Pedestrian Tunnels

Lessons Learned

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Presented to: County Engineers Workshop
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Overview

Introduction

Planning

Agreements

Design

Construction

Disclaimer: **We cannot possibly talk about all of the complexities involved in the above areas within our allotted timeframe so please proceed with caution…and consult with experts!**

Overview

Introduction

Lessons Learned based on 4 Projects

M-52 Underpass

US-127/I-94 Interchange

Allen Creek Berm Opening

Bandemer-Barton

Straightforward
(relatively)

Complex

Planning

Site Selection & Need

- Demand vs. Encouraging Use
- Physical Site Constraints
- Land Ownership
- Maximize Use of Public Land

Lesson Learned: Consider if this is where people WANT to cross. Consider future development. Public and stakeholder engagement is key!

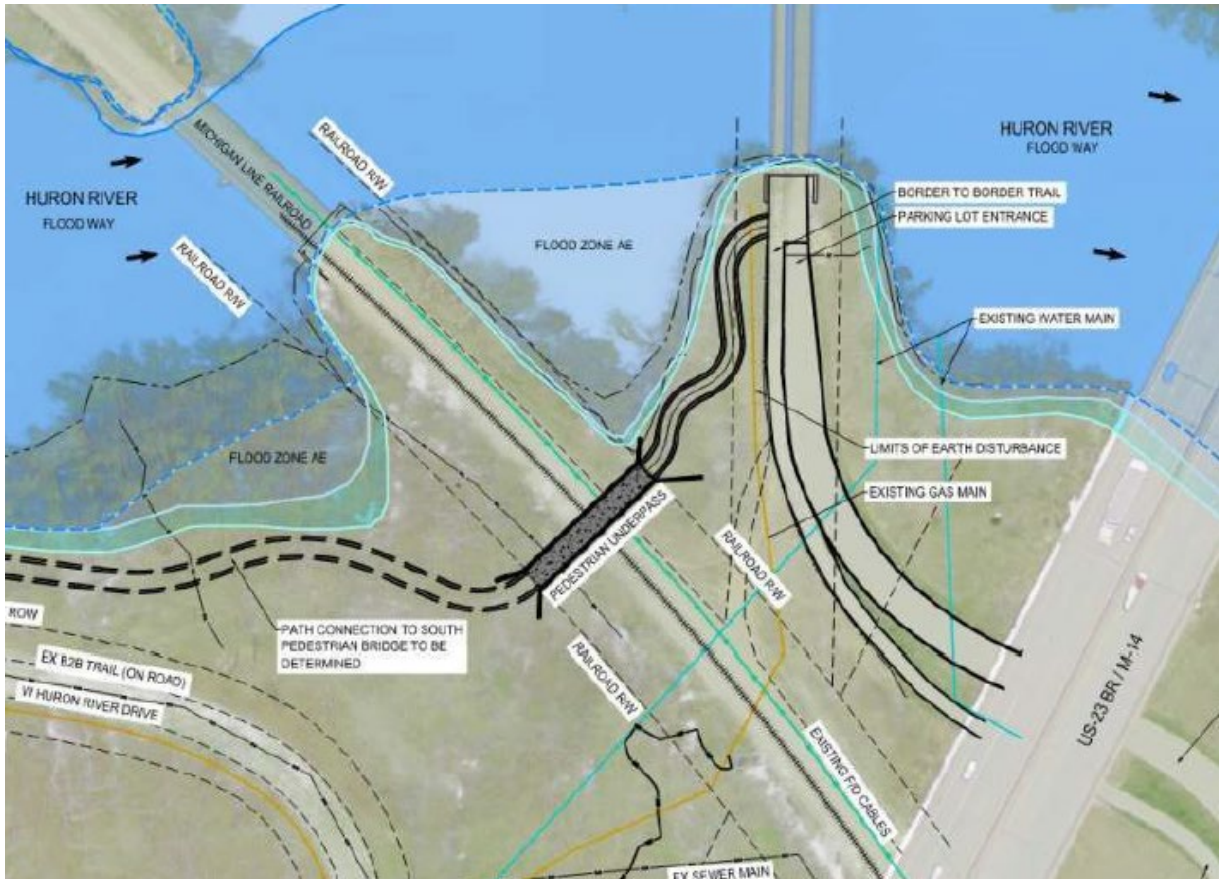
Planning

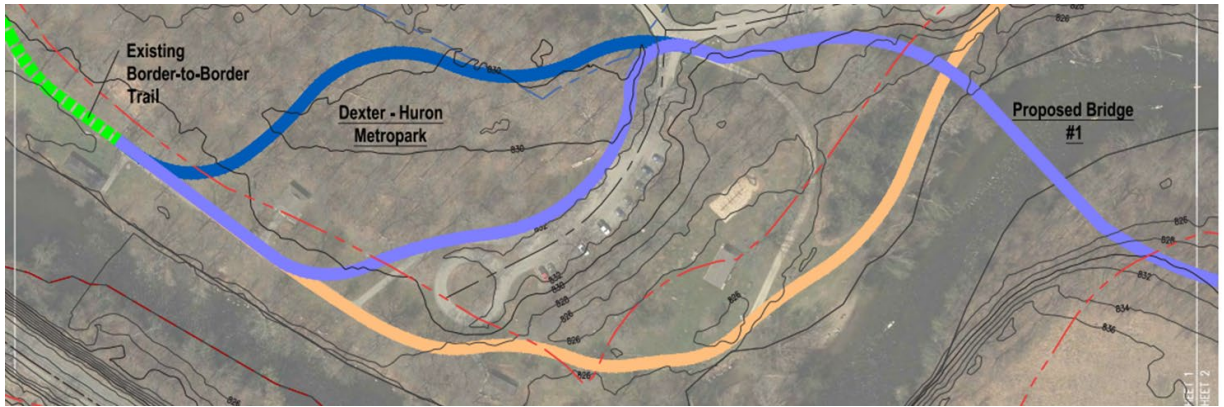
Site Challenges

Alternatives Analysis

- Macro vs micro
- Visit the site
- Over vs under

Lesson Learned: Plans do not give a "feel" for the project. Consider renderings and visit other similar scenarios





Planning

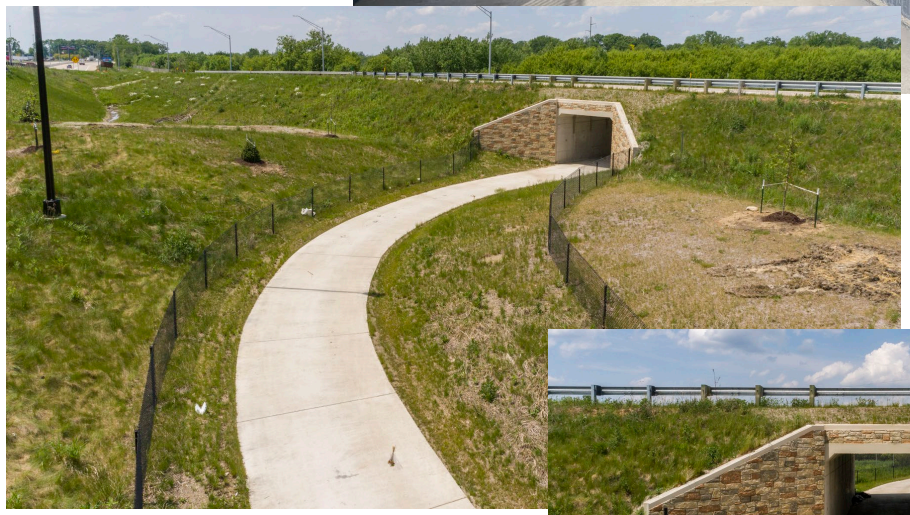
Site Challenges

Parallel Occupancy w/ RRs

High Speed Considerations

Safety & Security

Visibility, cameras, lighting, plantings, path alignment

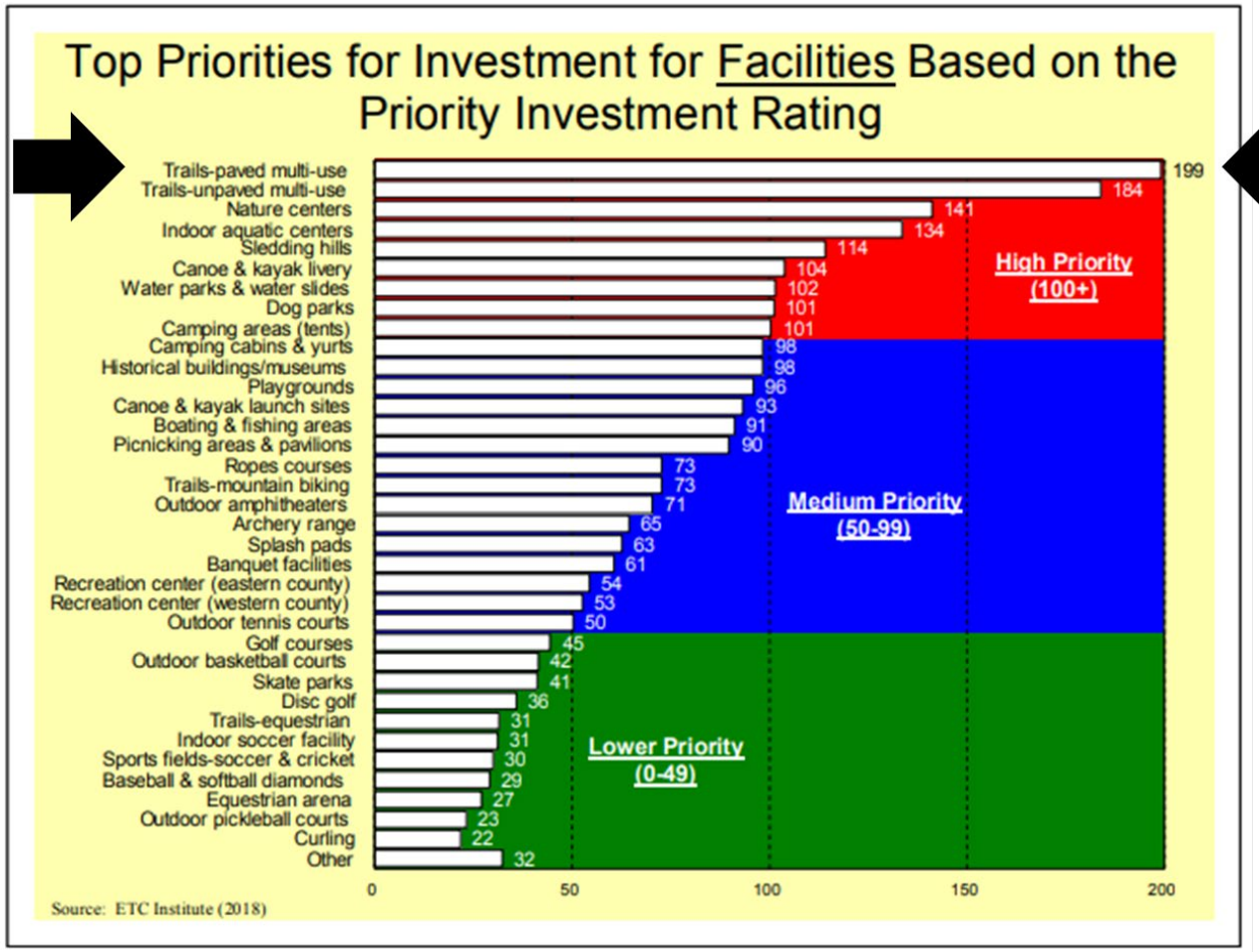


Lesson Learned: High Speed Rail has “extra” requirements. Avoid 90-deg turns. Consider maintenance & operational costs.

Planning

Funding Opportunities

1. Local/State
2. FEMA
3. TAP
4. SEMCOG
5. MDNR
6. INFRA/CRISI/RAISE
7. Private Contributions



Agreements

Railroads

Public & Private Interests

RRs

-Permit-To-Enter (PTE) (Provides site access during design & payment to RR's)

-Construction Agreement (Outlines Requirements During Initial Construction)

-Structure Agreement (Outlines Maintenance & Inspection Reqts over life of X-ing)

ALL RR's may be required to sign

-Recently Michigan has required both the owning RR and all operating RR's to sign which can be challenging as those RR's themselves do not like signing an agreement for which they are not an owner

Agreements

Utilities

Fiber Optic Lines (3rd Party Occupancy in RR R/W)

Lead Times and Seasonal Outage Issues

Payment Terms

Not all utilities participate in Miss Dig (rail communications and other facilities may not be located during Miss Dig visit)

Design

Staging

Several Methods to Consider

Complexity, Cost, & Calendar

a) Tunnel Jacking
b) Jump Spans
c) Shoo-Fly
d) Cut & Cover

Design

Staging

Cut & Cover

Not always “simple”

Design

Staging

Cut & Cover

Requires Longer Outage

Cost Varies

Lesson Learned: Study your site specific constraints and layout; including timing, staging area, critical utilities, risks (unknown underground), etc.

Design

Environmental

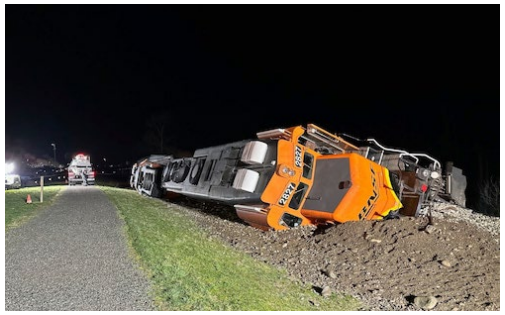
Contamination

Rail corridors are typically 100 to 150 years old!

Accidents occur and clean up can only do so much

Undetected leaks

Lesson Learned: Do Your Homework/Fieldwork. Be prepared for encountering contaminated soils before your Contractor begins.



Design

Environmental

Contamination

Some corridors require all disposal on R/W or must be treated as contaminated and disposed of properly at a dump.

Don’t forget groundwater can be contaminated also.

Its difficult to bid this type of work.

Lesson Learned: Research what can and cannot be tested. Think about cost of risk and structure contract, appropriately.

Design

Large RR Loading

Trains are heavy…duh!

Culvert/Pipe Manufacturers can help during design/planning.

Lesson Learned: Don’t rely on past projects for box culvert or pipe sizes, cover, etc.

Design

Underpass Issues

RR's Have Stringent Reqts.

Typically the feature being crossed is fixed

Cover to top of culvert & Bottom of excavation limits results in lower than desired elevations

Groundwater during construction

Surface water while in service

Lesson Learned: Coordinate early with RR's for any Design Exceptions. Key is to explain why other alternatives are not feasible.

Consider what happens when underpass is inundated. How often this is predicted to happen may influence your decision.

Construction

Costs

M-52: $1.3M (2019)

78' of Box Culvert

Allen Creek: $9M (2019)

510’ of Box Culvert, Prefab Ped Bridge, Parallel RR Retaining Wall

US-127: N/A (2019)

Individual pricing for project not available.

Bandemer-Barton: $4.9M (2024)

60’ of Box Culvert, Aesthetics, Timber Ped Bridge, Block Retaining Walls, Seawall, Parking Lot Reconfiguration

Construction

Allen Creek Outage Timelapse Video