 3C – Sunshine Crossing at Lone Pine Signal**

This option includes an at-grade crossing of Sunshine Street (Route D), at the Lone Pine Signal, located west of the Chadwick Flyer alignment. Figure 10 below shows the conceptual layout. Major features of Option 3C include:

- Signal & pedestrian crossing improvements at Sunshine/Lone Pine
- Reconstruct portions of existing sidewalk to be multi-use compliant
- Connection to existing sidewalk in front of businesses along Sunshine St.
- Connection to potential future SRC trailhead parking





*Figure 10: Option 3C – Lone Pine Crossing*

**Benefits**

- Reduced cost compared to Option 3A
- Connection to potential parking
- Opportunities for placemaking north of Sunshine at future SRC trailhead

**Disadvantages**

- Increased rebuild of existing sidewalk
- Requires adverse travel, albeit reduced from Option 3B
- Reduced safety due to at-grade crossing
- Reduced safety with the trail crossing high-volume commercial driveways
- Utility Impacts along Sunshine

**4.4 RECOMMENDED ALTERNATIVE**

The chosen alternative provides a safe and economical trail connecting the cities of Ozark and Springfield, MO. Combining options 1A, 2C, and 3A, this alternative also provides a level of aesthetic customization to make this section a signature piece along the Chadwick Flyer trail corridor. Due to all these factors, the alternative is the recommended alternative to carry forward as the preferred alignment between Kissick Ave. and Sunshine St.

A refined conceptual cost estimate was developed for the preferred alternative, and was provided to Ozark Greenways for program budgeting purposes. This refined cost estimate for the preferred alternative is attached in **Appendix D**. Costs by implementation section are detailed in Section 6.1.

## 4.5 MAINTENANCE OPERATIONS

As a result of the unique aspects of this section along the Chadwick Flyer Trail corridor, it is anticipated to have higher associated maintenance costs compared to other trail sections. This section has several pedestrian structures that will require periodic maintenance to preserve and extend the infrastructure lifespan.

Additionally, similar to other sections of the trail, general maintenance such as mowing, landscaping, erosion and sediment management, and other key activities will need to be performed on a regular basis to ensure the long lasting quality of the Chadwick Flyer Trail corridor.

### Prefabricated Pedestrian Bridge

Seven (7) existing wood structures will be replaced with prefabricated pedestrian bridges. These new pedestrian structures will require periodic maintenance such as flushing, painting, and other activities to maintain structural integrity and extend lifespan.

### Pedestrian Tressel Bridge

Refurbishing the existing railroad truss bridge over Springfield Lake, will allow for an extended lifespan and its long term use as a pedestrian bridge, while preserving a piece of history. However, to maintain its integrity, ongoing maintenance will be required to ensure the safety of all trail users. Depending on the degree of rehabilitation and bridge deck material chosen, a variety of maintenance activities should be considered to prolong the life of the structure. Such activities should include:

- Annual inspection of all safety rails, handrails, rubrails, fencing or other types of safety features
- Annual inspection of all deck surfaces for gaps, cracks, or projections to maintain a safe structure and ADA compliance of the trail
- Annual inspection of decking to ensure it is in satisfactory condition
- Annual inspection of steel structure surfaces, welded and bolted connections, any impact damage from strikes, abutments and bents, bearings and expansion joints, and any other structural component of the bridge
- Rinsing of the steel surfaces on steel bridges frequently if de-icing salts are used.
- Removal of vegetation or debris from steel surfaces or substructure
- Annual inspection of concrete or asphalt decking for excessive cracking and deterioration and replacement of failing pavement

Annual maintenance costs for prefabricated steel structures in are estimated to be between \$2,500 and \$5,000 per year. The actual realized maintenance costs will depend on the preferred structure type, additional aesthetic enhancements to the bridge requiring maintenance, unfavorable or unexpected environmental impacts, and frequency of routine maintenance activities. Additional costs beyond regular maintenance such as replacement or repair of structural elements, safety features, or other non-

annual maintenance activities to preserve the structure are not included in the estimated regular maintenance costs.

### Concrete Box Culvert Underpass Structure

The baseline design for the underpass structure at Battlefield Road assumes use of a reinforced concrete box culvert large enough to accommodate bicyclists for vertical clearance and shy distance on either side of the trail. The following maintenance activities should be expected on the box culvert underpass option:

- Regular flushing of debris and sediment from the box culvert to maintain normal flow and avoid ponding on the trail surface
- Regular inspection of the box culvert condition should take place every five years. Specific items to evaluate and assess should include corrosion of concrete or reinforcement, abrasion of the culvert surface, coating loss of the culvert walls, cracks, joints, seams, changes in shape or deflection, undermining of the culvert, and other structural elements of the culvert.

Annual maintenance costs for the box culvert are estimated to be between \$1,000 and \$2,000 per year. Actual realized maintenance costs may differ depending on frequency of maintenance activities or unexpected environmental factors such as frequent rain events that may cause more frequent maintenance efforts. Additional costs beyond regular maintenance involving replacement or repair of structural elements, safety features, or other components of the structure are not included in the estimated regular maintenance costs.

### Other General Maintenance Activities

Outside the limits of the overpass and underpass structures, general maintenance of City-owned right-of-way and trail pavement will be required. Expected activities may include:

- Mowing, trimming or pruning of grasses, trees, shrubs or other vegetation will be required on regular intervals to prevent overgrowth on the trail surface or impacts to bicyclist clearances
- Regular inspection of trail pavement surface to discover and replace concrete or asphalt pavement causing gaps, tripping hazards, or slippery surfaces deemed out of compliance by ADA standards
- Regular flushing of drainage culverts, detention areas, or water quality features to prevent sedimentation and facilitate sediment removal of such drainage features
- Replacement of lighting elements

Costs associated with general maintenance activities of the trail outside the structure limits would be in addition to other similar City maintenance activities already being performed. Due to the increase right-of-way area for crews to maintain, the annual cost to maintain the trail outside the structure limits are estimated to be between \$2,000 and \$5,000 per year. Actual realized costs will depend on amount of vegetation present and higher than expected deterioration of the trail pavement surface. Additional costs beyond regular maintenance involving replacement or repair of structural elements, safety features, or other components of the structure are not included in the estimated regular maintenance costs.

## 4.6 COST ESTIMATES

In order to evaluate and compare the costs of the trail alternatives, high-level conceptual construction costs were determined for each alternative to aid in alternative ranking. A fully developed program cost estimate that includes construction, preliminary engineering, construction engineering, right of way, right of way incidental, and utility relocation costs was not performed until the core group agreed on a recommended alternative. A full program budget was performed on the recommended alternative and this budget can be found in **Appendix D** of this report.

## 4.7 UTILITY IMPACTS AND RELOCATIONS

This project involves the development of a multipurpose trail from Kissick Avenue near Springfield Lake going north to Sunshine Street in Springfield. The general alignment of the trail follows the old Chadwick Flyer Railroad that was acquired by BNSF. A preliminary MO One Call search of the alignment has identified the possibility of 14 different utilities within the project limits. Since the trail follows the old railroad bed, utility impacts would only be anticipated at the existing at-grade public crossings. The two notable crossings with the highest potential for impacts would be Battlefield Road and Sunshine Street. Both of these roadways consist of a 5-lane section and are classified as Primary Arterials.

At Battlefield Road, City Utilities has electrical transmission and distribution along the south side of Battlefield Road. They also have electrical transmission crossing Battlefield Road on both sides of the railroad tracks. The lines paralleling the railroad are within the railroad R/W so any relocation work will be reimbursable. A pedestrian overpass over Battlefield Road would likely impact all three aerial lines. City Utilities does not have any water mains at this location and only a 2" plastic gas main along the south side of Battlefield Road. A pedestrian underpass might be the preferable option at this location.

At Sunshine Street, City Utilities has several high profile facilities. They have electrical transmission and distribution crossing of Sunshine on the west side of the railroad tracks. They have double three phase distribution crossing the railroad tracks on the north side of Sunshine. City Utilities has a 14" steel gas main and a 12" ductile iron water main crossing the railroad tracks on the north and south side of Sunshine, respectively. Any new pedestrian overpass or underpass at this location will result in substantial utility relocations. The electric transmission is within the railroad R/W so it would be considered reimbursable. It is unknown at this time if the gas main or water main is within private easement or within public R/W of Sunshine Street.

It is recommended to keep the utility companies updated as trail concepts and plans develop. Failure to do so may result in project delays or costly overruns.

## 4.8 RIGHT-OF-WAY IMPACTS

Each option utilizes existing BNSF right-of-way from Kissick Avenue to Sunshine Street. For trail spurs and trailheads additional right-of-way and easements are anticipated due to the narrow right-of-way corridor. Currently the corridor is still owned by BNSF, and will need to be acquired by the City of Springfield prior to any trail construction occurring.

Aesthetic enhancements tying into neighborhoods and parks may require additional right-of-way.

Each option closely follows the original railroad right-of-way which has since been abandoned and owned by private third parties.

## 4.9 PLACEMAKING & AESTHETIC ENHANCEMENTS

With this trail corridor identified as a top priority within the ForwardSGF plan, placemaking and aesthetic enhancements are a key component of this trail section. The goal is not just to create a multi-use path, but rather facilitate a holistic corridor that provides access to amenities, connection to the historic corridor and surrounding neighborhoods, and opportunities to connect with the natural attraction of the Ozarks.

During the Adjacent Landowner meeting held at the onset of the conceptual study, various precedent images and concepts were presented for discussion on enhancing the aesthetics and creating placemaking opportunities. Various enhancements such as fencing, landscaping, lighting, natural buffers, signing, and local development were presented for feedback. Feedback and comments received is summarized in **Appendix G**.

A common theme of themes provided by the public include the following:

- Overall Support for Trail
- Desire for increased focus on privacy/safety features
- Opportunities to stop, and enjoy the area, through benches, parks, or other features.

To accommodate these additional features along the corridor, an additional Aesthetic and Placemaking line item was added to the recommended alternative cost estimate (assumed at 15% construction total) for items such as signing, benches, landscaping, fencing, etc. Further specific details on aesthetic enhancements can be found in the Adjacent Landowner Meeting Summary (**Appendix G**), and additional details for proposed trailside development opportunities are further described in Section 6.0 and **Appendix F**.

Additionally, future design phases should include focus on integrating these features into the design naturally through natural buffers, water quality enhancements, and drainage detention areas. Implementing these trailside features is also important to provide a holistic and connected environment to the surrounding areas; as such placemaking efforts on this corridor should also focus creating additional connections (ADA compliant) and access to the trail corridor.

## 4.10 SATISFACTION OF THE PURPOSE AND NEED

The proposed Chadwick Flyer Trail between Kissick Avenue and Sunshine Street provides a safe, multi-modal transportation alternative for the planned bicycle and pedestrian corridor between the cities of Ozark and Springfield, Missouri. The three options evaluated as part of this study satisfy the needs and purpose of the trail corridor, and provide logical termini at each end (Kissick Ave. and Sunshine St), as well as interim logical termini for each implementation phase (See Section 6.1).

## 5.0 ENVIRONMENTAL CONSTRAINTS SUMMARY

A high-level environmental review was performed as part of this conceptual study with the assumption that federal permits or funding may be sought out for future design or construction of the Chadwick Flyer Trail. The following environmental categories, some of which can be found in the environmental constraints map in **Appendix E**, were reviewed and summarized to include each crossing option:

### 4.1 NOISE ASSESSMENT

This project would be classified as a Type III project which means a noise analysis would not be required.

### 4.2 PARKLAND/4(F) PROPERTIES

Parkland and potential 4(f) properties that are near and/or adjacent to the project corridor and may be affected include Sequiota Park, Lone Pine Bike Park, Galloway Creek Greenway, Springfield Conservation Nature Center, and James River Greenway Trail of Honor. The Lake Springfield fishing access point near the south end of the project may also be affected. Project may require compliance with Section 4(f).

### 4.3 THREATENED AND ENDANGERED SPECIES

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

- Indiana bat (*Myotis sodalists*, endangered)
  - Tree clearing of suitable habitat will require seasonal restrictions (Additional assessment may be required Mar. 31 to Oct. 31)
  - Project does not overlap critical habitat
  - If 5 or more acres of forested habitat will be cleared and the project falls within Missouri FWS current buffer areas for the Indiana bat, a formal bat habitat assessment may be necessary
- Northern long-eared bat (*Myotis septentrionalis*, endangered), Tricolored Bat (*Perimyotis subflavus*, proposed endangered)
  - No critical habitat identified
- Gray bat (*Myotis grisescens*, endangered)
  - Project area will need to be assessed for suitable cave habitat
- Ozark cavefish (*Amblyopsis rosae*, threatened)
  - Project area will need to be reviewed for potential cave stream habitat; see nearby Sequiota Park Cave & Spring.
- Monarch Butterfly (*Danaus plexippus*, candidate to be listed endangered)
  - No critical habitat identified. Additional action may be needed if endangered status changes during the project

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

A T&E Habitat Assessment will need to be completed.

Migratory bird field check

- Bridge/culvert structures may require a field check for bird nesting. Potential areas to check include bridges south and west of US-65 and area crossing underneath US-65.

#### 4.4 404 PERMIT – WETLANDS/STREAMS

The National Wetland Inventory indicates that wetlands are present in the project area along the north side of Lake Springfield. Field check for wetlands may also be needed where the project crosses Galloway Creek. Impacts to federally jurisdictional streams and/or wetlands will require compliance with 404/401 permitting.

#### 4.5 CULTURAL RESOURCES

No National Register sites are located within the project area. Area will likely need to be reviewed for buildings and structures that are over 45 years of age. Missouri Veterans Cemetery is adjacent to the project corridor; impact to the cemetery should be avoided.

#### 4.6 FLOODPLAIN

Much of the project area is within or immediately adjacent to FEMA regulatory floodway and floodplain (Zone AE, 1% annual chance flooding hazard) along Galloway Creek and Springfield Lake. Construction with a floodplain will require a floodplain development permit.

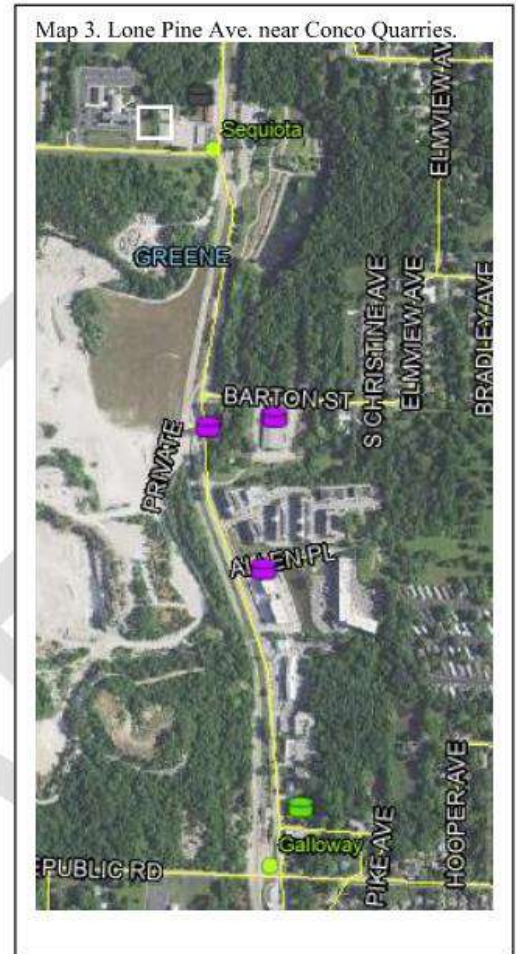
#### 4.7 HAZARDOUS WASTE SITES

No current hazardous substance investigation and cleanup sites are located within the project area. One completed cleanup site is located at 3677-3847 S Lone Pine Ave. The next closest site is also completed, several blocks from the north end of the project area at 2401 Sunshine St.

Regulated storage tank facilities near or adjacent to project area according to Missouri DNR:

- Operating UST with no known releases: 1 (Orange ■)
- Other reported petroleum facilities with no known releases: 2 (Brown ■)
- Facility closed prior to implementation of 2004 tanks RBCA: 6 (Purple ■)
- Administrative closure: 1 (Black ■)
- No further action letter issued with restriction: 1 (Yellow ■)
- No further action letter issued without restriction: 3 (Green ■)

If right-of-ways or easements will be required from these properties, additional investigation will likely be necessary.



## 4.8 FARMLAND

A desktop review indicates that the study area is unlikely to impact any farmland. Impacts to farmland may require coordination with NRCS.

## 6.0 TRAILSIDE DEVELOPMENT OPPORTUNITIES

Urban trail and greenway corridors are being implemented across the country and with them trail-oriented developments have quickly followed. These trail developments bolster the local economy by boosting property values, attracting workforce, and promoting tourism. The Chadwick Flyer Trail corridor is anticipated to provide these benefits to the City of Springfield and is one of the reasons why it is recognized as a top priority for the City.



As part of the Forward SGF plan, the City has produced a proposed land use plan to focus on areas that can guide and foster growth within the community. This Chadwick Flyer Trail corridor has been reviewed as part of the Forward SGF plan, and includes a multi-faceted approach to balance

residential areas with development and recreational access. This conceptual trail planning study built on the work already performed by the City to re-imagine the land use in this area and to develop a vision for potential trailside development opportunities along the corridor. The image to the right, also located in **Appendix F**, represents potential development opportunities along the corridor. These



As depicted in the image, adjacent properties to the trail corridor offer varying types of development opportunities, including mixed residential, multi-use development, recreation and greenspace, and commercial/industrial business flex. Further a goal of the Chadwick Flyer Trail is to enhance connections to these existing and future development areas, providing access to recreation areas, and serve as a north-south transportation corridor in eastern Springfield.

Future design phases are anticipated to focus trailside enhancements that provide not only aesthetic improvements, but a connection to the surrounding community. Likewise, as developments may occur alongside this historic corridor, strategic improvements should be made that support trail connection and access.

## 7.0 PUBLIC INVOLVEMENT

### 7.1 ADJACENT LAND OWNERS OPEN HOUSE

A public meeting pertaining to the Chadwick Flyer Trail Study Report was held on August 15<sup>th</sup>, 2023, with an attendance of 49. Numerous written and in person comments were received. See **Appendix G** for the public meeting sign-in sheet and written comments. A summary of the common themes of the public comments is provided below.

- A trail connection from Springfield to Ozark was strongly favored by both local citizens and business owners.
- There was some concern expressed about the privacy impacts on residential properties.

- Concern was also noted regarding the safety of the numerous property intersections along the trail south of Sunshine St., as well as the concern for easy access to property (yards, mailboxes, etc.) along the trail.



*Figure 11: Adjacent Landowners Open House*

## 7.2 PUBLIC INPUT MEETING

A second public meeting will take place in early 2024. Additional public and stakeholder input will be continued during future phases of the project, as funding is identified for various sections. See Summary in **Appendix H**.

## 8.0 ADDITIONAL TRAIL CONSIDERATIONS

### 8.1 IMPEMENTATION PLAN

Due to the substantial length of the trail, a multi-phase approach is the most feasible approach to build the trail as funding becomes available. The trail has been broken up into the following six sections:



*Figure 12: Implementation Plan*

**Section 1 – Kissick to Trail of Honor**

Begins at Kissick Ave and ends at the Trail of Honor (1.4 miles).

The challenges in the construction of this phase include:

- One (1) structure along this section
- Grading/drainage solutions vary greatly along alignment, especially with corridor proximity to Springfield Lake

**Section 2 – Trail of Honor to Republic Road**

Begins at the Trail of Honor and ends at the intersection of Lone Pine Ave. and Republic Rd. (1.2 miles).

The challenges in the construction of this phase include:

- Five (5) structures in this area
- One (1) road crossing in this area
- Sections paralleling existing Galloway trail (0.4 miles)
- Grading/drainage solutions vary greatly along alignment
- Utility easements required in a few areas

**Section 3 – Republic Road to Galloway St.**

Begins at Republic Rd. and ends at the intersection of Lone Pine Ave. and Galloway St. (0.7 miles).

The challenges in the construction of this phase include:

- One (1) structure in this area

- One (1) road crossings in this area
- Sections paralleling existing Galloway trail (0.7 miles)
- Grading/drainage solutions vary greatly along alignment
- Utility easements required in a few areas

#### **Section 4 – Galloway St. to Battlefield Rd.**

Begins at the intersection of Lone Pine and Galloway St. and ends at Battlefield Rd. (0.8 miles).

The challenges in the construction of this phase include:

- Crossing of Battlefield Rd.
- Utility impacts at Battlefield Rd.
- One (1) structure in this area
- Enclosed Drainage required in multiple areas
- Utility easements required in a few areas

#### **Section 5 – Battlefield Rd. to Southern Hills Blvd.**

Begins at the Battlefield Rd. and ends east of the intersection of Lone Pine Ave. and Southern Hills Blvd. (0.8 miles)

The challenges in the construction of this phase include:

- Crossing of Battlefield Rd.
- One (1) box culvert in this section
- Two (2) at-grade road crossings
- Grading/drainage solutions vary greatly along alignment
- Relocation of existing at-grade road crossing at Southern Hills Blvd.

#### **Section 6 – Southern Hills Blvd. to Sunshine St.**

Begins east of the intersection of Lone Pine Ave. and Southern Hills Blvd. and ends north of Sunshine St. (1.0 miles)

The challenges in the construction of this phase include:

- Crossing of Sunshine St.
- Utility impacts at Sunshine St.
- BNSF ROW north of Sunshine St.

Program costs for each section are listed below for the recommended alternative. These program costs are intended to recommend a high-level programming budget for the trail gap and may increase with the inclusion of aesthetic enhancements, more expensive drainage solutions, increases in property values, or other factors. A detailed summary of the full program costs for each section and the entire project (for the baseline and additional designs) can be found in **Appendix D**.

	Section 1 Program Budget	Section 2 Program Budget	Section 3 Program Budget	Section 4 Program Budget	Section 5 Program Budget	Section 6 Program Budget
<b>Construction Cost</b>	\$1,608,195.23	\$6,084,658.13	\$1,490,443.50	\$3,252,010.13	\$1,178,268.00	\$3,048,518.38
<b>Preliminary Engineering (12%)</b>	\$192,983.43	\$793,605.56	\$181,253.22	\$493,801.52	\$144,992.16	\$449,684.33
<b>Construction Engineering (12%)</b>	\$192,983.43	\$793,605.56	\$181,253.22	\$493,801.52	\$144,992.16	\$449,684.33
<b>Right-of-Way &amp; Incidentals</b>	\$0.00	\$0.00	\$0.00	\$15,000.00	\$10,000.00	\$90,000.00
<b>Utility Relocation</b>	\$0.00	\$20,000.00	\$20,000.00	\$25,000.00	\$20,000.00	\$660,000.00
<b>Section Total</b>	<b>\$1,994,162.08</b>	<b>\$7,691,869.24</b>	<b>\$1,872,949.94</b>	<b>\$4,279,613.16</b>	<b>\$1,498,252.32</b>	<b>\$4,697,887.03</b>
<b>Total</b>	<b>\$22,034,733.76</b>					

**Table 5: Recommended Alternative Program Budgets\* for Sections 1, 2, 3, 4, 5, and 6**

*\* Program Cost is based on 2024 dollars and assumes a reasonable schedule for construction with no additional contingencies for acceleration. Program Cost does not include any additional contingencies for escalation of steel and fuel costs and is subject to change based on unforeseen fluctuation in costs necessary to construction due to inflation or that are out of the control of CMT.*

## 8.2 FUNDING OPPORTUNITIES

Trails are ever-growing in popularity in recent history and with this growth there has been additional grant funding allocated to trail projects. Some of these grant programs include Surface Transportation Block Grants, Department of Economic Development Grants, and Department of Natural Resource Grants.

As the project gains momentum, those grants (along with others) should be explored to provide valuable sources of potential funding for the project. One caveat to nearly all grant programs is that in order to obtain funding, dollar-for-dollar matches will be required. Therefore, as funding becomes available, it can be allocated to build the budget needed for the cost-share.