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Iowa Data Bike 2.0 Project Proposal

Background – Iowa Data Bike

The original Iowa Data Bike launched in the spring of 2017, and by all accounts it has succeeded as a proof-of-concept initiative, having demonstrated the feasibility of originating a pavement-condition database for the region's paved trail network by using a unique combination of emerging technologies.

It achieved its core objectives by successfully collecting three datasets, including pavement ratings, close-up photos of every segment of pavement, and a large cache of 360-degree photos that were published on Google Street View and have been viewed more than 500,000 times. The data generated by this project are now used by local jurisdictions planning for the long-term maintenance of the 600-plus miles of paved trails in Central Iowa.

What's more, the Iowa Data Bike drew international interest from transportation professionals, the media, and even members of the Google Street View Team. It won multiple awards, including the Best Practice Award from the Iowa Chapter of the American Planning Association. Multiple jurisdictions around the state of Iowa subsequently rented the Iowa Data Bike to gather data on their own trails, and several other jurisdictions from around the country developed copy-cat versions of their own.

In short, the Des Moines Area MPO has set the national bar for data-gathering in support of long-term paved trail maintenance.

Technology Advances

The Iowa Data Bike succeeded at demonstrating the value of several emerging technologies. Since the project launched in 2017, however, those technologies have matured considerably, prompting the Des Moines Area MPO to reassess the tools and functionality Iowa Data Bike. In its research, the Des Moines Area MPO has identified three technology advances:

- **Better App.** The Iowa Data Bike collected pavement conditions using an iPhone mounted over the rear wheel of the bike, running an application called "rRuf" by Rival Solutions. The "rRuf" application now has additional capabilities. Specifically, it can collect the slopes of pavement, which has two useful applications for local jurisdictions and land-managers. One, it can help determine whether the trail complies with the Americans with Disability Act (ADA). Two, it can identify the direction of stormwater runoff. To collect this data, however, the app needs to be mounted over a full axle, which a two-wheel bicycle does not have.
- **Better Interface.** The two data sets most useful to managing pavement – the pavement condition index and the correlating photos of the pavement segments – currently require two separate interfaces to access. So, once a rough spot is identified, you would have to switch

programs and find the same spot in a separate program – until MPO staff merged the two sets in a third interface. Furthermore, these data sets are only accessible to MPO staff, which use the interfaces to create reports, which are then available to local jurisdictions. Now, however, there is the option to create an interface that includes both the pavement conditions and the correlating section photos, and which can be made available for local jurisdictions to access directly.

- **Better Cameras.** The Iowa Data Bike collected 360-degree images using an early generation Samsung 360 Camera, which was a Google-recommended camera for collecting Street View images. The camera performed as advertised, collecting a series of 360-degree images that were published as Street View "sites," which appear as dots on paved trails within Google Maps. While valuable, these images fell short of the full Street View experience, in which viewers click down the road, providing a 360-degree imagery at every point along the roadway. Until recently, that level of imagery could only be obtained with expensive camera equipment, often collected by Google itself. Today, however, camera technology has advanced far enough as to make this kind of high-resolution, continuous 360-imagery available at a more obtainable price.

Next Frontier – Iowa Data Bike 2.0

Given that the original Iowa Data Bike succeeded a as a proof-of-concept, and given that the technologies have matured considerably since its initial launch, the Des Moines Area MPO is proposing to develop the Iowa Data Bike 2.0. The objective of the Iowa Data Bike 2.0 is to continue, expand, and refine the data-collection that started with the first version.

The goals are as follows:

- Collected additional sets of the base data, to develop trends and identify improvements and/or deteriorations, including:
    - Pavement conditions (PCI index score)
    - Close-up, geo-coded images of every segment of pavement with a Go-Pro Camera
- Collect new data sets, including:
    - Slopes of pavement.
- Update the 360-degree imagery of the paved trail network on Google Street View, replacing period sites with high-resolution, continuous imagery of the entire trail network.
- Improve access to and usability of the datasets, including a better online interface for member governments' access.

Additional applications
While primary objectives are outlined above, we recognize the potential for additional applications of the Iowa Data Bike 2.0 or its components.

- **Sidewalk evaluation.** The Iowa Data Bike 2.0 could be loaned out to member jurisdictions to collect pavement-condition and slope data for their sidewalks. For example, this could help local jurisdiction determine areas that are or are not in compliance with the ADA.
- **Water Trails on Google Street View.** The 360-degree camera could also be used to capture high-resolution, continuous imagery of the water trails network in Central Iowa. This would require a separate vehicle, obviously. Please see the separate, add-on proposal included below.
- **360-degree video cache.** While the primary purpose of the 360-degree video would be for

publication on Google Street View, the underlying set of video would potentially have market value. It is possible that this video footage could be sold to other companies for video projects – or given to project sponsors as part of their sponsorship.

- **Second data bike.** By creating a second data bike, the original becomes available to loan out to other communities, which can help offset the program costs.