



Dequindre Cut Greenway Methods

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This investigation was conducted as part of the Landscape Architecture Foundation's 2022 *Case Study Investigation* (CSI) program. CSI matches faculty-student research teams with design practitioners to document the benefits of exemplary high-performing landscape projects. Teams develop methods to quantify environmental, social, and economic benefits and produce Case Study Briefs for LAF's *Landscape Performance Series*.

To cite:

Lindquist, Salvador and Kyle Riley. "Dequindre Cut Greenway Methods." *Landscape Performance Series*, Landscape Architecture Foundation, 2022.
<https://doi.org/10.31353/cs1801>

The full case study can be found at: <https://landscapeperformance.org/case-study-briefs/dequindre-cut-greenway>

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Environmental Benefits

- ***Reduces auto trips by an estimated 15,218 round-trip weekday commutes annually, reducing carbon dioxide emissions by an estimated 38,250 lbs each year.***

Background:

Detroit is very much a car-centric city--it is called Motor City, after all. This makes it difficult for those without a vehicle to access main parts of the city, making the Cut and future greenway initiatives the key to opening up the city. For this benefit, commuter trips were utilized to give a tangible value of cars taken “off the road”. If all users were to be accounted for, values would be skewed due to those using the Cut for recreation or other purposes that would not have required a vehicle. The Dequindre Cut’s goal to maximize accessibility justifies the need to measure commuter use even further.

Method:

A survey about various aspects of the Cut was conducted by the CSI research team during summer 2022. Researchers set up a table along the Cut and visitors could respond voluntarily. 107 responses were received.

The Dequindre Cut was intended to reduce auto trips to and from key parts of the city. To assess these reductions, the survey question: “What do you primarily use the Cut for?” gave a percentage of people who use the Cut as part of their commute. This was taken as the best available information for researchers to use to estimate percentage of users on the Cut for their commute. 22% (22 of 108) survey respondents stated that they use the Cut for their commute. Additionally, about 41% of commuters stated that the Cut reduces the time of their daily commute.

This value was then compared with the number of total annual users of the site, gathered from the Eco-counter at the Gratiot St. entrance. This counter was chosen for its relatively central location on the site and because it had the most complete data of all the counters on site.

Average miles per trip was estimated by analysis of main site uses and distance from access. Amount of CO2 emissions saved per mile was found using EPA MOVES's Emission simulator.

Calculations:

Automobile reduction calculation: Multiplied the decimal percentage of survey participants who use the Cut as part of their commute (.2037) by the eco-counter signals on weekdays. The Eco-counter weekday signals value was determined through removing weekend numeric values (263,264 total - 113,849 weekend = 149,415 weekday signals). Using this calculation, we got 30,436 counter signals. When divided by two to account for a round trip by one commuter, the final value for round-trip commuter trips and therefore automobile trip reduction is 15,218.

Emissions rates for vehicles, in grams per mile, were estimated using the EPA MOVES model (MOTOR Vehicle Emission Simulator) for Detroit, MI. The emissions estimates were on average 300 grams of CO2 per mile. This value was multiplied the following values:

Average trip distance for those using the Cut was estimated using the distance from the Atwater St entry point to the Wilkins St entry point. This is because major programming along the Cut is located between or near these points, including the Riverfront Conservancy, Riverfront Fit Park, Campbell Terrace, Gratiot entry point, the Freightyard, and the Eastern Market. The distance from Atwater to Wilkins is roughly 1.4 miles, equating to a 2.8 mile round trip. With a half mile buffer to account for travel to the Cut, this amounts to an estimated 3.8 mile round trip, which was used to estimate the emissions saved by eliminated auto trips.

Table 1: Carbon Avoidance due to Non-Vehicular commuters (annually)

Variable Name	Unit	Value	Source
Non-Vehicular Commuters	Persons	15,218	Survey; Eco-Counter Gratiot
Average Trip	miles	3.8	City of Detroit
CO2 Emissions per mile	grams	300	EPA MOVES (MOTOR Vehicle Emission Simulator)
lbs. CO2 Emission Avoidance	pounds	38,247	<i>Calculation*</i>

Survey Questions/Results:

- **What do you primarily use the Dequindre Cut for? Select all that apply.**

- Transit
- Exercise
- Attend events on and adjacent to the Dequindre Cut
- Leisure
- Other, Please specify

Transit: 20% (22 out of 108)

Sources:

On-site Survey by CSI research team:

“LAF Case Study Investigation - Dequindre Cut.” Qualtrics, June 22, 2022.

Eco Counter:

“Dequindre Cut - Eco Counters.” Eco-Visio. Accessed June 25, 2022.

BCA Memo:

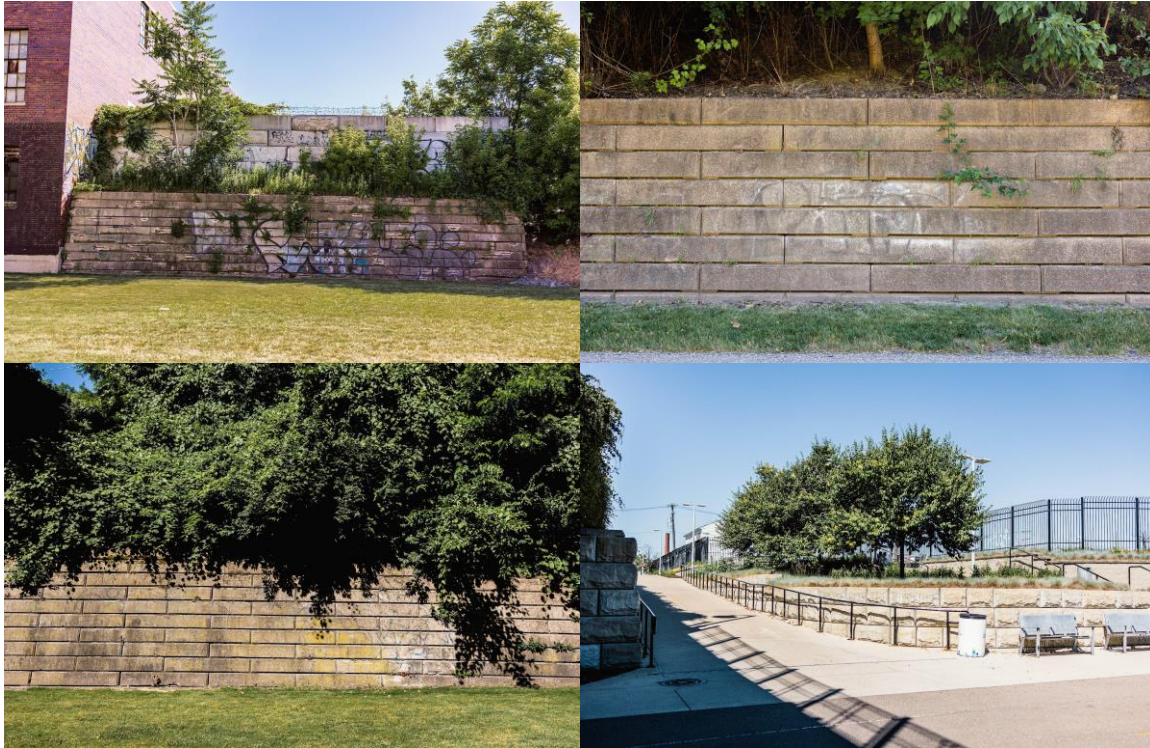
City of Detroit. *Inner Circle Greenway Benefit Cost Analysis*. June 5, 2015.

Limitations:

- Estimations made that the average distance of commuting trips is 3.8 miles. This average may not accurately reflect all commuter trips.
- Does not account for any use of non-CO2 emitting vehicles.
- Assumes that commuters using the Cut work 5-day weeks and not on weekends.
- This is an estimation based on the best available information; auto trip reductions could be higher or lower than state.
- ***Used 80% less concrete by repurposing 31,685 sf of concrete retaining wall blocks on-site, saving an estimated \$8.9 million in materials as compared to using all new cast-in-place retaining walls.***

Background:

In order to implement the trail, significant grading changes along the slopes of the Cut were necessary. As both an environmental benefit and a cost effective approach, the usable retaining walls left over from previous development were pushed back to allow for a wider path and more usable green space.



Images taken on-site by the CSI research team of reused retaining wall materials

Method:

On-site observation was conducted to see where each type of retaining wall was implemented. The units of each type were measured in face feet (square feet of the face of the wall). Through this classification and referencing the construction documentation, we were able to determine the area of face feet saved through reuse of prior retaining wall segments. See *Table 2* in *Calculations* for further details. Using current concrete provisions documents, a cost comparison was derived between using gravity walls with the existing pre-cast, and a complete cast-in-place method. See *Table 3* in *Calculations* for further details.

Calculations:

Table 2: Retaining Wall Methods and Concrete Material Reuse

Retaining Method	Retaining Wall Unit Height	Face/feet Used
Reused Pre-cast Block Units	1'0"	28,950
Gravity Wall Blocks	1'6"	6,800

Existing Cast-in-place wall	3'6"	2,735
<i>Total Retaining Wall Surface Area</i>	1'6"	38,485

Table 3: Estimated Concrete Unit Cost for each Retainment Method (2022 Dollars)

Retaining Method	Retaining Wall Unit Height	Face/foot Used	Cost per Face/foot	Material Cost <i>*Not including labor*</i>
As-built				
<u>Reused</u> Pre-cast Blocks	1'0"	28,950	\$0	\$0
<u>Existing</u> Cast-in-place Concrete Walls	3'6"	2,735	\$0	\$0
<u>New</u> Pre-cast Gravity Wall Blocks	1'6"	6,800	\$47	\$319,600
Cast-in-place Alternative				
Cast-in-place	<i>Varies</i>	35,750	\$250	\$8,937,500

Sources:

Construction Documents (SmithGroup)

Pre-cast concrete provisions:

City of Detroit. *Special Provision for _Retaining Wall, Pre-Cast Large Block*. January 25, 2021.

Limitations:

- Retaining wall heights in calculations were averaged by section.
 - On-site analysis calculations did not allow for calculation of tonnage for concrete units, only face feet (sf of the face of the walls).
 - Cost values do not account for cost of labor or for inflation.
-

Social Benefits

- ***Provides access to recreational activities and more, with more than 263,260 trips taken on the Cut annually. 92% of 101 surveyed users agreed that the Cut provides access to diverse recreational activities.***

Background:

Access to key places and recreational opportunities using the Cut allows for the avoidance of streets and vehicular traffic all together, making trips quicker and safer. The Cut itself also provides a safe space for aerobic recreation and social interactions. One example of this is Mogo, a bike rental company that has grown in Detroit since the introduction of the Cut. Lafayette Park and the Detroit Riverfront Conservancy are two well-known recreation areas in the city that the Cut provides direct access to.

Method:

Data was collected using eco counters on-site for all of 2021. The eco counters give a signal when someone passes over them, giving an estimated value of Cut users. The Gratiot St. counter was chosen for its relatively central location on the site and because it had the most complete data of all the counters on site.

A survey about various aspects of the Cut was conducted by the CSI research team during summer 2022. Researchers set up a table along the Cut and visitors could respond voluntarily. 107 responses were received.

The survey question utilized for this benefit asked survey participants to rate this statement: "The Dequindre Cut provides access to diverse recreational activities". It will give a rough estimate of how many of the site users, by percentage, approve that the Cut has given better opportunities for recreational access in the area.

Calculations:

As seen in the graph below, daily values fluctuate frequently, with spikes on the weekends during the summer. The total signals for the Gratiot eco-counter in 2021 was 263,264 signals, roughly 720 signals daily.

Graph 1: Daily Signals at Gratiot Eco-Counter 2021



**Note: 2 outlying data points were removed from this graph due to counter malfunction.*

Survey Questions/Results:

- **Could you rate the following statements regarding your experience with the Dequindre Cut Greenway?** (Rating Scale: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)
 1. *Visiting the Dequindre Cut improves my quality of life and sense of well being*
 2. *Access to the Dequindre Cut is easy*
 3. **The Dequindre Cut provides access to diverse recreational activities**
 4. *I feel safe and secure when I am using the Cut*
 5. *The Dequindre Cut is a pleasant place to be overall*
 6. *The Dequindre Cut's art and atmosphere represents the cultural and historical context of Detroit.*
 7. *The art along the Dequindre Cut improves my perception of the greenway.*
 8. *The Dequindre Cut has improved my perception of the City of Detroit*

Statement 3: "Strongly Agree" (56 out of 101) 55%

"Agree" (37 out of 101) 37%

55 + 37 = 92% of users

Sources:

Eco Counter:

"Dequindre Cut - Eco Counters." Eco-Visio. Accessed June 25, 2022.

On-site Survey by CSI research team:

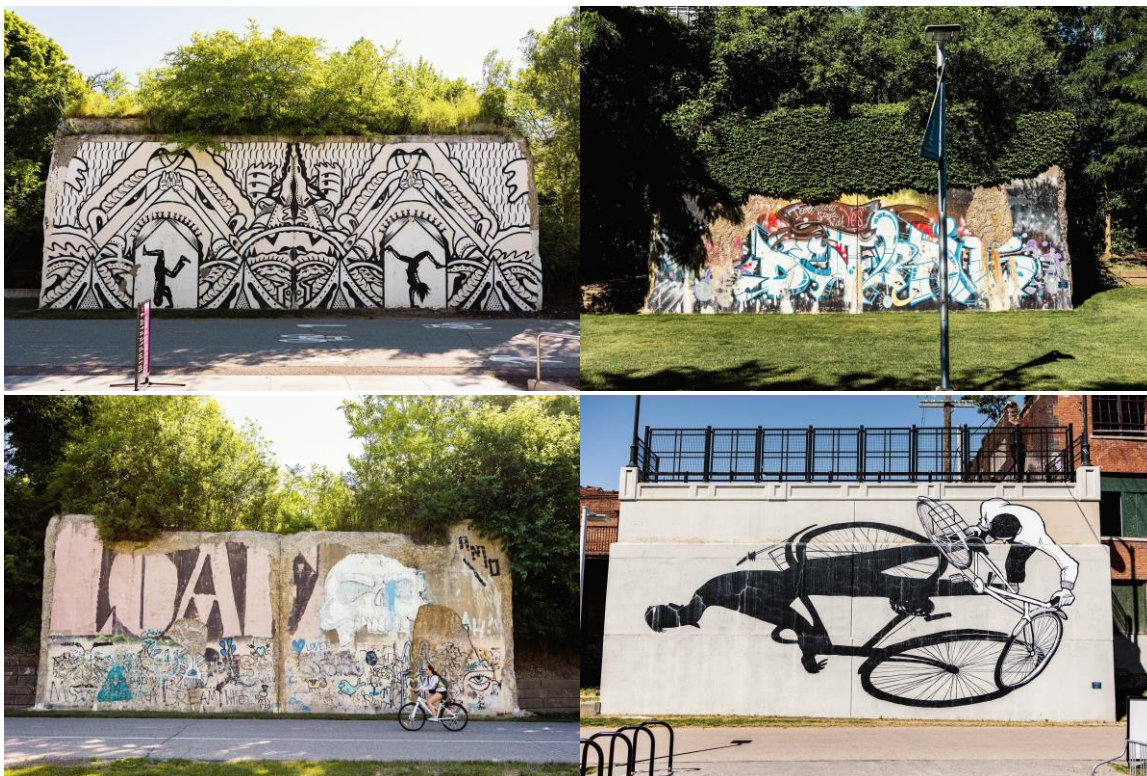
“LAF Case Study Investigation - Dequindre Cut.” Qualtrics, June 22, 2022.

Limitations:

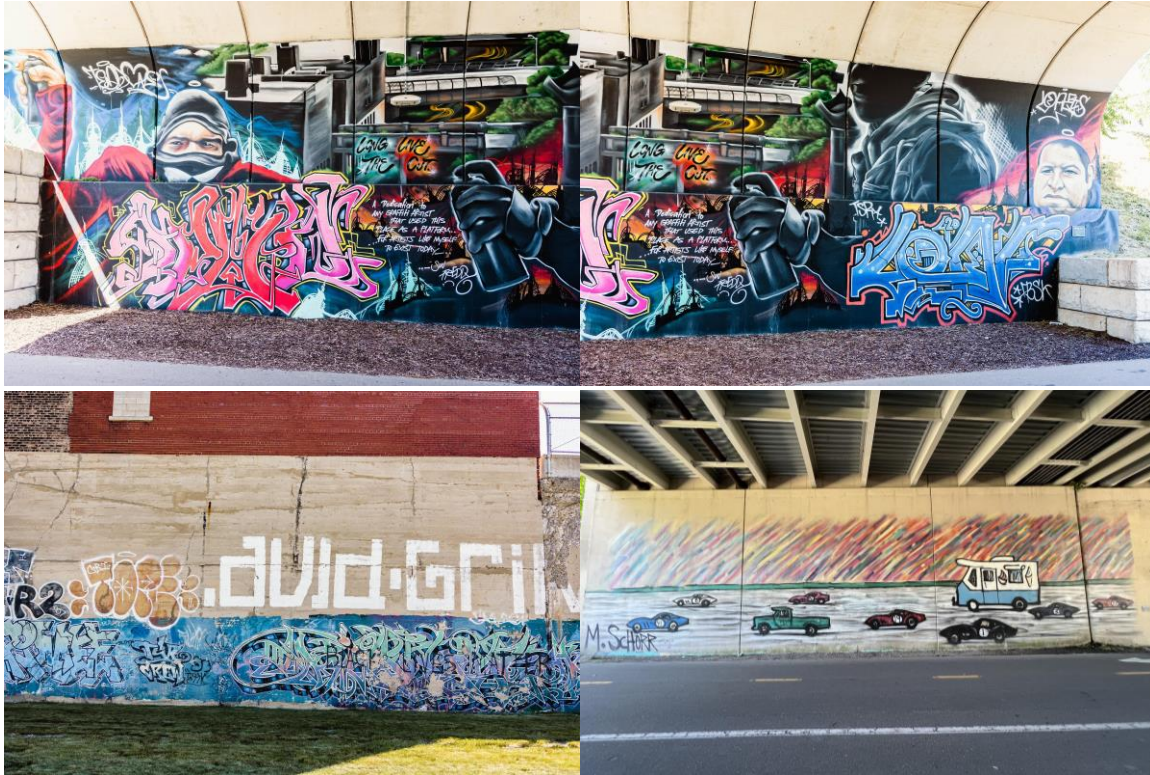
- Data for the number of annual visitors came from a single eco counter location.
- There are likely anomalies in data due to COVID-19-related spikes in use.
- ***Represents the cultural and historical context of Detroit according to 94% of 99 surveyed users. 99% of users agreed that the Cut improves their perception of the City of Detroit.***

Background:

One of the project goals was to embrace and preserve Detroit’s culture and history through encouragement of graffiti expression and art. 94% of site users also said that the Cut has improved their perception of the city of Detroit. Of these surveyed users, 53% were familiar with the rail corridor prior to the Cut’s introduction.







Images by CSI research team depicting graffiti at the Dequindre Cut.

Method:

A survey about various aspects of the Cut was conducted by the CSI research team during summer 2022. Researchers set up a table along the Cut and visitors could respond voluntarily. 107 responses were received.

Surveyed Cut users were asked if they believed Detroit’s cultural and historical context were represented by the art, if this art improved their perception of the Cut, and if the Cut improved their perception of Detroit. Survey participants were able to select between degrees of improvement or digression in each of these categories respectively. The survey questions for this benefit are in the *Calculations* section below.

Calculations:

Survey Questions/Results:

- **Could you rate the following statements regarding your experience with the Dequindre Cut Greenway?** (Rating Scale: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)
 1. *Visiting the Dequindre Cut improves my quality of life and sense of well being*
 2. *Access to the Dequindre Cut is easy*

3. *The Dequindre Cut provides access to diverse recreational activities*
4. *I feel safe and secure when I am using the Cut*
5. *The Dequindre Cut is a pleasant place to be overall*
6. The Dequindre Cut's art and atmosphere represents the cultural and historical context of Detroit.
7. The art along the Dequindre Cut improves my perception of the greenway.
8. The Dequindre Cut has improved my perception of the City of Detroit

Statement 6: "Strongly Agree"(67 out of 99) 68%

"Agree" (26 out of 99) 26%

68% + 26% = 94%

Statement 7: "Strongly Agree"(82 out of 99) 83%

"Agree" (16 out of 99) 16%

83% + 16% = 99%

Statement 8: "Strongly Agree"(77 out of 99) 78%

"Agree" (16 out of 99) 16%

78% + 16% = 94%

Sources:

On-site Survey by CSI research team:

"LAF Case Study Investigation - Dequindre Cut." Qualtrics, June 22, 2022.

<https://ssp.ca1.qualtrics.com/>.

- ***Improves quality of life and sense of well-being according to 94% of 99 surveyed users. 53% of 109 surveyed users reported exercising more often after the Cut's opening.***

Background:

This social benefit addresses a primary project goal: Create a safe and inviting space within the previously unsafe abandoned rail corridor. The goal is somewhat based on initiative on behalf of the user to attend events and utilize the Cut for recreation and engagement events. However, safety initiatives along the Cut, such as the full view security cameras roughly every 400ft, allow for a sense of wellbeing and protection.

Method:

A survey about various aspects of the Cut was conducted by the CSI research team during summer 2022. Researchers set up a table along the Cut and visitors could respond voluntarily. 107 responses were received.

The user conducted survey included questions regarding quality of life and wellbeing in relation to physical activity and social activity. These survey questions are in the *Calculations* section below.

Calculations:

Survey Questions/Results:

- **Could you rate the following statements regarding your experience with the Dequindre Cut Greenway?** (Rating Scale: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)
 1. Visiting the Dequindre Cut improves my quality of life and sense of well being
 2. *Access to the Dequindre Cut is easy*
 3. *The Dequindre Cut provides access to diverse recreational activities*
 4. *I feel safe and secure when I am using the Cut*
 5. *The Dequindre Cut is a pleasant place to be overall*
 6. *The Dequindre Cut's art and atmosphere represents the cultural and historical context of Detroit.*
 7. *The art along the Dequindre Cut improves my perception of the greenway.*
 8. *The Dequindre Cut has improved my perception of the City of Detroit*

Statement 1: "Strongly Agree" (67 out of 99) 68%

"Agree" (26 out of 99) 26%

68% + 26% = 94%

- **Have you exercised more since the Dequindre Cut opened/ since you started using it?**
 - (Yes/No)
 - Yes: (58 out of 109) 53%

Sources:

On-site Survey by CSI research team:

“LAF Case Study Investigation – Dequindre Cut.” Qualtrics, June 22, 2022.

Limitations:

- Although crime rates would be the most effective way to evaluate the safety aspect of this project goal, a reduction in crime rates was not found based on initial analysis. This could be due to more visibility of crime due to security measures along the Cut.
- ***Provides an estimated \$106,430 in cost of illness savings annually based on increased physical activity for users. 35% of 104 surveyed users reported noticing a decrease in physical ailments such as stress, asthma, and/or general poor health since they started visiting the Cut.***

Background:

This method anticipates a decrease in health care cost associated with increased exercise.

Method:

To quantify health benefits for users of the Cut, cost of illness savings due to physical activity were used. The values for individual savings were gathered from an outdoor recreation study developed by Oregon State University. Annual COI (cost of illness) savings per participant were gathered from the OSU data and adjusted to fit with the Cut’s travel distance. These values were then compared with values from the Gratiot Eco-counter (same counter as from Social Benefit 1). The data gathered from the eco-counter is measured in signals received when an individual passes.

A survey about various aspects of the Cut was conducted by the CSI research team during summer 2022. Researchers set up a table along the Cut and visitors could respond voluntarily. 107 responses were received. Survey results helped supplement these estimations through asking users if they have personally noticed a decrease in physical ailments.

Calculations:

Daily signals at the Gratiot St eco-counter were divided by half to account for a round trip by an individual. The number of daily signals on average is 720, giving an estimation of 360 daily trips.

Using the values from Environmental Benefit 2, the distance of a round trip using the Cut is 3.8 miles. According to the *US Department of Health and Human Services*, it takes 15-22 minutes to walk a mile, which averages out to 18.5 minutes. This means each round trip (walking) is 70 minutes.

Values of COI savings from the Oregon State University recreation study are for 201 weekly minutes of local street/sidewalk use. According to their calculations, 201 minutes of street/sidewalk walking weekly equates to an average of \$185 in savings annually. This needs to be adjusted to fit the average use of the Dequindre Cut, for a more specific metric. If the COI

is scaled proportionally, then 70 minutes of use weekly would amount to \$64 of annual COI savings.

201 minutes / \$185 in savings (OSU study) = 70 minutes (time to complete a round-trip at Dequindre Cut) / \$x (annual COI savings)

x = \$64 of annual COI savings for weekly trail use of 70 minutes total

52 weeks in a year/\$64 = \$.81 COI savings per week (1 weekly trip of 70 minutes)

360 daily trips x 365 days = 131,400 annual trips

\$.81 (COI savings for one 70-minute trip) x 131,400 annual trips = \$106,454 estimated annual COI savings for Dequindre Cut users

Table 4: Non-motorized Trail Activity: Walking on local streets/sidewalks Health Benefits According to OSU Outdoor Recreation Study (2021 Dollars)

Variable Name	Units	Value	Source
Urban Weekly Walking Baseline	Minutes	201	2019-2023 Oregon Statewide Comprehensive Outdoor Recreation Plan
Annual COI Savings /Participant - High	Dollars	248.93	2019-2023 Oregon Statewide Comprehensive Outdoor Recreation Plan
Annual COI Savings /Participant - Low	Dollars	120.67	2019-2023 Oregon Statewide Comprehensive Outdoor Recreation Plan

Survey Question/Results:

- **Have you noticed a decrease in physical ailments such as stress, asthma, and/or general poor health since you started visiting the Cut?**

- (Yes/No)

Yes: (36 out of 104) 35%

Sources:

Eco Counter:

“Dequindre Cut - Eco Counters.” Eco-Visio. Accessed June 25, 2022.

OSU Recreation Metrics:

Oregon State University, College of Forestry. *Oregon Outdoor Recreation Metrics: Health, Physical Activity, and Value*. November 19, 2018.

On-site Survey by CSI research team:

“LAF Case Study Investigation - Dequindre Cut.” Qualtrics, June 22, 2022.

US Department of Health and Human Services:

U.S. Department of Health and Human Services. Physical Activity Guidelines for Americans, 2nd edition. Washington, DC: U.S. Department of Health and Human Services; 2018.

Limitations:

- Eco-counter values do not account for multiple trips by the same person.
- Estimates assume that weekly trips will equate to the “Urban Weekly Walking Baseline” from the Outdoor Recreation Plan Survey. This information is from a different state with different health care costs.
- This analysis does not consider illness or injuries that may arise from using the Cut.
- This analysis does not consider trips by bicycle or other non-motorized transportation.
- ***Supports positive perceptions of the appearance of the Cut, with 99% of 102 surveyed users rating the corridor’s appearance as “very good” or “good”.***

Background:

One of the project goals was to create an attractive and inviting pedestrian environment. This goal was achieved through plantings, art installations, and cleaning initiatives. Surveyed users were also asked about why they gave their rating on appearance of the Cut. Some common reasons include: clean and well-manicured; a needed greenspace; beautiful murals; and family-friendliness.





Photos by the CSI research team showing various scenes along the well-maintained Cut

Method:

A survey about various aspects of the Cut was conducted by the CSI research team during summer 2022. Researchers set up a table along the Cut and visitors could respond voluntarily. 107 responses were received.

The survey included questions regarding user perception of space and primary use of Cut. The survey questions for this benefit are in the *Calculations* section below.

Calculations:

Survey Questions/Results:

- **How would you rate the appearance of the Dequindre Cut today?**
 - Very good

Background:

A project goal was: “Improve the business climate and enliven adjacent streets and public spaces with a variety of uses that support the identity of Eastern Market, Midtown, and other districts located along the greenway connections.”

Method:

A survey about various aspects of the Cut was conducted by the CSI research team during summer 2022. Researchers set up a table along the Cut and visitors could respond voluntarily. 107 responses were received.

The survey question asked users if they have visited nearby businesses/restaurants while using the Cut, and how often. This gave an estimated percentage to use for this benefit.

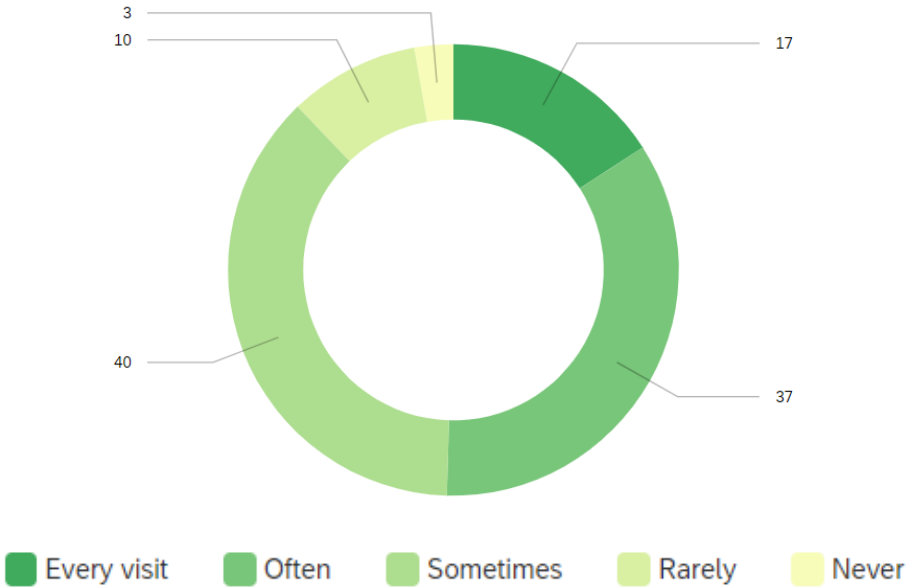
Calculations:

Survey Questions/Results:

- **Have you visited any nearby businesses/restaurants as part of your visit to the Dequindre Cut?**
 - (Yes/No)

Yes: (97 out of 107) 91%

- **How often do you visit nearby businesses/restaurants as part of your visit to the Dequindre Cut?**



Sources:

On-site Survey by CSI research team:

“LAF Case Study Investigation - Dequindre Cut.” Qualtrics, June 22, 2022.

Limitations:

- This is an estimation based on a survey of users.
-

Inconclusive

- ***Inconclusive Social Benefit: Supports improved recreational safety by reducing bicycle/vehicle collisions by 10% in the City of Detroit, and pedestrian/vehicle collisions by 14%. There were over 430 fewer crashes in 2020 than 2004.***

Background:

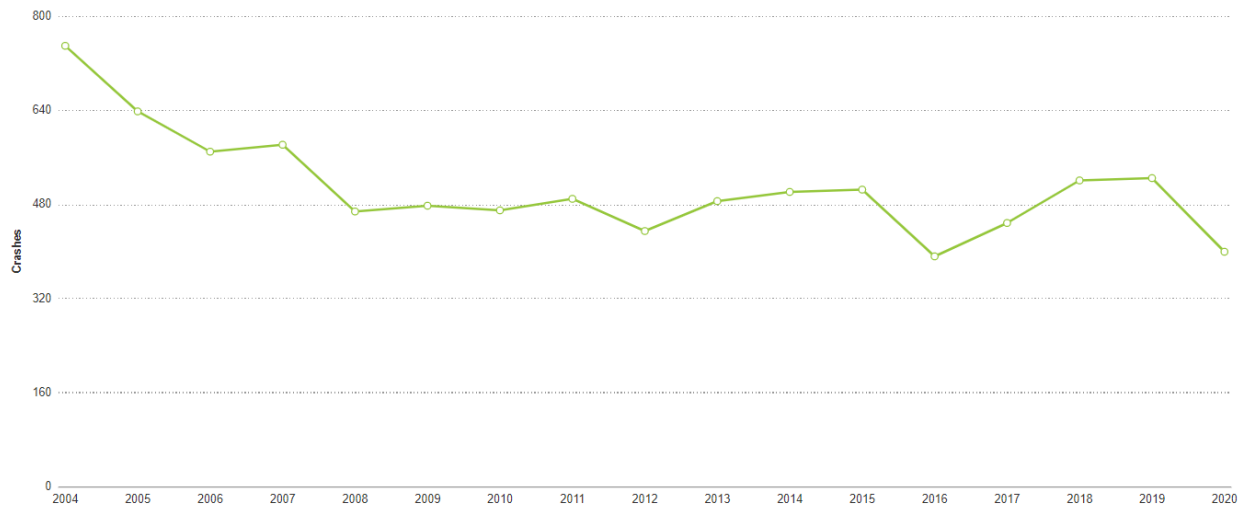
This social benefit was deemed inconclusive due to the wide scope of the analysis. The available data for this benefit was not robust enough when analyzed within a half-mile or mile of the site. The chances of the Cut having a sphere of influence for reducing crashes beyond this boundary is doubtful. However, seeing that the overall values are still high for both bicycle/vehicle and pedestrian/vehicle crashes, the continuation and connection of the Joe Louis Greenway initiative in Detroit could provide better results.

Method:

For scale as to the severity of the crash incidents and their financial impact, a “Cost of Injury” section was included below with values and percentages.

Calculations:

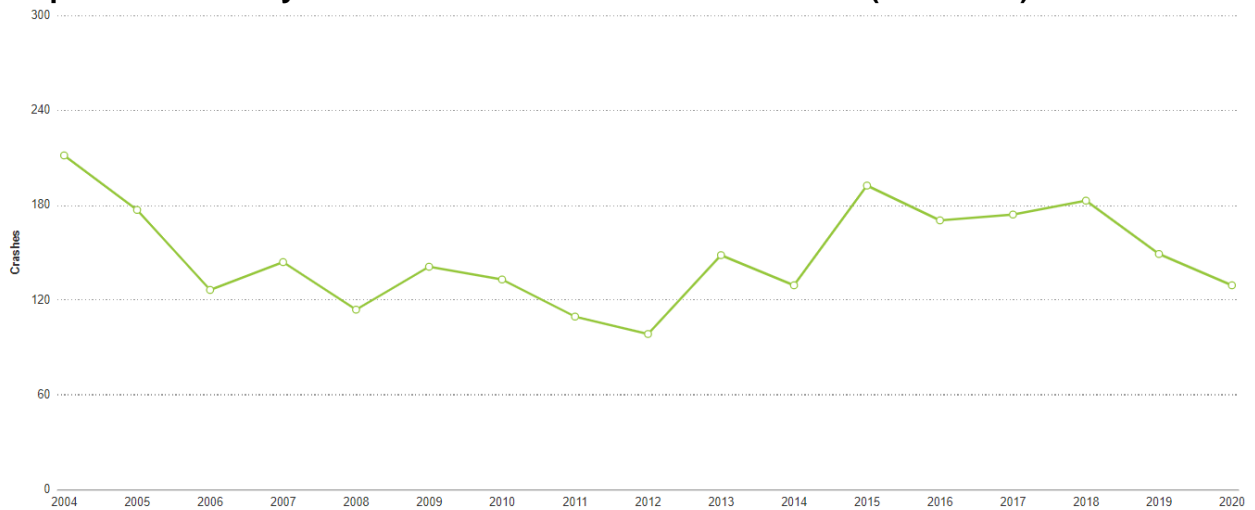
Graph 2: Annual Pedestrian/Vehicular Crash Incidents in Detroit (2004-2020)



Prior to Cut: 4,655 (548 annually)

Post Cut Completion: 3,997 (470 annually)

Graph 3: Annual Bicyclist/Vehicular Crash Incidents in Detroit (2004-2020)



Prior to Cut: 1,530 (170 annually)

Post Cut Completion: 1,372 (152 annually)

Table 5: Assumptions used in the Estimation of Safety Benefits

Crash Statistics before and after Dequindre Cut				
Variable Name	Units	Timeframe: 01/01/2004- 07/02/2012	Timeframe: 07/02/2012- 12/31/2020	Source
Population (average)	persons	688,701	689,032	Census.gov American Community Survey, Detroit
Total Bicycle/ Vehicle Collisions	#	1530	1372	Michigan Traffic Crash Facts
Bicycle/Vehicle Collision Rate	Accidents/Year	170	152	Michigan Traffic Crash Facts
Cost of Injury - 2022 dollars (annual growth of 1.18%)				
Injury Severity	Units	Timeframe: 2004-2012	Timeframe: 2012-2020	Source
Cost - No Injury	Dollars Per injury	3,219	6,802	USDOT TIGER Recommendation
Cost - Possible Injury	Dollars Per injury	63,538	134,260	USDOT TIGER Recommendation
Cost - Non Incapacitating	Dollars Per injury	124,431	262,922	USDOT TIGER Recommendation
Cost - Incapacitating	Dollars Per injury	456,848	963,949	USDOT TIGER Recommendation
Cost - Killed	Dollars Per injury	9,200,000	19,412,000	USDOT TIGER Recommendation

Share of - No Injury	Percent	26%	27%	Michigan Traffic Crash Facts
Share of - Possible Injury	Percent	41%	43%	Michigan Traffic Crash Facts
Share of - Non Incapacitating	Percent	22%	19%	Michigan Traffic Crash Facts
Share of - Incapacitating	Percent	10%	9%	Michigan Traffic Crash Facts
Share of - Killed	Percent	2%	2%	Michigan Traffic Crash Facts

Sources:

BCA Memo:

City of Detroit. *Inner Circle Greenway Benefit Cost Analysis*. June 5, 2015.

Michigan Traffic Crash Facts (MTCF):

University of Michigan. "Data Query Tool." Michigan Traffic Crash Facts. Accessed June 25, 2022. <https://www.michigantrafficcrashfacts.org/>.

Eco Counter:

"Dequindre Cut - Eco Counters." Eco-Visio. Accessed June 25, 2022. <https://www.eco-visio.net/v5/#dashboard-site>.

Limitations

- Data only includes reported incidents
- The MTCF tool did not allow for analysis within a buffer, making it difficult to narrow down results to an area affected by the Cut.
- ***Inconclusive Economic Benefit: Saves roughly \$3.2 million in out-of-pocket cost savings and \$2.7 million in mobility benefits over the project lifecycle due to users of the Cut not driving cars.***

Background:

This was deemed inconclusive it assumes all users would be using cars –the Cut is a highly recreational trail and not all users may have otherwise driven.

Out-of-pocket travel costs for cars include car oil, fuel, tires, and depreciation. Mobility benefits are quantified by the estimates on the willingness to spend time to reach the safer and more directly connected trail; and the traffic congestion relief associated with that.

Method:

The two parts of this benefit were gathered from two different sources. The congestion savings per mile, or mobility benefits, was from NCHRP Report 552. The out-of-pocket travel savings were estimated by the removal of charges for a vehicle such as oil, fuel, tires, and depreciation. These costs of owning a vehicle were calculated by AAA Composite Average Auto Fleet (most current model). These two values will be related with the average Cut trip distance of 3.8 miles (Environmental Benefit 2) and annual trips. The amount of annual trips was estimated using the same method as the auto reduction benefit above, but accounting for all trips instead of just weekdays. (See below in *Calculations*)

Calculations:

Trip distance: 3.8 miles

Annual trips: 131,632

Eco-counter: 263,264 signals annually. Value divided by two to account for round trip by the same person.

Mobility benefit: \$0.18 per mile

Out-of-pocket savings: \$0.21 per mile

Project Lifespan: 30 years

Table 6: Assumptions for the Estimation of Economic Competitiveness Benefits – Annual Congestion Reduction Benefits (2022 dollars)

Variable Name	Unit	Value	Source
Congestion savings per mile	\$/mile	0.18	NCHRP
Average round trip length (miles)	miles	3.8	Cut Length and Access
Annual trips	#	131,632	Eco-counter

Mobility benefits	dollars	90,036	<i>Calculation*</i>
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Table 7: Assumptions for the Estimation of Economic Competitiveness Benefits – Annual Out-of-Pocket Travel Cost Savings (2022 dollars)

Variable Name	Unit	Value	Source
Total driving costs	\$/mile	\$0.21	AAA Composite Average Auto Fleet (2022)
Average round trip length (miles)	miles	3.8	Cut Length and Access
Annual trips	#	131,632	Eco-counter
Out-of-pocket cost and congestion cost savings	dollars	105,042	<i>Calculation*</i>

Sources:

AAA Composite Average Auto Fleet:

“AAA Composite Average Auto Fleet - Detroit.” Automotive Fleet. Accessed June 25, 2022. <https://www.automotive-fleet.com/>.

City of Detroit:

“Detroit’s Open Data Portal.” City of Detroit. Accessed June 30, 2022. <https://detroitmi.gov/>.

NCHRP Report 552:

National Highway Cooperative Research Program. Rep. *Guidelines for Analysis of Investments in Bicycle Facilities*. Report 552.

BCA Memo:

City of Detroit. *Inner Circle Greenway Benefit Cost Analysis*. June 5, 2015.

Limitations:

- Calculations do not account for users of the site who are not residents of Detroit or are not in close proximity to the Cut.

- Assumed same amount of site trips over project lifespan.
- ***Inconclusive Economic Benefit: Avoids \$25,510 in vehicle-caused damages over the project's lifespan.***

Background:

This was deemed inconclusive it assumes all users would be using cars –the Cut is a highly recreational trail and not all users may have otherwise driven.

The trail improvement and extensions enhance the *State of Good Repair* by: (a) reducing overall pavement maintenance costs because of diverted road users; and (b) creating a long-term residual value for the real estate acquired for this project. That is:

- An improved bike system will encourage some residents to choose cycling over driving a vehicle. This means less wear and tear on existing roadways.

Methods:

For this benefit, the following variables must be acquired in order to estimate savings due to damage reduction.

- Average Cost per mile in pavement maintenance
- Average round-trip distance
- Annual trips

Calculations:

Table 8: Pavement Damage Avoidance due to Reduction of Vehicle use (2022 Dollars)

Variable Name	Unit	Value	Source
Annual Trips:	#	131,632	Eco-counter
Average Trip	miles	3.8	Cut Length and Access
Cost in damages per mile	dollars	.0017	2006 NCHRP savings for urban areas
Project Lifespan	years	30	BCA memo

Total Damage Avoidance	dollars	25,510	<i>Calculation*</i>
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Sources:

Eco Counter:

“Dequindre Cut - Eco Counters.” Eco-Visio. Accessed June 25, 2022. <https://www.eco-visio.net/v5/#dashboard-site>.

NCHRP Report 552:

National Highway Cooperative Research Program. Rep. *Guidelines for Analysis of Investments in Bicycle Facilities*. Report 552.

BCA Memo:

City of Detroit. *Inner Circle Greenway Benefit Cost Analysis*. June 5, 2015.

On-site Survey by CSI research team:

“LAF Case Study Investigation - Dequindre Cut.” Qualtrics, June 22, 2022. <https://ssp.ca1.qualtrics.com/>.

Limitations:

Estimations may range high due to the assumption that users of the Cut would otherwise be driving to a destination.

Appendix

Websites:

AAA Composite Average Auto Fleet

“AAA Composite Average Auto Fleet - Detroit.” Automotive Fleet. Accessed June 25, 2022. <https://www.automotive-fleet.com/>.

Census Reporter:

“Census Profile: Detroit, MI.” Census Reporter, n.d. <https://censusreporter.org/profiles/16000US2622000-detroit-mi/>.

City of Detroit:

“Detroit’s Open Data Portal.” City of Detroit. Accessed June 30, 2022. <https://detroitmi.gov/>.

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Inflation Calculator:

“AIER Cost of Living Calculator.” American Institute of Economic Research, May 19, 2022. <https://www.aier.org/cost-of-living-calculator/>.

Michigan Traffic Crash Facts (MTCF)

University of Michigan. “Data Query Tool.” Michigan Traffic Crash Facts. Accessed June 25, 2022. <https://www.michigantrafficcrashfacts.org/>.

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OSU Recreation Metrics:

Oregon State University, College of Forestry. *Oregon Outdoor Recreation Metrics: Health, Physical Activity, and Value*. November 19, 2018.

Pre-cast concrete provisions:

City of Detroit. *Special Provision for _Retaining Wall, Pre-Cast Large Block*. January 25, 2021.

US Department of Health and Human Services:

U.S. Department of Health and Human Services. *Physical Activity Guidelines for Americans*, 2nd edition. Washington, DC: U.S. Department of Health and Human Services; 2018.