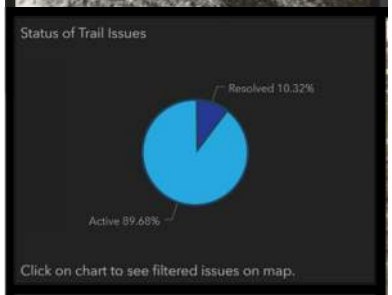
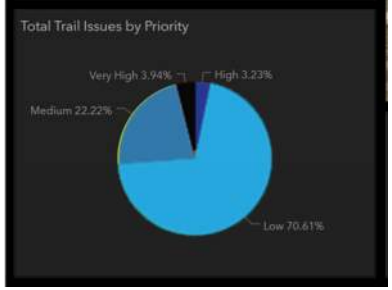
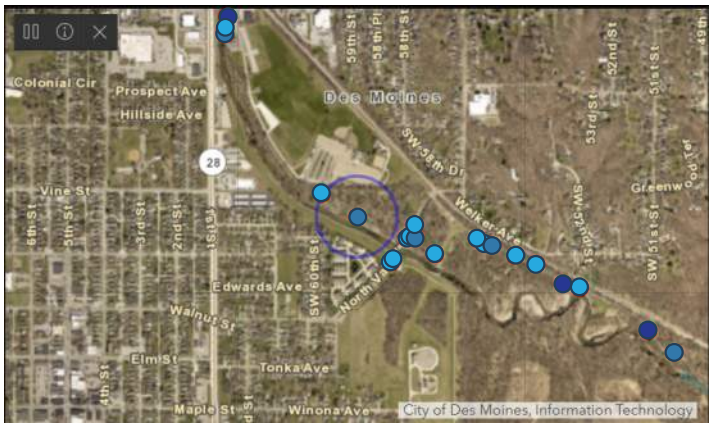
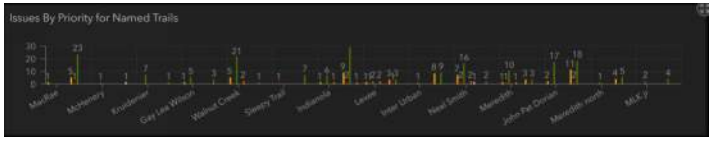
CDM Multi-Use Trails – Systemic Condition Analysis & Management









Derek Hansen, ASLA
Park Planner II

Colby Fangman, PLA, NGICP
Park Planner III

CDM Multi-Use Trails – Systemic Condition Analysis & Management

SCAMMUT it or lose it!

Presentation Overview

1 2 3 4 5 6 7 8 9

Accepted Budget Increase

SUSTAINABLE TRAIL FUNDING PROPOSAL
10-15 Year Proposal to Solvency

OPERATIONS

2022 Current **$64K** | Recommended **$100K**

What is covered ?

CAPITAL REPAIRS

2022 Current **$120K** | Recommended **$300K**

What is covered ?

OPERATIONS + CAPITAL

2022 Existing **$184K** › Proposed Funding **$400K**

STAFFING COSTS NOT INCLUDED

PROPOSED FUNDING Inflation @ 3%

2023	$184K	2029	$450K
2024	$1.18M	2030	$464K
2025	$400K	2031	$478K
2026	$412K	2032	$492K
2027	$424K	2033	$507K
2028	$437K	2034	$522K

PLANNED TRAIL NEW CONSTRUCTION CIP

	CIP G.O.	Grants	(ARPA)	Total
FY 2023	$2.1M	$2.3M		$4.4M
FY 2024	$2.2M	$3.1M	$1.5M	$7.8M
FY 2025	$2.3M	$1.0M		$3.3M
FY 2026	$1.6M	$700K		$2.3M

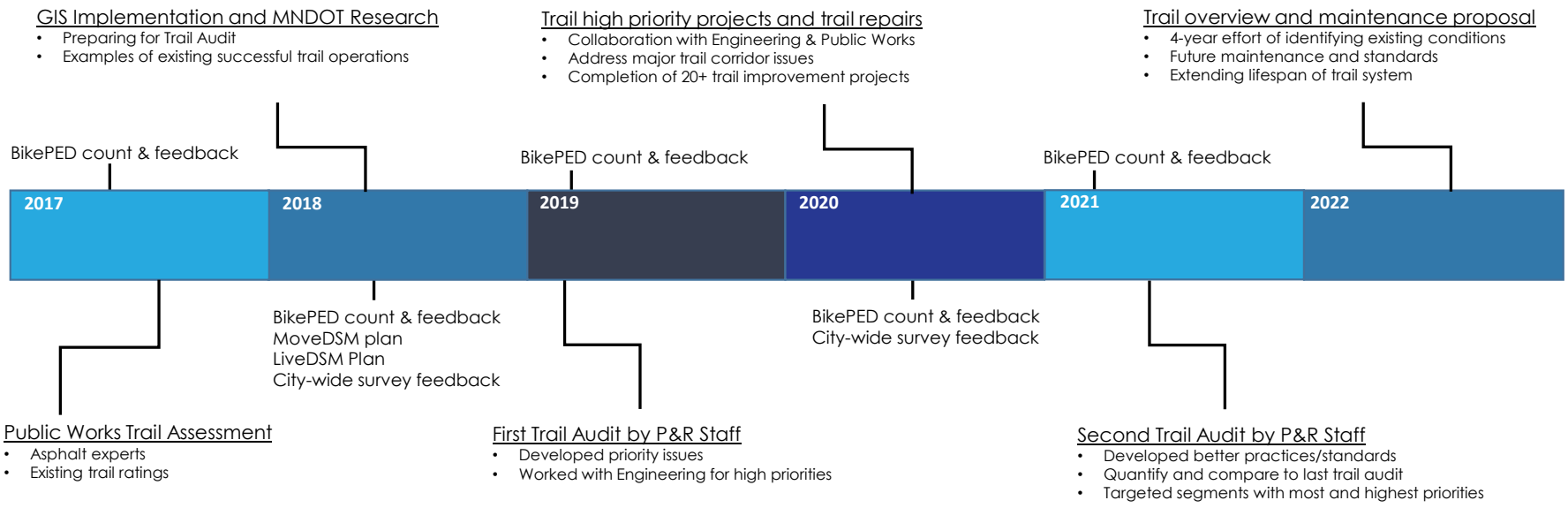
~$3.9 Million Maintenance Funding Increase Over 10 Years (Excludes Staffing & CIP)

Presentation Overview

Presentation Overview

1 2 3 4 5 6 7 8 9

Analysis Development Timeline



Goals

- Respond to public's desire for better trail maintenance and surfacing
- Protect city's and project grantor's capital investments with a regular cycle of preventative maintenance and repairs following established standards
- Achieve a full lifespan of the asphalt trails in our system and provide maintenance schedule for existing and developing trails
- Goals of LiveDSM, innovation through improved efficiency and efficacy

Existing Trail System

Existing Trail System

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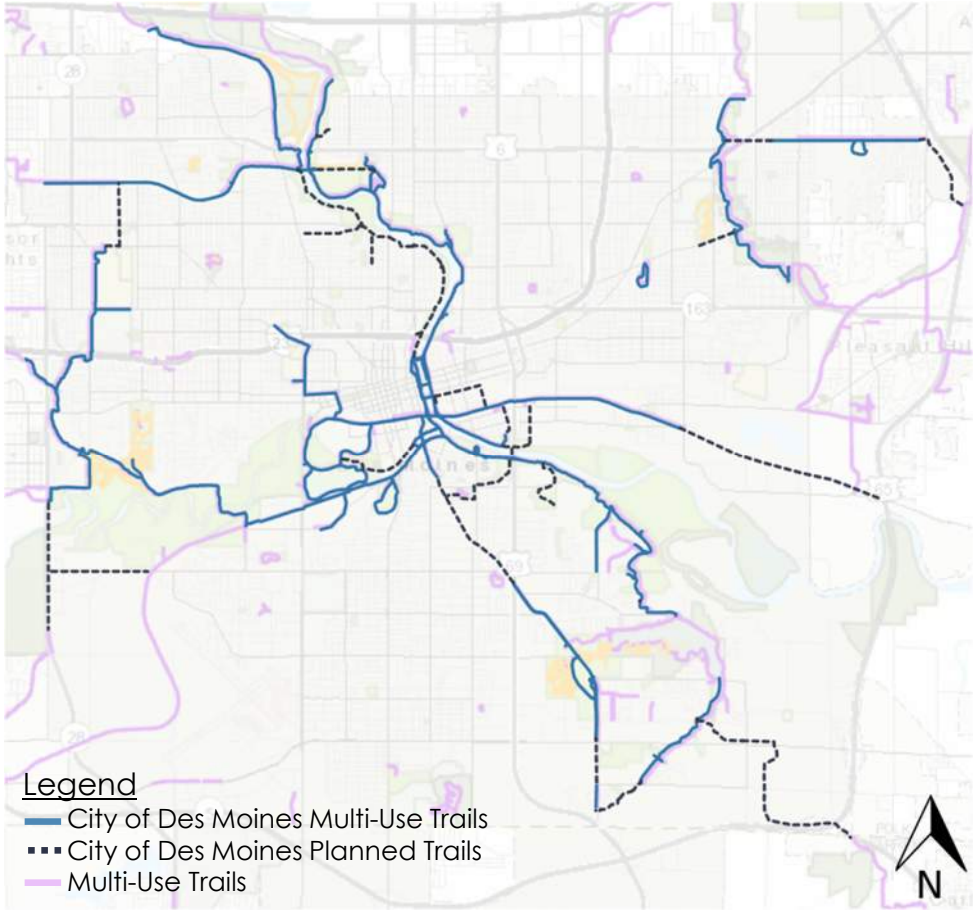
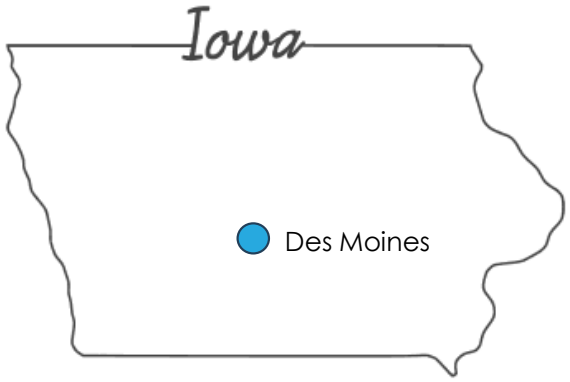
City of Des Moines Trail System Existing & Planned





68 miles of paved multi-use trails

Connected to the Central Iowa Trail Network boasting 600+ miles of trail

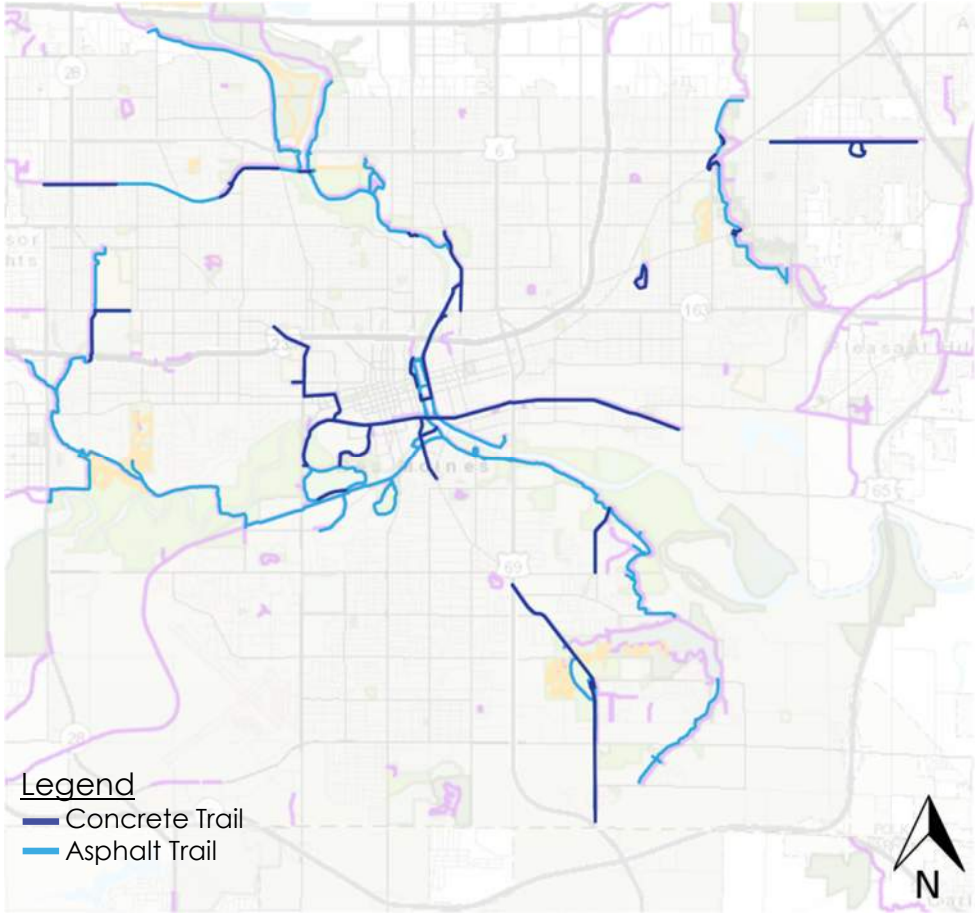
CITY OF DES MOINES PARKS AND RECRUITMENT

NATIONAL GOLD MEDAL AWARD FOR EXCELLENCE IN THE FIELD OF PARK AND RECREATION MANAGEMENT

Existing Trail System

1 2 3 4 5 6 7 8 9

Existing Trail Paving Types



Asphalt Trails, Existing

- Waveland Trail
- Walnut Creek Trail
- Brody Middle School Loop
- Bill Riley Trail
- Kruidenier Trail
- Pomerantz Family Trail
- MacRae Park Trail Loop
- Meredith Trail
- John Pat Dorrian Trail
- Carl Voss Trail
- Harry Piper Parkway
- Easter Lake Spine Trail
- Inter-Urban Trail
- Trestle to Trestle Trail
- Neal Smith Trail
- Riverview Connection Spurs
- McHenry Park Trail
- Gay Lea Wilson Trail

Concrete Trails, Existing

- Inter-Urban Trail
- Neal Smith Trail
- John Pat Dorian Trail
- MLK Jr Pkwy
- MLK JR Pkwy - North
- Meredith Trail - North
- Indianola Sidepath
- 2nd Street Sidepath
- Carl Voss 22nd Ave Spur
- Easton Basin Loop
- Gray's Station Trail
- E. Douglas Sidepath
- Brook Run Park Loop
- University Ave Sidepath
- Waveland Trail

39 Miles of Hot Mix Asphalt (HMA) Trail

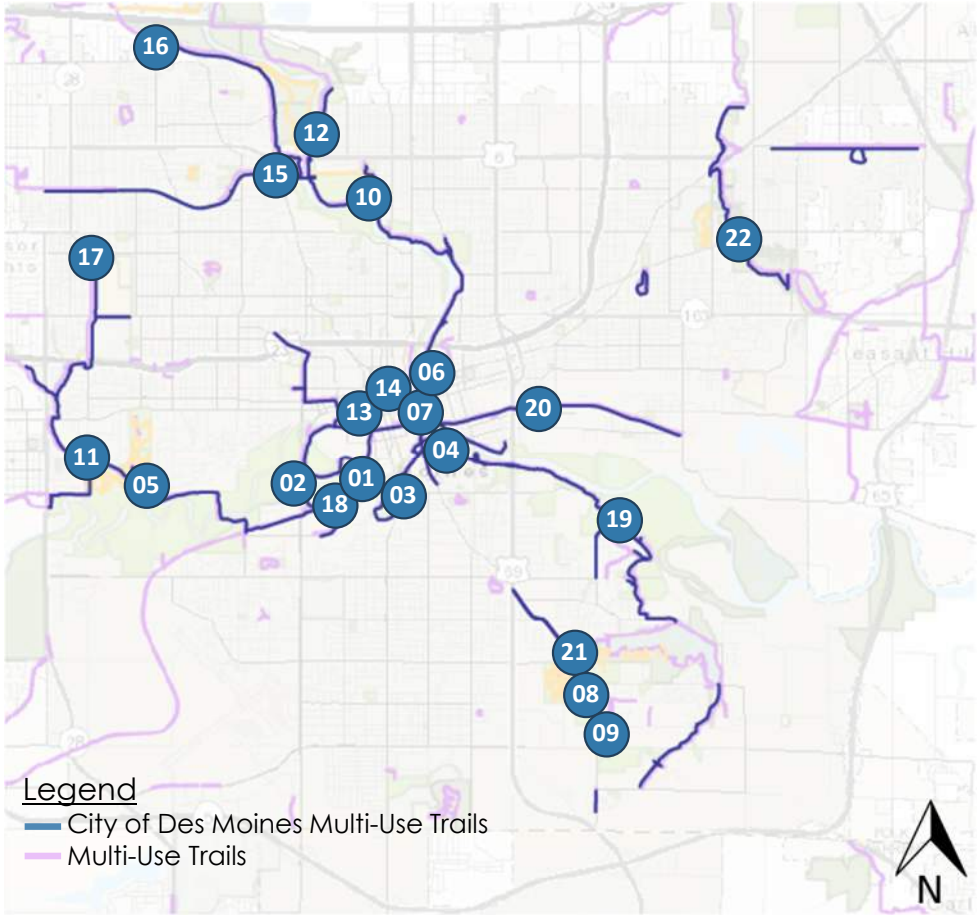
29 Miles of Concrete Trail

Project Justification

Project Justification

1 2 3 4 5 6 7 8 9

Documenting Existing Trail Usage



Annual Uses

	2023	
	Total	Daily Average
1	387,032	1,057
2	489,344	1,337
3	235,050	642
4	209,526	572
5	236,051	645
6	211,780	579
7	196,858	538
8	2,512	26
10	112,622	344
11	229,308	627
12	58,362	176
13	314,067	1,013
14	110,469	305
15	90,183	276
16	58,527	179
17	73,508	225
18	41,397	125
19	59,648	182
20	28,804	88
21	34,066	104
22	35,182	132
	3,214,296	

Permitted Major Trail Events

DES MOINES MARATHON
DAM DSM HALF MARATHON
FORE! OUR PARKS Golf Tournament | Bike Ride
IRONMAN

~17,000 annual participants

Example Trail Counter

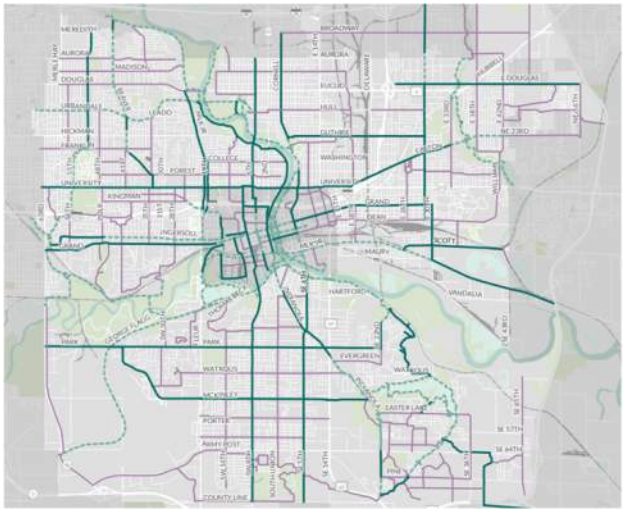
Project Justification – LiveDSM & MoveDSM

1 2 3 4 5 6 7 8 9

Existing City Plans

MOVE DSM

TRANSPORTATION FOR EVERYONE



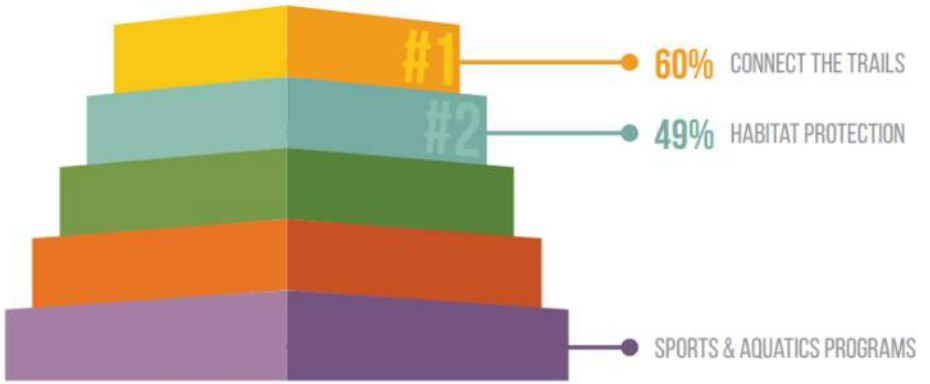
Future Bike Network

LIVE DSM

PARKS AND RECREATION COMPREHENSIVE PLAN

40% USE PAVED TRAILS **WEEKLY**

64% USE PAVED TRAILS **MONTHLY**



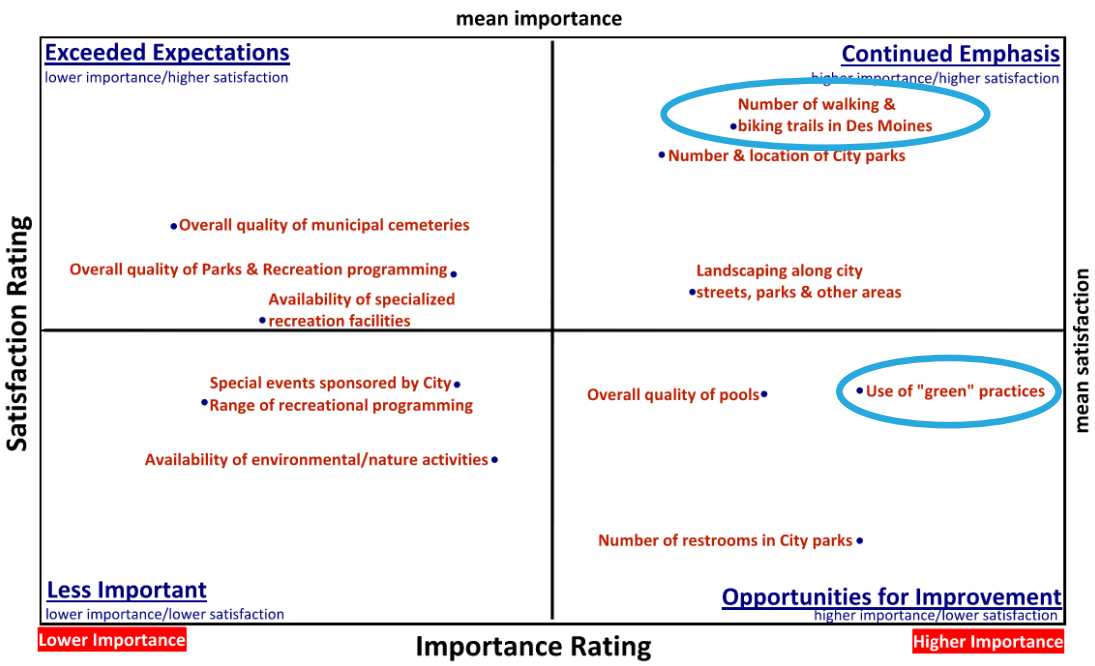
LiveDSM – System Vision, Goals, Desires

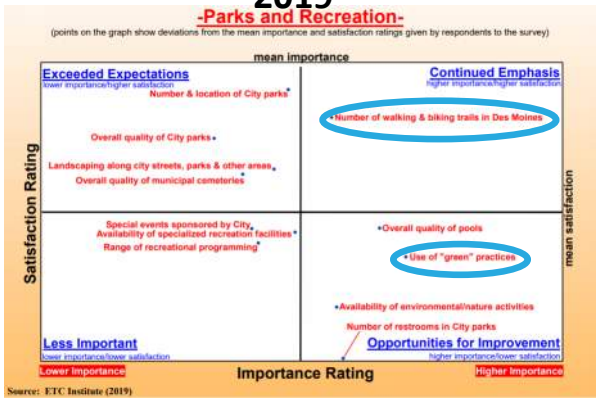
Project Justification – CDM Resident Survey Results

1 2 3 4 5 6 7 8 9

2022-2019 Importance-Satisfaction Assessment Matrix

- Surveys are conducted every 2-3 years
- Goal of reaching 800 residents for statistical validity
- Satisfaction & Importance ratings are key indicators of the public's priorities



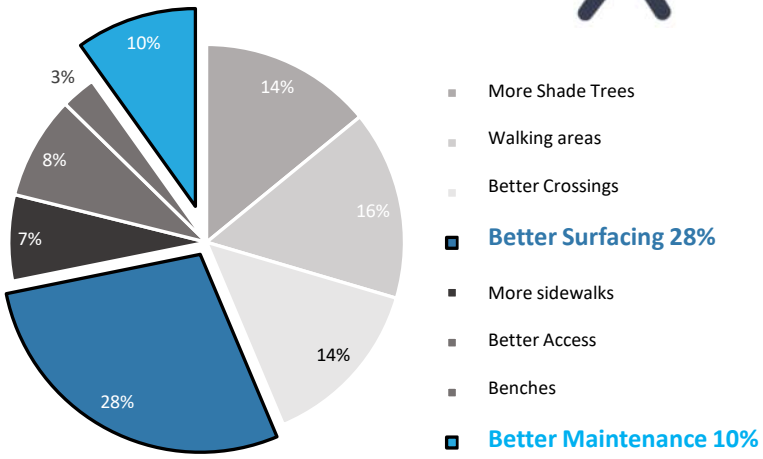


Project Justification – Bike/Ped Questionnaire Results

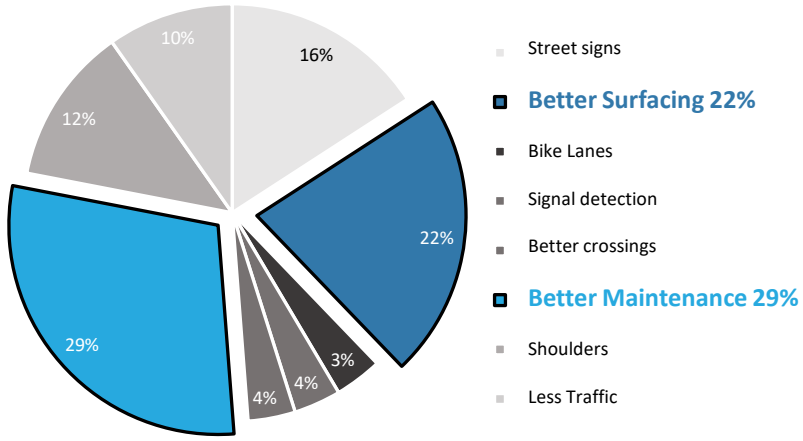
1 2 3 4 5 6 7 8 9

Bike/PED 2021 Questionnaire *(149 Responses, highest response)*

Trail Improvements **Pedestrian** Users



Trail Improvements **Bicycle** Users



Previous Practices (Pre-2016)

Previous Practices (Pre-2016)

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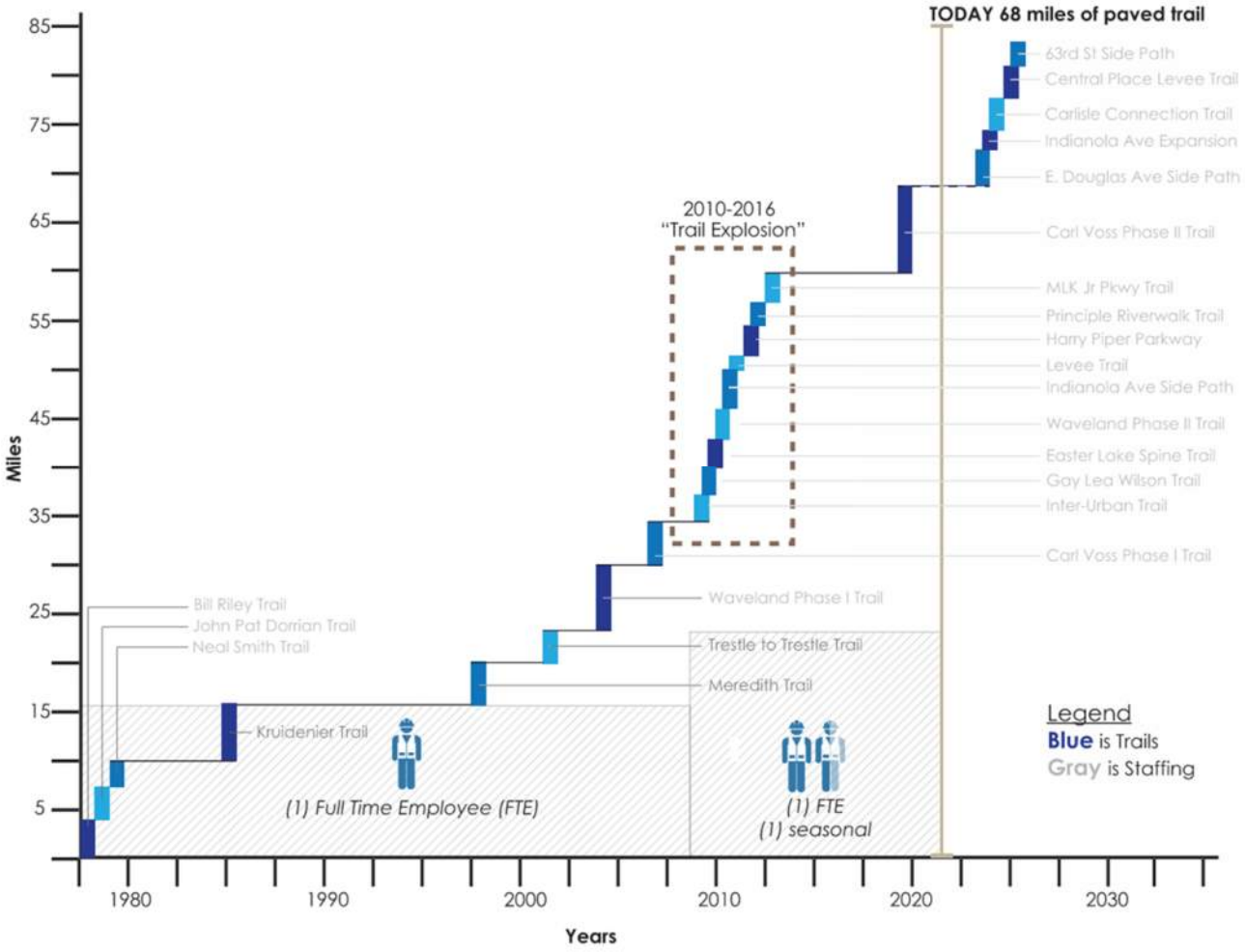
City of Des Moines Trail & Staffing Growth



Previous Practices (Pre-2016)

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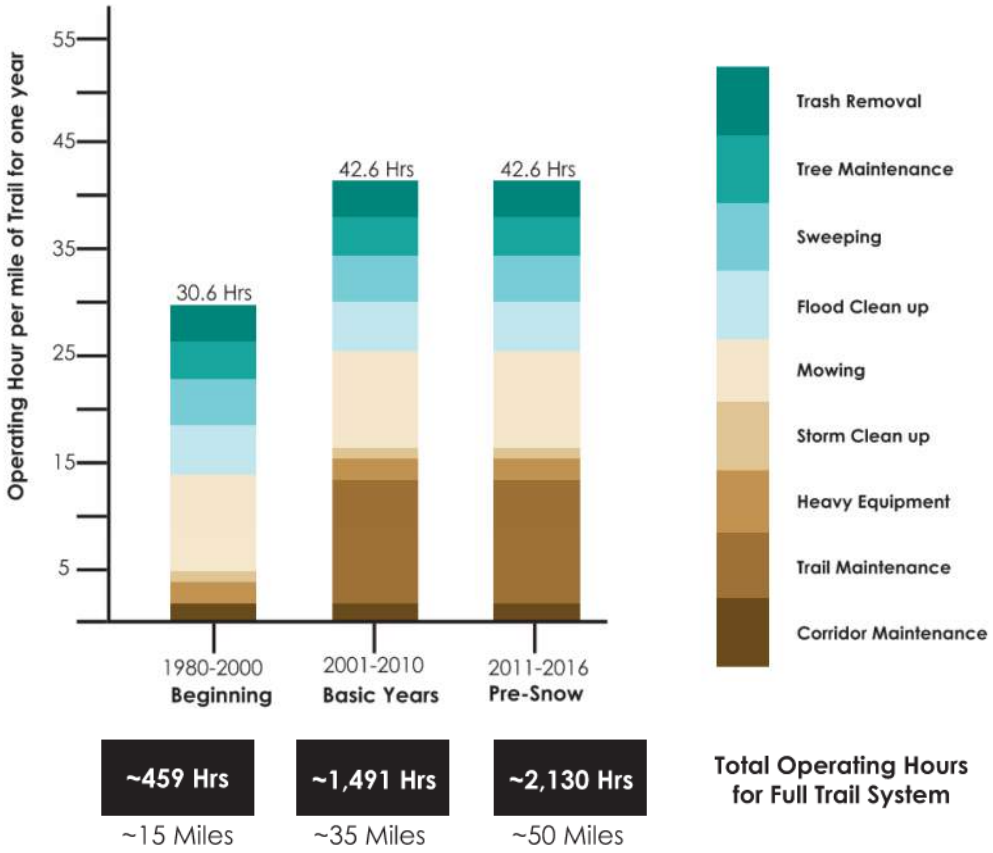
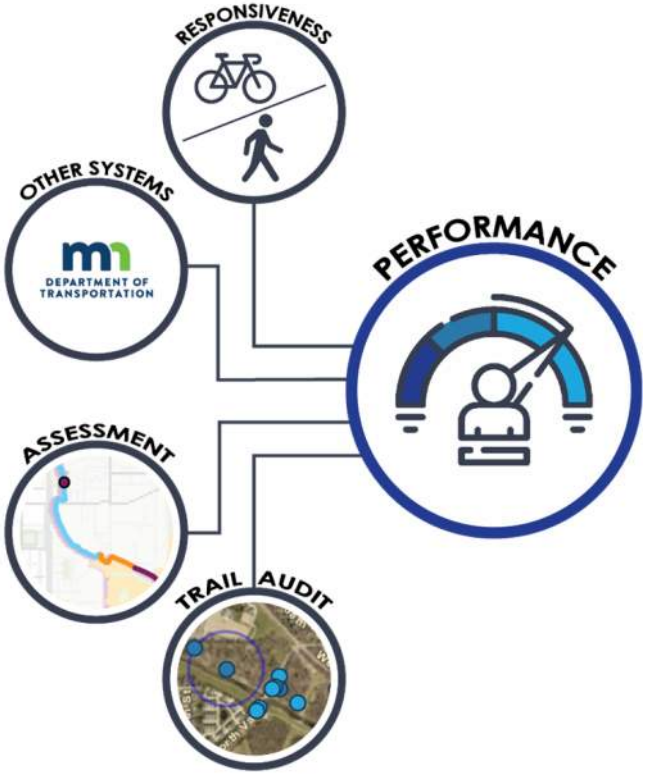
Previous Operating Hours System-Wide



Analysis & Assessment

Analysis & Assessment

Current System Performance



- Trail User Feedback
- Public Surveys
- Adopted City Plans

- Comparing System Operations
- Preventative Maintenance Measures
- Lifespan of Asphalt Trails

- Preventative Recommendations
- Segmental Analysis
- Lifespan Expectancy

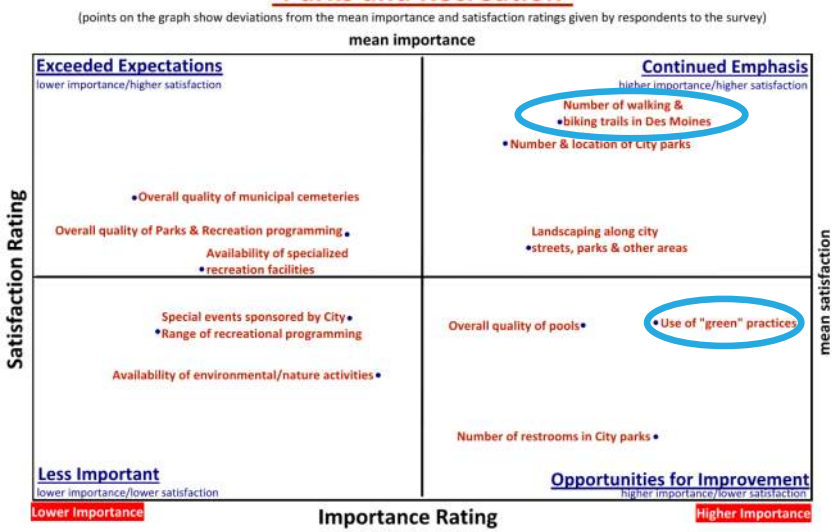
- Prioritizing Issues
- Point Location Analysis
- Pedestrian/Bicycle Scale

Analysis & Assessment

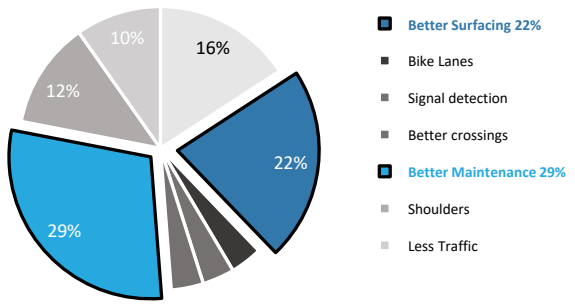
Responsiveness

MOVE DSM
TRANSPORTATION FOR EVERYONE

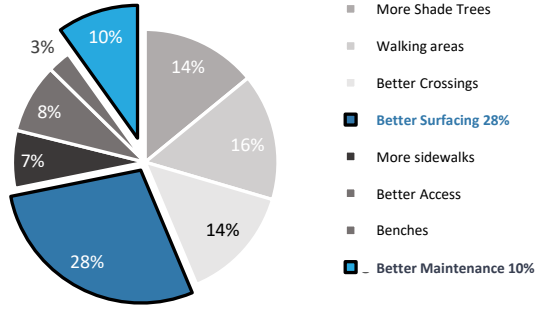
LIVE DSM
PARKS AND RECREATION COMPREHENSIVE PLAN



Trail Improvements **Bicycle** Users



Trail Improvements **Pedestrian** Users

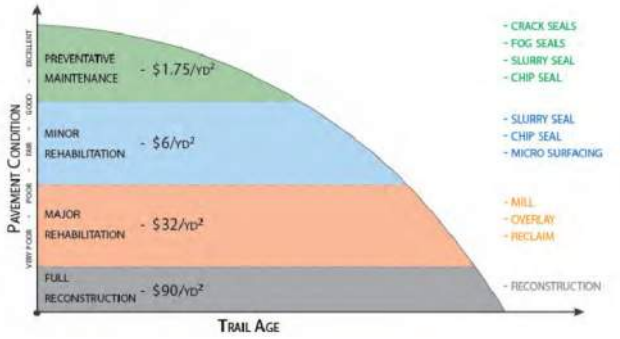


Other Systems

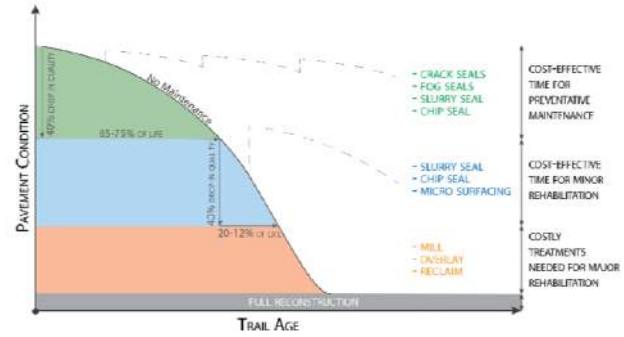
Trail System Cycle

Trail Surface Applications

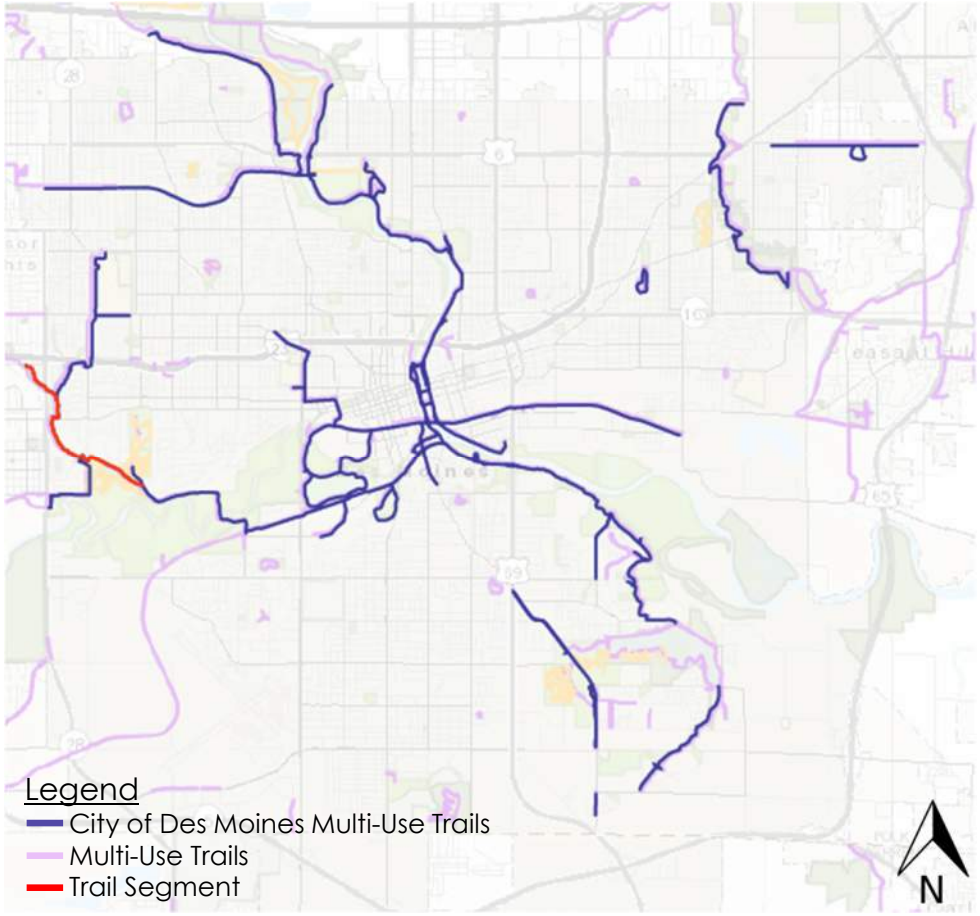
Trail Age and Preventive measures

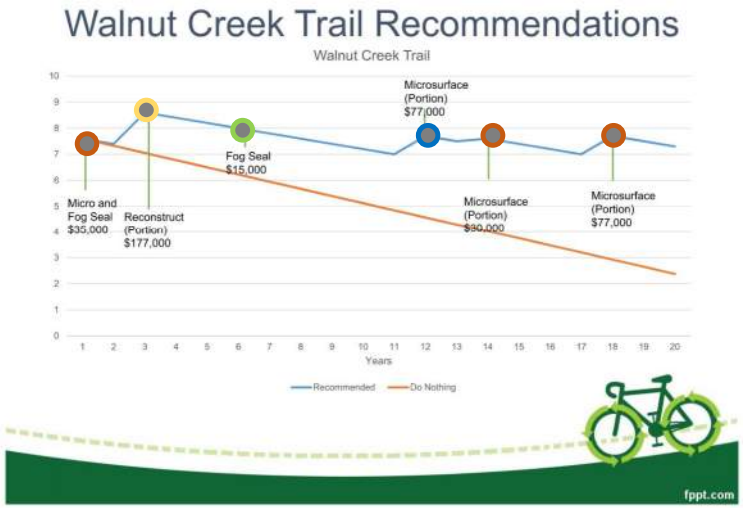


LRRB LOCAL ROAD RESEARCH BOARD



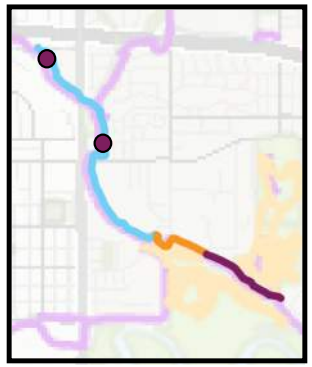
Segmental Analysis: 2017 Public Works Assessment





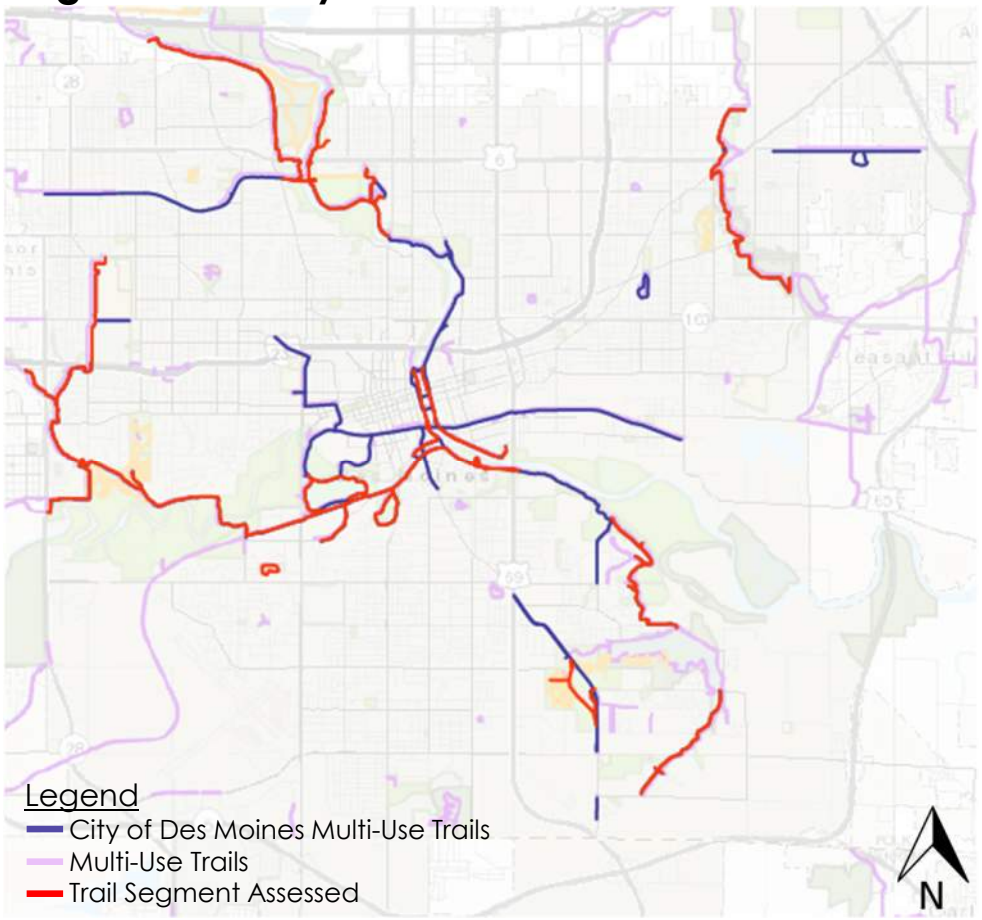
2017 Public Works Recommendation

- Micro High Cracking
- CSS Application
- GSB Application
- Micro Low Cracking



Analysis & Assessment

Segmental Analysis: 2017 Public Works Assessment



Segmental Assessment Constraints

- Average condition based on motor vehicle roadway assessment specifications

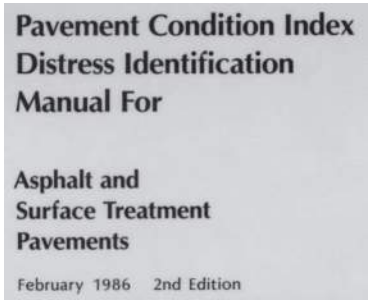
  Pavement Condition Index Distress Identification Manual for Asphalt and Surface Treatment Pavements, 2nd Edition, 1986

- Outdated assessment (2017), only covered half of the system

- Issues aggregated by 1/10-mile segment, so issue details and location specificity is limited

Trail Conditions

Trail	Average Condition
Bill Riley	8.5
Great Western	8.6
Walnut Creek	7.6
Meredith & Kruidenier	9.0
Waveland	9.1
John Pat Dorian	7.2
Neal Smith	8.3
Trestle-to-Trestle	8.5
Gay Lea Wilson	8.0



Analysis & Assessment

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Point Location Analysis: 2019-2022 Trail Audit

- Tools, Products, & Data Collection Intro
- Point Analysis Prioritization Process
- Post-Audit Reporting

Analysis & Assessment

Point Location Analysis: Tools & Products

List of Tools

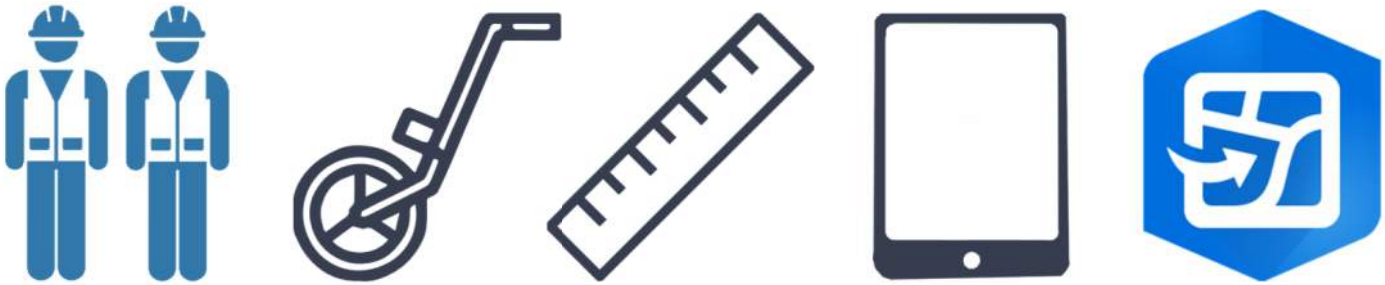
- (2) Staff Members
- Vehicle w/Amber Strobe and Identifying Markings
- Measuring Wheel
- Survey Rod
- iPad
- Extra Batteries & Charger
- Personal Protective Equipment

ESRI Products

- Collector / Field Maps
- ArcMap 10.8.2
- ESRI Webmap Interface
- ESRI Dashboard Interface

Staff Expertise

- Iowa Statewide Urban Design and Specifications (SUDAS)
- Guide for the Development of Bicycle Facilities (AASHTO)
- MUTCD
- Stormwater Management



Audit Timeline

Audit	Analysis & Prioritizing	Reporting	Budgeting & Estimate	Addressing	Audit (next year)
5-6 workdays	*2-3 months*	*5-6 workdays*	*2-3 months*	*5-6 months*	*5-6 workdays*

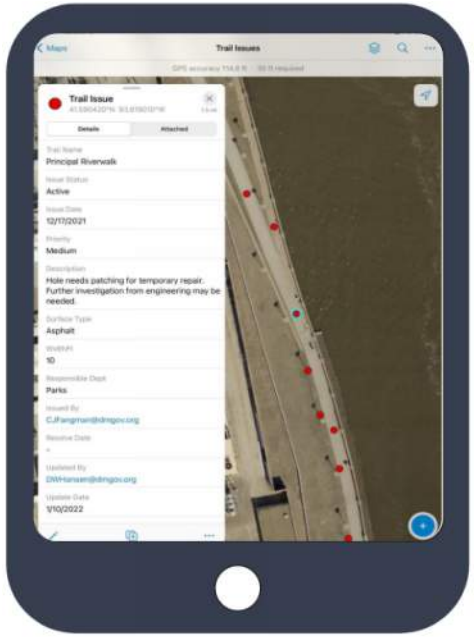
Total Time ~ **1 Year**

Analysis & Assessment

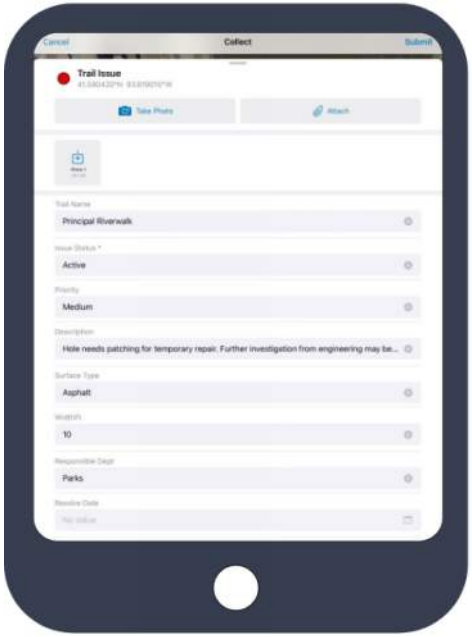
1 2 3 4 5 6 7 8 9

Point Location Analysis: Products - ESRI Field Maps

Geographically Located



Standardized Fields



Photos & Descriptions

Audit	Analysis & Prioritizing	Reporting	Budgeting & Estimate	Addressing	Audit (next year)
5-6 workdays	*2-3 months*	*5-6 workdays*	*2-3 months*	*5-6 months*	*5-6 workdays*

Analysis & Assessment

1 2 3 4 5 6 7 8 9

Point Location Analysis: Prioritizing Issue

Very High Priority
- Highest level of risk to the health, safety and welfare of trail users
- Often requires immediate risk mitigation and or threatens collapse of trail profile
- Typically corrected with assistance of Engineering Department and contractor

High Priority
- High risk to the health, safety and welfare of trail users
- Often ADA disparities, hazard trees, severe root ridging, ¾-inch or larger longitudinal cracks (tire grabbers)
- Typically corrected with pre-bid blanket/volume contract

Medium Priority
- Often issues that could develop into high priority if not corrected
- Often transverse cracking, stormwater management issue, large amount of cracking
- Typically corrected with pre-bid blanket/volume contract or operations work order

Low Priority
- Issues that low in risk to the public, sometimes could develop into medium priorities
- Often clear zone infractions, start of cracking, grading and shaping
- Typically corrected with operations work order

Audit	Analysis & Prioritizing	Reporting	Budgeting & Estimate	Addressing	Audit (next year)
5-6 workdays	*2-3 months*	*5-6 workdays*	*2-3 months*	*5-6 months*	*5-6 workdays*

Analysis & Assessment

CITY OF DES MOINES PARKS AND RECREATION

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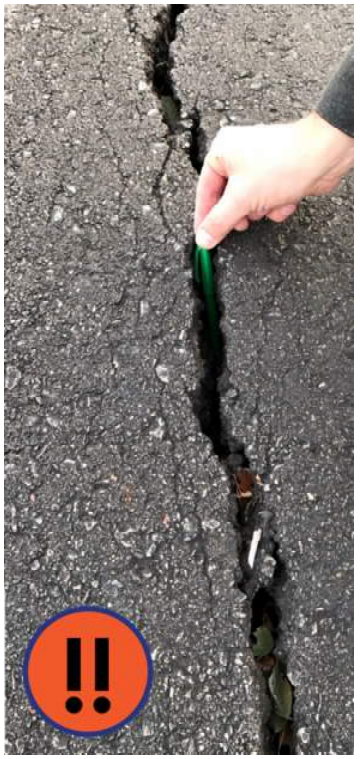
Point Location Analysis: Prioritizing Issues



Audit	Analysis & Prioritizing	Reporting	Budgeting & Estimate	Addressing	Audit (next year)
5-6 workdays	*2-3 months*	*5-6 workdays*	*2-3 months*	*5-6 months*	*5-6 workdays*

Analysis & Assessment

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Point Location Analysis: Prioritizing Issues

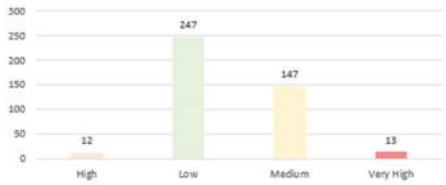
Audit	Analysis & Prioritizing	Reporting	Budgeting & Estimate	Addressing	Audit (next year)
5-6 workdays	*2-3 months*	*5-6 workdays*	*2-3 months*	*5-6 months*	*5-6 workdays*

Analysis & Assessment

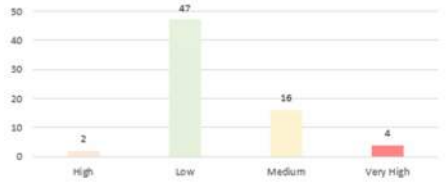
1 2 3 4 5 6 7 8 9

Point Location Analysis: Post-Audit Reporting

Active Trail Issues By Priority



Resolved Trail Issues



Remaining Trail Issues

!	200
!	131
!!	10
!!!	9

Reporting Findings

1. Active Issues by Priority
2. Resolved Issues by Priority
3. Remaining Issues by Priority

---

1. Updated Top Priorities for Engineering Supported Projects
2. Updated Top Priorities for Blanket/Volume Contract Supported Projects
3. Updated Top Priorities for Internal Work Order Repairs

Audit	Analysis & Prioritizing	Reporting	Budgeting & Estimate	Addressing	Audit (next year)
5-6 workdays	*2-3 months*	*5-6 workdays*	*2-3 months*	*5-6 months*	*5-6 workdays*

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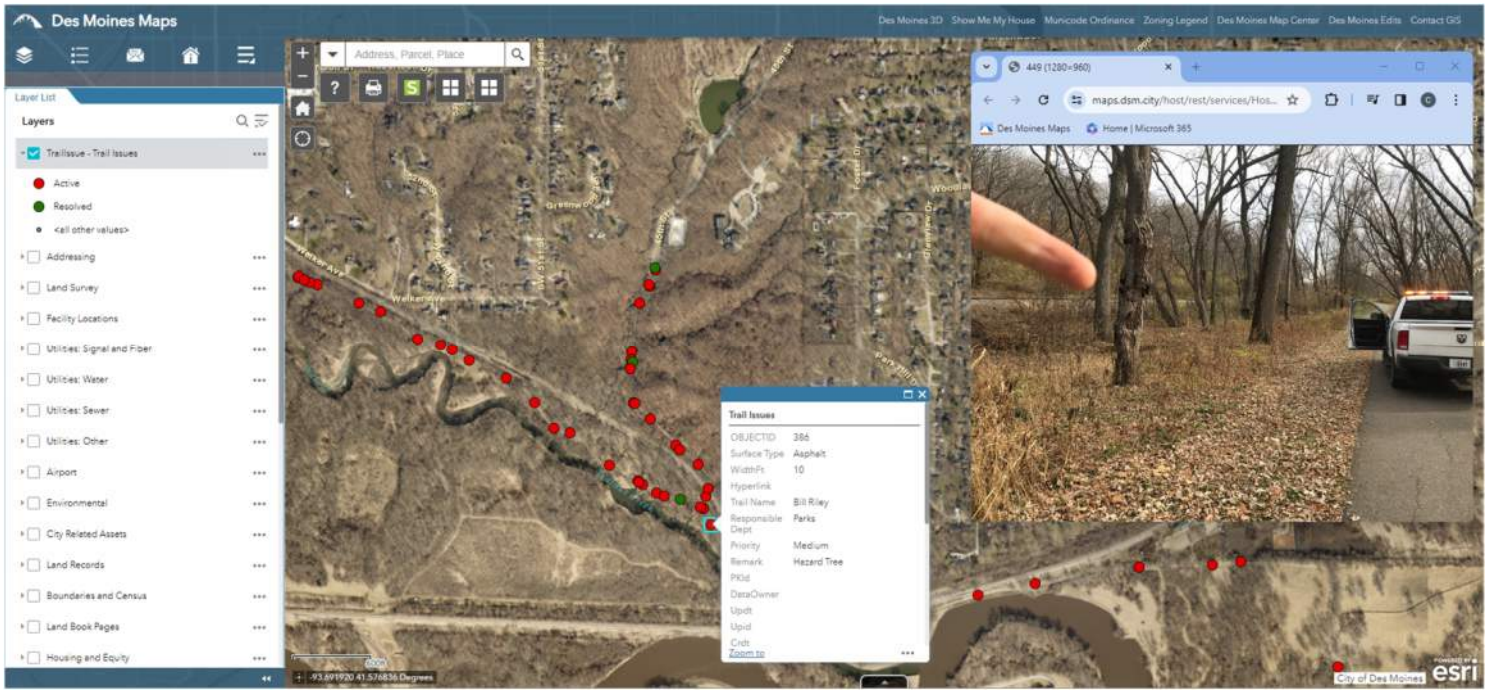
Point Location Analysis: Post-Audit Reporting



Internal Staff Access

1. City Leadership
2. Operations Staff
3. Design Engineers

Audit	Analysis & Prioritizing	Reporting	Budgeting & Estimate	Addressing	Audit (next year)
5-6 workdays	*2-3 months*	*5-6 workdays*	*2-3 months*	*5-6 months*	*5-6 workdays*

Analysis & Assessment

CITY OF DES MOINES PARKS AND RECREATION

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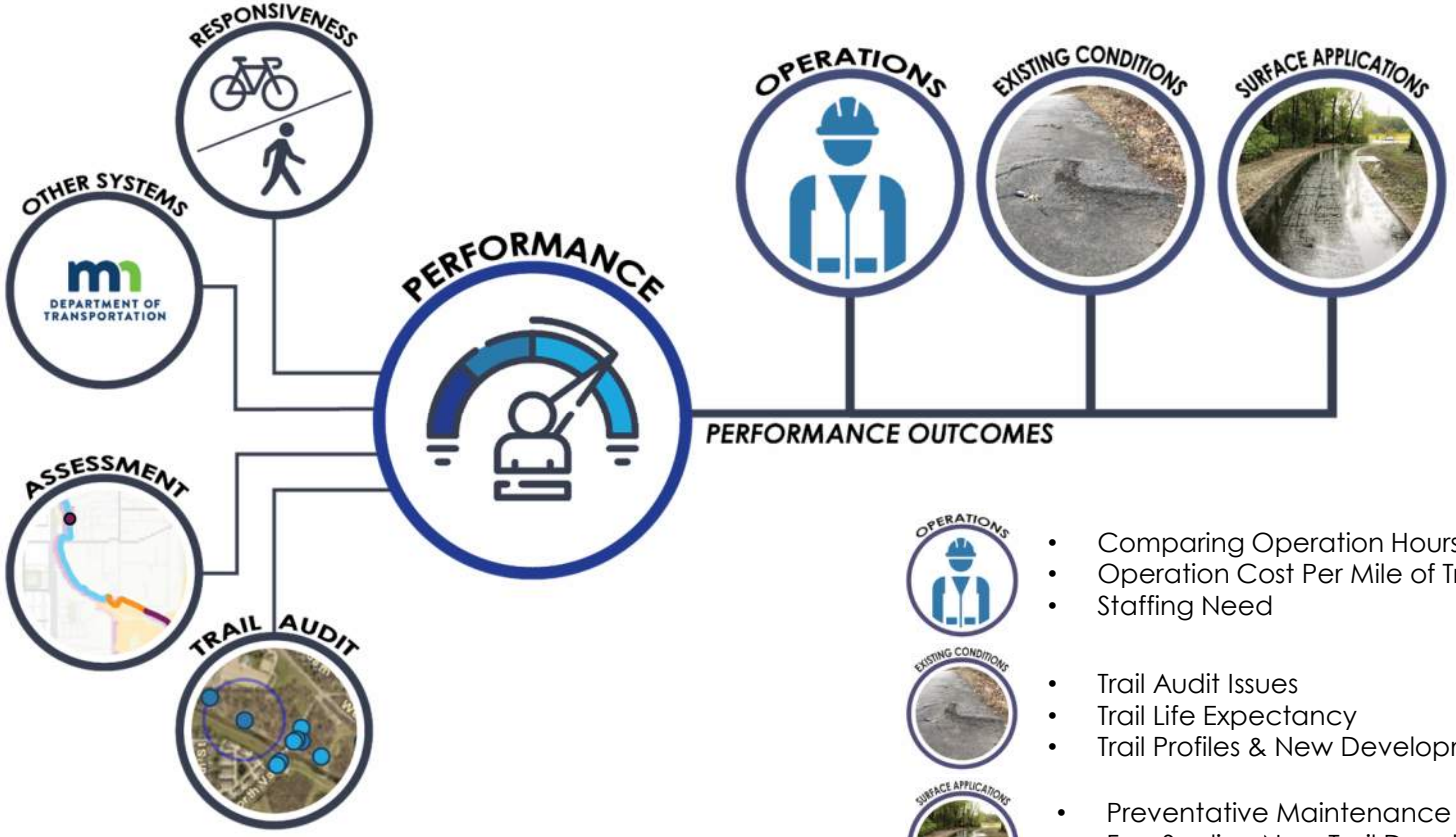
Point Location Analysis: Post-Audit Reporting (Blanket / Volume Contract Project)

Audit	Analysis & Prioritizing	Reporting	Budgeting & Estimate	Addressing	Audit (next year)
5-6 workdays	*2-3 months*	*5-6 workdays*	*2-3 months*	*5-6 months*	*5-6 workdays*

Analysis & Assessment

1 2 3 4 5 6 7 8 9

Performance Outcomes: Where our system is today

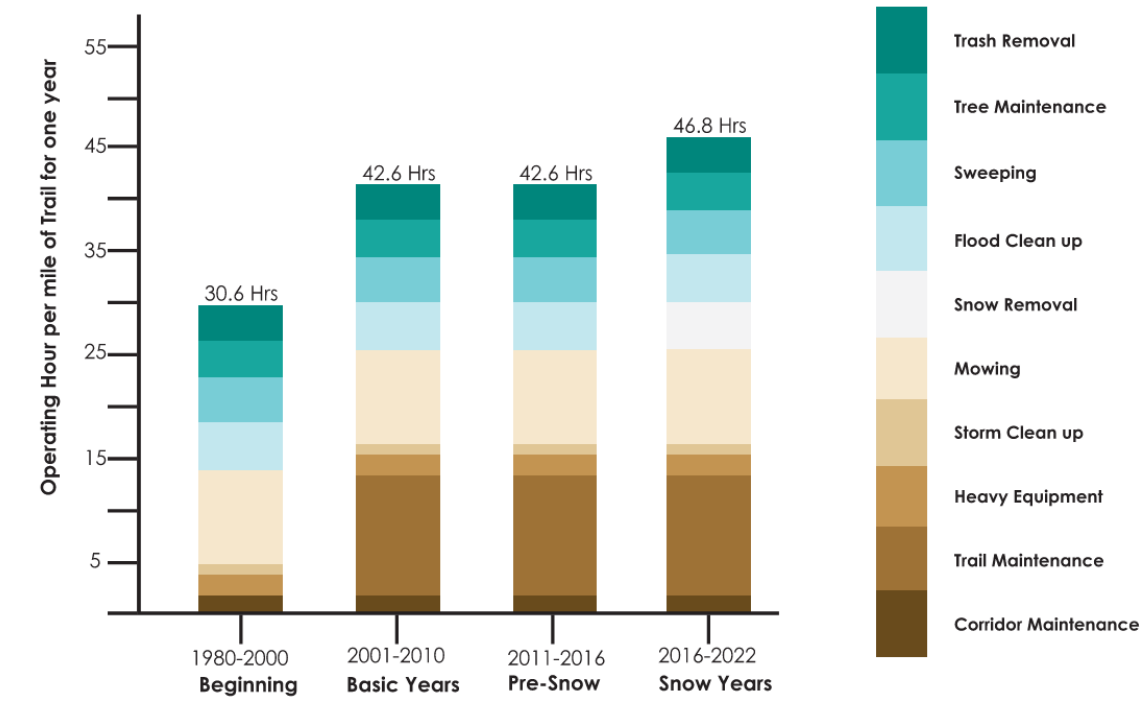


- Comparing Operation Hours
- Operation Cost Per Mile of Trail
- Staffing Need

- Trail Audit Issues
- Trail Life Expectancy
- Trail Profiles & New Development Standards

- Preventative Maintenance Measures
- Fog Sealing New Trail Development
- Long-Term Cost Analysis

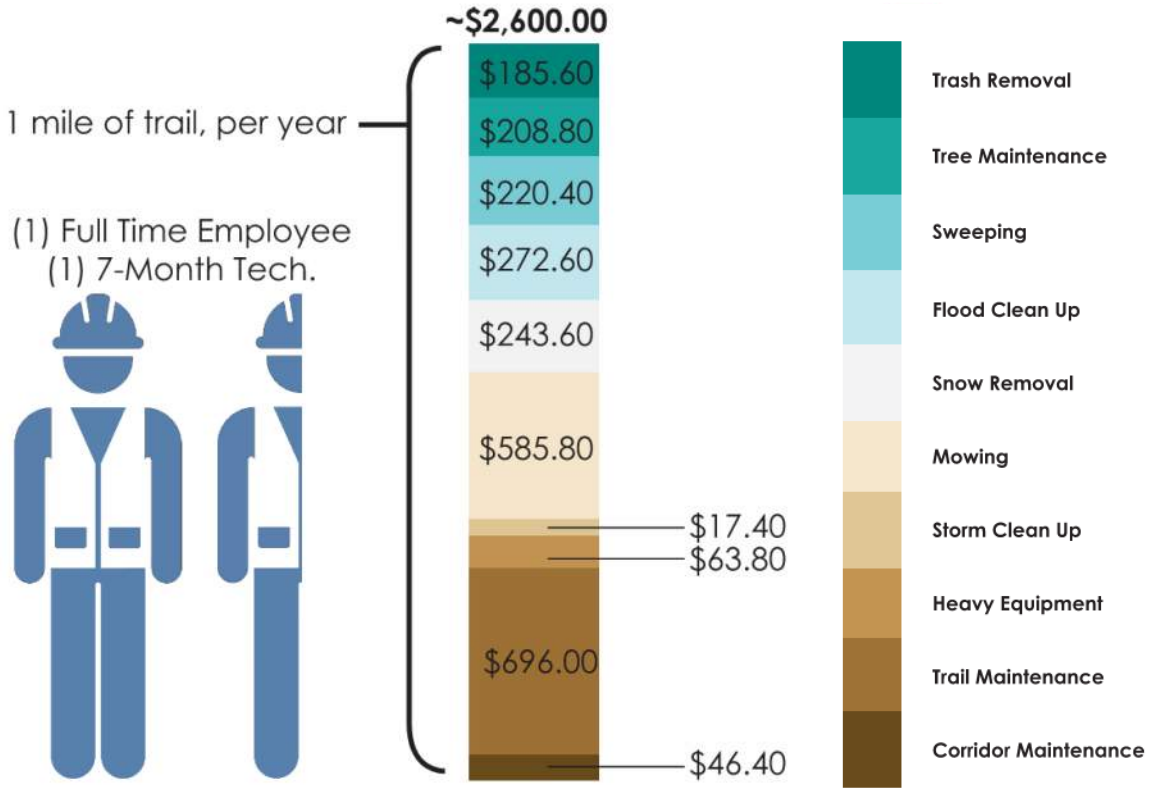
Existing Operating Hours System-Wide



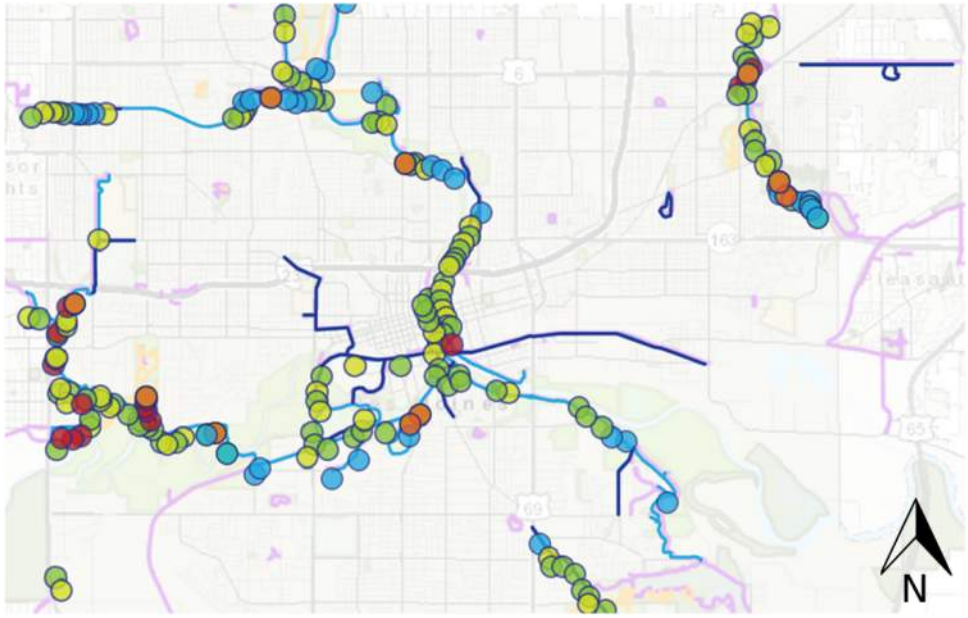
~459 Hrs	~1,491 Hrs	~2,130 Hrs	3,215.4 Hrs
~15 Miles	~35 Miles	~50 Miles	68 Miles

Total Operating Hours for Full Trail System

Operating Costs Per Mile By Category of Work



Existing Conditions: 2022 Trail Audit Mapping

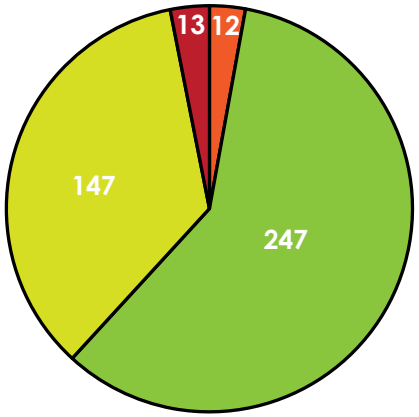


2022 Trail Audit Issues

OBJECTID	Surface Type	WidthFt	Trail Name	Responsible Dept	Priority	Description	Issue Status
1	Asphalt	11	Gay Lea Wilson	Engineering	Low	Realign to widen curve. Design completed by Snyder and funded by PCCB.	Resolved
2	Asphalt	11	Gay Lea Wilson	Public Works	Low	Realign to facilitate streambank repair. May be completed by PW - Need to confirm w/Dan Pritchard	Resolved
3	Asphalt	11	Gay Lea Wilson	Parks	Low	Gate clear zone.	Active
4	Asphalt	11	Gay Lea Wilson	Engineering	Low	Pipe extension, pipe very close to trail, may need replacement possibly 18" pipe concrete	Active
5	Asphalt	11	Gay Lea Wilson	Engineering	Medium	Armoring bank inlet	Active
6	Asphalt	11	Gay Lea Wilson	Public Works	Low	Repair large dip in asphalt.	Resolved
7	Asphalt	11	Gay Lea Wilson	Engineering	Medium	Repair bank erosion and remove flood aggradation in area.	Resolved
8	Asphalt	11	Gay Lea Wilson	Public Works	Low	Hump in paving. Mill only.	Resolved

2022 Trail Audit Quick Stats:

- 144 new issues documented
- 69 issues resolved
- 350 issues unresolved



Existing Conditions: 2022 Multi-Use Trail Major Typologies

Levee Profile

Asphalt Profile

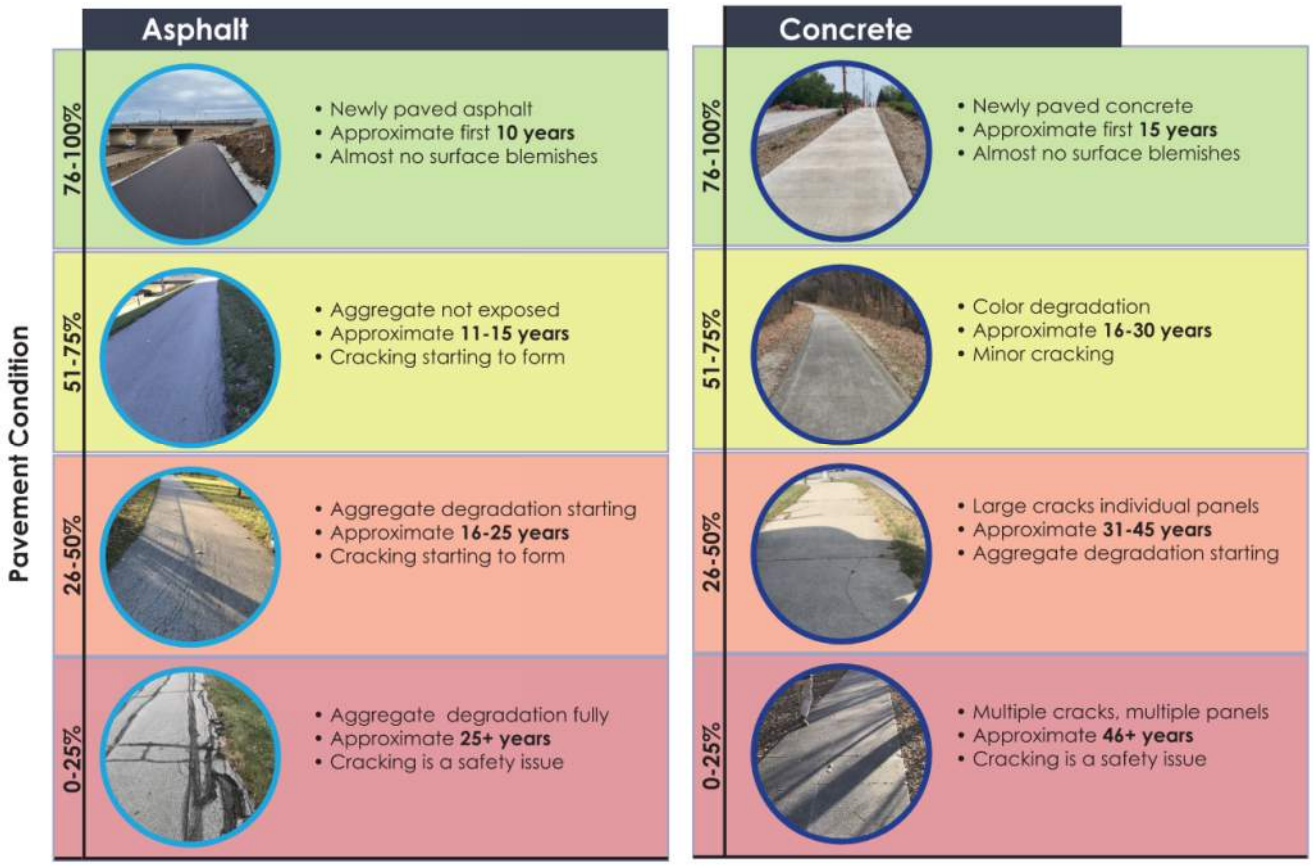
Concrete Profile

Floodplain Location

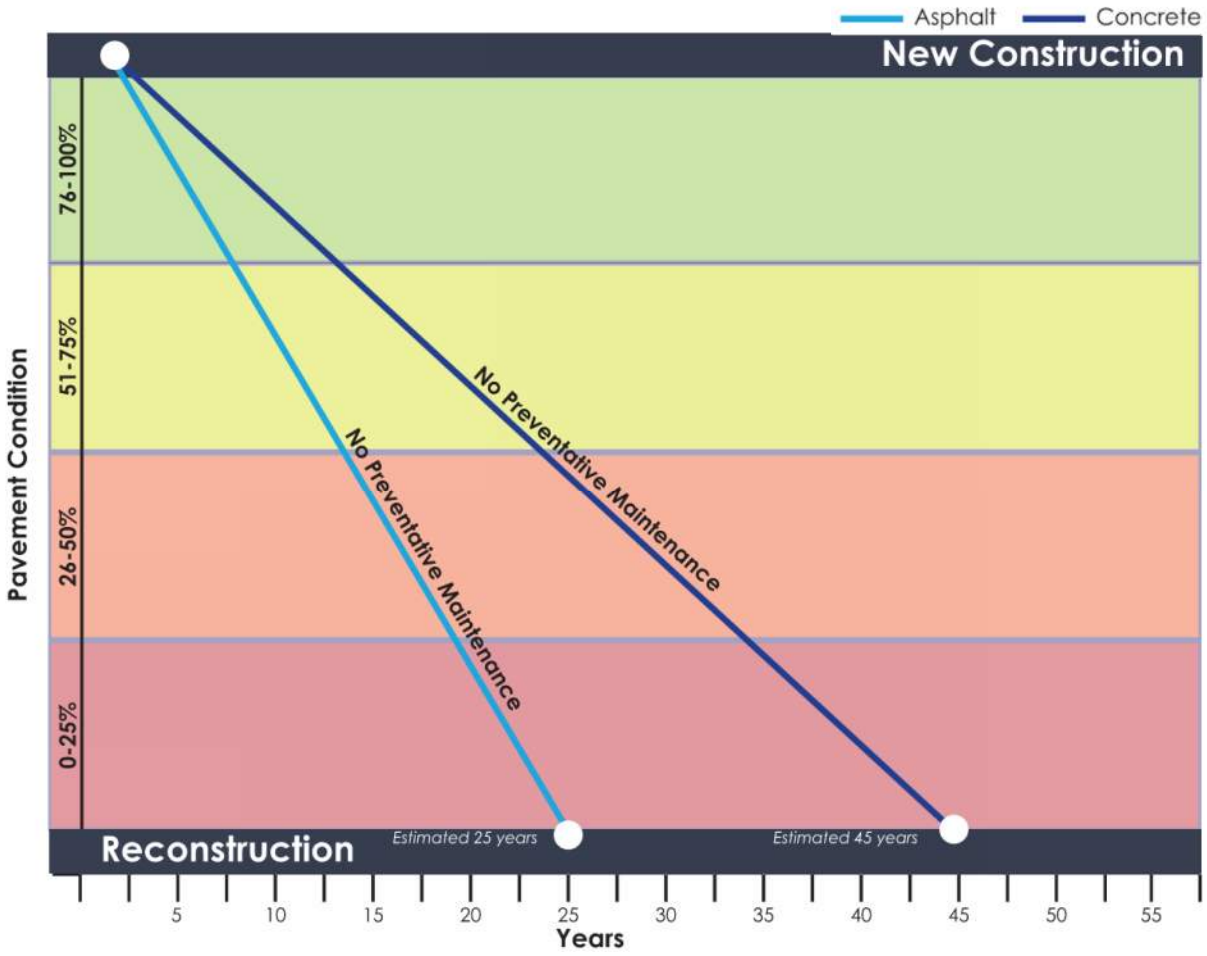
Peri-Urban Location

Right of Way Location

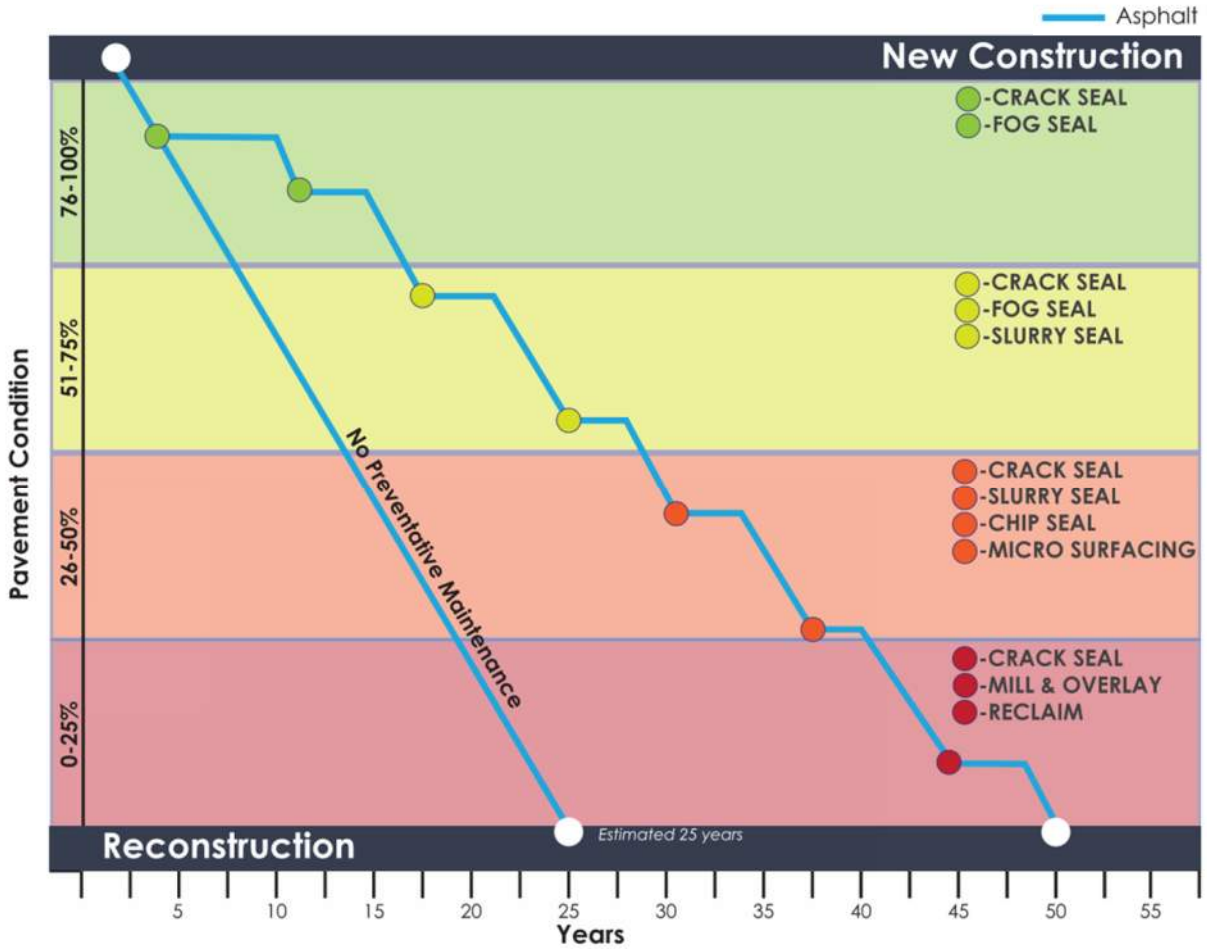
Existing Conditions: Multi-Use Trail Pavement Condition Assessment



Existing Conditions: Multi-Use Trail Pavement Average Anticipated Lifespan

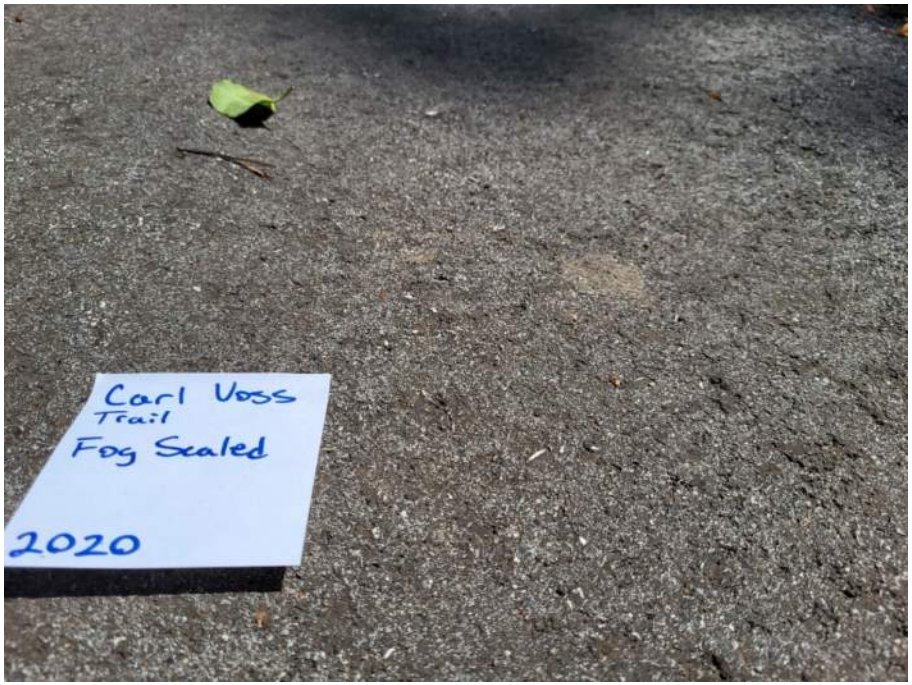


Existing Conditions: Asphalt Average Anticipated Lifespan w/Preventative Maintenance



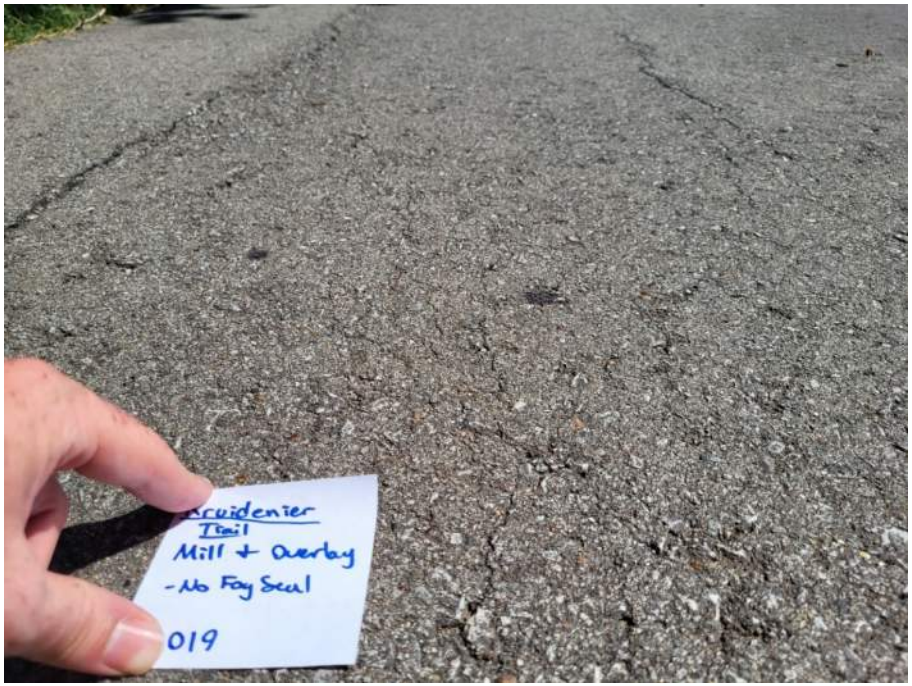
Existing Conditions: Asphalt Preventative Maintenance at New Construction

Carl Voss Trail: New Construction 2020



Fog Seal CSS-1H Application

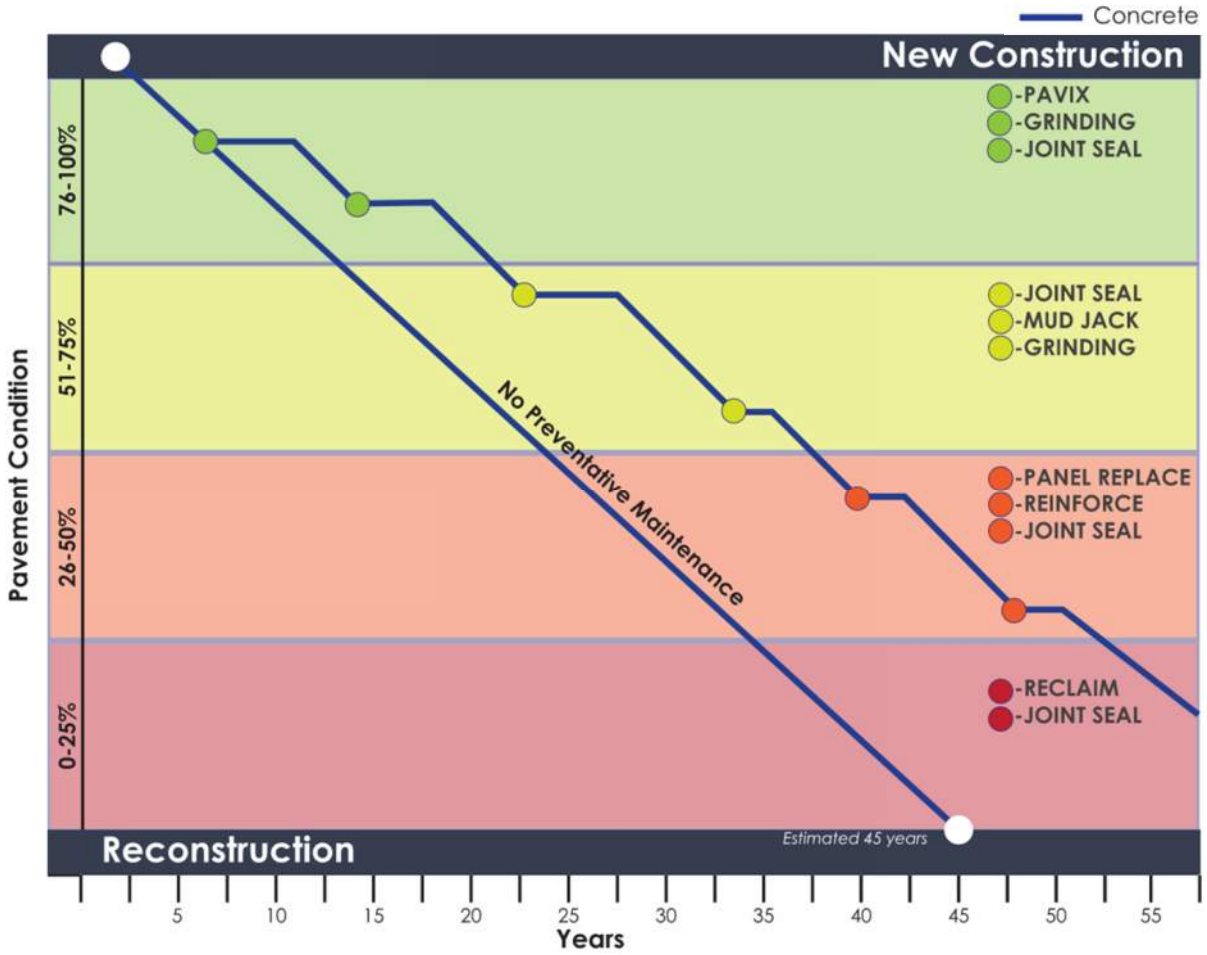
Kruidenier Trail: Mill and Overlay 2019



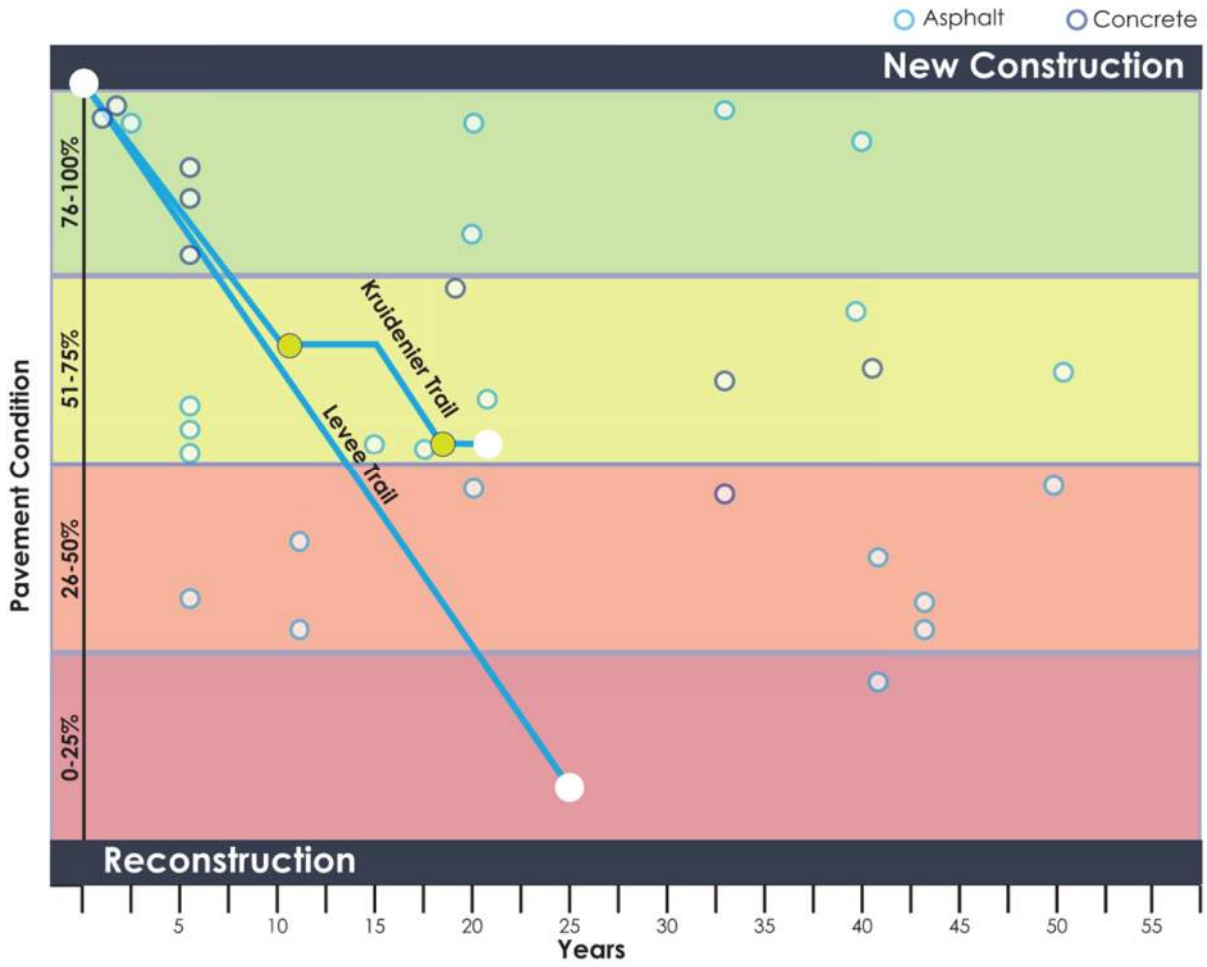
No Fog Seal Applied

WHY FOG SEAL AT NEW CONSTRUCTION/ OVERLAY?

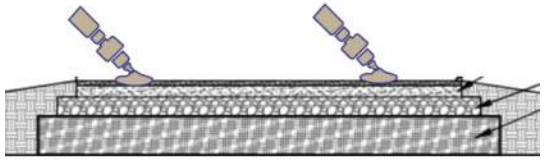
Existing Conditions: Concrete Average Anticipated Lifespan w/Preventative Maintenance



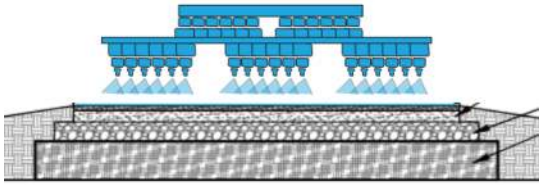
Existing Conditions: 2022 Estimated Conditions By Trail



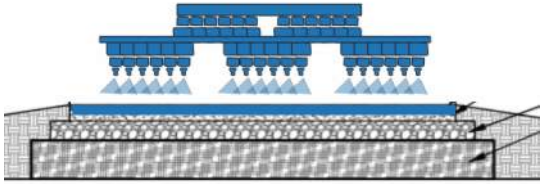
Surface Applications: Hot Mix Asphalt



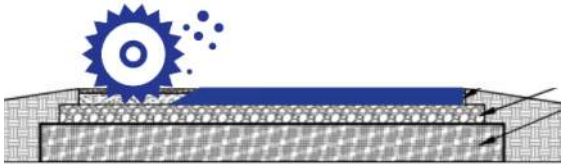
Crack Seal, as needed



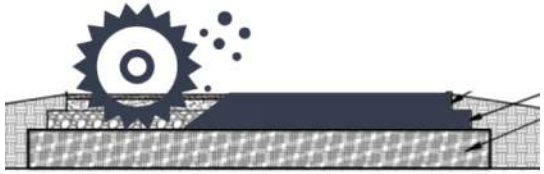
CSS Fog Seal, Every 5 Years



GSB Fog Seal, Every 5 Years

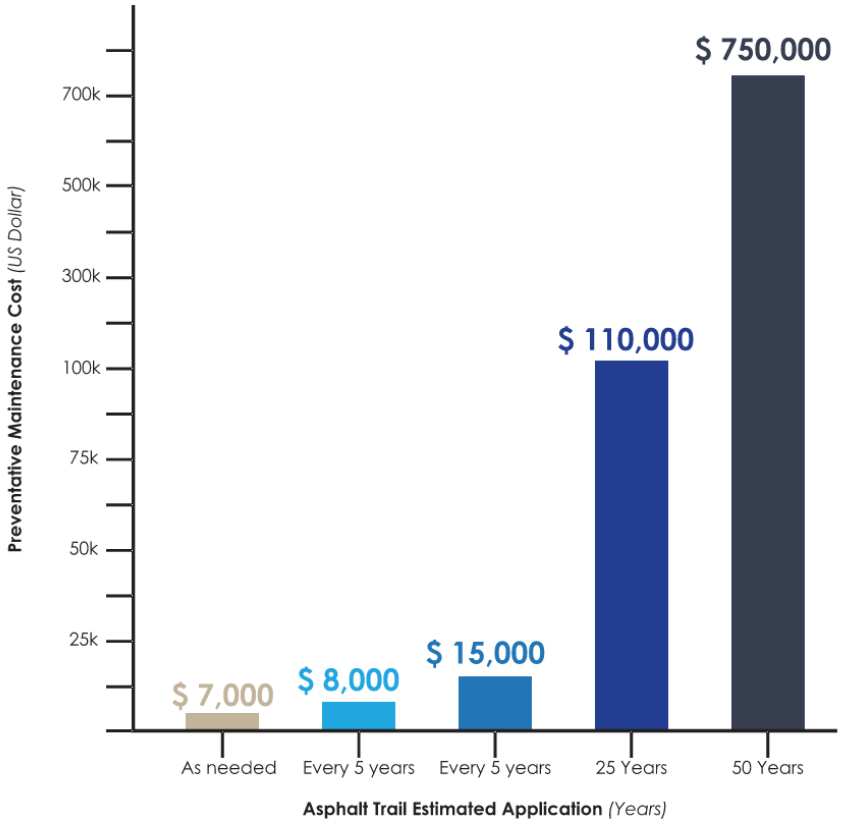


Mill and Overlay, Every 25 Years



Reclamation, Every 50 Years

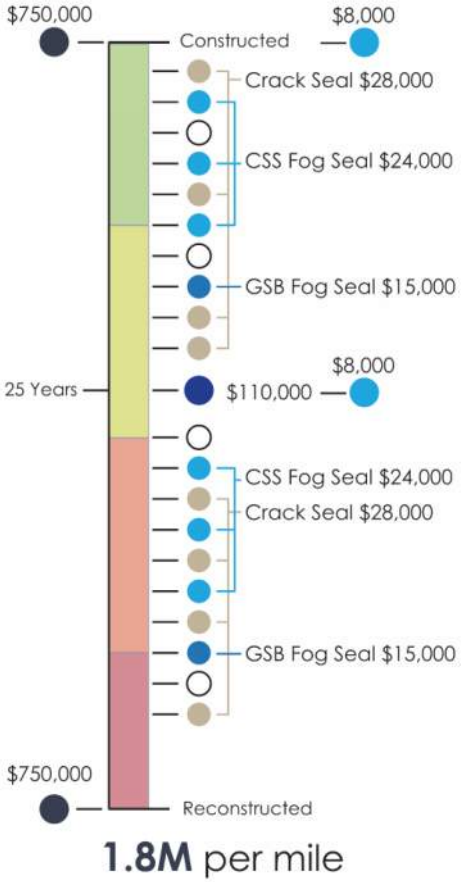
Surface Applications: 2022 Estimated Cost Per Mile

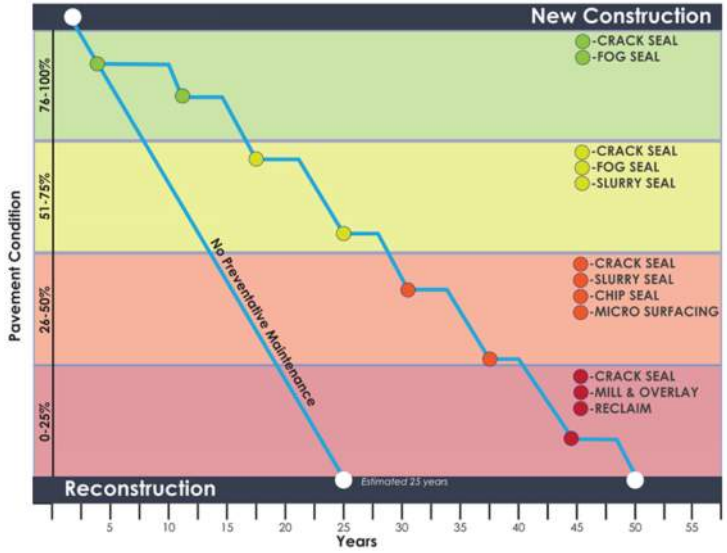


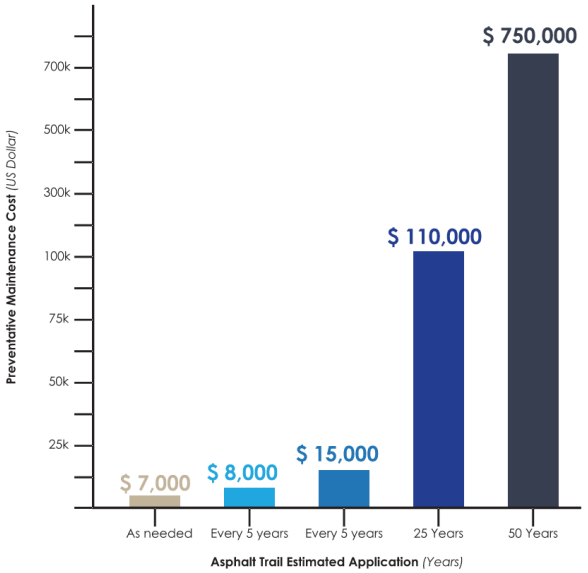
Total Cost for Asphalt Trails System Wide (39 miles)

$ 273K	$ 312K	$ 585K	$ 4.29M	$ 29.2M
Crack Seal	CSS Fog Seal	GSB Fog Seal	Mill and Overlay	Reconstruction

Surface Applications: 50-Year Asphalt Preventative Maintenance Scenario







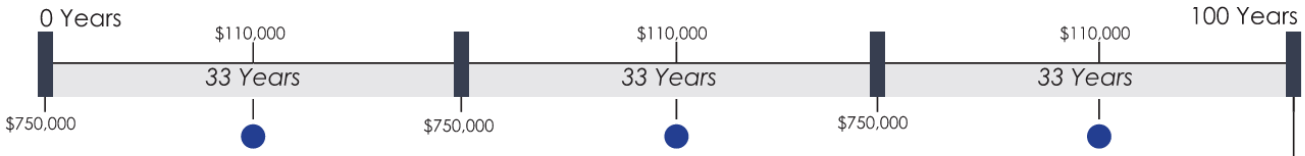
Surface Applications: 100-Year Cost Effectiveness Study

1-Mile No Preventative Maintenance

$175M total for existing trail system

$4,500,000
100 Year Total

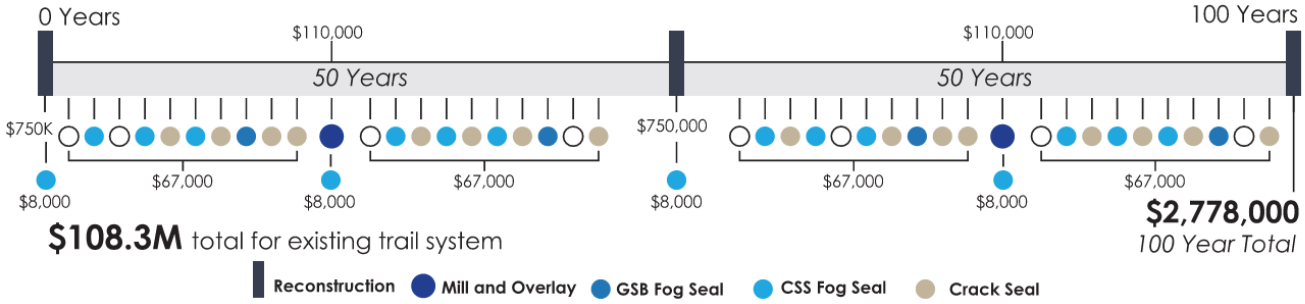
1-Mile Mill and Overlay



$129.9M total for existing trail system

$3,330,000
100 Year Total

1-Mile Mill and Overlay + Fog Sealing



$108.3M total for existing trail system

$2,778,000
100 Year Total

Modernized Approaches

Modernized Approaches

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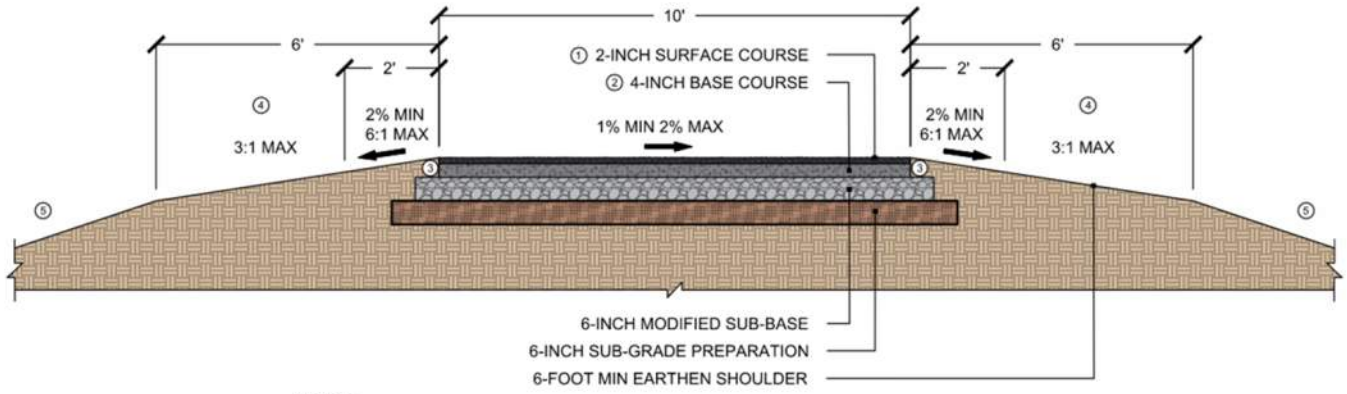
Modernized Construction Standards

- Hot Mix Asphalt Trail Typical Section
- Concrete Trail Typical Section
- Levee Trail Typical Section
- ROW Sidepath Trail Typical Section
- Trail Signage, Vegetation, and Stormwater Management
- Trail Underpass Typical Section
- Underpass Stemwall Protection Detail
- Underpass Sheet Pile Protection Detail

Modernized Construction Standards - Hot Mix Asphalt Trail Typical Section



NOTES:

① HOT MIX ASPHALT - SURFACE COURSE
Surface course shall be placed with a 2-inch lift and mix of HMA Standard Traffic (ST), Surface Course, 1/2-inch, PG 58-28S

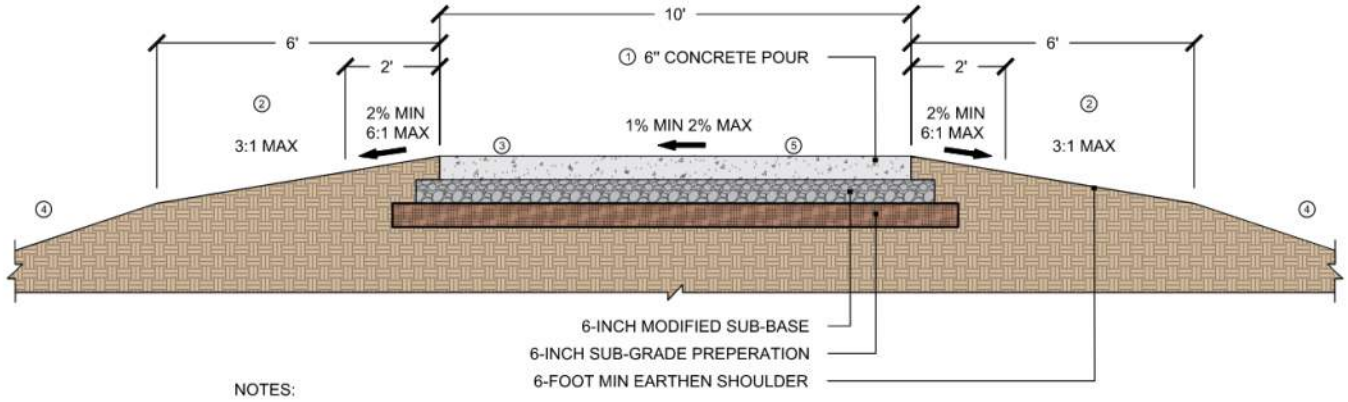
② HOT MIX ASPHALT - BASE COURSE
Base Course shall be placed with a 4-inch lift and mix of HMA Standard Traffic (ST), Base Course, 3/4-inch, PG 58-28S

③ HOT MIX ASPHALT - SHOULDER TRIMMING
Excess asphalt extending beyond the specified paving width may not exceed 1:1

④ MULTI-USE TRAIL SHOULDERS
Multi-use trails shall include a minimum 2-foot clear zone adjacent to trail's edge that cannot contain any vertical obstructions and has a max slope of 6:1, min 2%. a 6-foot-wide shoulder with a max slope of 3:1 that is seeded with SUDAS Type 1 turf seed mix shall be provided.

⑤ STORMWATER MANAGEMENT
Rural drainage practices where stormwater is managed via ditches and culverts to prevent runoff from crossing the trail surface shall be utilized whenever feasible.

Modernized Construction Standards - Concrete Trail Typical Section



NOTES:

① CONCRETE - PORTLAND CEMENT 6-INCH PROFILE
Concrete paving shall follow Iowa SUDAS, typical section 7010 for Portland cement concrete pavement. An Iowa DOT C4 concrete mix shall be used unless an alternate mix is recommended by a professional engineer licensed in the state of Iowa. Concrete pours shall provide a comprehensive strength of no less than 4,000 psi at 28 days. Concrete paving to be free of defects or deficiencies including surface imperfections. A medium broom finish perpendicular to the direction of travel shall be provided. A burlap drag finish is acceptable where slipform paving is permitted.

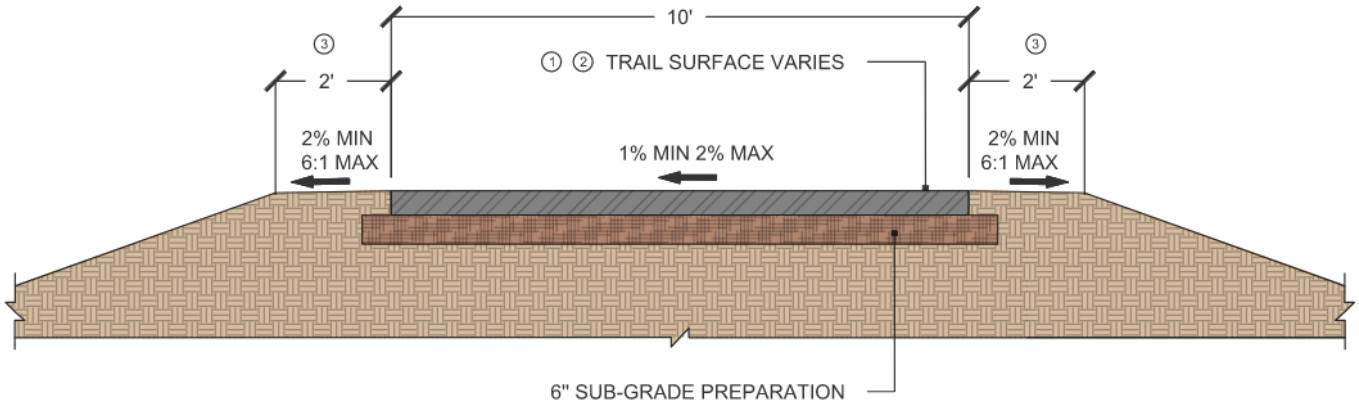
② MULTI-USE TRAIL SHOULDERS
Multi-use trails shall include a minimum 2-foot clear zone adjacent to trail's edge that cannot contain any vertical obstructions and has a max slope of 6:1, min 2%. a 6-foot-wide shoulder with a max slope of 3:1 that is seeded with SUDAS Type 1 turf seed mix shall be provided.

③ CONCRETE JOINTING AND EDGING
All control joints shall be sawcut perpendicular to the direction of travel using a 1/8-inch blade. Longitudinal joints are not permitted unless specified. Control joint spacing shall generally match the width of the trail with 12-foot being the maximum spacing. Fiberboard of foam may be used for expansion joint applications, but joint sealant shall be applied when foam joint products with a tear-off strip are used. All edges shall be finished with an 1/8-inch radius edging tool.

④ STORMWATER MANAGEMENT
Rural drainage practices where stormwater is managed via ditches and culverts to prevent runoff from crossing the trail surface shall be utilized whenever feasible.

⑤ PAVIX APPLICATION
PAVIX applications to be specified. Typical application areas with high exposure to road salts. Curing compound shall not be applied to areas specified for PAVIX application. Apply Chem-Crete PAVIX CCC-100 28 days after pour. Application needs to applied when temperatures are above 60 degrees, clear weather and the concrete will need to be cleaned and free of debris prior to applying the chemical. Allow at least 4-6 hours to cure without rain before reopening.

Modernized Construction Standards - Levee Trail Typical Section



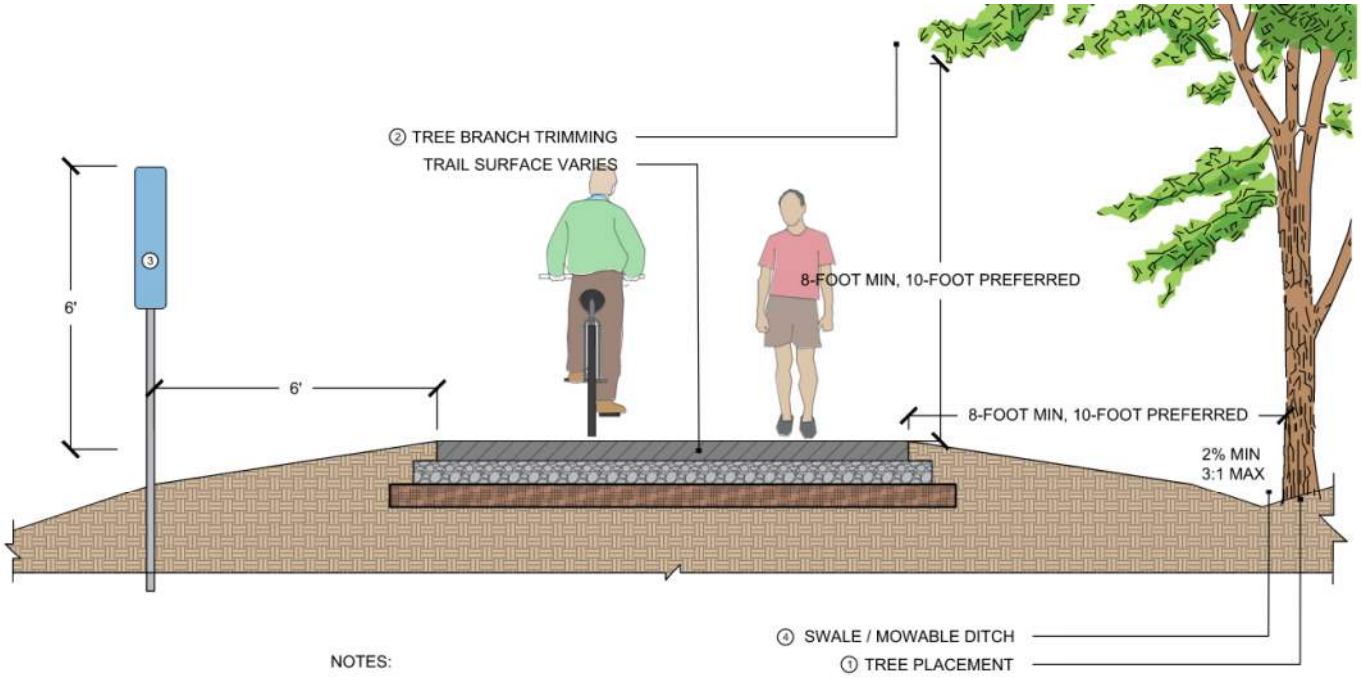
NOTES:

① CONCRETE PAVING
For concrete paving see multi-use trail section typ. concrete notes 1, 3 and 5

② HOT MIX ASPHALT PAVING
For Asphalt paving see multi-use trail section typ. asphalt notes 1, 2, and 3

③ MULTI-USE TRAIL SHOULDERS
Multi-use trails shall include a minimum 2-foot clear zone adjacent to trail's edge that cannot contain any vertical obstructions and has a max slope of 6:1, min 2%. a 6-foot-wide shoulder with a max slope of 3:1 that is seeded with SUDAS Type 1 turf seed mix shall be provided.

Modernized Construction Standards - Trail Signage, Vegetation, Stormwater Management



NOTES:

① TREE PLACEMENT
No Tree shall be planted within 8 feet of the edge of the trail paving with an offset of 10 feet or more being preferred. Offset may be reduced if root barriers are included to prevent damage from long-term root growth

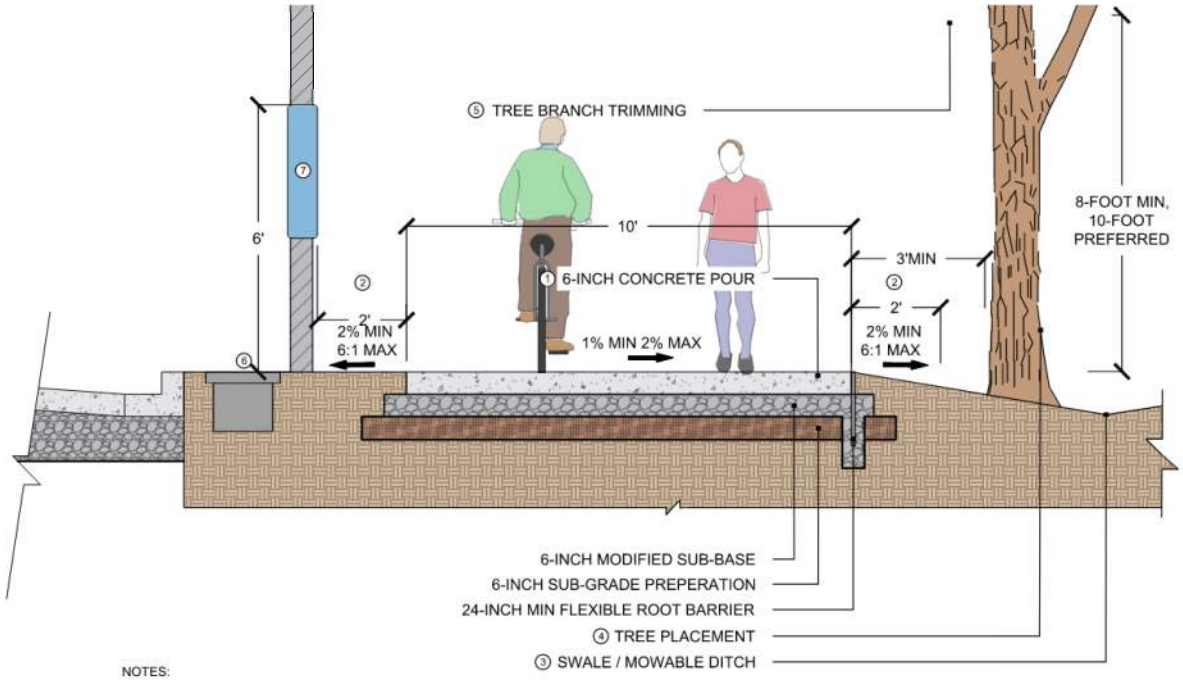
② TREE BRANCH TRIMMING
Tree branches shall be pruned to a minimum of 8-feet above trail surface when leafed out, with a 10-feet being recommended by IDOT specifications.

③ E-911 SIGNAGE PLACEMENT
E-911 signage posts shall be offset 6-feet from the edge of the trail. The top of signage shall be 6-feet above trail surface. An in-ground post receiver sleeve shall be provided for ease of signage replacement. The sign post shall be bolted to the receiver sleeve with locking nuts or anti-tamper hardware.

Modernized Approaches

1 2 3 4 5 6 7 8 9

Modernized Construction Standards - Right of Way Sidepath Trail Typical Section



NOTES:

① CONCRETE PAVING
For concrete paving see multi-use trail section typ. concrete notes 1, 3 and 5

② MULTI-USE TRAIL SHOULDERS
Multi-use trails shall include a minimum 2-foot clear zone adjacent to trail's edge that cannot contain any vertical obstructions and has a max slope of 6:1, min 2%. a 6-foot-wide shoulder with a max slope of 3:1 that is seeded with SUDAS Type 1 turf seed mix shall be provided.

③ STORMWATER MANAGEMENT
Rural drainage practices where stormwater is managed via ditches and culverts to prevent runoff from crossing the trail surface shall be utilized whenever feasible.

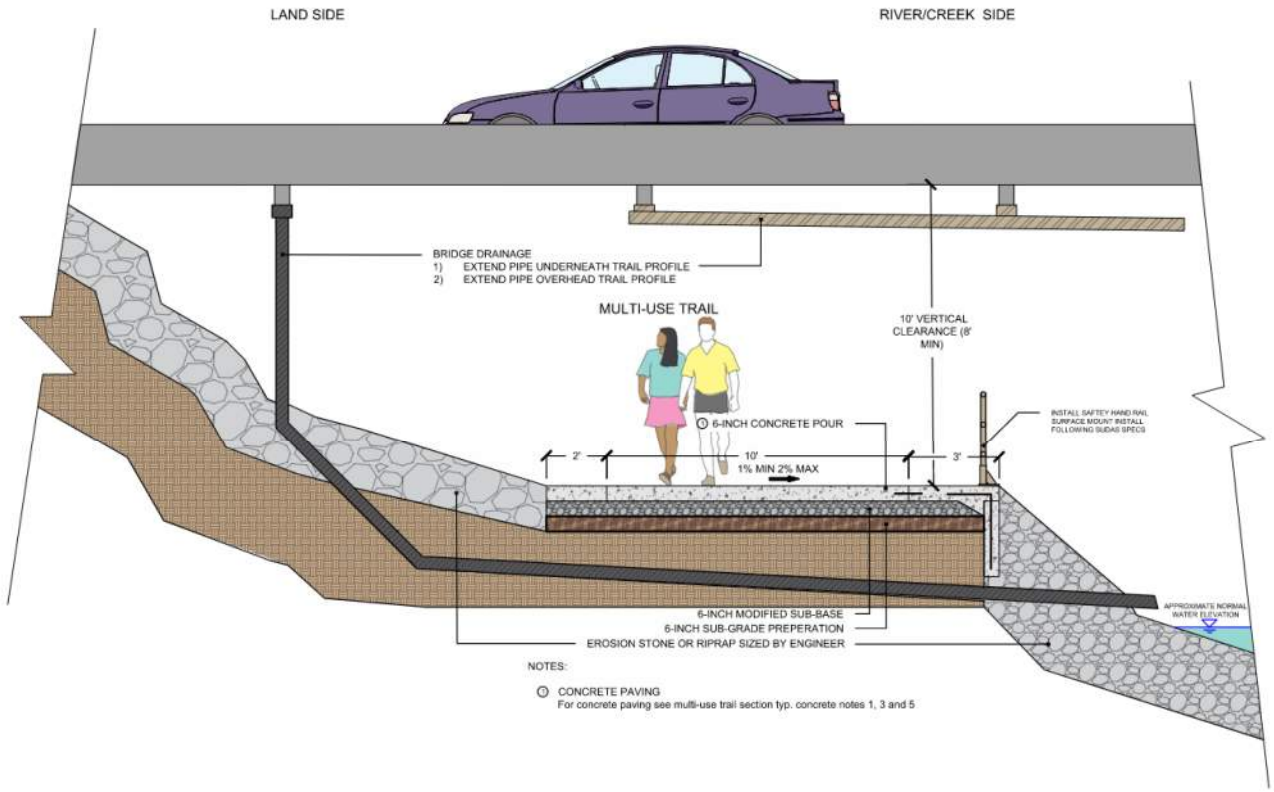
④ TREE PLACEMENT
No Tree shall be planted within 8 feet of the edge of the trail paving with an offset of 10 feet or more being preferred. Offset may be reduced if root barriers are included to prevent damage from long-term root growth

⑤ TREE BRANCH TRIMMING
Tree branches shall be pruned to a minimum of 8-feet above trail surface when leafed out, with a 10-feet being recommended by IDOT specifications.

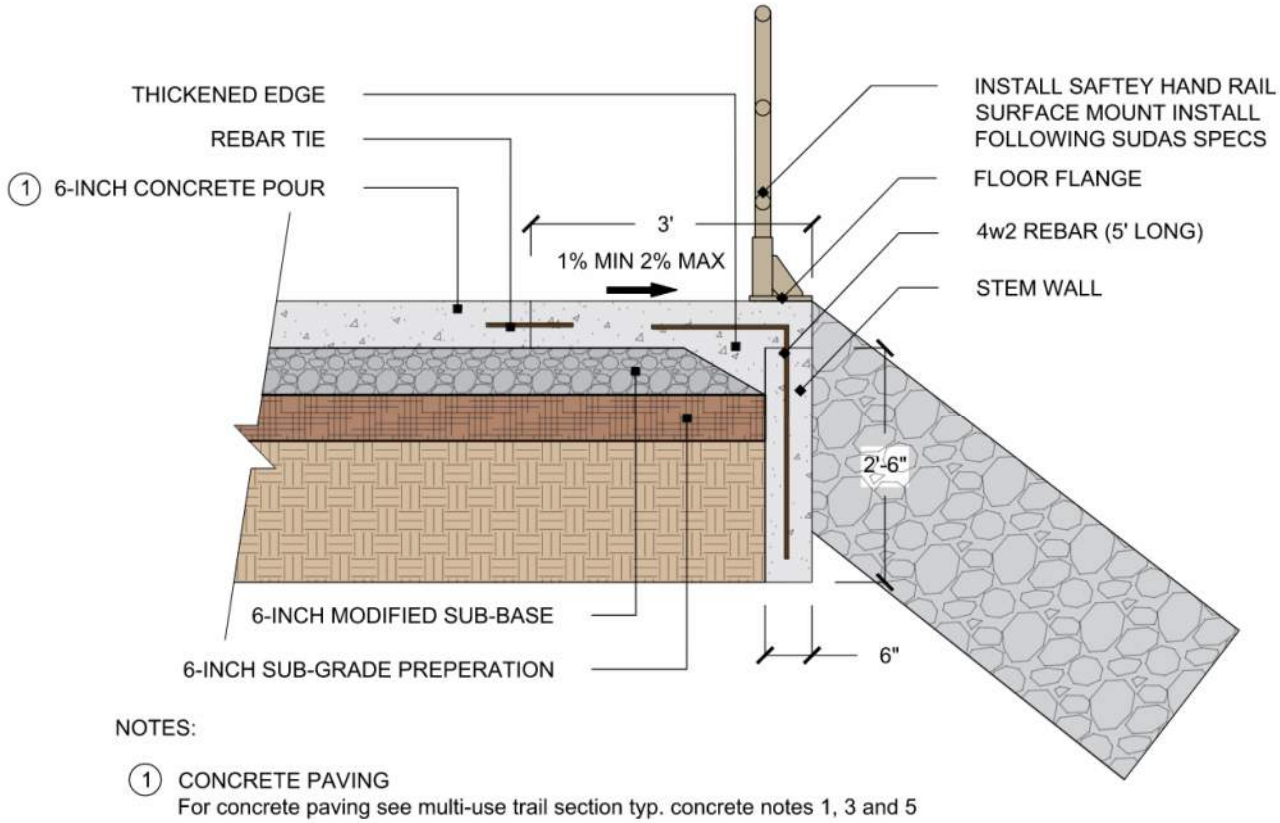
⑥ UTILITY PLACEMENT
Utilities and thier associated access points shall be located outside of the trail paving whenever possible. High density polyethylene (HDPE) and fiberglass-reinforced polymer in-ground enclosures are not permitted to be cast in the trail paving. When manhole structures must be located within the trail paving, they must be wholly contained within the paving and no less than 3 inches from the edge of the trail.

⑦ E-911 SIGNAGE PLACEMENT
In urban settings where installing a new standalone post is not feasible or otherwise imprudent, E-911 signage may be attached to existing poles via strap clamps. The top of the signage shall be 6 feet above the trail surface.

Modernized Construction Standards - Trail Underpass Typical Section



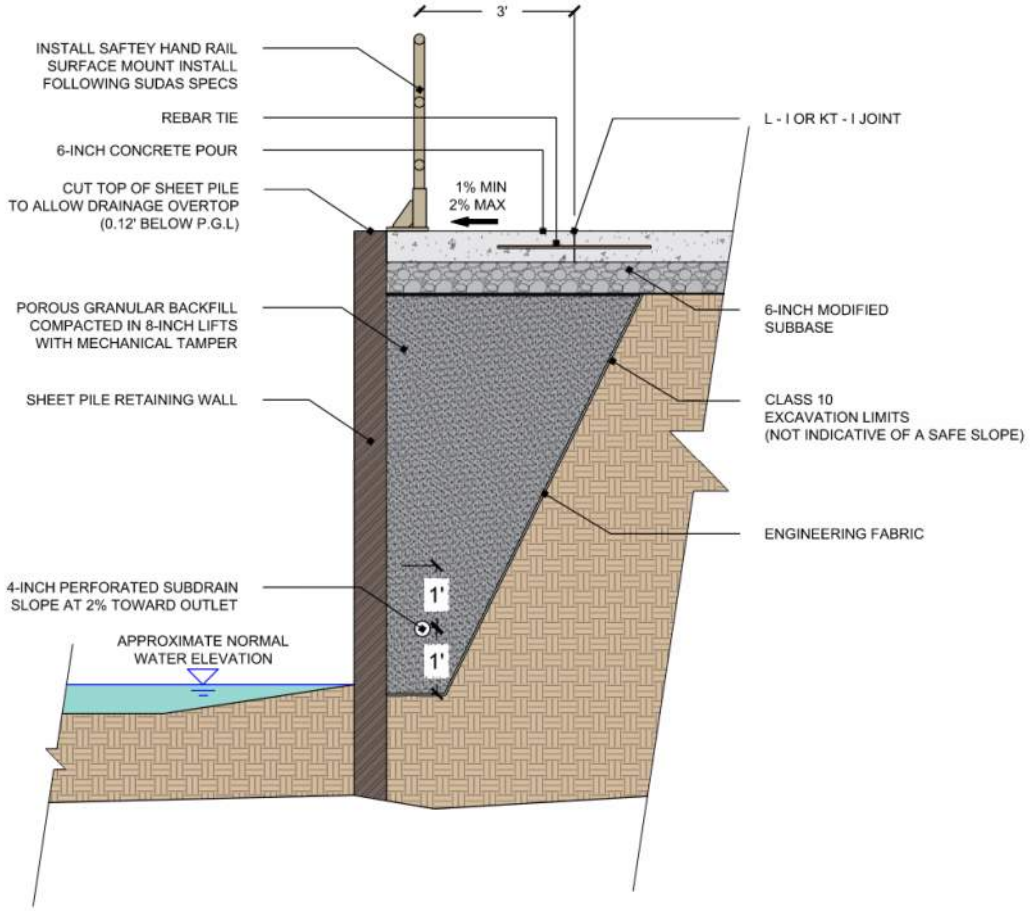
Modernized Construction Standards - Underpass Stemwall Protection Detail



NOTES:

1 CONCRETE PAVING
For concrete paving see multi-use trail section typ. concrete notes 1, 3 and 5

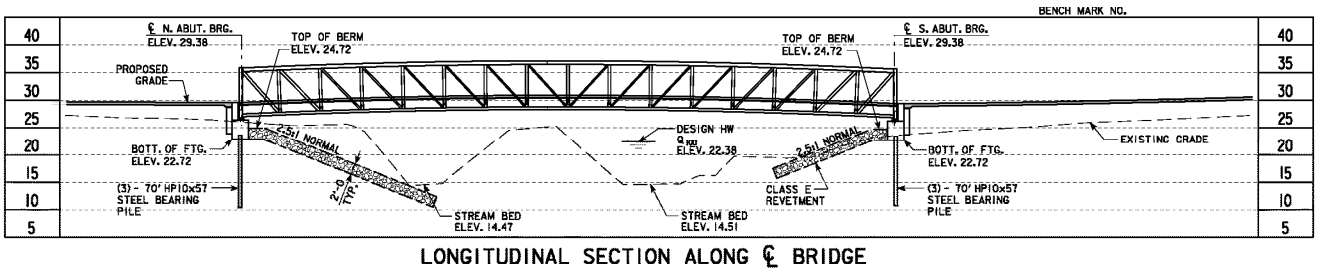
Modernized Construction Standards - Underpass Sheet Pile Protection Detail



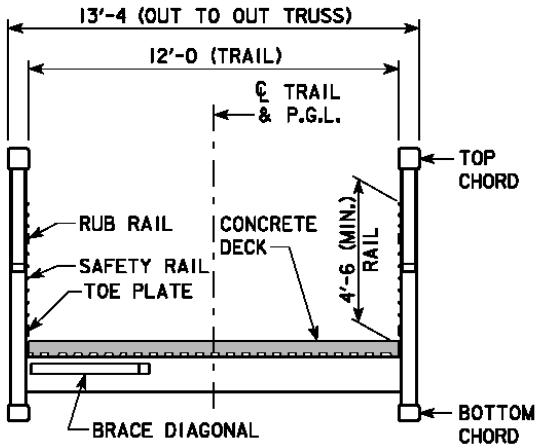
Modernized Approaches

1 2 3 4 5 6 7 8 9

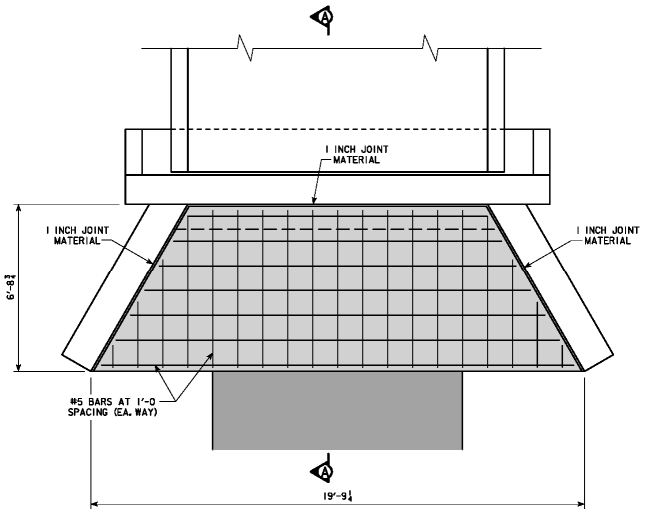
Modernized Construction Standards – Typical Trail Bridge Details



LONGITUDINAL SECTION ALONG ℄ BRIDGE



SECTION THRU TRUSS



PLAN - BRIDGE APPROACH

New Approaches In Practices

New Approaches In Practices

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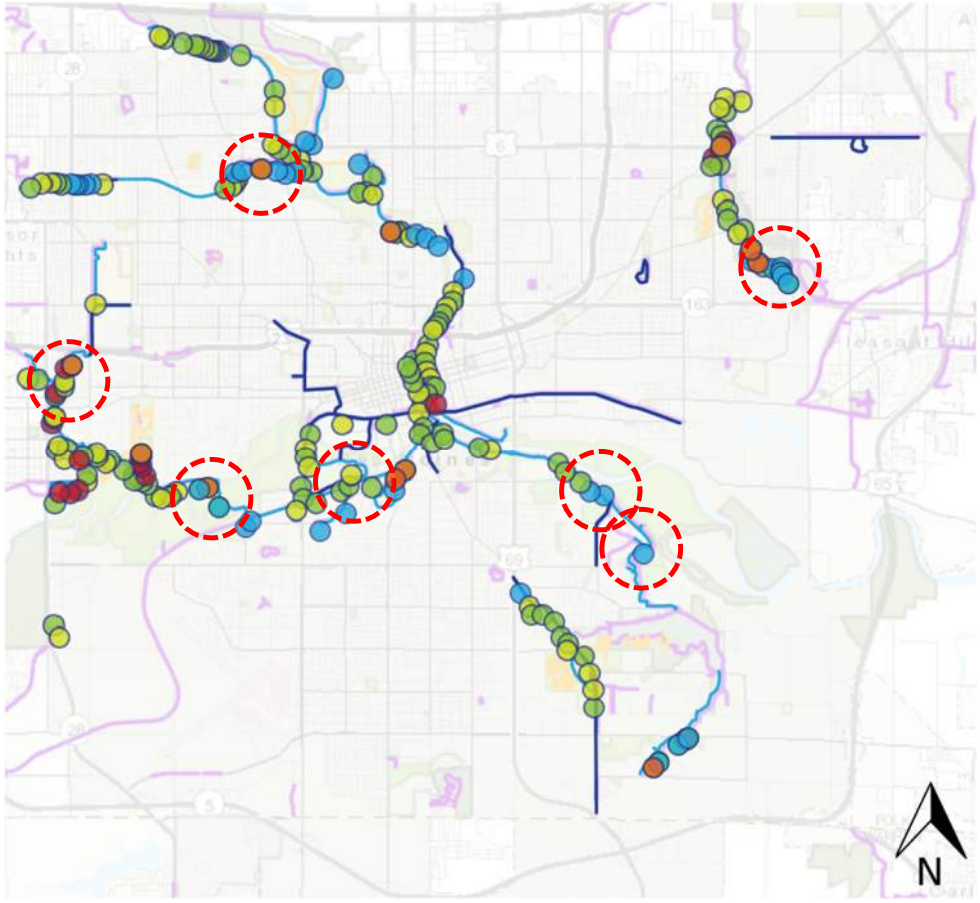
2022 Trail Audit- Completed Projects



2020-2021 Completed Trail Projects

(snapshot of fixes, not all trail projects are shown)

- 2022 Completed Projects
- Low-Priority Issues
- Medium-Priority Issues
- High-Priority Issues
- Very High-Priority Issues

New Approaches In Practices

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Gay Lea Wilson Trail - Realignment & Bendway Weirs

BEFORE:

AFTER:

New Approaches In Practices

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Gay Lea Wilson Trail - Stem Wall Scour Protection

BEFORE:

AFTER:

New Approaches In Practices

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Bill Riley Trail - Sheet Pile Scour Protection

BEFORE:

AFTER:

New Approaches In Practices

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Carl Voss Trail - CSS Fog Seal at New Construction

BEFORE:

AFTER:

New Approaches In Practices

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PAVIX Application - New Construction

BEFORE:

AFTER:

New Approaches In Practices

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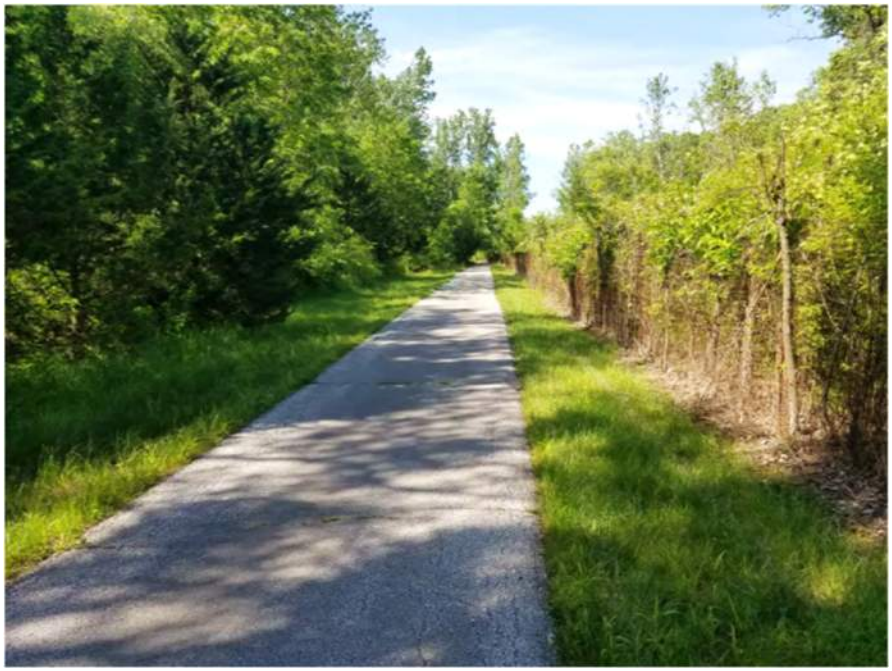
Neal Smith Trail - Reconstruction Using Full Depth Reclamation

BEFORE:



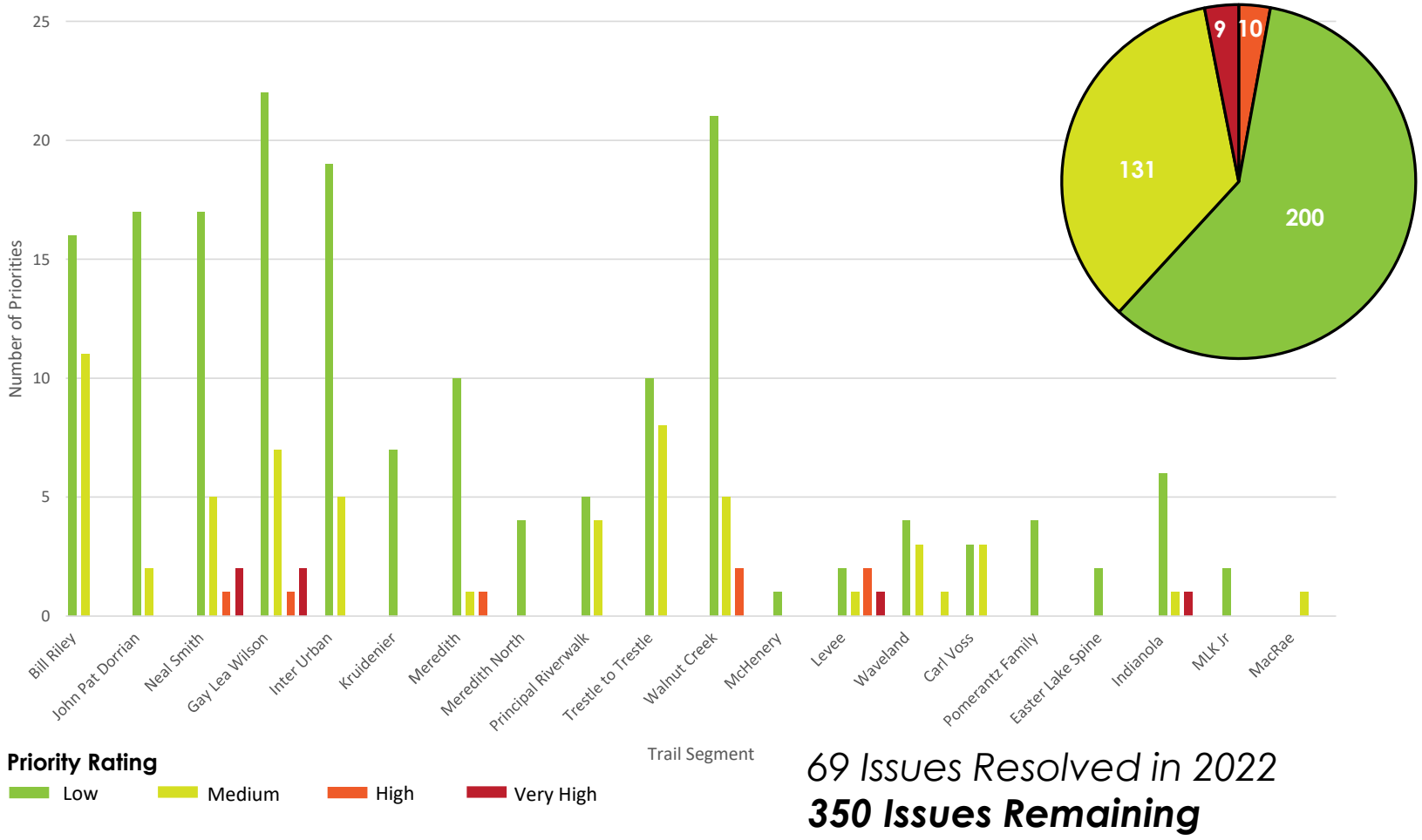
AFTER:

Deferred Maintenance Remaining

Deferred Maintenance Remaining

1 2 3 4 5 6 7 8 9

Trail Issues by Trail and Priority *(Ordered by Age of Trail)*



69 Issues Resolved in 2022

350 Issues Remaining

Deferred Maintenance Remaining

1
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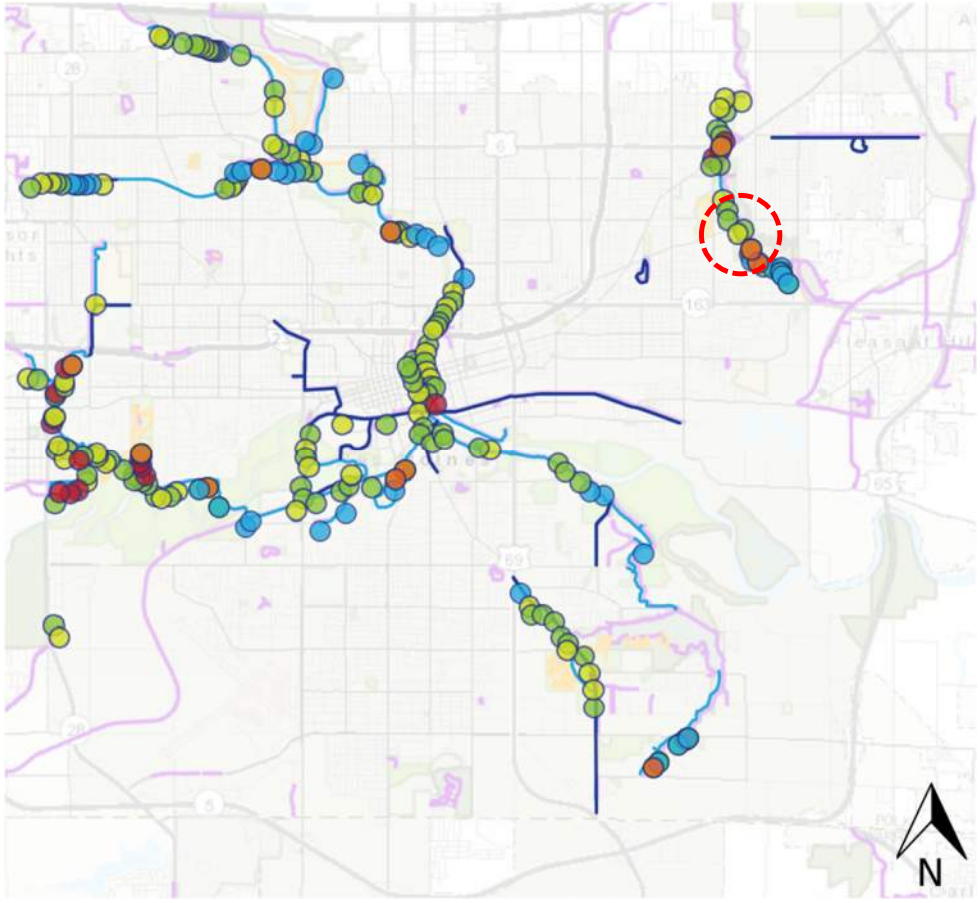
Priority Repairs Via CIP Projects

Planners identify and prioritized deferred CIP projects for the first 5 years with estimated costs.

Deferred Maintenance Remaining

1 2 3 4 5 6 7 8 9

Estimating Deferred Maintenance



Operations Issue Description

Excess asphalt in the shoulder needs to be cut and removed to enable turf vegetation growth.

Operations Repair Estimate

- **(10 hours)** | 2 Operators x 5 hours needed
- **(01 hours)** | 30 mins there + 30 mins back

11 Hours Needed

Deferred Maintenance Remaining

1 2 3 4 5 6 7 8 9

Estimating Deferred Maintenance - Operations Items

Maintenance Regime FY2023 -FY 2024

Fiscal Yea	Application Dat	Name of Trail	Trail Application	Description	Units	Workers	Quantity	LF	F per Ga	Gallons	Tons	Unit Price	Total
		Trail Repairs											
		Neal Smith Trail	Parks	Alligator cracking. Trail is unspot. Reshape area to drain and reconstruct trail.	Operation Hours	5	10	x	x	x	x	$ 65.00	$ 3,250.00
			Parks	Drainage issue upland ride of trail. Tuespatc	Operation Hours	3	10	x	x	x	x	$ 65.00	$ 1,950.00
			Parks	Lau paint pealing reshape and paritive drainage. Whale stretch	Operation Hours	5	15	x	x	x	x	$ 65.00	$ 4,875.00
			Parks	Big dip in trail need filling	Operation Hours	2	5	x	x	x	x	$ 65.00	$ 650.00
			Parks	Small ornarian fill in for paritive drainage	Operation Hours	3	10	x	x	x	x	$ 65.00	$ 1,950.00
			Parks	Crack sealing whale trail segment	Operation Hours	2	30	x	x	x	x	$ 65.00	$ 3,900.00
			Engineering	Grass slope ir going the urong way. Icing happene. Turn redius could be fixed. Add culvert for paritive drainage.	Asphalt	x	x	150	x	x	40	$ 129.00	$ 5,160.00
			Engineering	Pauling water drainage icing could happen.	Asphalt	x	x	75	x	x	20	$ 129.00	$ 2,580.00
		McHenery Trail	Parks	Small depression patch	Operation Hours	2	4	x	x	x	x	$ 65.00	$ 520.00
			Parks	Crack Seal/cold patch the whale segment and riverview	Operation Hours	2	15	x	x	x	x	$ 65.00	$ 1,950.00
		Downtown Jon Pat Dorrian Pk	Parks	Fog seal, crack repair and shouldering	Operation Hours	2	6	x	x	x	x	$ 65.00	$ 780.00
			Parks	Crack repair and shouldering	Operation Hours	2	6	x	x	x	x	$ 65.00	$ 780.00
			Parks	Caulking need to avoid water damage	Operation Hours	2	4	x	x	x	x	$ 65.00	$ 520.00
			Parks	Crack Seal/cold patch the whale segment	Operation Hours	2	6	x	x	x	x	$ 65.00	$ 780.00
			Engineering	CIP-approx. 420 LF of mill and overly ar parably total rebuild needed.	Asphalt	x	x	420	x	x	110	$ 129.00	$ 14,190.00
			Engineering	CIP-rite condition photo related trail item #54	Asphalt	x	x	150	x	x	40	$ 129.00	$ 5,160.00
		Downtown Meredith Trail	Parks	Shaping to drain for paritive drainage remove fabric and change to beehive inlet	Operation Hours	3	15	x	x	x	x	$ 65.00	$ 2,925.00
			Parks	Shaping and change drain to beehive	Operation Hours	3	15	x	x	x	x	$ 65.00	$ 2,925.00
			Parks	Tear out planters fill with concrete, clean out drainage area	Operation Hours	5	20	x	x	x	x	$ 65.00	$ 6,500.00
			Parks	Crack Seal/cold patch the whale segment	Operation Hours	2	6	x	x	x	x	$ 65.00	$ 780.00
		Gay Lea Wilson Trail	Parks	Non ADA compliant change in level. Approach need redone.	Operation Hours	2	6	x	x	x	x	$ 65.00	$ 780.00
			Parks	Non ADA compliant change in level.	Operation Hours	2	6	x	x	x	x	$ 65.00	$ 780.00
			Parks	Repair Trail asphalt failing cracks seal and fog	Operation Hours	2	8	x	x	x	x	$ 65.00	$ 1,040.00
			Parks	tree roots need repave	Operation Hours	2	15	x	x	x	x	$ 65.00	$ 1,950.00
			Parks	Culvert clean out and cold patch crack	Operation Hours	5	15	x	x	x	x	$ 65.00	$ 4,875.00
			Parks	Root ridge, grind and overlay, cut roots	Operation Hours	2	10	x	x	x	x	$ 65.00	$ 1,300.00
			Parks	remove tree necessary ar	Operation Hours	2	10	x	x	x	x	$ 65.00	$ 1,300.00
			Parks	Crack Seal/cold patch the whale segment	Operation Hours	2	35	x	x	x	x	$ 65.00	$ 4,550.00
			Engineering	5 culvert replace and far extend along trail segment	Brook Run	x	5	x	x	x	x	$ 12,000.00	$ 60,000.00
		Kreideier Trail	Parks	Crack Seal/cold patch the whale segment	Operation Hours	2	12	x	x	x	x	$ 65.00	$ 780.00
			Parks	Depression in asphalt icing occurring	Operation Hours	3	6	x	x	x	x	$ 65.00	$ 390.00
												Total	$ 142,730.00

Average Hours by Priority Type

20 Operating Hours

26 Operating Hours

Addressed by Contract

Addressed by Contract

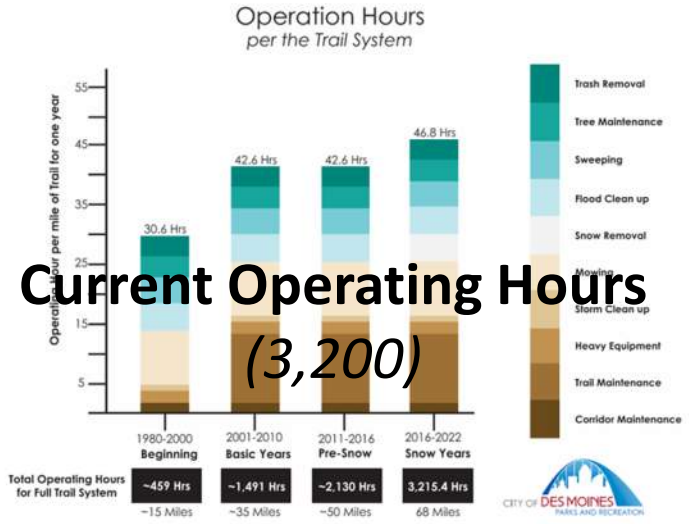
Formula for estimating the number of hours needed to address low and medium priority deferred maintenance

((Sum (Low Priority Hours) / # of Low Priority Issues) + ((Sum (Med Priority Hours) / # of Med Priority Issues)

Deferred Maintenance Remaining

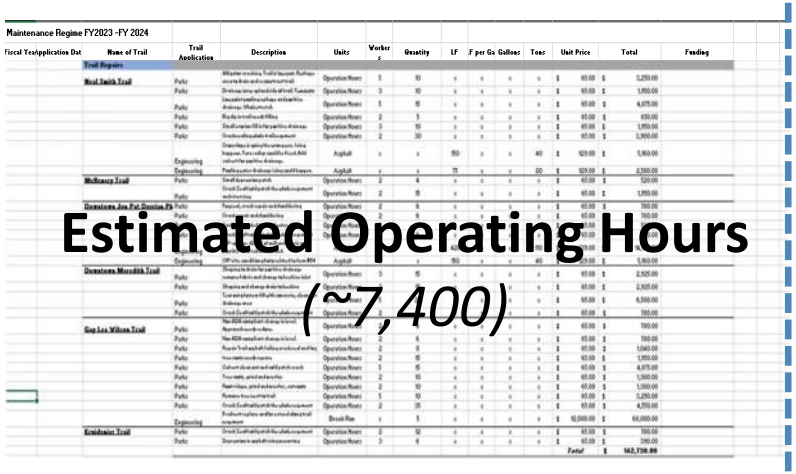
1 2 3 4 5 6 7 8 9

Total Estimated Operating Hours to Address Low & Medium Priority Deferred Maintenance



Current Operating Hours
(3,200)

+



Estimated Operating Hours
(~7,400)

~10,600 Operating Hours

Addressing Deferred Maintenance

1. Presentation Overview
2. Existing Trail System
3. Project Justification
4. Previous Practices (Pre-2016)
5. Analysis & Assessment
6. Modernized Approaches
7. New Approaches In Practice
8. Deferred Maintenance Remaining
9. **Addressing Deferred Maintenance**

Addressing Deferred Maintenance

1
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Trail System Cycle

Addressing Deferred Maintenance

1
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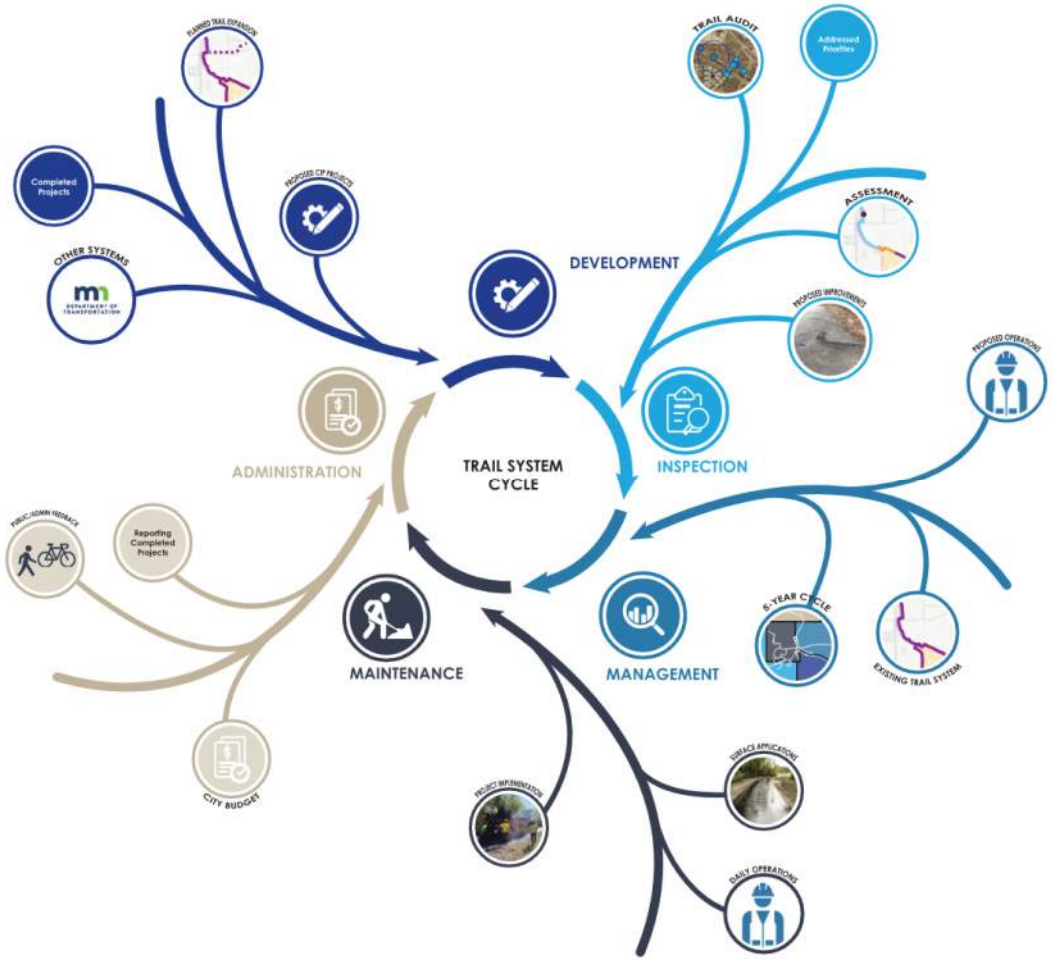
9

Feeding the Trail System Cycle



Addressing Deferred Maintenance

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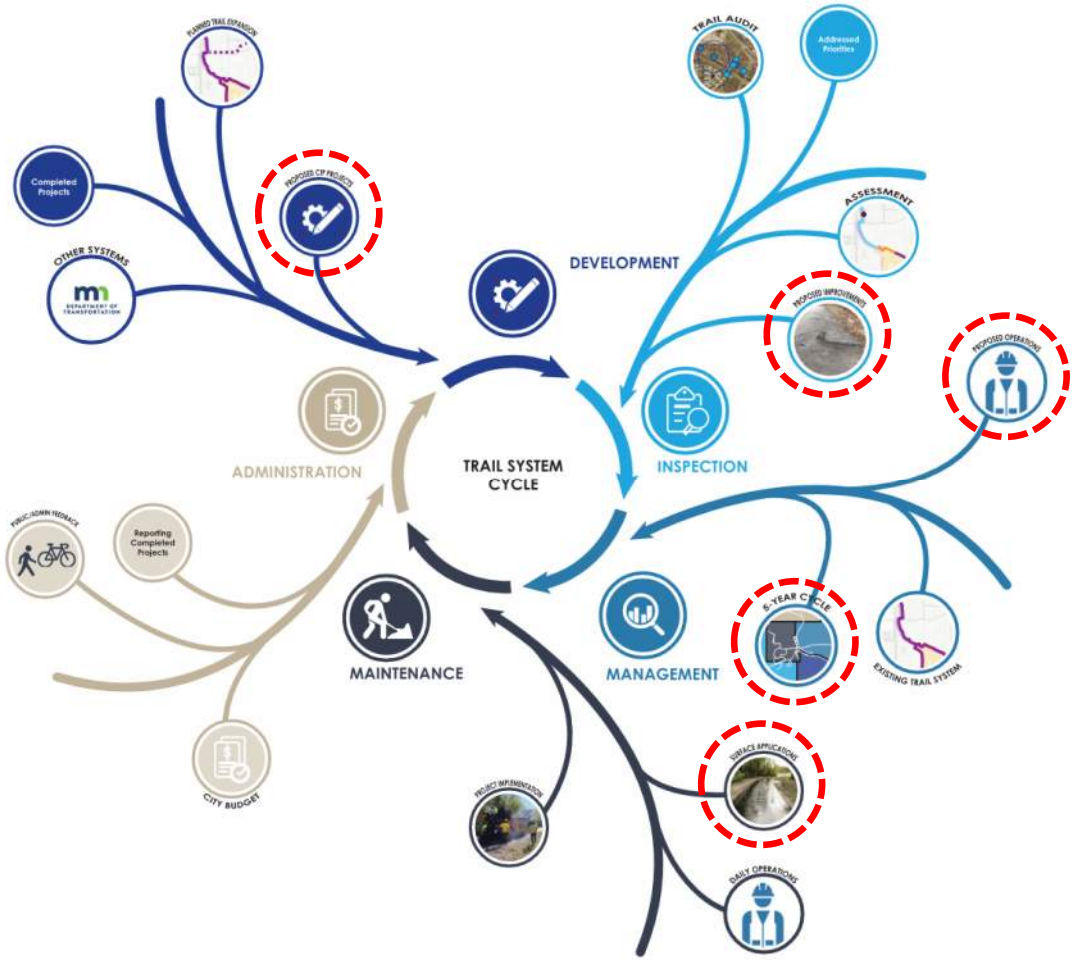
Focus Areas and Ongoing Improvement



Focused Proposal Costs

Daily Operations
- *Daily operation costs*
- *Yearly costs*

Proposed CIP Projects
- *Existing infrastructure deficiencies*
- *Deferred operation cost*

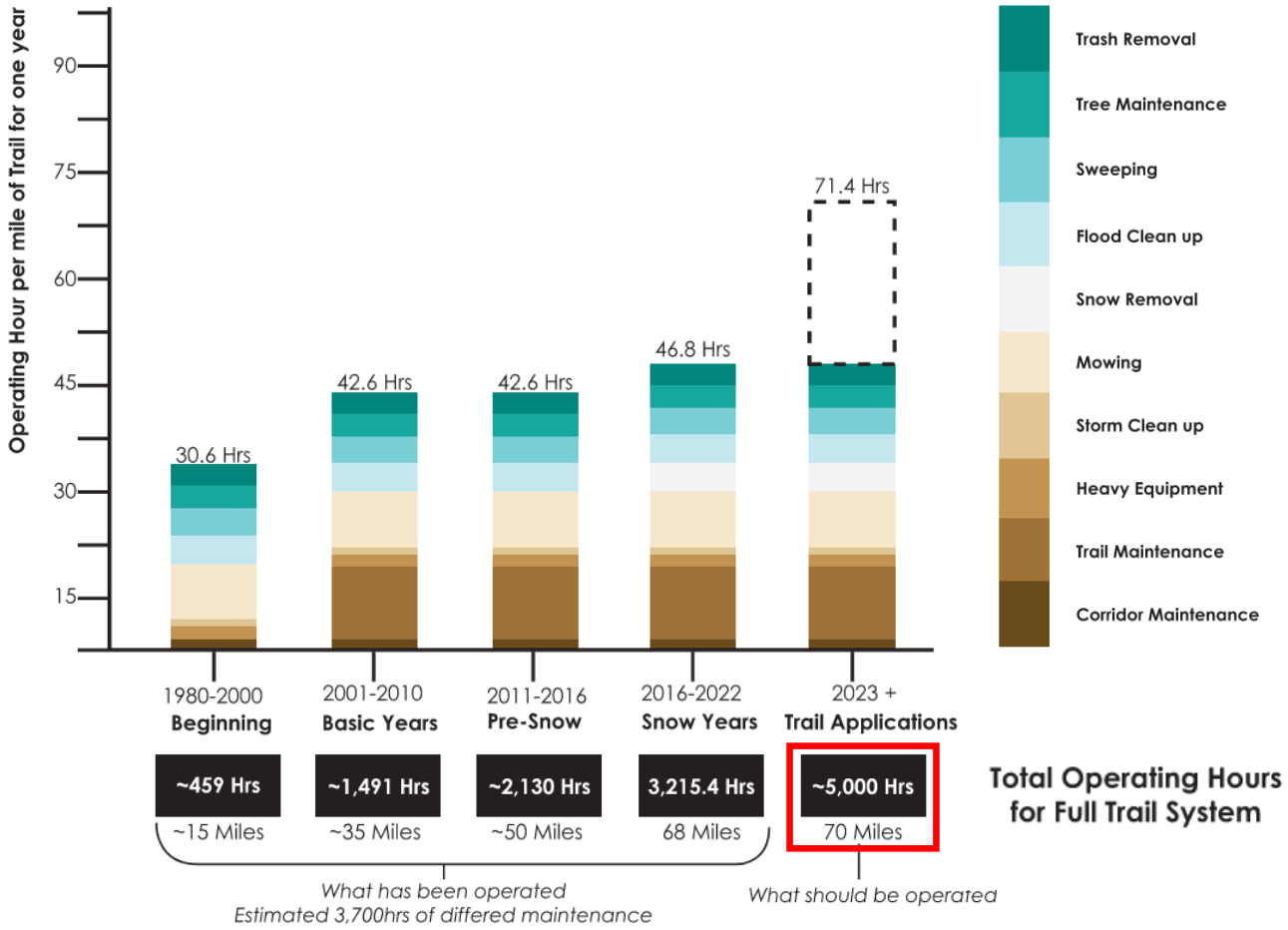
Deferred Maintenance & Repairs
- *Deferred operation costs*
- *Mill and overlay older trails*

Preventative Operations
- *Preventative operations costs*

Ideal 5-year Maintenance Cycle
- *Preventative operation costs*
- *Proposed 5-year cycle costs*

Addressing Deferred Maintenance

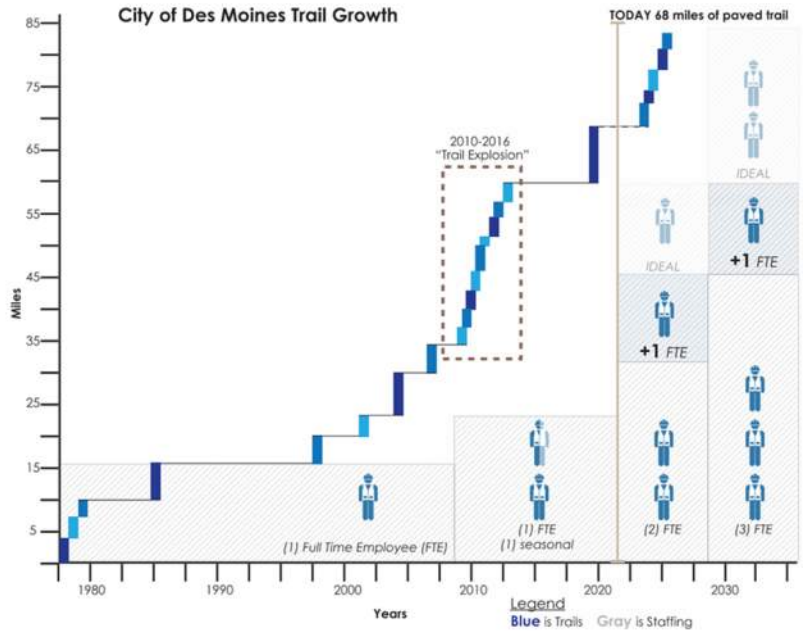
Daily Operations - Proposed Costs



Addressing Deferred Maintenance

1 2 3 4 5 6 7 8 9

Daily Operations - Proposed Staffing



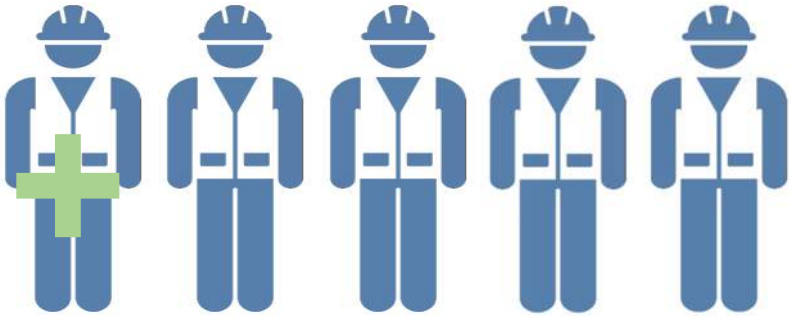
Daily Operations Recommended Costs

$5,500.00 per mile, annually

Basic Operations Recommended Costs

Recommend adding one FTE **FY2024** (ideal total: 4 FTE)

Recommend adding one FTE **FY2029** (ideal total: 5 FTE)



Ideal Staffing (recommend adding 1 FTE every 15.5 miles added)

1 FTE = 15.6 miles of trail

Addressing Deferred Maintenance

Capital Improvement Projects (CIP) - Contracted Work to Address Deferred Issues

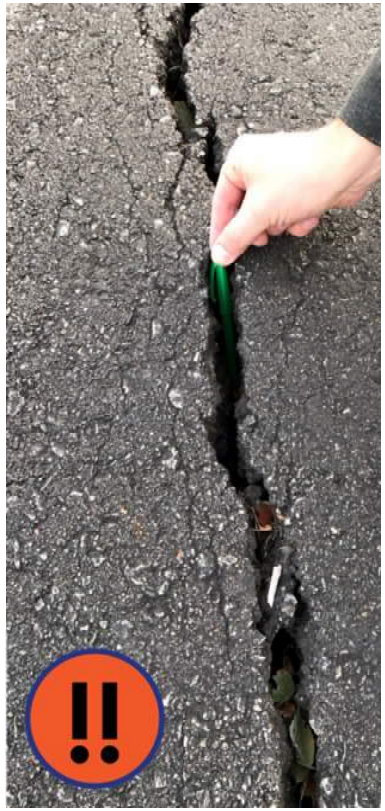
Planners have identified and prioritized deferred priorities to address in CIP Projects estimated costs.

Addressing Deferred Maintenance

Deferred Maintenance & Repairs - Proposed Set-Aside

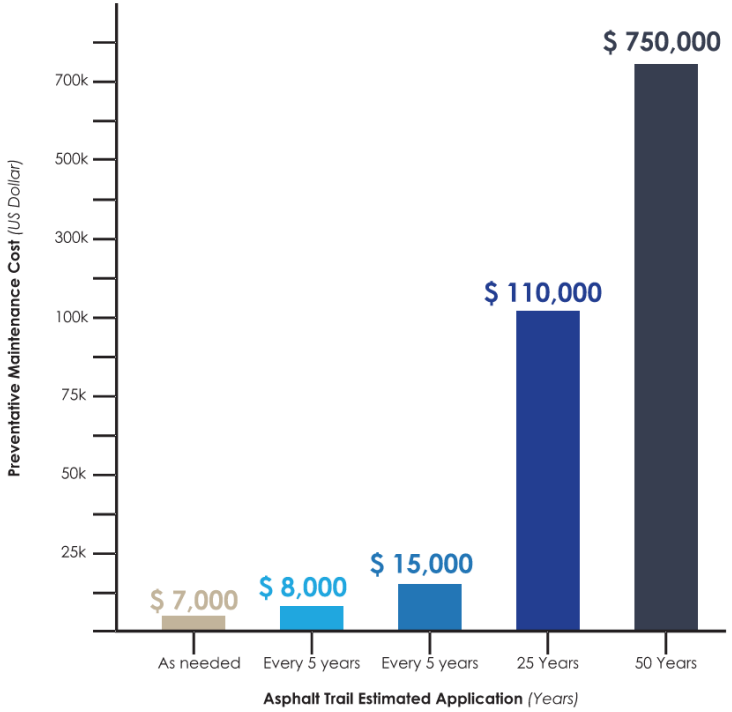
Alta Design Group
Deferred Operations Recommended Costs
1% total construction costs per mile

Deferred Operations Recommended Costs *(FY 30 and beyond)*
$7,500.00 per mile, 5-year cycle

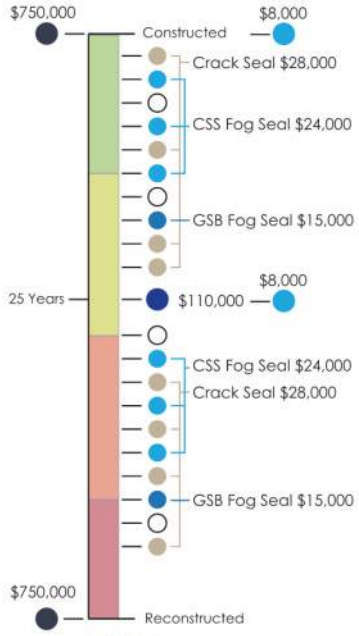


Addressing Deferred Maintenance

Preventative Operations - Proposed Cost



50 Year timeline of Preventative Maintenance



1.8M per mile

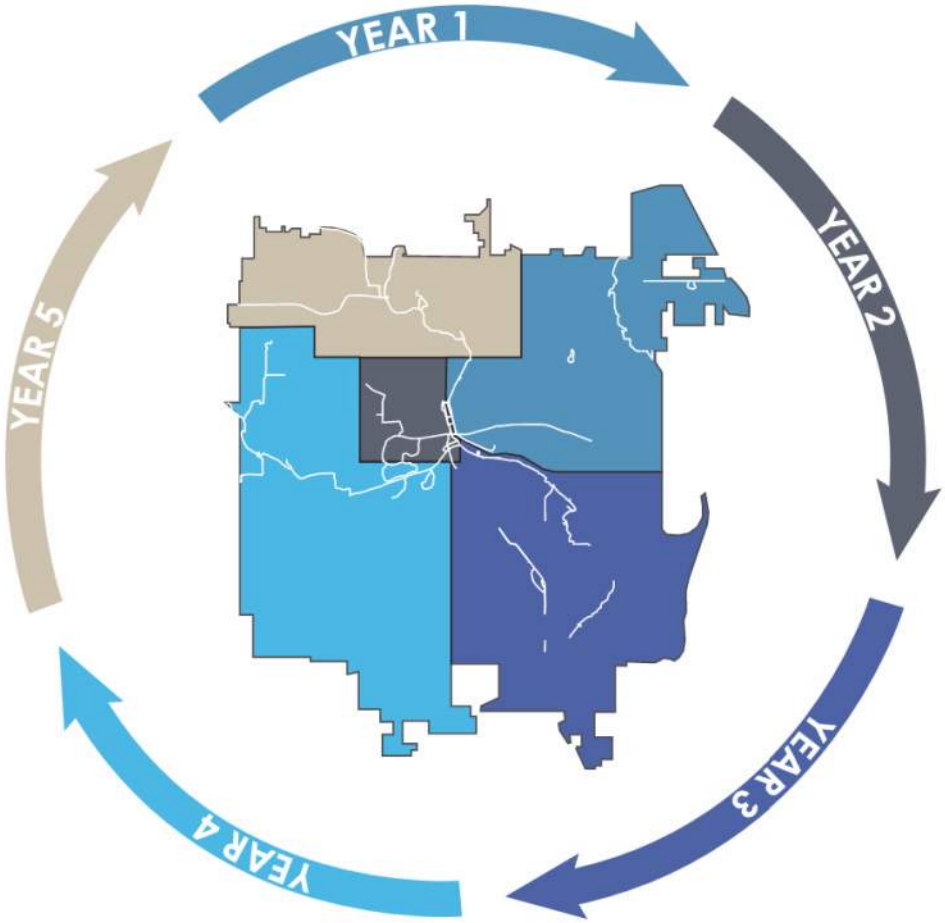
Preventative Operations Recommended Costs

$7,500.00 per mile, 5-year cycle

Addressing Deferred Maintenance

1 2 3 4 5 6 7 8 9

Ideal Scenario - 5-Year Maintenance Cycle Plan



Ideal Proposal Costs

Daily Operations Recommended Costs
$5,500.00 per mile, annually

Deferred Operations Recommended Costs
$7,500.00 per mile, 5-year cycle

Preventative Operations Recommended Costs
$7,500.00 per mile, 5-year cycle

Total Ideal Cost
~$1,000,000 ***annually w/CIP projects***

Addressing Deferred Maintenance

1 2 3 4 5 6 7 8 9

Resulting Trail Maintenance Funding Allocation

SUSTAINABLE TRAIL FUNDING PROPOSAL
10-15 Year Proposal to Solvency

OPERATIONS

2022 Current **$64K** | Recommended **$100K**

What is covered ?

CAPITAL REPAIRS

2022 Current **$120K** | Recommended **$300K**

What is covered ?

OPERATIONS + CAPITAL

2022 Existing **$184K** › Proposed Funding **$400K**

STAFFING COSTS NOT INCLUDED

PROPOSED FUNDING Inflation @ 3%

2023	$184K	2029	$450K
2024	$1.18M	2030	$464K
2025	$400K	2031	$478K
2026	$412K	2032	$492K
2027	$424K	2033	$507K
2028	$437K	2034	$522K

PLANNED TRAIL NEW CONSTRUCTION CIP

	CIP G.O.	Grants	(ARPA)	Total
FY 2023	$2.1M	$2.3M		$4.4M
FY 2024	$2.2M	$3.1M	$1.5M	$7.8M
FY 2025	$2.3M	$1.0M		$3.3M
FY 2026	$1.6M	$700K		$2.3M

~$3.9 Million Maintenance Funding Increase Over 10 Years (Excludes Staffing & CIP)

Thank You!

CITY OF DES MOINES
PARKS AND RECREATION

THANK YOU TO OUR PARTNERS!

- American Trails
- Webinar Attendees

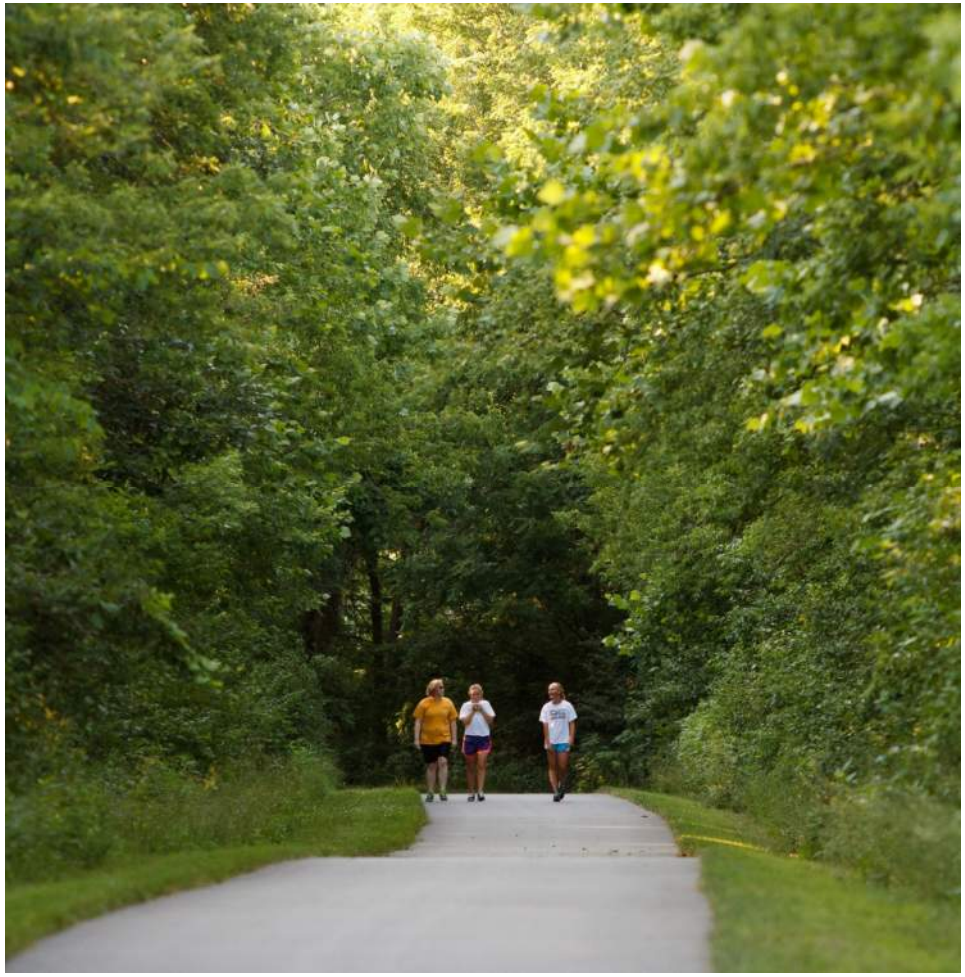
- IT-GIS Department
- Public Works Department
- Engineering Department
- City Manager's Office
- Parks and Recreation Department
- Volunteers


MILE 3¼
Neal Smith Trail
YOUR 911 LOCATION
463 083
IN CASE OF EMERGENCY CALL 911


SAXO
BANK
TREK

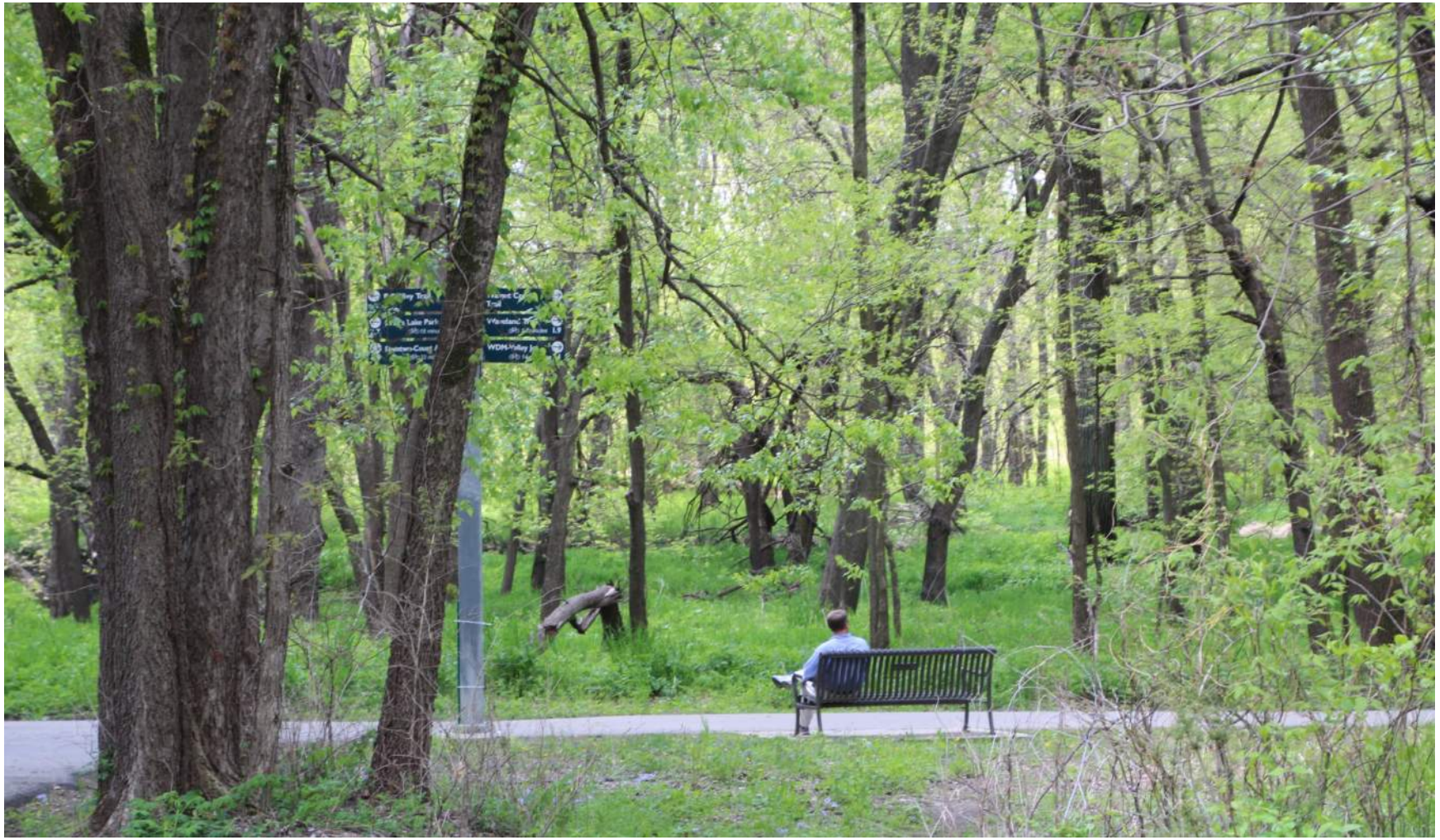

MILE ¾
Walunt Creek Trail
421
028


Bill Riley Trail
432
022



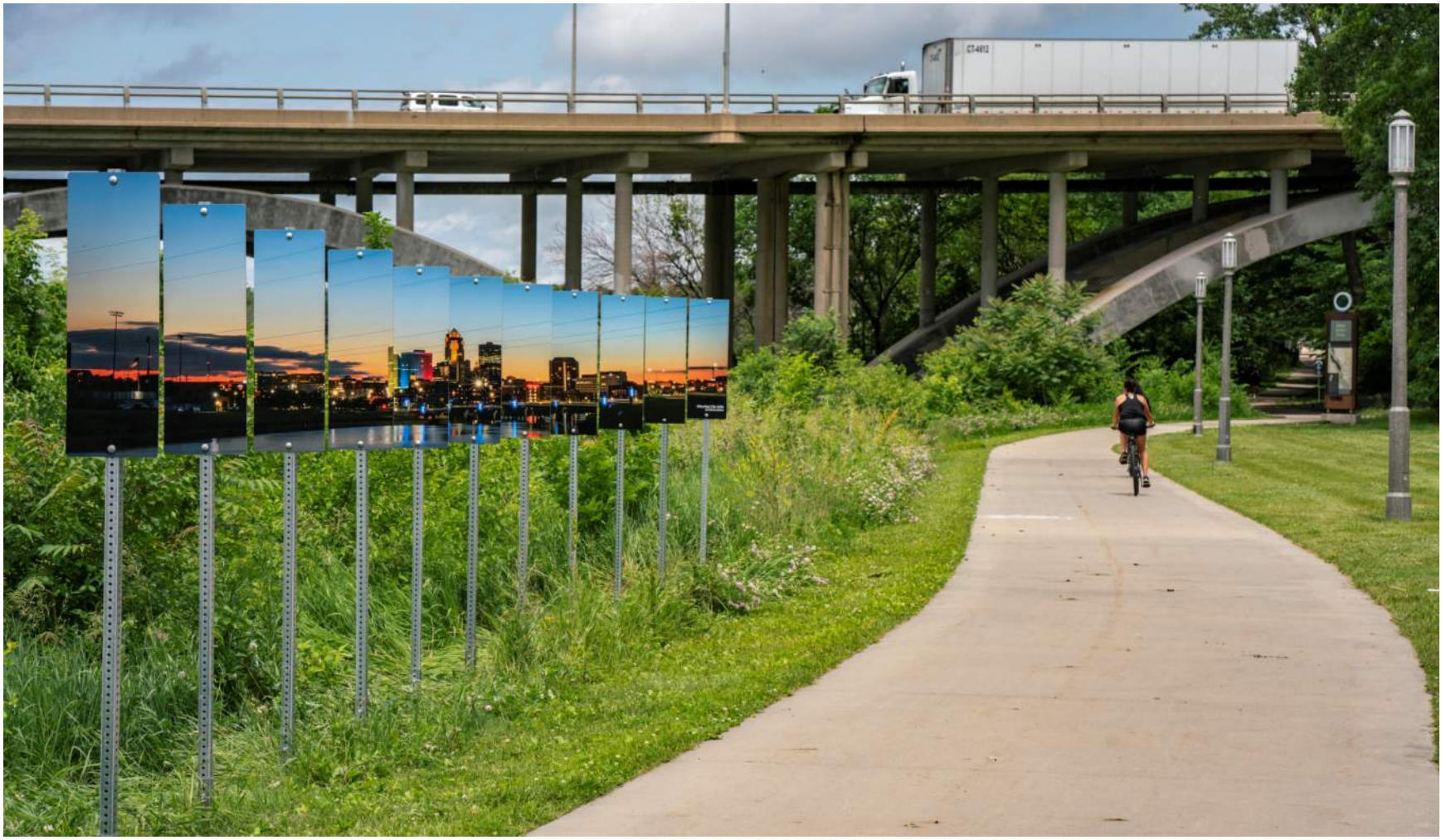

MILE 1/4
Walnut Creek Trail
you are beautiful
YOUR 911 LOCATION
427 025
IN CASE OF EMERGENCY CALL 911

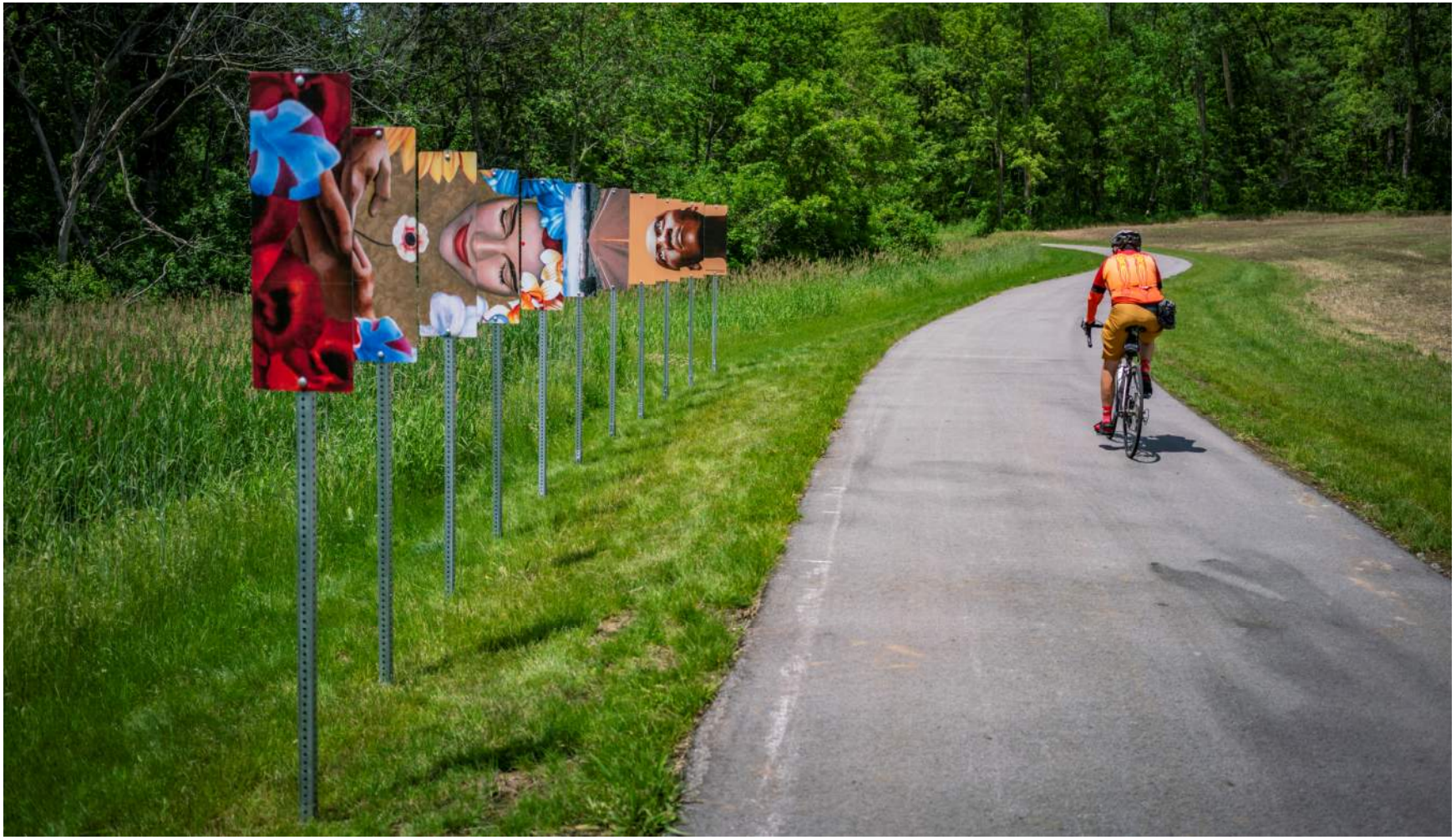

MILE ¾
John Pat Dorrian Trail
YOUR 911 LOCATION
485 048
IN CASE OF EMERGENCY CALL 911




MILE 2½
Neal Smith Trail
YOUR 911 LOCATION
472 078
IN CASE OF EMERGENCY CALL 911
FRIENDS PARKS


MILE ½
Meredith
Trail
North
YOUR 911
LOCATION
462
030
IN CASE OF EMERGENCY CALL 911
FRIENDS
PARKS






JOHN PAT
DORRIAN
TRAIL
BIKERS WELCOME!
Drink & Food Specials!


MILE 3½
Bill Riley Trail
YOUR 911 LOCATION
430
026
OF EMERGENCY CALL 911


Bill Riley Trail
Gray's Lake Park
2.7
18 minutes
Dwntwn-Court Ave
4.9
33 minutes
Greenwood-Ashwor
Parks
3 minute
Center Nature
Trails
3 minute
DM Art Center
7 minut


ADOPT
-A-
TRAIL
PROGRAM
ADOPTED BY
Fun on Friday
Group