

EXHIBIT K

MANYLABS, INC.

FORM 1-SUPPLEMENTAL ENVIRONMENTAL PROJECT PROPOSAL FORM

SUPPLEMENTAL ENVIRONMENTAL PROJECT PROPOSAL FORM

Project Name: A High-Performance Next-Generation Hyperlocal Air Quality Network for San Francisco's Eastern Neighborhoods		
Organization Name: Manylabs, Inc.		
Contact Name: Rebecca E. Skinner for San Francisco AQ Peter Sand for Manylabs		
Mailing Address: San Francisco AQ: 1032 Irving Street #214 Text		
City: San Francisco	State: CA	Zip Code: 94122
Street Address (if different from above): Manylabs, Inc. PO Box 420012		
City: San Francisco	State: CA	Zip Code: 94142
Telephone Number: 415 990 2692 Rebecca E. Skinner, 415 484 5333 Peter Sand		
Fax Number:		
Company Email Address: info@sanfranciscoaq.org		

SIGNATURE

I declare that I have examined this statement, and to the best of my knowledge and belief, it is true, correct, and complete.

SEP Submitter Name: Peter Sand	Title: Executive Director, Manylabs, Inc.
Signature of Submitter: by Peter Sand	Date of Signature: September 13, 2019

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ORGANIZATION DESCRIPTION

<input checked="" type="checkbox"/> nonprofit 501(C)(3)
<input type="checkbox"/> government
<input type="checkbox"/> local agency
<input type="checkbox"/> tribal government
<input type="checkbox"/> business
<input type="checkbox"/> other (if other, please explain):

Provide a brief history of the organization (mission, vision, and goals):

Manylabs is a nonprofit focused on sensors for science and science education. Our goal is to make it easier for students, scientists, and everyone else to collect and analyze data about the world around them. These sensors can measure many aspects of our physical world. We build systems for environmental monitoring, including measuring air quality (both outdoor and indoor), water quality, and soil health. We also work on systems for monitoring and controlling experiments involving plant biology, food production, and carbon sequestration.

ORGANIZATION EXPERIENCE

Provide information on the organization's ability and capacity to complete the proposed project. Describe previous project management experience, including a list of completed projects/dates and who funded the project:

Manylabs has designed, built, and deployed numerous air quality sensor systems over the last several years. These include monitors onsite at its San Francisco premises (2014 through 2018, funded by the Moore Foundation); a network of air quality stations measuring CO and particulates in Louisville, Kentucky, as part of a Creative Commons project funded by the Robert Wood Johnson Foundation; and sensor-based science education funded by the National Science Foundation and carried out with the Concord Consortium. The San Francisco Air Quality project (SFAQ), led by longtime Manylabs residents Ken McGary and Rebecca Skinner, is nearing completion of its original CalARB Supplemental Environmental Project for a local AQ sensor network.

We are requesting additional funding for continued and enhanced activities.

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PROJECT INFORMATION

Project Name:

A low-cost particulate matter sensor network for San Francisco's Eastern Neighborhoods

Organization Name:

Manylabs, Inc. 501(c)(3), our fiscal sponsor

Project Location(s): Provide the address or GPS coordinates of where the proposed project will take place:

As this is a network within a geographic region, there are many addresses, most of them not yet selected. All will be within the boundaries of the Eastern Neighborhoods, which overlap with the AB 617 region and the CARE region (defined by BAAQMD).

ENVIRONMENTAL ISSUE TO BE ADDRESSED

Air Monitoring

Indoor Air Filtration

Human Health and Asthma Outreach

Green Projects

Community Engagement and education

Other (if other, please explain):

PROJECT DESCRIPTION

Provide a scope of work for the project and explain how the proposed project will benefit air quality. If applicable, explain how the project benefits disadvantaged communities:

The project uses low-cost Purple Air -II PM sensors and more elaborate near-reference grade PM and criteria gas/total VOC / wind sensors in San Francisco's Eastern Neighborhoods. These SB535- and AB1550-designated areas, also coincident with BAAQMD's Community Air Risk Evaluation zone, have many sensitive receptors, and other residents susceptible to elevated pollution levels. Current Air Quality Index for each sensor will be displayed using Wi-fi enabled LIFX bulbs visible from the street, as well as on the SFAQ project website. Beyond real-time AQI updates, the accumulating qualified hyperlocal dataset will provide many ongoing clues as to local pollution patterns and events, and will be available to citizens, agencies, and researchers via CSV/JSON download from San Francisco AQ's website/dashboards, and via an open API to qualified users. This work will also build a foundation for further network enhancements and expansions. We will contribute to public environmental data infrastructure in San Francisco, especially in the disadvantaged Eastern Neighborhoods, and to the field beyond by developing deployment protocols and relatively low-cost calibration methods, data visualization techniques, and standardized hardware and software.

Our work has already begun to yield contributions in instrumentation, software and algorithms, display and presentation protocols, hardware, and community relations, and observational knowledge of how to carry out such projects (as discussed in our Final Progress Report, turned in June 10, 2019). For example, this project has already yielded an algorithmic method to improve data quality and reduce spurious noise of Purple Air sensor results. We also have recovered from several setbacks, such as initial wind sensors which did not function properly in our application and had to be replaced with alternatives. The public data platform and web site interface has been more difficult than anticipated and is still not quite ready. Finally, BAAQMD did not provide the co-location sensor testing support we had anticipated, and we instead had to rely on a borrowed eBAM. This project merits reference monitors for proper calibration in order to ensure the meticulous data quality. The critical requirement of accurate calibration across a widely-dispersed sensor network, to ensure a high degree of trust in data which we have carefully gathered, leads us to include our own community reference monitor as an essential line item.

This proposal builds on our initial successes to support ongoing operation and significant expansion of this network for the next two years, as enumerated in the detailed Timeline Addendum.

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PROJECT TIMELINE

Provide a timeline for project implementation. Provide a breakdown of the major milestones required to implement the project, including completion dates:

Please see detailed Timeline Addendum.

Estimated Cost:

198,242, please see detailed budget.

SELECT THE BENEFIT THAT BEST APPLIES TO THE PROPOSED PROJECT

Reduction of exposure to air pollution

Emissions reductions

Air quality violations preventions

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ENVIRONMENTAL BENEFITS

Describe the specific benefits/drawbacks to the environment and/or the community:

This project will benefit the neighborhoods involved by providing reliable AQ data as a norm, rather than a curiosity, for built urban infrastructure. Public awareness through visual and online accessibility contributes directly to methods of mitigation. Information about air quality will help people to make careful choices about reduction of their exposure to criteria pollutants. With access to transparent hyperlocal real-time data, community members can manage their own exposure in a number of ways: by purchasing HEPA filters for their homes; by using N95 masks when need be; and by reducing exposure, by exercising discretion as to their own and their family's exposure to ambient air.

Finally, with better information about air quality at the neighborhood level, people can press for public policy changes and mitigation efforts from the City and from the relevant regulatory agencies.

Emission Benefits: For projects with a direct emissions benefit, please provide an analysis of the emissions prevention or reduction that result from the proposed SEP, and specify the pollutants addressed by the project.

ITEMIZED BUDGET

Provide a detailed list of expected project expenses; include all items to complete the project and the funding needed for each item. Cost breakdown should include capital, operational, and administrative costs (You may attach documents relating to the project to provide additional information (e.g. project timeline, itemized budget):

Please see detailed Budget Addendum.

(For amendments to projects in implementation phase, include up-to-date project costs to justify funding amounts.)

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INSTRUCTIONS FOR COMPLETING THIS FORM

Use this form to submit detailed supplemental environmental project (SEP) proposals. Complete this SEP proposal form cover page, and attach the supplementary proposal documents as requested below. Questions may be directed to SEP@arb.ca.gov.

Project proposal submissions shall be directed to either SEP@arb.ca.gov or mailed to:

Air Resources Board
Enforcement Division
ATTN: SEP Program
P.O. Box 2815
Sacramento, CA 95812-2815

PRIVACY STATEMENT

Please note that under the California Public Records Act (Gov. Code, § 6250 et seq.), your submissions, including associated contact information (e.g., your address, phone, email, etc.) become public records and may be released to the public upon request. Personal information will be protected from disclosure as required by law, including under the Information Protection Act (Cal. Civ. Code, § 1798, et seq.). Information that is claimed to be confidential should be submitted as provided in CARB's regulations for submitting confidential data, California Code of Regulations, title 17, section 91011.

Ken McGary
Rebecca E. Skinner

A High-Performance Next-Generation Hyperlocal Air Quality Network for San Francisco's Eastern Neighborhood

Timeline Addendum

Quarter 1

Finalize site location(s) and operating agreements for community reference monitor
Order more Purple Air-II sensors
Order particulate monitor (T640) and related equipment for community reference site
Start project publicity, looking for more sensor hosts, other outreach
Prepare and submit to CalARB Progress Report and expenses, each month or quarter, as required.
Finalize collaboration on VOC sensing with San Francisco State University

Quarter 2

Set up community reference site
Initiate first batch of co-location testing to swap out Phase I sensors
Bring Triad stations back to reference site for second (better) ES-642 co-location
Set up public dashboards
Build and test Purple Air Cluster Transfer Standard (PACTS) prototype, co-locate against reference
Start VOC capture collaborations
Install first LIFX bulb displays

Quarter 3

Continued co-location testing and sensor deployments
PACTS and ES-642 transfer standard field testing with small batches of PA-IIs
Make community reference site available to other AB-617 communities, researchers, etc.
Community outreach -- sensor hosts, how to access and analyze data seminars
Continue VOC capture collaborations

Quarter 4

PACTS and ES-642 transfer standard field testing in regular use
Community and civic outreach with sensor hosts, regarding access and analysis of data
Ongoing support of sensors and community reference site

Quarter 5

Community and civic outreach with sensor hosts, regarding how to access and analyze data
Ongoing support of sensors and community reference site
Transfer standard field evaluations continue

Quarter 6

Ongoing support of sensors and community reference site
Community and civic outreach regarding understanding and acting on two years of hyperlocal air sensor data
Continuing evaluation of Transfer standard field data
Evaluate SFAQ project and start planning for Phase III

Quarter 7+

Continue ongoing support and outreach activities
Evaluate project and plan for Phase III

Total Duration: two years.

Addendum for SEP Project Phase II Proposal

Status Quo as of May 2019

San Francisco AQ accomplished a great deal with a modest amount of money and time (six months, extended to seven months and a week). Between October 1 and early May, we obtained permission from CalARB Enforcement to adjust our technical plan from DIY sensors to calibrated low-cost off the shelf Purple Air II's; purchased the sensors; formally asked BAAQMD for co-location and calibration assistance and were denied. Finally, we arranged an alternative co-location plan using a borrowed eBAM, and colocated two dozen PA-II sensors with the eBAM and an ES 642 dust monitor.

We obtained a website, and established a data analysis arrangement through Apis-AQ, including a Grafana data display portal which is currently displaying PM 2.5 data from several deployed sensors. During the summer, we installed eight calibrated sensors, and we have three more sensors with hosts but not yet deployed, and several others that will be installed within the next few weeks. Throughout the duration of the pilot grant, we regularly attended and occasionally presented at community meetings, met with San Francisco Supervisors and their aides, and tabled at local street fairs.

Outline of Planned Activities

This proposal builds on our initial successes to support ongoing operation and significant expansion of this network for the next two years.

Our plans encompass both technical initiatives and ongoing community and professional activities, and work on presentation of sensor data. The latter includes a) local data display, using LIFX bulbs colored to correspond with the EPA's AQI color code; b) ongoing civic and community outreach; c) an improved website with a live data map. We have already submitted a paper for the AGU conference (December 2019), and plan to submit a paper for the ASIC conference (May 2020).

The former include operation of a "community reference site" including PM reference monitor purchase (TS640 or similar) and cooperation with other community groups; more sophisticated calibration investigations, including transfer standard techniques with the ES-642s and with Purple Air "clusters" (Purple Air Cluster Transfer Standard or PACTS); and further evaluation and characterization of the Purple Air II dual sensor channels and other calibration subtleties.

Finally, we are working to arrange a collaboration with a local research institution on VOC speciation using Apis' VOC detection capability to trigger a canister capture for lab analysis by GC/MS.

A high-performance next-generation Hyperlocal Network for San Francisco's Eastern Neighborhoods					
	qty/hours	amount/rate	task subtotal	section totals	Notes
Publicity				\$11,000	
ads in local publications	4	\$250	\$1,000		
monthly website developer	24	\$275	\$6,600		
Sunday Streets registration	6	\$250	\$1,500		
Presentation at ASIC 2020 (Pasadena)	1	\$500	\$500		
Other Travel & misc publicity		1000	\$1,000		
Website hosting \$200/year	2	\$200	\$400		
Labor				\$97,000	
Outreach / Attending community meetings	300	\$60	\$18,000		
AGU conference \$500	2	\$500	\$1,000		
Continued sensor testing / analysis / tech support	250	\$60	\$15,000		
Sensor installs / Replacements / Field Calls	300	\$60	\$18,000		
Project Management & Administration	750	\$60	\$45,000		
Equipment & Services				\$72,220	
Apis Triad Station subs continued for another year	6	\$3,250	\$19,500		(3 stations x 2 years)
T640 purchase	1	\$25,000	\$25,000		
T640 support (calibration and preventative maint.)	8	\$750	\$6,000		(8 quarterly tech visits)
T640 support (internet bandwidth)	24	\$100	\$2,400		
additional Purple Air sensors	40	\$225	\$9,000		some for replacement, some for new sites
Apis Purple Air bandwidth	960	\$7	\$6,720		\$7/mo for 40 stations for 24 mo
Apis host public dashboards	24	\$150	\$3,600		24 mo x \$150/mo
PROJECT SUBTOTAL				180220	
Fiscal Sponsorship (Manylabs 10%)				18022	
Total				198242	