

**SHOULD THE TEMPE (AZ) POLICE DEPARTMENT CONSIDER THE
IMPLEMENTATION OF e-BIKE TECHNOLOGY TO REPLACE THE CURRENT
FLEET OF HUMAN-POWERED MOUNTAIN BIKES WITHIN THE GROWING
DOWNTOWN BUREAU?**

**JOHN THOMPSON
TEMPE POLICE DEPARTMENT (AZ)**

**A Staff Study Submitted to the
Northwestern University Center for Public Safety
School of Police Staff & Command
Class # 437
Scottsdale, AZ
May 28, 2018**

SHOULD THE TEMPE (AZ) POLICE DEPARTMENT CONSIDER THE IMPLEMENTATION OF e-BIKE TECHNOLOGY TO REPLACE THE CURRENT FLEET OF HUMAN-POWERED MOUNTAIN BIKES WITHIN THE GROWING DOWNTOWN BUREAU?

Opportunity:

The vision of the Tempe Police Department is to keep all who visit and live in Tempe safe from harm. One way in which officers strive to accomplish this goal is through the efficient response to requests for help from the community – including calls-for-service that originate within the downtown. The downtown/Mill Avenue District is currently 280 acres in size, which is slightly less than ½ a square mile (Annex A). Located immediately adjacent to the main campus of Arizona State University, this high-rise urban core is a regional hub of retail, dining and entertainment options for the tens of thousands of students, residents and employees that live in or frequent the area on a daily basis. This downtown is often the host to a number of events that are important to regional and national interests; including marathons, music festivals, New Year's Eve block parties, art fairs, and collegiate and professional sporting events, including the Superbowl in 1996.

The downtown district is poised to rapidly expand in size in the next decade (McGlothlin, 2018). Construction projects currently underway within the downtown area will soon add thousands of residential units, hotel rooms and commercial office space within the next 3-5 years (Annex B). Additionally, a proposed ASU Stadium District expansion will take place over the next eighteen years; and is expected to virtually double the footprint of the area; adding another 274 acres of land for the bike squad to patrol (Annex C).

Because of the considerable population density within the downtown district, the most efficient way the Tempe Police Department has found to navigate heavy traffic and deliver reliable police service throughout the day is via officers on mountain bike. However, with the expected increases in the geographic size and density of the downtown, it is incumbent upon the Tempe Police Department to remain focused on ensuring that technological considerations are given to the current and future needs of the bicycle squad fleet. This study will be dedicated to determining if an e-bike (electronic bike) is an effective alternative to consider – now or in the future.

Assumptions:

- The officers assigned to the Field Operations/Bike Squad will continue to be tasked with primary responsibility for the patrol function within this (expanding) district.
- The Tempe Police Department will not receive additional staffing positions to assist with the proposed expansion of this downtown district.
- Patrol via mountain bike (whether it be manually powered or via e-bike) will continue to be the preferred method of transport within this district.
- The current manually-powered mountain bike model in use is about as technologically advanced as it is going to get (now and in the future), aside from periodic minor equipment upgrades that do not translate to a noticeable change on behalf of the rider.

Facts

- Currently, approximately 62,000 college students, 20,000 residents and 30,000 employees live in or frequent the downtown community on a daily basis (Annex D)
- Within the next 3-5 years, the downtown district is set to expand upward, adding another 2,370 residential units, 806 hotel rooms, and over 1,400,000 square feet of commercial office space (Annex B)
- Within the next eighteen years, the ASU Stadium District is set to add another 274 acres to the footprint of the downtown district, including 3,645 residential units, 667 hotel rooms, 298,000 square feet of retail space and over 4,300,000 square feet of commercial office space (Annex C)
- The Tempe Police Department has considerable historical experience with the use of a bicycle as a mode of transportation for officers within the downtown district; having an established 'Bike Squad' in this area for over 20 years
- There are currently 35 manually-powered mountain bikes manufactured by Volcanic that make up the fleet of bikes within the Tempe Police Department (Rowan, 2018)
- Volcanic, a company based in Washington, specifically designs mountain bikes for police patrol functions (Volcanic Bikes, 2018)
- A new "patrol ready" Volcanic mountain bike will cost approximately \$2,200 (including accessory items such as a gear bag, helmet, and lights) (Kleppe, 2018)
- Volcanic offers a lifetime frame warranty, as long as the bicycle is maintained by a bicycle mechanic certified by Volcanic (Volcanic Bikes, 2018). The Tempe Police Department has several officers on staff that are certified Volcanic mechanics. As a result, there have been numerous times where damaged frames have been replaced free of charge (Kleppe, 2018).
- A physically fit officer can navigate through traffic and pedal from one end of the downtown district (as it is currently sized) to the other in approximately 60-90 seconds; albeit having exerted considerable energy upon arriving at the destination (personal observation)
- Typical bicycle speeds during "routine patrol" are less than 5 mph. When responding to a call-for-service, speeds are generally between 5-12 mph. A "top speed" on the manually-powered mountain bike, given ideal conditions, is generally around 18 mph (personal observation)

Discussion

Background

The successful implementation of bicycles into an urban policing environment is not a novel concept. In fact, policing on bicycle began to appear around the 1860's, as jurisdictions began to spread in size, making patrol on foot impractical (Petty, 2006). While the urgency in the use of a police bicycle has fluctuated over time with the rate of suburban sprawl and the availability of patrol vehicles, many agencies are again seeing a return of people to the urban cores of their communities, making transportation of police officers via bicycle in a dense environment necessary (Petty, 2006).

E-bikes have been around for quite some time, although their use as a rugged alternative to a manually-powered bicycle did not really take hold until this last decade, as more efficient rechargeable batteries were able to be married to motors that could provide greater power output (Turner, 2013). Now, e-bikes are offered to hunters looking for an effortless way to get into the backcountry, tourists looking for an easy way to see the sights, and in the last five years, the law enforcement community has seen the e-bike market begin to advertise to police agencies. E-bike vendors are beginning to show up at law enforcement-centered conferences, such as the 2017 IACP Annual Conference and the 2018 IPMBA Annual Conference (IPMBA Annual Conference, 2018).

Current Vendor and Model Specifications

While the market of e-bike vendors is still relatively new, some companies have emerged as front-runners in this technology. In an effort to compare and contrast the options available by several vendors, the below list represents a sampling of companies that produce a rugged e-bike option. For easy comparison purposes, specifications for the current *manually-powered* bicycle used by the Tempe Police Department are listed in the column at the far right.

Company Name	Rad Power	Samson	Volt	Rogue Ridge	Trek	Volcanic
Cost	\$1,500	Not listed	Not listed	\$2,800	\$3,600	\$2,200
Year business established	2007	Not listed	Not listed	Not listed	1975	2005
Warranty	1 year	30 days	2 year	Not listed	Conditional	Lifetime
Wheel base	26"	27.5"	26" or 29"	26"	29"	26" or 29"
Top speed capability (in mph)	20 mph	Not listed	50 mph	28 mph	28 mph	18 mph
Mileage range (on full charge)	25-45 miles	30-50 miles	30-50 miles	25-50 miles	Not listed	n/a
Weight limit (rider)	275 lbs.	Not listed	Not listed	300 lbs.	250 lbs.	n/a
Manual bike option	Y	Y	Not listed	Y	Y	Only manual
Weight of bike	66.5 lbs.	Not listed	Not listed	65 lbs.	50 lbs.	34 lbs.
Motor/battery weather limit	Not listed	Not listed	Not listed	Not listed	Not listed	n/a
Full suspension frame system	Only front	Only front	Only front	Only front	Only front	Y
Speedometer	Y	Y	Y	Y	Y	N

This list is not limited to companies marketing e-bikes solely to law enforcement, as it is conceivable that should any bike meet needed specifications, a ‘police’ sticker can be affixed to it, making it “officially” a police bike. However, whenever one of the companies above offered a ‘law enforcement’ model, those specifications are listed here. (Rad Power Bikes, 2018) (Samson Electric Bikes, 2018) (Volt Electric Police Bikes, 2018) (Rogue Ridge Bikes, 2018) (Trek Electric Bikes, 2018) (Volcanic Bikes, 2018)

Safety Considerations

Of primary concern is whether the possible implementation of this new fleet vehicle will pose a greater risk to the employees charged with riding them. The first factor to review is how bicycle speed may factor into injury severity. In a study published in the journal, *Injury Prevention* in 1997, 3,854 bicycle incidents in the greater Seattle area were examined for factors to assist with future prevention (Rivara, Thompson, & Thompson, 1997). Within this study, it was discovered:

- Bicyclists are 40% more likely to sustain severe injury when they are travelling at speeds greater than 15 mph at the time of the crash
- Bicyclists are 50% more likely to be admitted to the hospital when they are travelling at speeds greater than 15 mph at the time of the crash
- Bicyclists are 2.6 times more likely to die in crashes in which they are travelling at speeds greater than 15 mph at the time of the crash

As noted previously, typical bicycle speeds during “routine patrol” are less than 5 mph. When responding to a call-for-service, officers may reach speeds between 5 and 12 mph. A “top speed” on the manually-powered mountain bike that is currently in use (under ideal conditions) is generally around 18 mph. Officers are currently assigned a bike helmet to assist with protection, as their speeds rarely (if ever) come close to or exceed 15 mph. In a survey of current members of the Tempe Police Department Bike Squad, 40% indicated that they would feel the need for added protection (i.e. elbow/knee pads, larger helmets, etc.) if the bicycle they were riding could reach speeds in excess of 20 mph (Annex E). It should be noted in the above matrix of available e-bike models, top speeds ranged from 20-50 mph. At higher potential speeds, it is important to also ensure that the suspension system is capable of absorbing the bumps in the road. If not, the rider is susceptible to being thrown from the bike and sustaining injury. It is curiously noted that among the bikes in the comparative list above, the only model that is currently offered as a full-frame suspension system is the manual bike option that also goes the slowest.

Another consideration is the listed weight limit for bike riders. In this circumstance, it is important to note that our riders are expected to wear an average of forty to fifty pounds of law enforcement-related gear when riding a bicycle. Further, the weight of the bikes, themselves, will be of value to note. It is not uncommon that officers need to pick up and carry their bicycles up several flights of stairs if responding to calls for service or navigating unique terrain in the downtown.

Lastly, no information is yet readily available as to whether the battery systems would cause a danger to the rider if exposed to high heat or humidity (both of which are expected weather extremes during the summer months in Tempe).

Training Considerations

Currently, officers wishing to ride a manually-powered bicycle in a patrol function for the Tempe Police Department must first be certified in a three-day course that is developed and taught by members of the bike team. This course covers basic through advanced bike riding techniques, as well as proper ways to navigate obstacles such as curbs, stairs and vehicles. Officers are also taught tactical dismount procedures and how their bicycles can be used effectively in heavy crowd situations.

Should an e-bike be introduced into the bike fleet, it would be necessary to create a supplemental training day for any current ‘certified’ bike officers to attend. Officers will certainly need an opportunity to be taught the nuances of operation and care, including how to properly accelerate,

brake, as well as charge and store the batteries when not in use. If proper training is not implemented, and an injury occurs to a rider or a pedestrian as a result of negligent operation of the e-bike, the administration of the police department will likely be held liable, as is demonstrated in cases such as *City of Canton, Ohio v. Harris* (1989) (Ross, 2000).

Legal Considerations

Of interest is recent legislation at the state level regarding the difference between an e-bike and a moped, and how those definitions may affect the use of this new technology. For example, as of now if one of our riders fell off of a *manually-powered bike*, it would not automatically be considered a ‘reportable’ vehicle accident, per Arizona Revised Statute (ARS). However, would there be a point at which this would change under existing laws with the use of the proposed technology? ARS 28-2516 defines an e-bike as a bicycle that, with a motorized ‘helper motor’ can be operated at speeds of less than 20 mph. (Annex F) According to the current law, a crash involving an e-bike at speeds of under 20 mph would not be considered a reportable vehicle accident. Unfortunately, the laws are still vague and ever-changing, and presently there is no definition of when higher speeds now qualify an e-bike as a moped (which would make a crash a single-vehicle reportable event) (Curtis, 2018). Further, Tempe City Code Article VII, addresses e-bikes, and writes that it is unlawful for an e-bike to: (1) be operated on a public sidewalk, at speeds of over 28 mph when on a city street, (2) at speeds of over 20 mph when on a shared/multi-use path, or (3) at speeds of over 5 mph, when passing a pedestrian or horse on a shared/multi-use path (Annex G). There does not appear to be a public safety exception written into the City Code, indicating that any e-bike implementation by the police department would have to abide by these same laws while on general patrol.

Fiscal Considerations

The current Tempe Police Department bike fleet consists of 35 bikes. Based upon the information gathered on four different e-bike models currently available, should the fleet be replaced with an e-bike option, this may come at a cost between \$52,000 and \$126,000. This cost may be offset, somewhat, through the sale of the current mountain bikes to other agencies. However, it is expected the sale of those bicycles will have very little impact on the total expenditure needed for a complete fleet replacement with e-bikes.

Maintenance and equipment costs are expected to be similar to what is now spent on the current fleet. Of note, also, is the warranty length for the frame systems of available e-bike models. Given the added weight of equipment and rider, it is the bike frame that often wears out in specific places, requiring a replacement. If the frame of an e-bike is now out of warranty, that cost will have to be taken into consideration as well.

Operator Perception

An important part of this project consideration is to solicit feedback and provide a voice to the operators that would be tasked with riding the proposed e-bikes on a daily basis. As a result, in early April, current members of the Bike Team were given a 10-question survey to complete. In this survey, Bike Team members were asked to consider the e-bike technology and how it may

be an effective alternative now, or in the future. In summary, the following results were noted (Annex E):

- Only one team member had ridden an e-bike in the past; although that same person had a favorable experience when riding the e-bike.
- 33% of the team felt that an e-bike *may* make their current assignment easier (assuming the geographic boundaries of the downtown are not changed). 67% felt that using a manually-powered bike *could* be easier. The team was virtually split (53% to 47%) as to whether the use of an e-bike in the new ASU Stadium District would be of value.
- A significant number of team members (91%) felt the use of an e-bike would be of value while patrolling events over long distances, such as the Ironman Triathlon. 64% felt the use of an e-bike would be of value while patrolling locations such as Arizona Mills Mall or Tempe Marketplace.
- About 79% of the bike team feels that the use of e-bikes would bring some form of ridicule to the bike squad from other agencies (ranging from a couple of good-natured jokes to all-out ‘shame’).
- However, 73% of the bike team is supportive of further research into the e-bike option. 67% of the bike team members were willing to beta-test any possible new e-bikes.

Potential Solutions

- **Alternative #1: Replace the current fleet of bicycles with e-bikes**
 - Pros include:
 - All new bikes
 - Less potential for rider fatigue
 - Ability to cover larger distances/zone boundaries
 - Cons include:
 - High cost
 - Training will quickly need to be developed and taught to all riders
 - Limited bike frame warranties/replacement may have unexpected costs
 - Technology may not be what is necessary or safe for our purposes
 - Current operators do not yet have ‘buy-in’ with this technology option
 - Legal considerations are still vague
 - Cost Estimate:
 - Between \$52,000 - \$126,000 (depending on e-bike model selected)
- **Alternative #2: Do nothing, stop researching this topic, and keep our current fleet as is**
 - Pros include:
 - Cost savings
 - The current operators do not have to adjust to a new system and would be most comfortable in the near future
 - The department is very familiar with the operation and repair of Volcanic bikes
 - Cons include:
 - The department loses the ability to be innovative leaders

- The department loses the opportunity to work with e-bike companies to develop a product that is specific to our needs
 - As zone responsibilities increase, continued use of manually-powered mountain bikes may be burdensome
 - In another two years, the department may be having to re-research this option as new technology is advertised at law enforcement conferences and elsewhere
 - Cost Estimate:
 - \$0
- **Alternative #3: Continue to explore the e-bike option and do research, but make no immediate large-scale purchases (aside from procuring one or two e-bikes for testing purposes)**
 - Pros include:
 - Potential ability to work with vendors to design a system specific to us
 - Not fully committed to any particular path, as technologies continue to emerge (such as front-tire motors)
 - Conducting a beta-test with one or two e-bike models will not significantly impact budgets
 - The department can make accurate predictions for success based upon practical experience
 - Cons include:
 - The department may miss out on early product designs and prices, if demand for e-bikes significantly increases in the coming years
 - Cost Estimate:
 - Between \$3,000 and \$7,200 (for two prototypes, depending on e-bike model selected)

Conclusion

Successful police departments have shown that innovation and the intelligent implementation of new technology can provide considerable support to the peacekeeping mission. However, history has also shown that making rash purchasing decisions without proper research has often relegated “last year’s new technology” to what is now a source of dust collection within a storage closet. The option to replace the current fleet of manually-powered mountain bikes with an e-bike option is certainly an opportunity to be explored. Yet there are certain features of an e-bike option that may not be suitable to the current or future needs of the police department.

Three alternatives have been suggested: (1) replace the entire fleet with e-bikes, (2) don’t change the fleet at all and stop researching this option, or (3) continue to research this option but develop a “wait-and-see” approach to the technology; and include the purchase of one or two e-bike models to test. In assigning value to the three alternatives, each were considered based upon: vendor options, safety concerns, training obligations, legal considerations, financial obligations, level of innovation, and operator mindset. In comparing and contrasting the information provided in this report, the following levels of concern have been assigned to each alternative:

	Alternative #1	Alternative #2	Alternative #3
Options Available	Significant concern	Muted concern	Moderate concern
Rider Safety	Significant concern	Muted concern	Moderate concern
Training Obligations	Significant concern	Muted concern	Moderate concern
Legality	Significant concern	Muted concern	Muted concern
Financial Obligations	Significant concern	Muted concern	Moderate concern
Lack of Innovation	Muted concern	Significant concern	Muted concern
Operator Perception	Significant concern	Moderate concern	Moderate concern

As can be seen from the above chart, Alternative #1 has several significant concerns if it were to be enacted at this time. Alternative #2 appears to be the “safe” alternative (in that it will not cause disruption in the day-to-day activity, as we know it). However, it severely lacks any form of innovation. Alternative #3 may have some concerns to be addressed, although those may be able to be mitigated with thoughtful research and contemplation. As such, Alternative #3 is the best option at this point. Additionally, Alternative #3 would still allow for the department to be innovative leaders in this area, when the right options come along.

For example, companies are currently developing ‘retrofit’ options for mountain bikes in which only the front tire can be replaced with a low-speed pedal-assist motor option. While this technology is still in its infancy, it is just one example where there may be an option for the Tempe Police Department to entertain that would allow for (1) the continued use of the current Volcanic frame and warranty, (2) along with the speeds that would satisfy safety and legal concerns, (3) at a cost that is minuscule compared to the alternatives.

Recommendation

The Tempe Police Department is committed to finding innovative ways to continue to provide exceptional customer service to our community. In this effort, it is important for the Tempe Police Department to remain keenly aware of the technological advances related to e-bikes, and the benefits that e-bikes may provide now and in the future. For this reason, it is required that the Tempe Police Department continue to research available e-bike options, work with e-bike vendors to consider the purchase of one or two e-bike models for trial purposes, and continue to review existing protocols and rules in an effort to prepare for the eventuality where an e-bike option meeting every need we have makes itself available. As such, “Alternative #3”, as described above, is authorized. A proposed implementation schedule has been included as an annex (Annex H).

Chief Sylvia M. Moir

🍏 Concur
 🍏 Do Not Concur

Additional Comments:

Works Cited

- Curtis, M. (2018, April 18). Sergeant. (J. Thompson, Interviewer)
- IPMBA Annual Conference*. (2018, April 20). Retrieved from International Police Mountain Bike Association (IPMBA): ipmba.org/conference/virtual-exhibit-hall
- Kleppe, C. (2018, April 6). Officer. (J. Thompson, Interviewer)
- McGlothlin, D. (2018, January 24). Here is AZRE's 2018 Commercial Real Estate Outlook. *AZ Big Media*.
- Petty, R. D. (2006). *The Rise, Fall and Rebirth of Bicycle Police*. Babson Park, MA: Babson College.
- Rad Power Bikes*. (2018, April 12). Retrieved from <https://www.radpowerbikes.com>
- Rivara, F. P., Thompson, D. C., & Thompson, R. S. (1997). Epidemiology of Bicycle Injuries and Risk Factors for Serious Injury. *Injury Prevention*, 110-114.
- Rogue Ridge Bikes*. (2018, April 7). Retrieved from rogueridge.com
- Ross, D. L. (2000). Emerging Trends in Police Failure-to-Train Liability. *Policing: An International Journal of Police Strategies & Management*, 169-193.
- Rowan, J. (2018, April 5). Officer. (J. Thompson, Interviewer)
- Samson Electric Bikes*. (2018, April 12). Retrieved from <https://samsonebikes.com/collections/public-safety>
- Trek Electric Bikes*. (2018, April 9). Retrieved from https://www.trekbikes.com/us/en_US/bikes/electric-bikes/c/B507/
- Turner, J. (2013, November 28). *A Brief History of Electronic Bikes*. Retrieved from Jim's Blog: <https://optibike.com/brief-history-electric-bikes/>
- Volcanic Bikes*. (2018, April 9). Retrieved from <https://volcanicbikes.com>
- Volt Electric Police Bikes*. (2018, April 8). Retrieved from twowheelelectric.com/electric-patrol-bikes

Table of Annexes

Annex A:	Map of the Downtown District
Annex B:	Listing of current developments in the Downtown
Annex C:	ASU Stadium District Report
Annex D:	DTA Quick Guide
Annex E:	Tempe Police Department Bike Squad Survey
Annex F:	ARS 28-2516
Annex G:	Tempe City Code, Article VII
Annex H:	Implementation Schedule

Annex B



Tempe
ARIZONA

TEMPE DEVELOPMENT PROJECTS

FEBRUARY 2018

www.tempe.gov/projects

FINALED / CERTIFICATE OF OCCUPANCY

#	*TRACK G PROJECT	SITE ADDRESS	PROPOSED USE / DESCRIPTION	ACRES	BLDG SF	# OF UNITS	MAX. HEIGHT	DENSITY UNITS/AC
1	(NO PL) 1665 W ALAMEDA	1665 W. Alameda Dr	OFFICE (T.L.)	n/a	8,750	n/a	n/a	n/a
2	(NO PL) AVHOMES @ PAPAGO SPECTRUM	1225 W. Washington St	OFFICE (T.L.)	n/a	5,274	n/a	n/a	n/a
3	(NO PL) BARD	2035 W. 4th St	OFFICE (T.L.)	n/a	22,810	n/a	n/a	n/a
4	(NO PL) TARGET TEMPE REFRESH	8530 S. Priest Dr	OFFICE (T.L.)	n/a	31,026	n/a	n/a	n/a
5	PL170094 CABIN WHISKEY	410 S Mill Ave	RESTAURANT / BAR	n/a	8,467	n/a	n/a	n/a
6	PL110130 DISCOVERY BUSINESS CENTER (BLOG B)	2060 E. Elliot Rd	OFFICE (T.L.)	n/a	158,432	n/a	51'	n/a
7	(NO PL) GUARDIAN	222 S. Mill Ave	OFFICE (T.L.)	n/a	7,508	n/a	n/a	n/a
8	(NO PL) GEN KOREAN BBQ HOUSE	2000 E. Rio Salado Pkwy	RESTAURANT	n/a	5,979	n/a	n/a	n/a
9	PL170025 HUMAN BEAN	1755 E. University Dr	COMMERCIAL / COFFEE SHOP KIOSK	0.72	550	n/a	19'	n/a
10	(NO PL) CIRCLE K	1120 W. Warner Rd	OFFICE (T.L.)	n/a	28,500	n/a	n/a	n/a
11	PL170019 ASHLEY FURNITURE	8515 S. Emerald Dr	RETAIL	2.69	36,500	n/a	56'	n/a
12	PL160012 GETHSEMANE LUTHERAN CHURCH	1035 E. Guadalupe Rd	CHURCH (ADDITION)	4.66	16,008	n/a	30'	n/a
13	(NO PL) DAYSPRING UNITED METHODIST	1365 E. Elliot	CHURCH (A/A)	n/a	n/a	n/a	n/a	n/a
14	PL160155 FBC WORSHIP SPACE	4525 S. McClintock Dr	CHURCH (A/A)	5.2	19,000	n/a	38.5'	n/a
15	PL140468 HOTEL @ DISCOVERY BUSINESS CAMPUS	7200 S. Price Rd	HOTEL	5.91	139,586	228	70'	n/a
16	PL160059 FAIRFIELD INN + SUITES	2222 S. Priest Dr	HOTEL	2.8	62,077	110	67'	n/a
17	PL160320 US AIRWAYS GARAGE	201 S. Ash Ave	PARKING GARAGE - ADD 2 LEVELS TO EXISTING	n/a	137,775	n/a	60'	n/a
18	(NO PL) PROQUAL LANDSCAPING	402 W. Orion St	OFFICE / WAREHOUSE (T.L.)	n/a	7,225	n/a	n/a	n/a
19	(NO PL) MUGFUB - THE GRAND	1101 W. Washington St	OFFICE (T.L.)	n/a	6,460	n/a	n/a	n/a
20	(NO PL) PLANET FITNESS	1405 W. Southern Ave	FITNESS CENTER (T.L.)	n/a	21,598	n/a	n/a	n/a
21	(NO PL) VARSITY TUTORS	2120 E. Rio Salado Pkwy	OFFICE (T.L.)	n/a	35,208	n/a	n/a	n/a
22	(NO PL) EZ COMMUNICATIONS	4645 S. Ash Ave	OFFICE (T.L.)	n/a	14,172	n/a	n/a	n/a
23	(NO PL) ARIZONA DISTILLING	603 W. University	DISTILLERY + TASTING ROOM	n/a	4,731	n/a	n/a	n/a
24	(NO PL) IRON MOUNTAIN TEMPE	2929 S. Hardy Dr	OFFICE (T.L.)	n/a	19,979	n/a	n/a	n/a
25	PL140468 WIDEWATERS RESTAURANT @ DBC	7200 S. Price Rd	NEW RESTAURANT	5.91	5,500	n/a	27.5'	n/a
26	PL150424 VALOR ON EIGHTH	1001 E. 8th St	MULTI-FAMILY RES	1.42	110,254	50	60'	35
27	PL160152 LIBERTY CENTER (BLDG 4)	1870 W. Rio Salado Pkwy	NEW OFFICE BLDG W/(T.L.) + PARKING GARAGE	13.35	572,000	n/a	62'	n/a
28	(NO PL) Z PIZZA	1015 S. Rural Rd	RESTAURANT (T.L.)	n/a	2,097	n/a	n/a	n/a
29	(NO PL) CENTENE @ LIBERTY CENTER (BLDG 4 - PHASE 2)	1870 W. Rio Salado Pkwy	CAFETERIA (T.L.)	n/a	14,098	n/a	n/a	n/a
30	(NO PL) CENTENE @ LIBERTY CENTER (BLDG 4 - PHASE 3)	1870 W. Rio Salado Pkwy	DAYCARE (T.L.)	n/a	9,856	n/a	n/a	n/a
31	PL160455 TEMPE PUBLIC MARKET	8749 S. Rural Rd	RESTAURANT / ADAPTIVE REUSE	1.13	3,309	n/a	n/a	n/a
32	(NO PL) EDUCATION AT WORK	230 W. 5th St	OFFICE (T.L.)	n/a	17,390	n/a	n/a	n/a
33	PL170185 ARBY'S	525 W. Broadway Rd	RESTAURANT (T.L. W/ EXTERIOR MOD)	n/a	2,972	n/a	n/a	n/a
34	(NO PL) BANK OF WEST	1625 W. Fountainhead Pkwy	BANK (T.L.)	n/a	tbd	n/a	n/a	n/a
35	PL160060 QUICKTRIP #400	2111 W. University Dr	CONVENIENT STORE / GAS STATION	2.59	5,848	n/a	24'	n/a

Executive Summary

The Tempe Police Department (TPD) was asked to prepare a cost estimate for resources required to provide police services to the *Arizona State University Athletic Facilities District* (District) at build-out, which is expected to occur in 2036. After thorough analysis, the TPD projects a need for 22 police employees at the cost of \$2.6 million annually (FY 17/18 dollars). These costs will grow parallel to the development--starting at approximately \$245,000 in 2018 and increasing to \$2.6 million in 2036. The police positions requested include:

- Patrol Officers (8)
- Patrol Sergeant (1)
- Detectives/Sworn Support Officers (8)
- Professional Staff (5)

Given the direct impact providing police services has on the Municipal Court, the Court anticipates the need for one additional Court Services Specialist position at approximately \$60,000 annually. Attached are detailed views of how police staffing needs and their related costs were determined. Also attached are the staffing and cost estimates provided by the Tempe Municipal Court.

This analysis does not include any cost assessments related to land or construction for police facilities in or around the District. However, our plan is to have a new police facility serve north Tempe and the District in the future.

Background

In 2010, the Arizona Legislature approved Arizona State University's (ASU) plan to pursue a large development project in North Tempe as a method to fund new and renovated University athletic facilities. In late 2014, ASU selected Catellus Development Corporation to master plan the project---which is now known as the *ASU Athletic Facilities District*.

The District is comprised of approximately 274 acres of land encompassed by McClintock Road to the East, Tempe Town Lake to the North, Sun Devil Stadium and Veterans Way to the West, and University Drive to the South. The planned development will occur in several phases over the next 20 years, and include:

- Office space: 4,308,500 square feet;
- Retail space: 298,665 square feet;
- Residential: 3,645 dwelling units; and
- Hotels: two, with a total of 667 rooms.



Annex D



Annex E

Q1

Have you ever ridden an e-bike?

RESPONSES

Yes	6.67% 1
No	93.33% 14

Q2

If you answered “Yes” to having ridden an e-bike in the past, did you have a positive experience?

RESPONSES

Dude. I answered “No”. Next question.	93.33% 14
Yes. They were pretty cool!	6.67% 1
Meh. It was fine, but nothing to write home about.	0.00% 0
No. The e-bike experience(s) I have had to date have sucked.	0.00% 0
No, but for reasons not related to the performance of the e-bike (i.e. it rained, I ran over my cell phone, I was attacked by a raccoon, etc.)	0.00% 0

Q3

Do you think that the use of an e-bike could make your current job assigned to patrolling the Mill Avenue bar district easier (assume, for this question, you had an e-bike ready to use this evening and have received instruction on how to use it)?

RESPONSES

Yes	6.67% 1
Maybe...all depends on the crowds/traffic and/or other conditions.	26.67% 4
Probably not. I like the feel/familiarity of my regular bike.	60.00% 9
Heck. No. You aren’t getting me on one of those things.	6.67% 1

Q4

Check any/all of the following, if you think it could possibly be easier to patrol on an e-bike at the following:

RESPONSES

The exterior of Tempe Marketplace or Arizona Mills	63.64% 7
During a busy ASU football game (say they’re playing U of A)	18.18% 2
Route security during Ironman or Rock n’ Roll marathon	90.91% 10
Providing security at the Waste Management Open (assisting Scottsdale PD)	18.18% 2
Providing security at the Ostrich Festival (assisting Chandler PD)	9.09% 1
Providing security at a march or demonstration that is law enforcement-neutral (such as a March to Save Kittens, etc.)	36.36% 4
Providing security at a march or demonstration that is law enforcement-related (such as a March to End Police Violence, etc.)	9.09% 1

Annex E (continued)

Q5

We have all heard of developmental plans regarding the ASU Stadium District, which is scheduled to expand eastward to McClintock Drive in the next 5-20 years. If our detail is tasked with the responsibility to be primary patrol officers in this new zone, as well as the current downtown, would you rather use a regular mountain bike or an e-bike?

RESPONSES

Regular mountain bike	53.33% 8
e-Bike	46.67% 7

Q6

Do you feel that the use of 'fat tires' could make it safer for you to navigate Mill Avenue with the impending Trolley Car tracks that are being installed?

RESPONSES

Yes, this will allow for better traction on/around the trolley tracks	26.67% 4
No, fat tires won't do anything for safety and I'll still find a way to earn 'the duck'	73.33% 11

Q7

Generally speaking, a regular mountain bike is ridden at a speed of about 15mph during a casual ride (without obstructions) on a city street. At what top speed would you be concerned with the use of an e-bike, without added protection (such as elbow/knee pads, larger helmet, etc.) from what you normally wear right now?

RESPONSES

Anything above 15 mph is too fast for me	6.67% 1
Around 20-25 mph	33.33% 5
Around 30-35 mph	26.67% 4
More than 35 mph	20.00% 3
I'm not concerned about falling on an e-bike without added protection, regardless of what speed it can get up to. Any road rash as a result of a spill will be worn as a badge of honor!	13.33% 2

Q8

You all work very hard to make the TPD Bike Squad one of the premier Bike Squads in the U.S., and you should be very proud of that achievement! If the bike 'fleet' were to be replaced with e-bikes in the next 1-2 years, do you think this would:

RESPONSES

Change nothing regarding our reputation. We'd still be the best; and innovative leaders at the same time!	21.43% 3
Make us the target of a few good-natured jokes by other agencies, but I'd be fine with talking about the pros and cons of the system. We'd still be rock stars.	42.86% 6
Make me have to hang my head in shame. I'd no longer feel I could say I'm on a "Bike" squad.	35.71% 5

Annex E (continued)

Q9

Do you think we (TPD) should continue further research into e-bike options at all?

RESPONSES

Absolutely. I think it may be cool to have this option and want the PD to learn more about it. 13.33% 2

Sure. I'd be interested to see what options are out there, but I'm not completely sold yet. 60.00% 9

Not really. I think we're fine where we are at – now and in the future. 20.00% 3

NO! I'd rather take an in-custody credit card fraud scheme case involving runaway juveniles than get on one of those things. 6.67% 1

Q10

If TPD were to acquire a couple of e-Bikes to sample their practicality, would you be willing to be one of the two 'beta-test' riders to give honest feedback on the system?

RESPONSES

Yes 66.67% 10

No 33.33% 5

Annex F

28-2516. Motorized electric or gas powered bicycles or tricycles; definition

A. Notwithstanding any other provision of this title:

1. A certificate of title is not required for a motorized electric or gas powered bicycle or tricycle.
2. Registration is not required for a motorized electric or gas powered bicycle or tricycle.
3. Vehicle license tax is not imposed on a motorized electric or gas powered bicycle or tricycle.
4. A motorized electric or gas powered bicycle or tricycle is exempt from the provisions of section 28-964 relating to required equipment on motorcycles and motor-driven cycles and from the provisions of title 49, chapter 3, article 5 relating to vehicle emissions inspections.
5. A driver license is not required to operate a motorized electric or gas powered bicycle or tricycle.
6. A motorized electric or gas powered bicycle or tricycle may use rights-of-way designated for the exclusive use of bicycles.
7. A motorized electric or gas powered bicycle or tricycle is not subject to chapter 9 of this title.

B. This section does not prohibit a local authority from adopting an ordinance that regulates or prohibits the operation of motorized electric or gas powered bicycles or tricycles, except that a local authority shall not adopt an ordinance that requires registration and licensing of motorized electric or gas powered bicycles or tricycles.

C. For the purposes of this section, "motorized electric or gas powered bicycle or tricycle" means a bicycle or tricycle that is equipped with a helper motor that has a maximum piston displacement of forty-eight cubic centimeters or less, that may also be self-propelled and that is operated at speeds of less than twenty miles per hour.

Annex G

ARTICLE VII. - ELECTRIC BICYCLES

Sec. 7-71. - Regulating electric bicycles: purpose and intent.

Pursuant to A.R.S. § 28-2516(b), the State of Arizona has granted municipalities express authority to regulate or prohibit the operation of bicycles that are equipped with electric motors. It is the purpose and intent of this article to provide for the regulation of electric bicycles and to protect the safety of pedestrians, bicyclists, motor vehicle drivers and operators of electric bicycles. It is in the public interest to regulate the use of electric bicycles by prohibiting their use on public sidewalks when the electric motor is engaged.

(Ord. No. O2017.05, 1-26-17)

Sec. 7-72. - Applicability of traffic laws.

In the City of Tempe, a person riding an electric bicycle is granted all of the rights and is subject to all of the duties applicable to a bicycle rider under state and local law. An electric bicycle must abide by all speed restrictions, including speed limitations on shared paths or multi-use paths.

(Ord. No. O2017.05, 1-26-17)

Sec. 7-73. - Electric bicycles must yield right-of-way.

A person riding an electric bicycle on a crosswalk, multi-use path, trail, or shared path must yield the right-of-way to any pedestrian or horse and shall slow to five (5) miles per hour and communicate with the pedestrian or rider before overtaking or passing any horse.

(Ord. No. O2017.05, 1-26-17)

Sec. 7-74. - General rules for electric bicycles.

- (a) An electric bicycle shall comply with the equipment and manufacturing requirements for bicycles adopted by the United States Consumer Product Safety Commission (16 C.F.R. Part 1512).
- (b) It shall be unlawful to use an electric bicycle to carry more persons at one time than the number for which it is designed or equipped.
- (c) It shall be unlawful to ride an electric bicycle where signs are posted prohibiting bicycling.
- (d) It shall be unlawful to operate an electric bicycle on any public sidewalk or trail when the electric motor is engaged.
- (e) When traveling in a bicycle lane or street, an electric bicycle may not be operated at speeds in excess of twenty-eight (28) miles per hour, or the posted speed limit, whichever is lower.
- (f) An electric bicycle may be used in all places where bicycles are permitted to travel, including shared paths and multi-use paths.

Annex G (continued)

- (g) An electric bicycle must abide by all speed restrictions on shared paths or multi-use paths. When traveling on a shared path or multi-use path, an electric bicycle may not be operated at speeds in excess of twenty (20) miles per hour.
- (h) It shall be unlawful for a person under sixteen (16) years of age to operate an electric bicycle. A person under the age of sixteen (16) may ride as a passenger on an electric bicycle that is designed to accommodate passengers.
- (i) All electric bicycles must be equipped with a speedometer that displays the speed the electric bicycle is traveling in miles per hour.

(Ord. No. O2017.05, 1-26-17)

Sec. 7-75. - Helmet use requirement.

No person under eighteen (18) years of age shall operate an electric bicycle or be a passenger on an electric bicycle unless the person is wearing a properly fitted and fastened bicycle helmet which meets the current standards of the American National Standards Institute for Protective Head Gear.

(Ord. No. O2017.05, 1-26-17)

Sec. 7-76. - Nighttime use requirements.

An electric bicycle that is used at nighttime shall have a lamp on the front that emits a white light visible from a distance of at least five hundred (500) feet to the front and a red reflector in the rear of a type that is visible from all distances from fifty (50) feet to three hundred (300) feet to the rear.

(Ord. No. O2017.05, 1-26-17)

Sec. 7-77. - Violation declared a civil traffic violation.

- (a) Violation of this article shall constitute a civil traffic violation punishable by a mandatory minimum fine of one hundred dollars (\$100.00).
- (b) All complaints for violations of this article shall be issued and adjudicated in accordance with the Arizona Rules of Procedure in civil traffic violation cases and applicable state and local laws.

(Ord. No. O2017.05, 1-26-17)

Annex H

Implementation Schedule

Task	Assigned To	Target Completion Date
Research use of e-bikes by other agencies and obtain results	Bureau lieutenant	July, 2018
Contact/consult with Rogue Rider Bikes (they have reached out to TPD for input on future e-bike models)	Bureau lieutenant	July, 2018
Inquire about funding sources for models to beta-test	Bureau lieutenant	August, 2018
Check on ARS/Tempe City Code clarification for PD use of e-bikes with legal advisor and City prosecutor	Bureau lieutenant	August, 2018
Examine safety equipment needs	Bureau lieutenant, in consultation with operators	September, 2018
Research e-bike conferences or conventions to consider attending	Bureau lieutenant, in consultation with bike mechanics	Ongoing
Research front-tire mounted motor options/costs	Bureau bike mechanics	September, 2018
Purchase/lease an e-bike or option for beta testing	Bureau lieutenant	October, 2018
Select two operators to beta-test the e-bike systems	Bureau sergeants	October, 2018
Receive product(s), conduct any necessary installation, and train operators on use	Bureau bike mechanics, in consultation with bike trainers	October, 2018
Conduct T & E (trial and error), both in the downtown and during special events (such as marathons, etc.)	Beta-testers, reporting to sergeants and bureau lieutenant	November, 2018 – May, 2019
Re-evaluate process, departmental needs, and current e-bike options. Create an addendum to this report, as necessary, with new information learned or recommendations	Bureau lieutenant, in consultation with bureau sergeants, bike mechanics and beta-testers	June, 2019

Executive Summary

Should the Tempe Police Department consider the implementation of e-bike technology to replace the current fleet of human-powered bikes within the growing downtown bureau?

Opportunity: The downtown/Mill Avenue District is currently 280 acres in size, which is slightly less than ½ a square mile (Annex A). Located immediately adjacent to the main campus of Arizona State University, this high-rise urban core is a regional hub of retail, dining and entertainment options for the tens of thousands of students, residents and employees that live in or frequent the area on a daily basis. The downtown district is poised to rapidly expand in size in the next decade.

Because of the considerable population density within the downtown district, the most efficient way the Tempe Police Department has found to navigate heavy traffic and deliver reliable police service throughout the day is via officers on mountain bike. However, with the expected increases in the geographic size and density of the downtown, it is incumbent upon the Tempe Police Department to remain focused on ensuring that technological considerations are given to the current and future needs of the bicycle squad fleet, to include the possible implementation of an e-bike into the bike squad fleet.

This opportunity was filtered through the following five topical areas, in order to identify the benefits and disadvantages of each: current vendor options, rider safety concerns, legal considerations, fiscal concerns, and operator/rider perception. Once risks and rewards of each area was identified, the below alternative solutions were created.

Alternative Solutions:

- Alternative #1 is to replace the entire fleet with e-bikes
- Alternative #2 is to not change the fleet at all and stop researching this option.
- Alternative #3 is continue to research this option but develop a “wait-and-see” approach to the technology; and include the purchase of one or two e-bike models to test.

The Tempe Police Department is committed to finding innovative ways to continue to provide exceptional customer service to our community. In this effort, it is important for the Tempe Police Department to remain keenly aware of the technological advances related to e-bikes, and the benefits that e-bikes may provide now and in the future. For this reason, it is required that the Tempe Police Department continue to research available e-bike options, work with e-bike vendors to consider the purchase of one or two e-bike models for trial purposes, and continue to review existing protocols and rules in an effort to prepare for the eventuality where an e-bike option meeting every need we have makes itself available. As such, “Alternative #3”, as described above, is authorized. A proposed implementation schedule has been included as an annex (Annex H).

Chief Sylvia M. Moir

🍏 Concur
🍏 Do Not Concur

Additional Comments: