

Memo

To: Julia Moore, FHWA
From: Marwa Said, Senior Project Manager
Date: October 6, 2023
Re: MPMS 113754 | Dauphin County, SR 0083 – 094 | John Harris Memorial Bridge (I-83 South Bridge) – Technical Memo for the Dismissal of Pedestrian/Bike accommodations on the I-83 South Bridge

This memo is intended to provide the technical reasoning for dismissing pedestrian and bicycle accommodations on the proposed I-83 South Bridge replacement. PennDOT is seeking concurrence from FHWA for the reasoning and conclusions stated in this memo.

Background

The I-83 John Harris Memorial (South) Bridge was originally built in 1960 and carries more than 125,000 vehicles per day over the Susquehanna River. The bridge is on the National Highway Freight Network and is the major cross-river connection between downtown Harrisburg and West Shore communities, linking Pennsylvania’s capital region with Baltimore at the south terminus of the I-83 corridor. The I-83 South Bridge is functionally obsolete and was downgraded to a “Poor” condition rating in May 2023. The I-83 South Bridge Replacement Project will reconstruct and modernize the bridge, including the connecting viaduct and interchange infrastructure, to meet the safety and mobility needs of the growing region and restore this major Interstate crossing to a state of good repair.

The following are the five approved project needs.

Project Need 1: The existing John Harris Memorial Bridge (I-83 South Bridge) consists of a fracture critical two-girder superstructure that is approaching the end of its fatigue life. Inspections and maintenance of the bridge will continue to increase in frequency and magnitude creating substantial and unpredictable impacts to traffic movement in the Harrisburg area with more frequent lane closures and potentially a permanent closure of the bridge. The cost to continually inspect for and mitigate new fatigue cracks is substantial.

Project Need 2: The existing pavement for the majority of the project corridor is over 50 years old (specifically I-83) and has reached the end of its serviceable life span.

Project Need 3: The existing roadway configuration will not accommodate existing traffic volumes and will fail system-wide with future traffic volumes.

Project Need 4: The existing roadway system features design elements from 50 years ago which do not afford the safety characteristics of modern roadway design for high-speed, high-volume facilities. As a consequence, there are operational safety concerns with the existing mainline and interchange configurations.

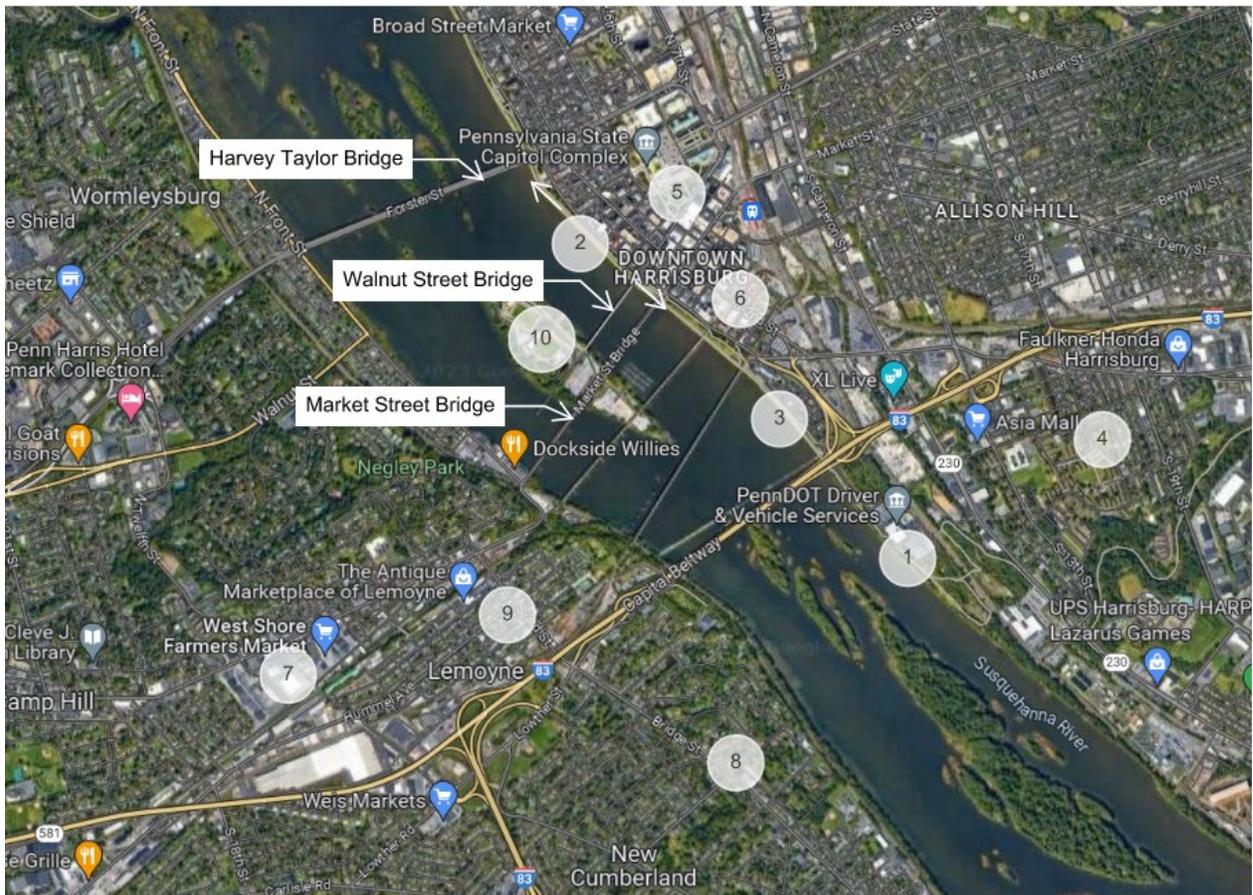
Project Need 5: The existing regional and local roadway network on the west shore impedes mobility for pedestrians and bicyclists to safely access adjacent communities, businesses, and places of employment within the project corridor severed by the railroad and I-83.

Existing Pedestrian/Bicycle Accommodations Crossing the Susquehanna River

The Susquehanna River separates Harrisburg from the west shore communities of Wormleysburg, Lemoyne, and New Cumberland as well as City Island. Of the bridges crossing the river in this area, three have sidewalks or multi-use trails. They are the full span Harvey Taylor and Market Street Bridges in addition to the Walnut Street Bridge crossing from Harrisburg to City Island.

Pennsylvania Bicycle Route J traverses through the project area. Route J uses the 3rd Street bridge to cross I-83, travels through Lemoyne, and crosses the river via the Market Street Bridge. It then turns south following the Capital Area Greenbelt. For more detail on Route J, see the following website - <https://www.penndot.pa.gov/TravelInPA/active-transportation/Pages/Pennsylvania-Bicycle-Routes.aspx>

Figure: Location Map



Reasons for Dismissing Pedestrian/Bicycle Accommodations on the I-83 South Bridge

As part of the I-83 South Bridge project, pedestrian/bicycle access was considered with the replacement structure. However, as described below, it was decided that these accommodations were not practical or reasonable for the new bridge.

Travel Distances and Location

According to Smartcitiesdive.com and its references, the average pedestrian will walk a maximum of about ¼ to ½ mile to a transit stop or for commuting. That distance increases to about 1.3 miles when personal errands, exercise and recreation is accounted for. Based on these distances, the Susquehanna River, nearly a mile wide, makes most non-exercise related pedestrian trips unreasonable due to trip length. Most existing pedestrian traffic in this area is observed on the Walnut and Market Street Bridges accessing City Island, a destination point for both recreation and commuter parking located in the middle of the river, which makes the trip length reasonable.

PennDOT's assumption is that 10 miles is a reasonable commute for bicyclists. Depending on experience and fitness level, 15 miles could be considered doable. Based on these distances, commuting or running errands over the Susquehanna River is potentially viable.

Some origin-destination locations in the area that non-motorized users could be interested in are as follows. Each is identified on the location map via reference number used below.

- 1) PennDOT Driver and Vehicle Services – This is not a large attraction for non-motorized users south of I-83.
- 2) Capital Area Greenbelt – This trail is a 20-mile loop that runs along the Susquehanna River from north of the Harvey Taylor Bridge and continues south of the I-83 bridge.
- 3) Shipoke – A neighborhood in Harrisburg, just north of I-83
- 4) Hall Manor – A neighborhood in Harrisburg, just south of I-83
- 5) Downtown Harrisburg – Commercial and residential hub on the east shore including the state capitol.
- 6) UPMC Harrisburg – A major medical facility in south Harrisburg.
- 7) Karns Food/West Shore Farmers Market in Lemoyne – closest major grocery/food area on the west shore.
- 8) New Cumberland – A neighborhood and employment center south of I-83 on the west shore.
- 9) Lemoyne – A neighborhood and employment center north of I-83 on the west shore.
- 10) City Island – A parking center for Harrisburg as well as a destination for recreation and entertainment.

The I-83 crossing is south of City Island and south of most pedestrian generators on the east shore. Also due to the skew of the bridges, a trip using Market Street rather than the I-83 bridge for south Harrisburg origins and destinations is not significantly longer. The table below depicts the travel distances between the various locations above. It is understood that there are a multitude of other origins and destinations in the area but that these selected sites represent a reasonable sample for this discussion. Since the Capital Area Greenbelt would be accessible via both Market Street and the potential I-83 crossing, it was not included in this table. Since Market Street crosses City Island, it also is not included in the table below as it is evident that any trip accessing City Island would not use a new I-83 crossing; however since City Island is a large pedestrian focal point and the new path on I-83 would not have a direct connection to it, this is one reason against constructing a multi-use path on I-83.

One-way Distance between O-D Pairs (in miles)*

Origin	Destination	Via Market Street	Via I-83	Difference
New Cumberland	PennDOT DMV	3.2	2.0	I-83 is shorter by 1.2
Lemoyne	PennDOT DMV	2.3	1.6	I-83 is shorter by 0.7
New Cumberland	UPMC	2.3	2.3	Same distance
Lemoyne	UPMC	1.5	1.9	Market Street shorter by 0.4
New Cumberland	Downtown HBG	2.5	2.7	Market Street shorter by 0.2
Lemoyne	Downtown HBG	1.6	2.4	Market Street shorter by 0.8
Shipoke	Karns	2.4	2.4	Same distance
Hall Manor	Karns	3.6	3.3	I-83 is shorter by 0.3
Shipoke	New Cumberland	2.7	1.9	I-83 is shorter by 1.2
Hall Manor	New Cumberland	3.9	2.7	I-83 is shorter by 1.2
Shipoke	Lemoyne	1.8	1.6	I-83 is shorter by 0.2
Hall Manor	Lemoyne	3.1	2.4	I-83 is shorter by 0.7

* Maps showing these distances are provided at the end of this memo

This table shows two main points. First, all these distances are well above what the average pedestrian would consider as a reasonable walk, particularly for non-recreational trips. Second is the difference in lengths are negligible in terms of biking. Commuter bicyclists typically average about 12 mph. The maximum difference distance of 1.2 miles equates to about 6 minutes with most differences equating to under 3.5 minutes.

Terminal Connections

Based on a conceptual design with a multiuse trail on the southbound structure, the connections to the existing sidewalk or trail networks are complex. On the west shore, the trail would diverge from the bridge, cross under both the proposed southbound off ramp and I-83 via new structures and terminate at the South 3rd St intersection as shown below. Under this configuration, the trail would pass through a new culvert under I-83 following the old ramp alignment. The tunnel would be approximately 500-ft long and would be a major safety issue for the local community. PennDOT would not handle law enforcement in this area, and discussions with the local communities indicated that they did not wish to assume the safety risks with this connection. There are substantial maintenance issues with the tunnel lighting, concerns with where users of the multiuse path would park, how they would turn around, and how it would complicate access to the Borough of Lemoyne’s water treatment facility. This second access point near the treatment facility would be needed to plow the sidewalk. Some of these issues would be resolved by putting the path on the south side of the I-83 South Bridge, but other issues such as encroachments into stormwater management facilities, the need to widen the sidewalk on Lowther Street, and having to design the trail around the proposed sound barrier, retaining walls and the “Internist” buildings thereby potentially increasing impacts while considering parking and snowplow access.

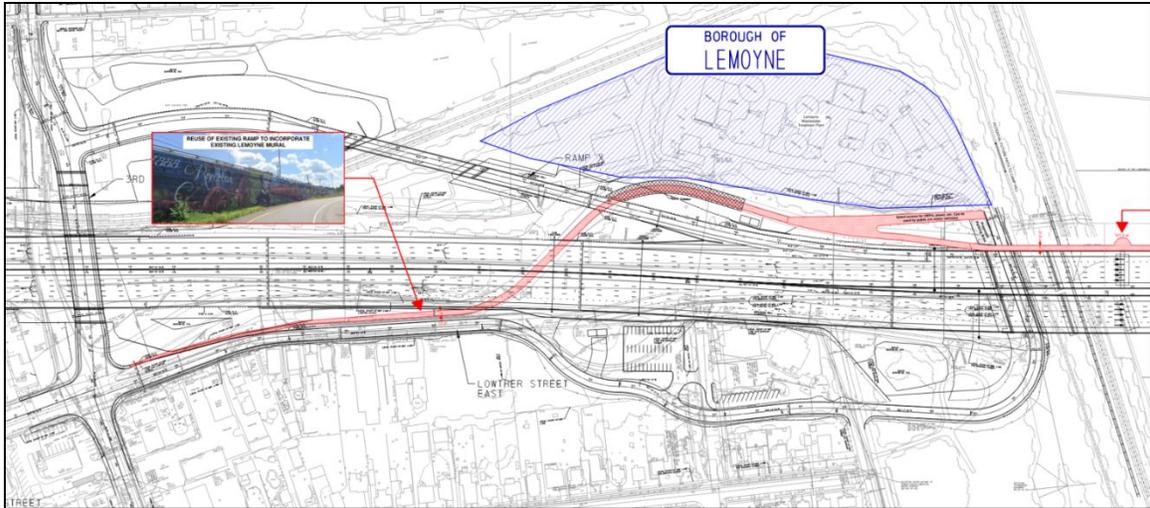


Figure: West shore trail connection, northside

The connection on the east shore is complicated by the directional Front Street/2nd Street interchange ramps and the location of the Capital Area Greenbelt trail system. As shown below, this connection on the northside of I-83 would require a spiral ramp system. The spiral ramp would complicate meeting ADA requirements and access for maintenance and emergency service providers. A connection for a ramp on the south side of I-83 would also require a spiral ramp or one with switchbacks to accomplish the large grade change within ADA requirements.

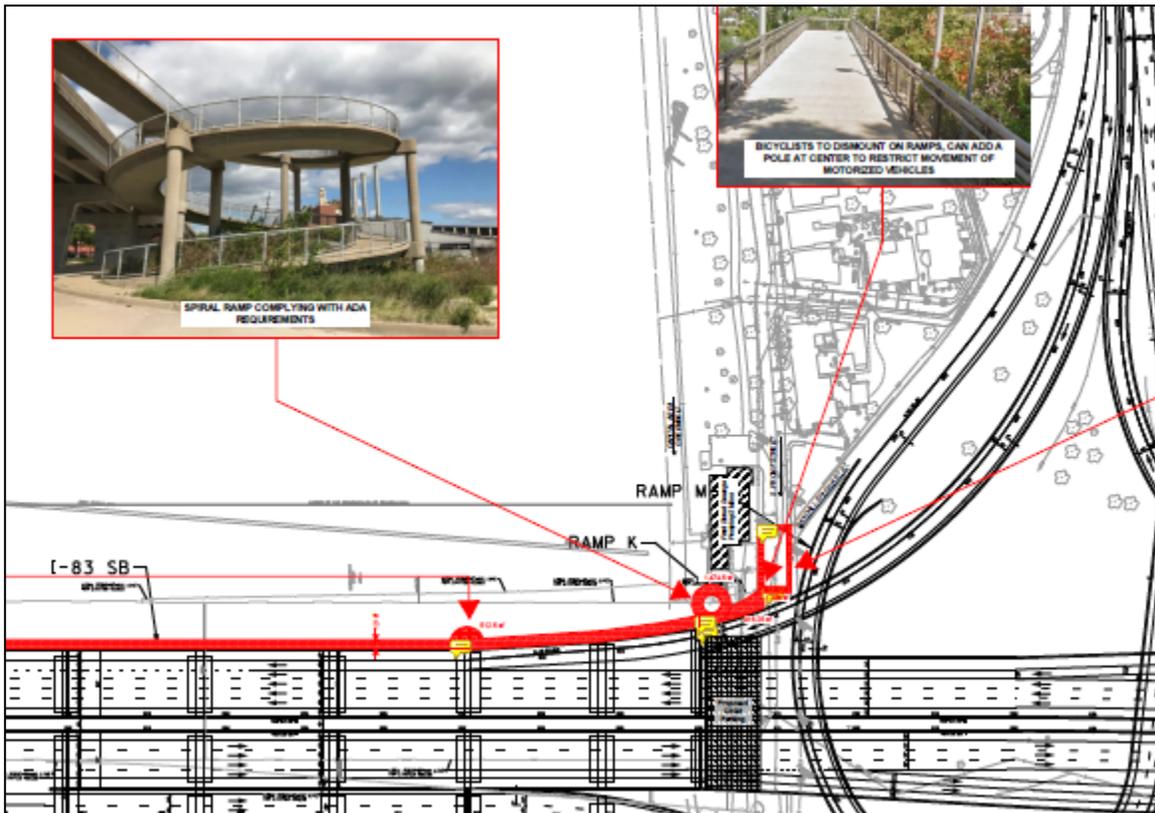


Figure: East shore trail connection, northside

Market Street corridor

As noted above, the Market Street corridor carries Bicycle Route J and is the only corridor with access to City Island. PennDOT currently has three active projects along Market Street. One is to improve pedestrian and bicycle connections from Lemoyne to the Market Street bridge. This section of roadway is locally known as the Lemoyne bottleneck. This involves roadway restriping and other bicycle accommodations on the surface street system through the Lemoyne bottleneck. The other two projects address the western and eastern spans on the Market Street bridge with the western spans having the superstructure replaced and the eastern spans being rehabilitated. Due to the numerous utility and constructability issues with the Market Street bridge projects, a separate structure adjacent to Market Street is proposed. This new bridge will be used to convey utilities and includes a dedicated pedestrian and bicycle multiuse trail across the Susquehanna River. This new bridge will be centrally located near existing pedestrian and bicycle attractions and will provide overall connectivity to adjacent trail networks. The figure below shows this new bridge. The following is an excerpt from the Market Street public meeting website.

“The downstream sidewalk on both bridges will be eliminated since the utility bridge will provide a 14-foot wide pathway for bicycle and pedestrian use in lieu of the downstream sidewalk. Additional bicycle signage (Share the Road and Bicycles May Use Full Lane), pavement markings, and shared lane use markings in the right lane in each direction will also be added from the west shore to the east shore. Pavement Markings and Signage will be included at both of the adjacent signalized intersections on the west shore and east shore.

The Lemoyne Bottleneck Project is ongoing to improve bicycle and pedestrian safety on Market Street on the western shore. Coordination will occur seamlessly.”

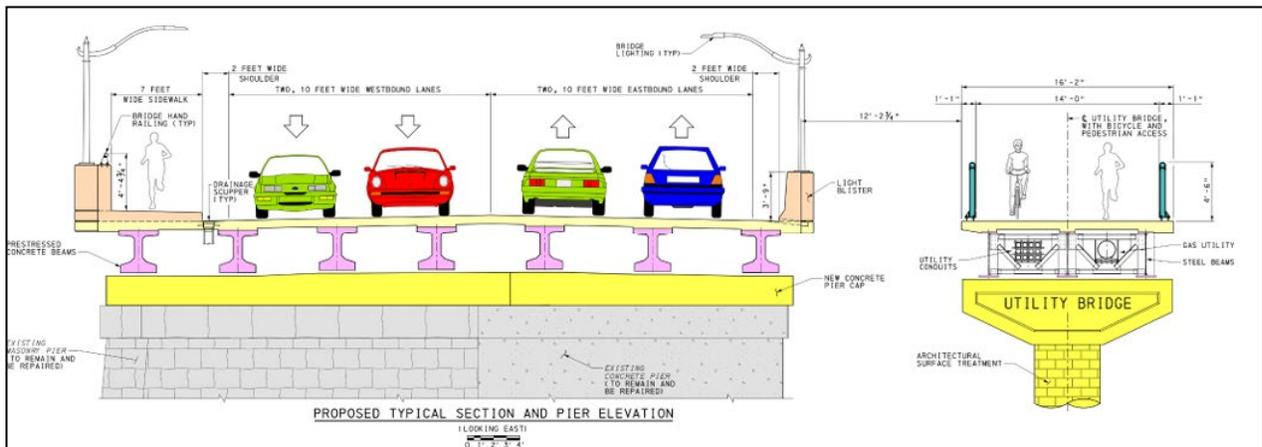


Figure: Proposed Market Street Corridor Typical Section

PennDOT is investing over \$128 million dollars in the Market Street corridor to serve all modes of transportation. By improving safety and providing additional capacity for bicycle and pedestrian traffic along a corridor that already serves all locations within the region, the need for additional active transportation user facilities is diminished.

Long-term inspection and maintenance:

The addition of a multiuse trail to the proposed I-83 South Bridge would complicate bridge inspections and increase long term maintenance needs. A potential typical section of the multiuse trail is shown below. Issues like snow removal and location/reach of inspection equipment are complicated by the trail and protective fence. Bridge inspections on this bridge are completed using a snoopers. A wider bridge would require a longer snoopers plus a protective fence would prohibit a snoopers from accessing the northern side. The reach of a snoopers tops out at about 60-ft as well which also means PennDOT would

have to develop an alternative, complex means to inspect the right side of this structure. Maintenance and emergency vehicle access to the trail proper is also difficult from either shore based on the terminal connections discussed above. By statute, PennDOT does not maintain sidewalks, these are the responsibility of the local municipalities. This further exacerbates the maintenance concerns as the local communities do not have the equipment nor the maintenance funds necessary to completely address these challenges. While these issues do not preclude the multi-use trail, they do make it more difficult to justify when redundant connections are provided elsewhere without these concerns.

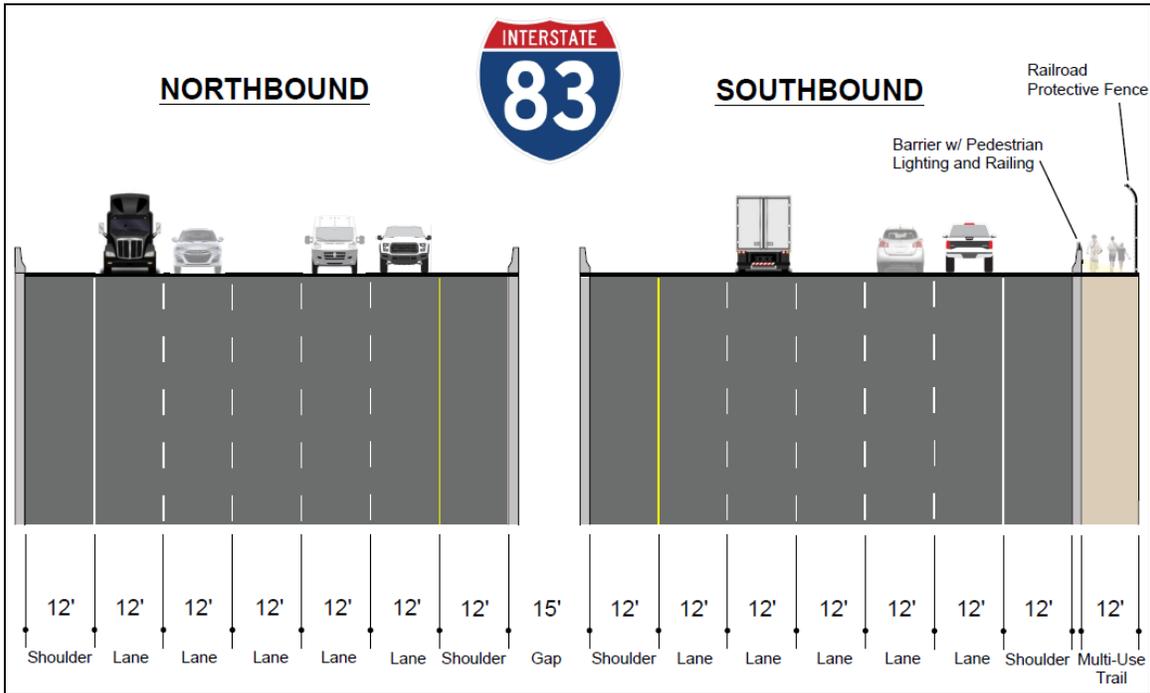


Figure: Possible Typical Section with Trail

User experience

When compared to the crossing proposed at Market Street, the multi-use trail users would experience more challenging and unfriendly conditions. The I-83 trail users would experience steep grades on either end of the new structure and would be traversing the bridge approximately 14-ft from live, high speed interstate traffic. The noise levels, high winds, potential debris from vehicles, and large percentage of trucks would all contribute to a degraded user experience when compared to the proposed structure on the Market Street corridor dedicated for non-motorized traffic.

Construction cost

Based on the conceptual trail layout on the southbound structure, the construction cost of the multiuse trail is approximately \$25 million in year 2022 dollars. With current inflation and the time until constructed, the initial cost would be well over \$30 million. While \$30 million is only 0.3% of the overall construction cost, it does represent a large investment on something that is not required to meet project needs. There are more needs on the interstate system, including pavement and bridge repairs, which are currently going unmet due to funding constraints, so these funds could be put to better, more reaching use elsewhere. With the multimodal investment PennDOT and the local community is making on the adjacent Market Street corridor, this additional expenditure for a multi-use trail does not appear prudent.

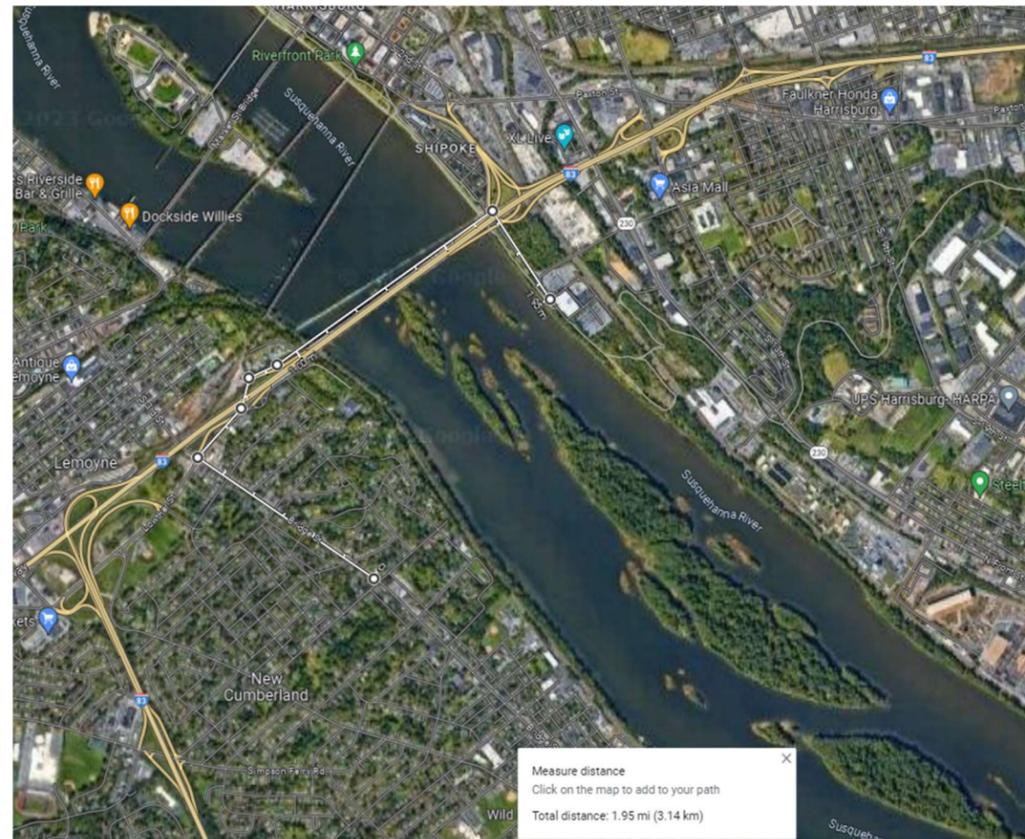
Project needs

Project need 5 deals with non-motorize transportation crossing I-83, not parallel to it. This is due to other parallel multiuse opportunities, namely the Market Street and Harvey Taylor bridges. The addition of a multiuse trail on the I-83 South Bridge does not help the project meet this need.

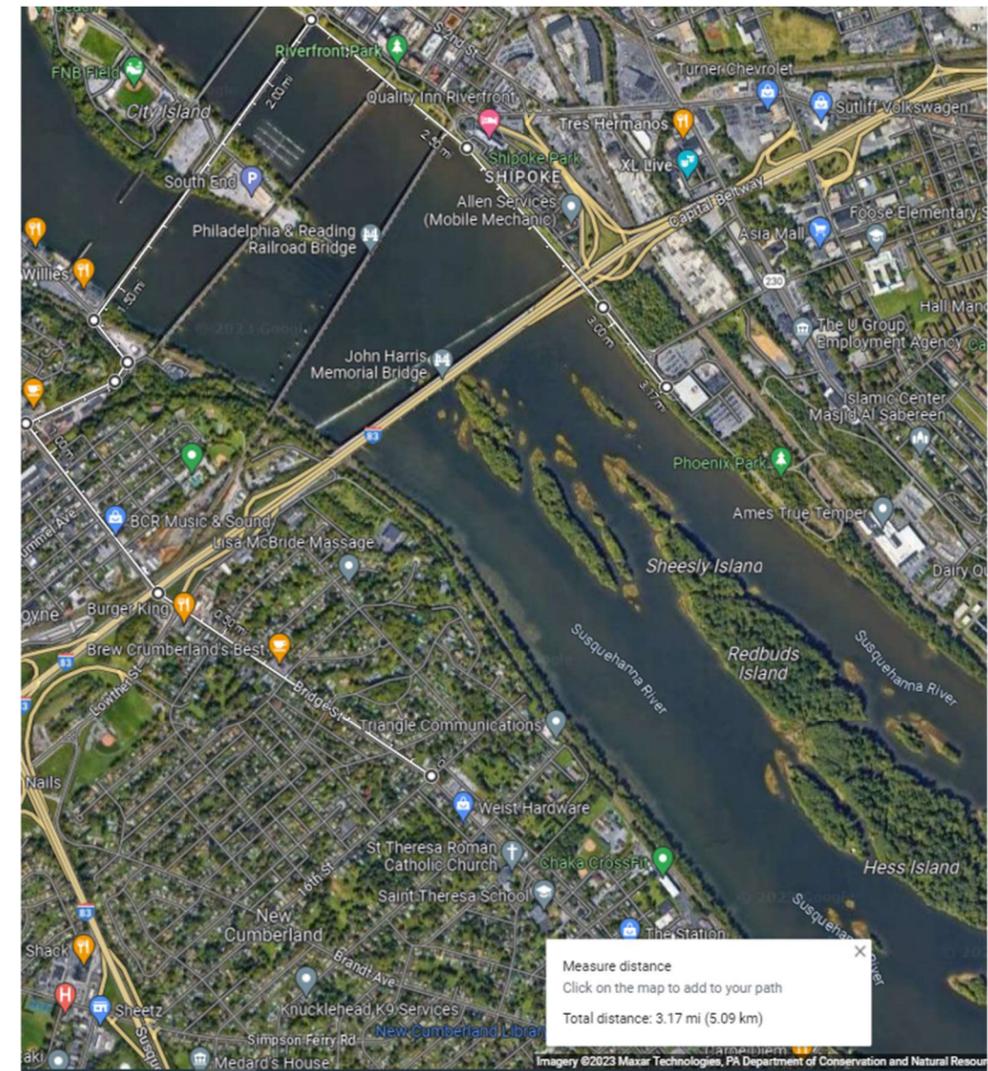
Summary

Based on several factors such as location and travel distances, construction and maintenance costs, long-term maintenance concerns, and other parallel route options for pedestrians and bicyclists, PennDOT is deciding to invest its limited resources on the Market Street corridor to promote a safe and desirable crossing of the Susquehanna River for non-motorized users. While it is possible to construct a multi-use trail on the proposed I-83 South Bridge, based on information in this memo it does not appear practical to do so, and therefore PennDOT is dismissing the alternative of pedestrian/bicycle accommodations on the proposed I-83 South Bridge.

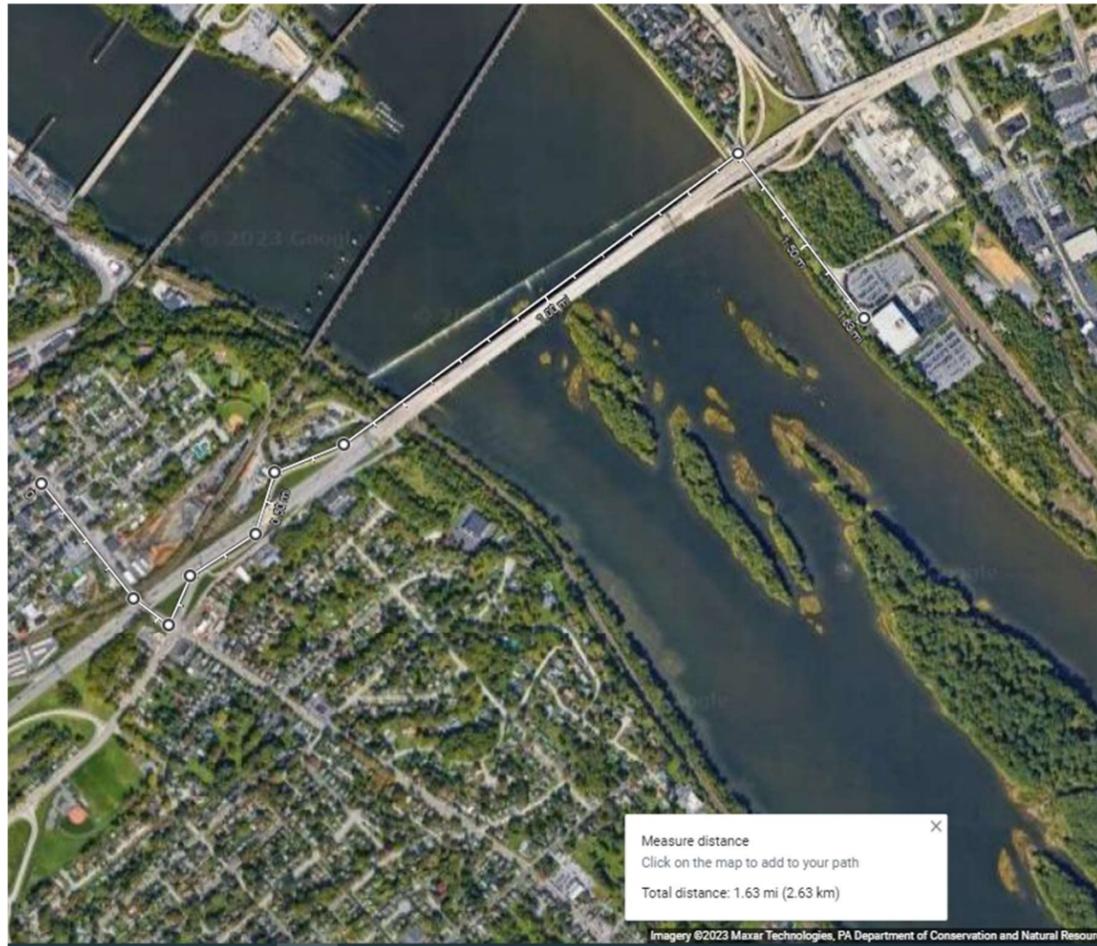
Length Derivation Exhibit



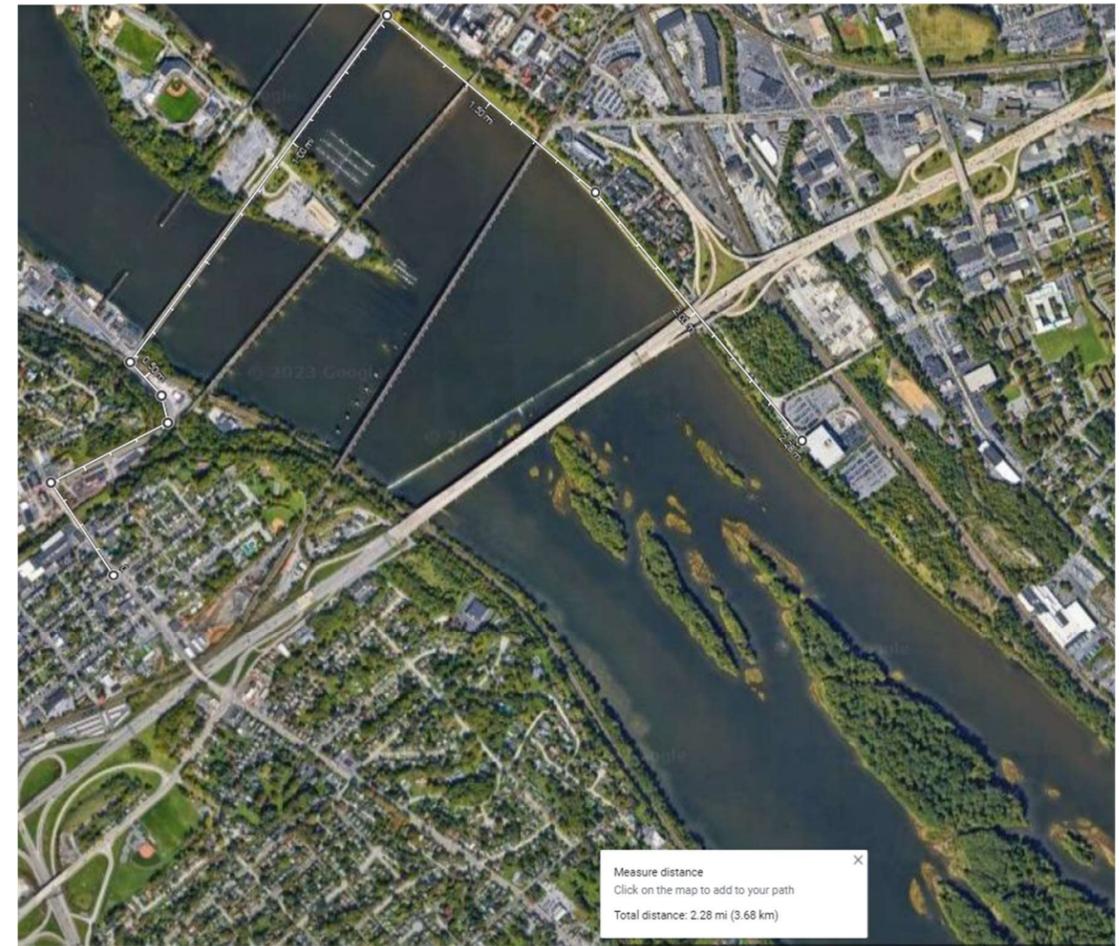
New Cumberland to PennDOT Driver and Vehicle Services via I-83



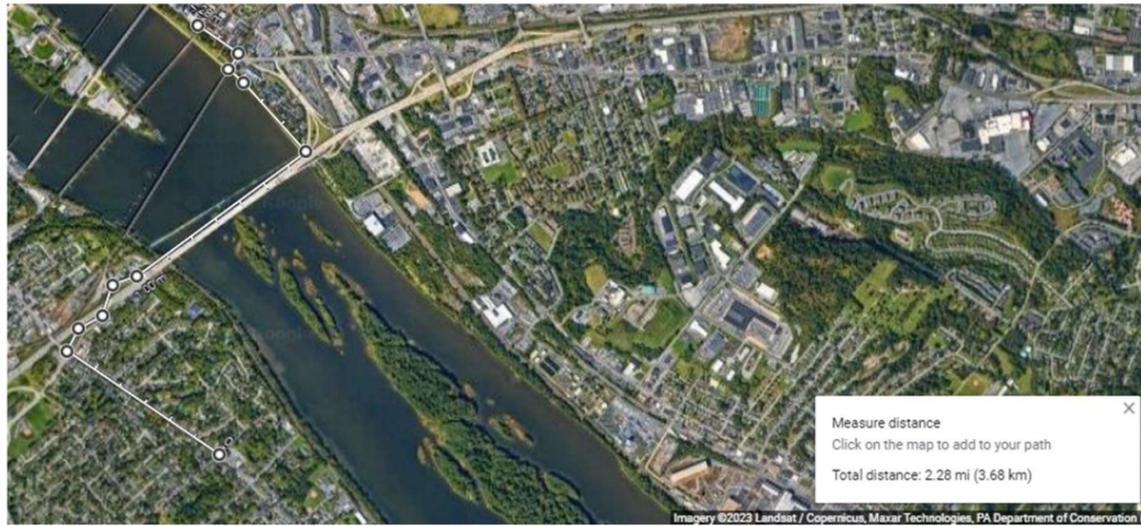
New Cumberland to PennDOT Driver and Vehicle Services via Market Street



Lemoyne to PennDOT Driver and Vehicle Services via I-83



Lemoyne to PennDOT Driver and Vehicle Services via Market Street



New Cumberland to UPMC via I-83



New Cumberland to UPMC via Market Street



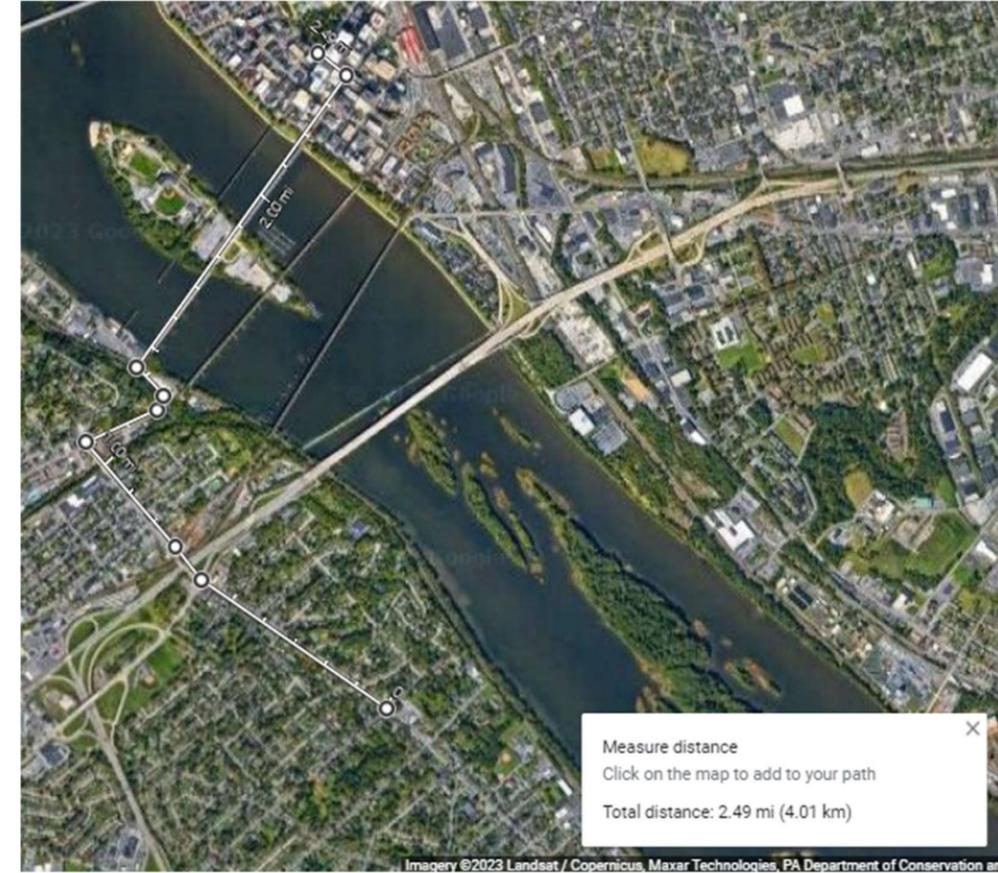
Lemoyne to UPMC via I-83



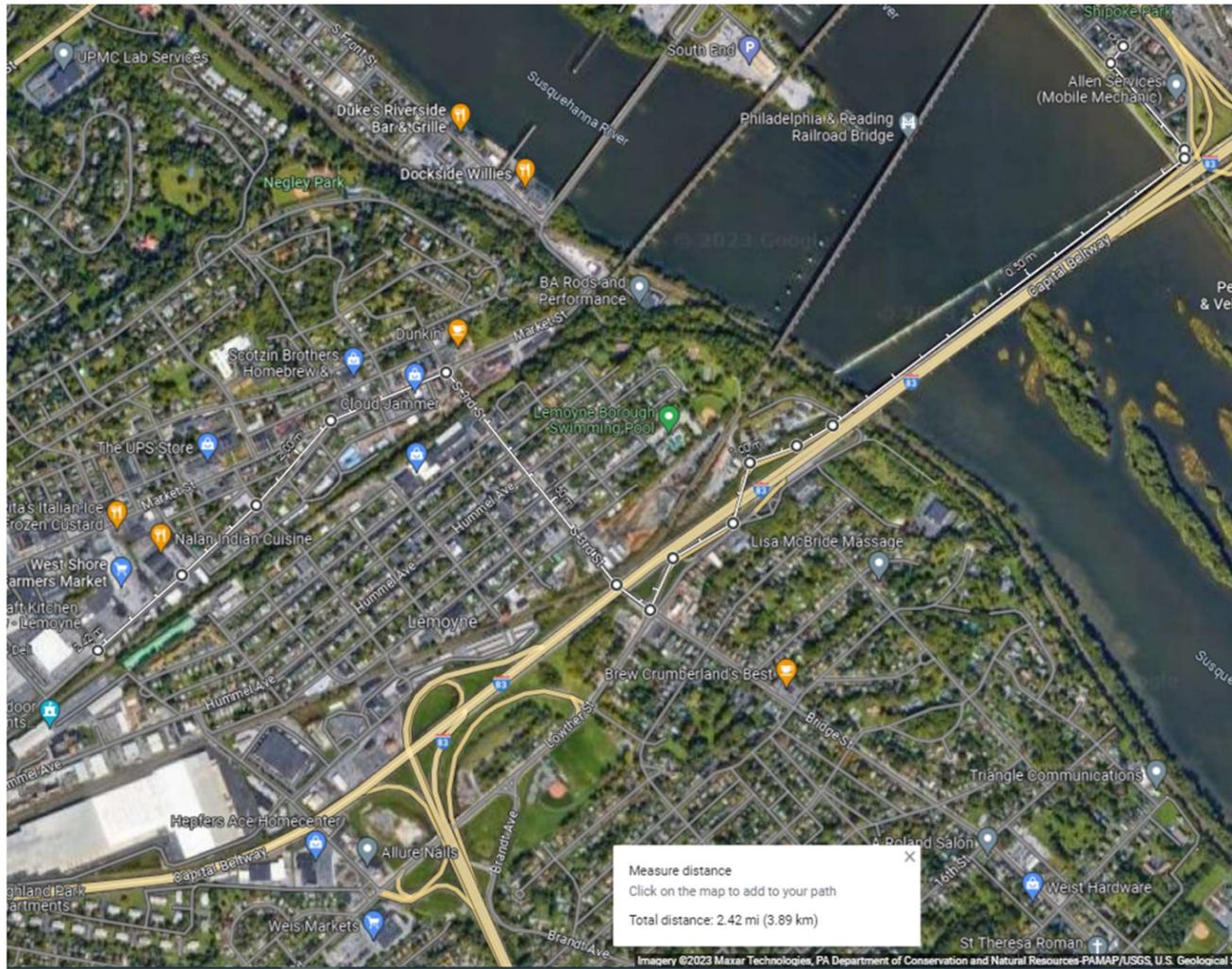
Lemoyne to UPMC via Market Street



New Cumberland to downtown Harrisburg via I-83



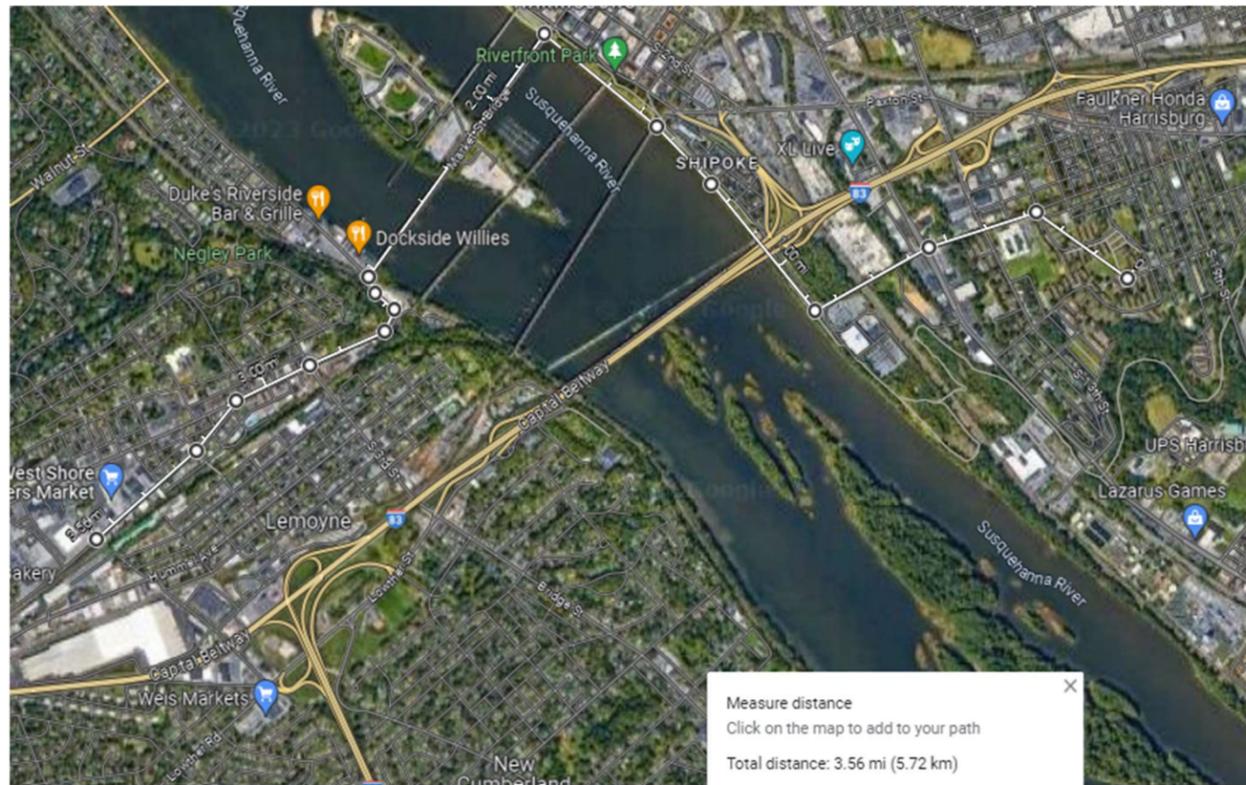
New Cumberland to downtown Harrisburg via Market Street



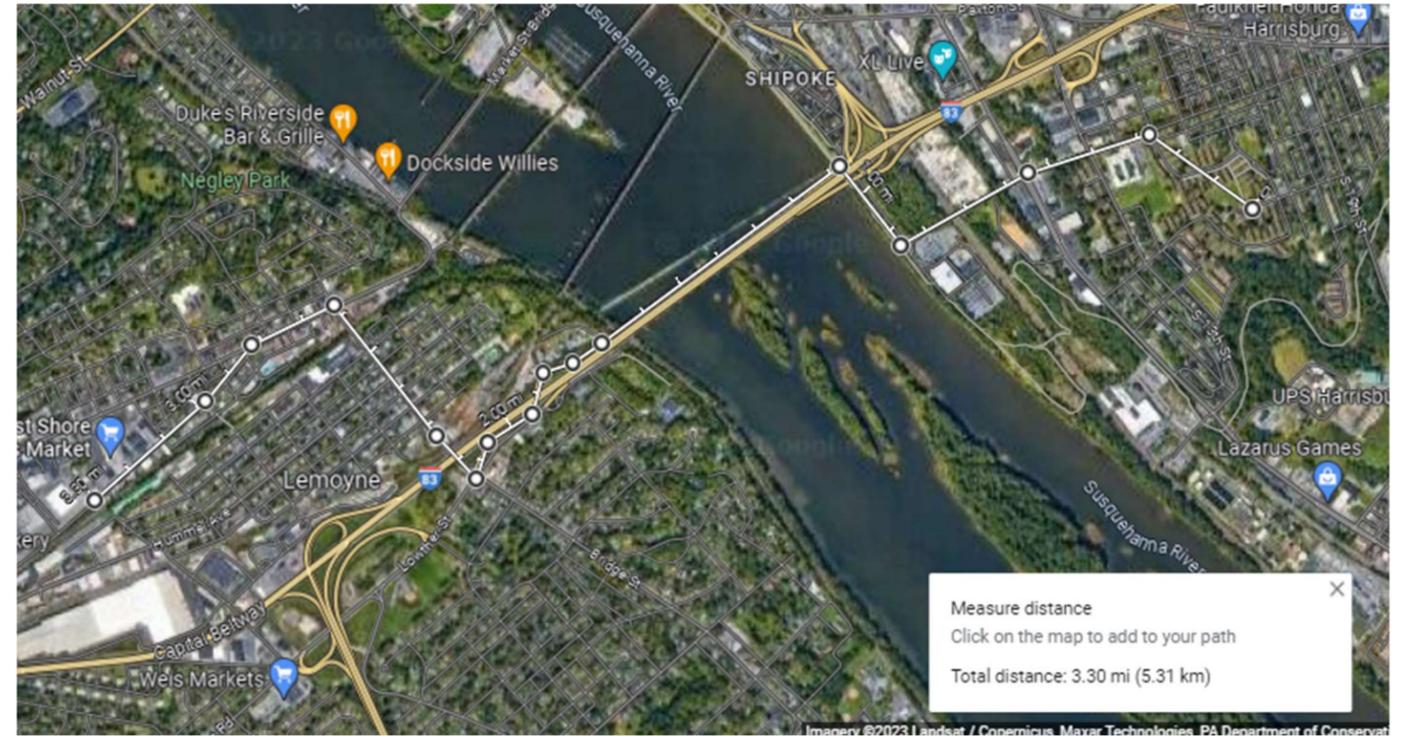
Shipoke to Kams/West Shore Farmers Market via I-83



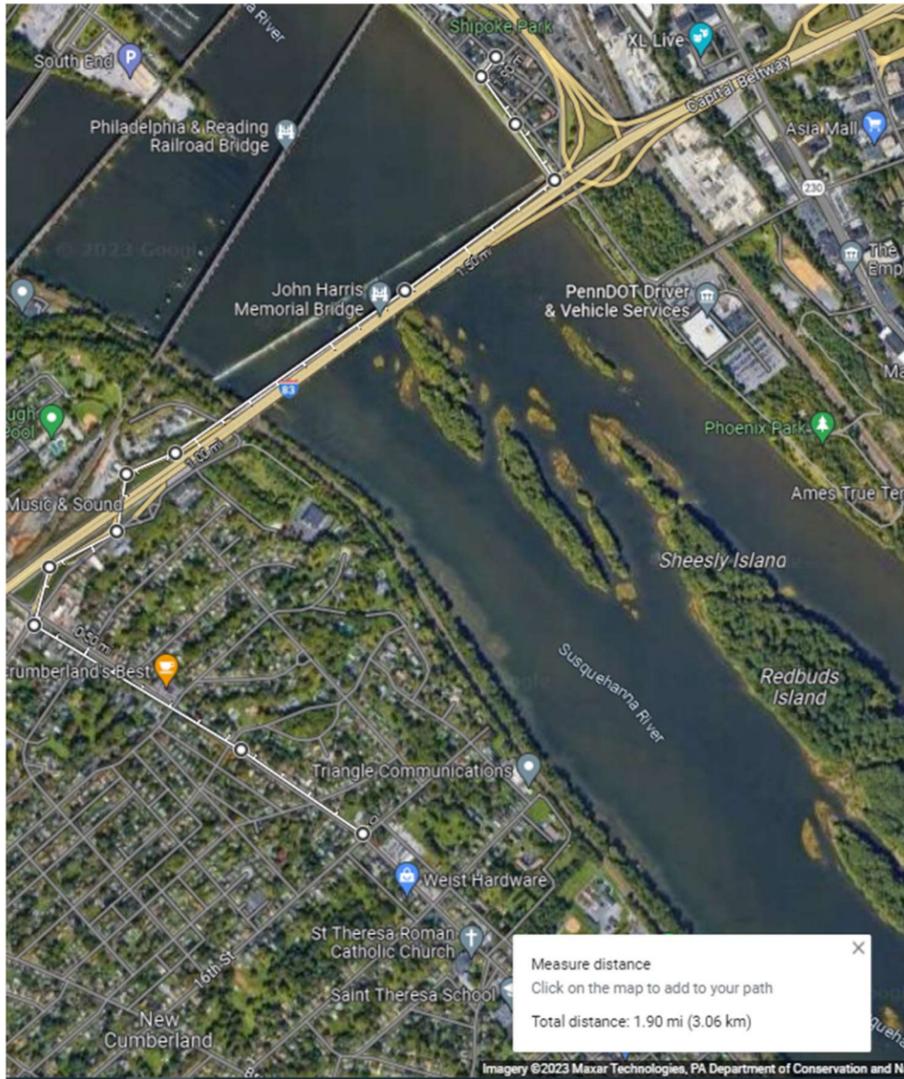
Shipoke to Kams/West Shore Farmers Market via Market Street



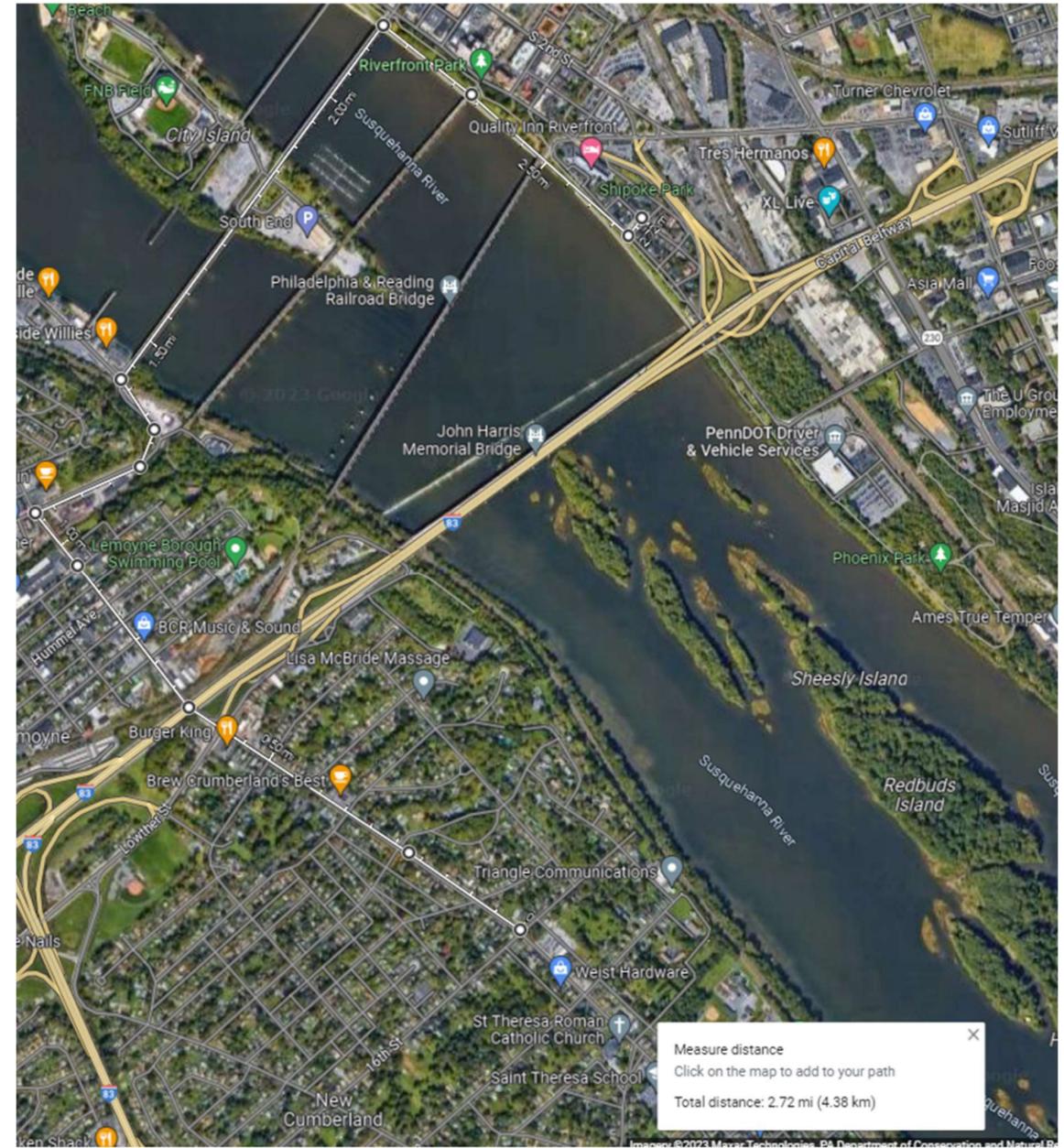
Hall Manor to Karns/West Shore Farmers Market via I-83



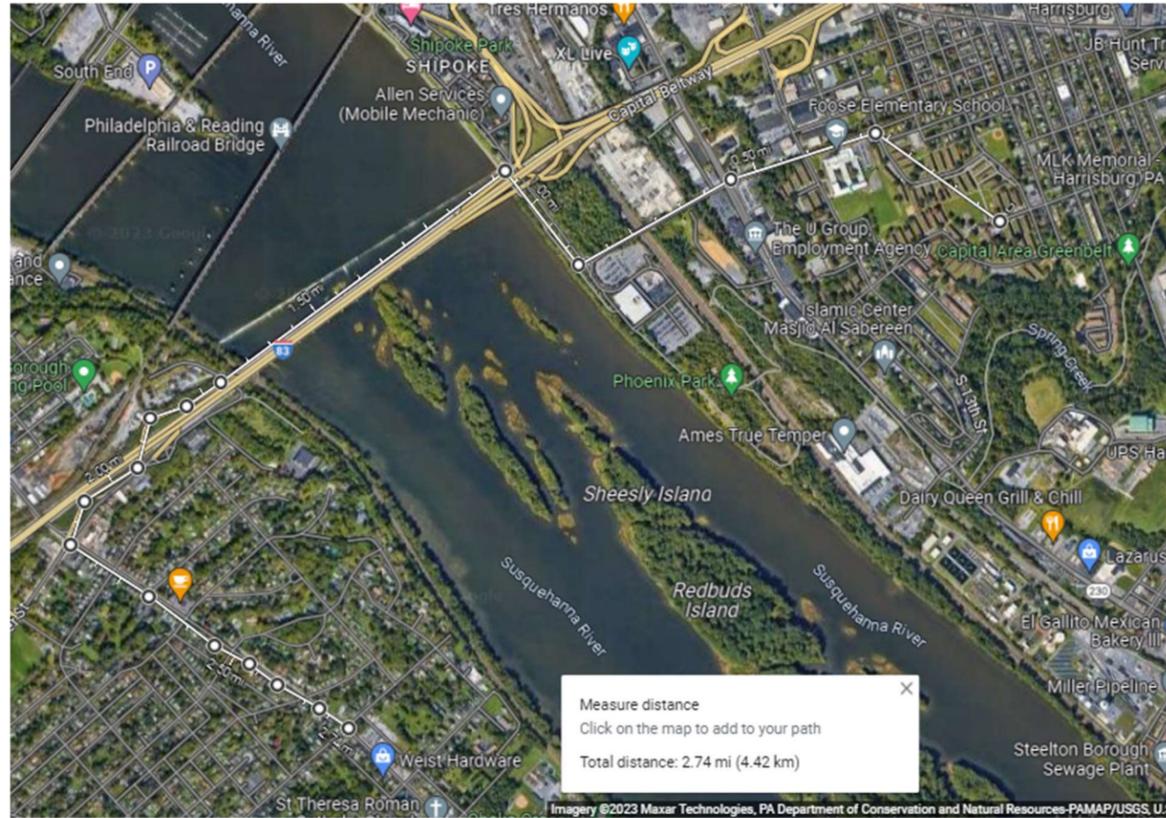
Hall Manor to Karns/West Shore Farmers Market via Market Street



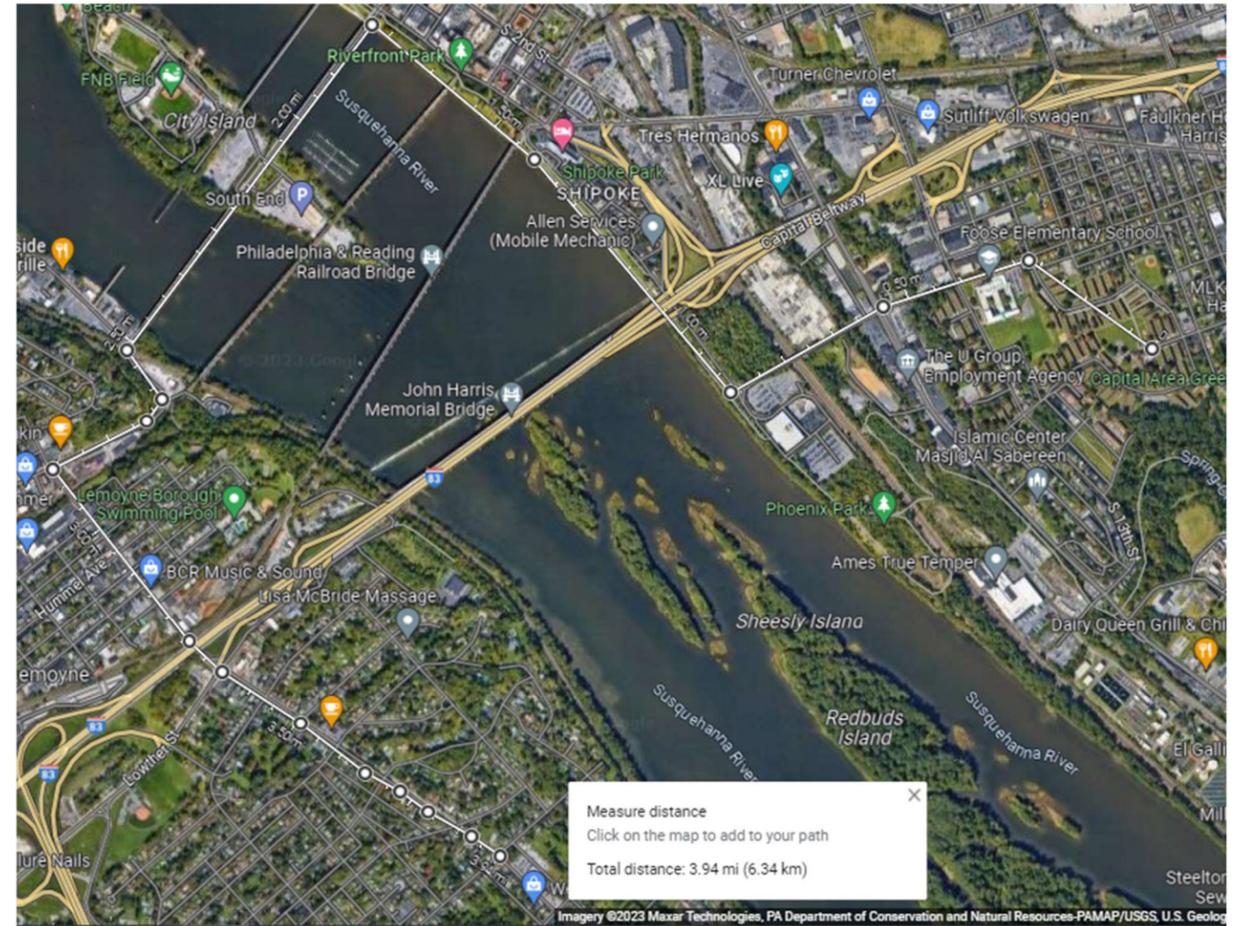
Shipoke to New Cumberland via I-83



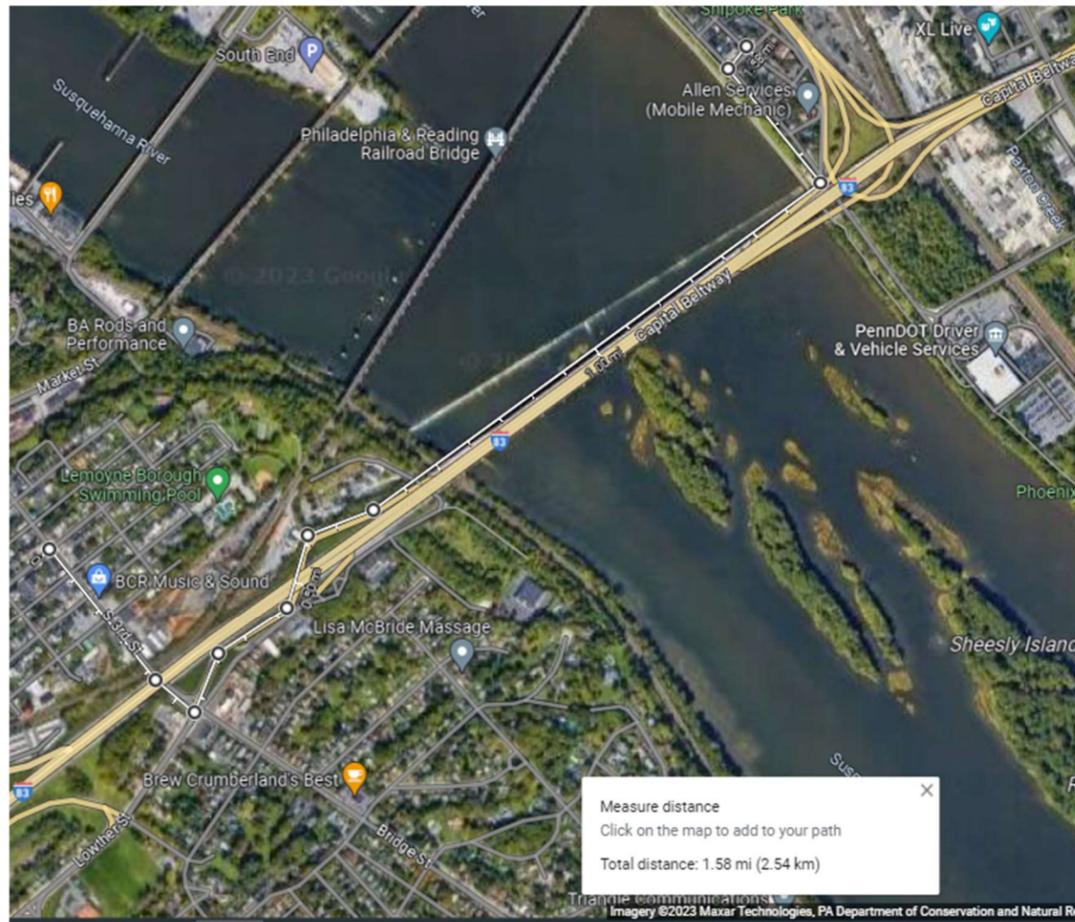
Shipoke to New Cumberland via Market Street



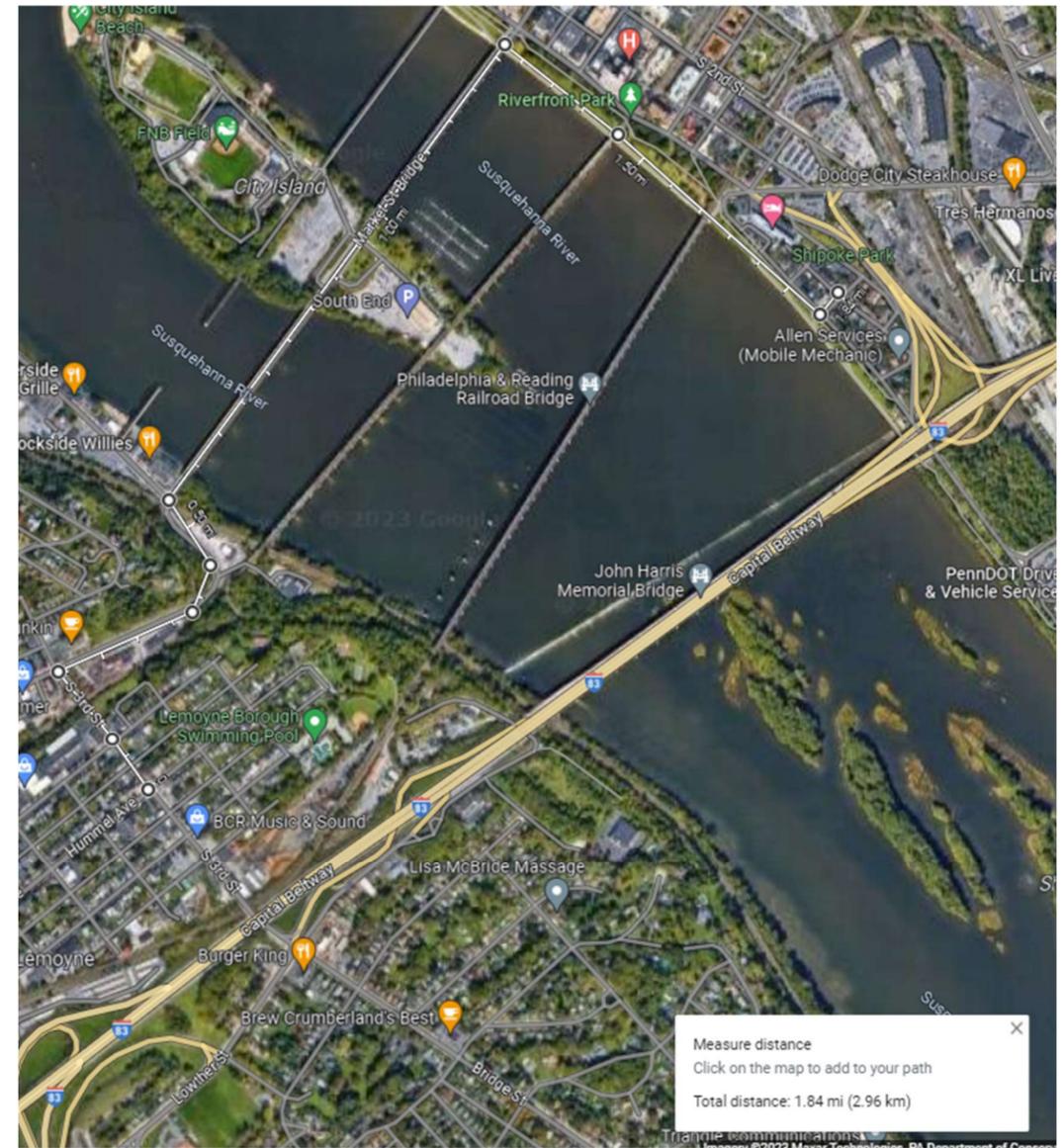
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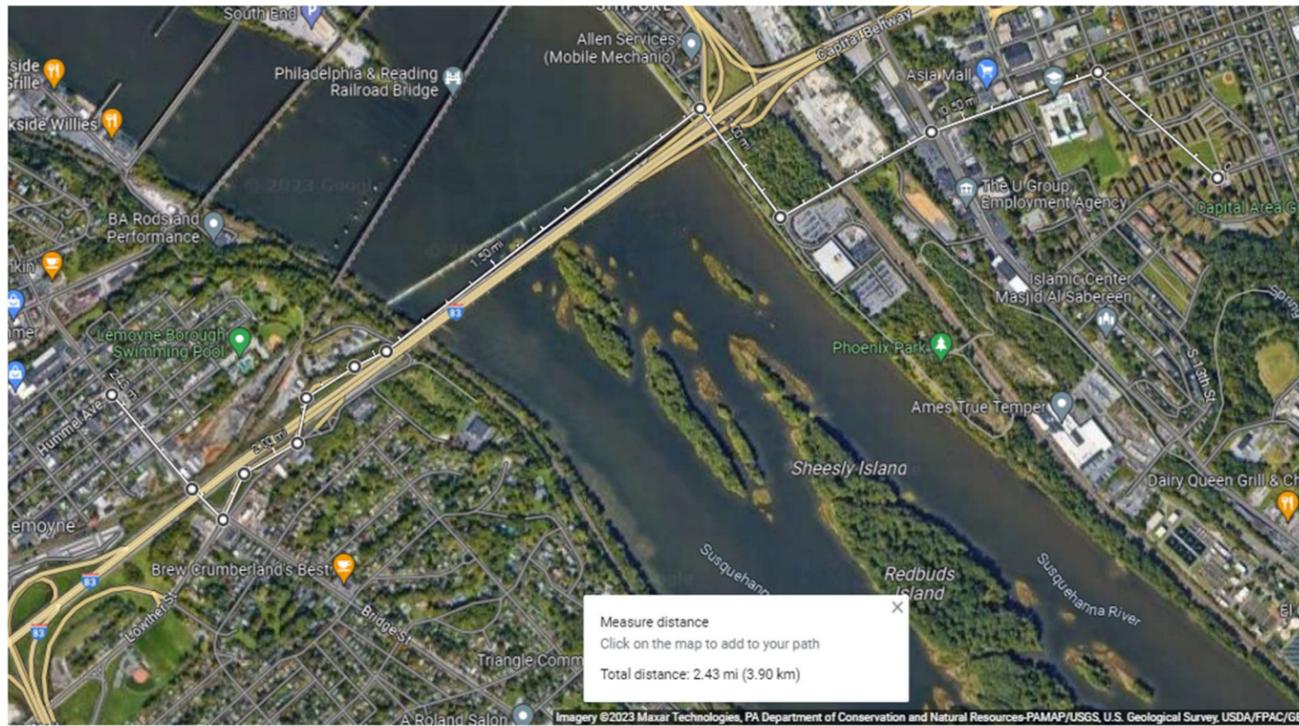
Hall Manor to New Cumberland via Market Street



Shipoke to Lemoyne via I-83



Shipoke to Lemoyne via Market Street



Hall Manor to Lemoyne via I-83



Hall Manor to Lemoyne via Market Street