

INTELLIGENT TRANSPORTATION SYSTEMS (ITS) INTEGRATION

DOCUMENT SUBSECTION: Smart Mobility
 MANAGING DEPARTMENT: Department of Transportation and Environmental Services

PROJECT LOCATION: Citywide
 REPORTING AREA: Citywide

PRIMARY STRATEGIC THEME: Theme 10: Multimodal Transportation

PROJECT CATEGORY: 3
 ESTIMATE USEFUL LIFE: Varies

Citywide Trans. Mgmt. Tech. - Intelligent Transportation Systems (ITS) Integration													
	A (B + M)	B	C	D	E	F	G	H	I	J	K	L	M (C:L)
	Total Budget & Financing	Through 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	Total FY 2021 - FY 2030
Expenditure Budget	20,317,477	15,009,804	223,123	1,000,000	400,000	600,000	3,084,550	0	0	0	0	0	5,307,673
Financing Plan													
Cash Capital	37,629	37,629	0	0	0	0	0	0	0	0	0	0	0
CMAQ/RSTP	3,084,550	0	0	0	0	0	3,084,550	0	0	0	0	0	3,084,550
State/Federal Grants	7,840,711	5,617,588	223,123	1,000,000	400,000	600,000	0	0	0	0	0	0	2,223,123
TIP	2,354,587	2,354,587	0	0	0	0	0	0	0	0	0	0	0
Financing Plan Total	13,317,477	8,009,804	223,123	1,000,000	400,000	600,000	3,084,550	0	0	0	0	0	5,307,673
Additional Operating Impact	3,670,500	0	0	350,300	363,100	376,500	390,600	405,400	420,900	437,200	454,300	472,200	3,670,500

CHANGES FROM PRIOR YEAR CIP

Funding plan updated to align with state grant schedule.

PROJECT DESCRIPTION & JUSTIFICATION

This project provides funding for the design and installation of upgrades to the City's Smart Mobility initiative, which keeps City streets safe and running smoothly, while also laying the groundwork for emerging technologies that will shape transportation over the next five, ten, twenty years and beyond. Completion of this project will replace much of the City's 30-year old traffic signal communications and allow public safety departments to monitor real time conditions on the City's roadway network. Staff is working with the ITS Department to determine if cost savings can be achieved by coordinating construction of this project with the Municipal Fiber project.

This project has five phases that largely focus on the design and installation of the City's fiber optic communications (broadband) network, which is the laying of cable that allows regional transportation agencies to communicate faster and more efficiently to manage traffic and respond to emergencies. The project also includes the installation of field devices such as traffic cameras, weather stations, flood monitoring equipment and pavement temperature sensors which capture data that can be used to reduce congestion and better manage the City's roadways.

The five phases are as follows:

- Phase I (Complete): Installed a broadband fiber optic communications network, 11 traffic surveillance cameras, and a traffic management center.
- Phase II (Complete): Which supplemented the first phase, expanded the broadband network and installed additional traffic surveillance cameras.
- The design for Phase III began in FY 2019 with construction scheduled to begin in FY 2021. This phase includes the installation of 10 new traffic surveillance cameras, upgrading the control center video wall, connecting 50 traffic signals to the fiber optic backbone and running fiber optic cable along parts of Van Dorn Street and the western end of Duke Street. Funding from this grant will also provide staff support for this project and coordinate with the ITS Department regarding technology aspects of this project.
- The design for Phase IV is expected to begin in FY 2021 and construction scheduled to begin in FY 2023. This phase will add 10 more traffic surveillance cameras and connect 46 traffic signals to the fiber optic backbone.
- The funding for Phase V becomes available in FY 2025 and design will begin at that time. Phase V will focus mainly on installing a fiber optic backbone to the Mount Vernon Avenue corridor and connecting approximately 20 traffic signals to the fiber optic backbone and installation of approximately 5 traffic surveillance cameras. This project may be constructed in coordination with the Municipal Fiber project to reduce costs and limit disturbance to the community.

EXTERNAL OR INTERNAL ADOPTED PLAN OR RECOMMENDATION

N/A

ADDITIONAL OPERATING IMPACTS

Full implementation of the project will likely require additional staffing at the Traffic Operations Center and funding for ongoing software support/maintenance contract.

TRAFFIC CONTROL UPGRADE

DOCUMENT SUBSECTION: Smart Mobility
 MANAGING DEPARTMENT: Department of Transportation and Environmental Services

PROJECT LOCATION: Citywide
 REPORTING AREA: Citywide

PRIMARY STRATEGIC THEME: Theme 10: Multimodal Transportation

PROJECT CATEGORY: 1
 ESTIMATE USEFUL LIFE: Varies

Citywide Trans. Mgmt. Tech. - Traffic Control Upgrade													
	A (B + M) Total Budget & Financing	B Through 2020	C FY 2021	D FY 2022	E FY 2023	F FY 2024	G FY 2025	H FY 2026	I FY 2027	J FY 2028	K FY 2029	L FY 2030	M (C:L) Total FY 2021 - FY 2030
Expenditure Budget	2,277,700	450,000	100,000	103,000	138,200	175,200	202,800	208,800	215,000	221,400	228,200	235,100	1,827,700
Financing Plan													
Cash Capital	2,227,700	400,000	100,000	103,000	138,200	175,200	202,800	208,800	215,000	221,400	228,200	235,100	1,827,700
Private Capital Contributions	50,000	50,000	0	0	0	0	0	0	0	0	0	0	0
Financing Plan Total	2,277,700	450,000	100,000	103,000	138,200	175,200	202,800	208,800	215,000	221,400	228,200	235,100	1,827,700
Additional Operating Impact	0	0	0	0	0	0	0	0	0	0	0	0	0

CHANGES FROM PRIOR YEAR CIP

Funding plan updated to reflect application of cost escalation to out years of project.

PROJECT DESCRIPTION & JUSTIFICATION

The Traffic Control Upgrade project funds ongoing capital maintenance, support and required hardware upgrades associated with implementation of the City’s Smart Mobility initiative.

The project supports necessary technology upgrades and software/system support contracts associated with the City's traffic surveillance cameras, broadband fiber optic communications network and hardware/systems in the management center. Additionally, this project provides funding for emergency repairs and replacement in cases of equipment failure of the existing traffic control system.

EXTERNAL OR INTERNAL ADOPTED PLAN OR RECOMMENDATION

N/A

ADDITIONAL OPERATING IMPACTS

No additional operating impacts identified at this time.

TRANSPORTATION TECHNOLOGIES

DOCUMENT SUBSECTION: Smart Mobility
 MANAGING DEPARTMENT: Department of Transportation and Environmental Services

PROJECT LOCATION: Citywide
 REPORTING AREA: Citywide

PRIMARY STRATEGIC THEME: Theme 10: Multimodal Transportation

PROJECT CATEGORY: 3
 ESTIMATE USEFUL LIFE: Varies

Citywide Trans. Mgmt. Tech. - Transportation Technologies													
	A (B + M)	B	C	D	E	F	G	H	I	J	K	L	M (C:L)
	Total Budget & Financing	Through 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	Total FY 2021 - FY 2030
Expenditure Budget	3,418,212	1,370,312	250,000	0	265,300	0	281,500	0	298,500	309,500	316,800	326,300	2,047,900
Financing Plan													
Cash Capital	0	0	0	0	0	0	0	0	0	0	0	0	0
GO Bonds	115,000	115,000	0	0	0	0	0	0	0	0	0	0	0
Reprogrammed TIP Bonds	95,312	95,312	0	0	0	0	0	0	0	0	0	0	0
TIP	3,207,900	1,160,000	250,000	0	265,300	0	281,500	0	298,500	309,500	316,800	326,300	2,047,900
Financing Plan Total	3,418,212	1,370,312	250,000	0	265,300	0	281,500	0	298,500	309,500	316,800	326,300	2,047,900
Additional Operating Impact	25,500	0	0	2,500	2,600	2,700	2,700	2,800	2,900	3,000	3,100	3,200	25,500

CHANGES FROM PRIOR YEAR CIP

Funding plan updated to reflect application of cost escalation to out years of project.

PROJECT DESCRIPTION & JUSTIFICATION

This project funds the deployment of small-scale transportation technology projects to improve efficiency of the transportation infrastructure including parking technology, traffic signals and signs. In FY 2021 the City will continue deployment of bluetooth and traffic counting technology which provides information on the movement of people in, around and through the City and assist the City in making decisions on how to better manage traffic. Pavement sensors are also being installed with this funding to help snow removal and de-icing operations. This technology will improve the reliability and integrity of future transportation studies and informed decision making. These technologies will also contribute to the engineering improvements being implemented as part of the City's Vision Zero and Complete Streets Programs as well as parking technologies to better manage on-street and garage parking.

Prior year funding has been used to upgrade city parking meter modems from 2G to 3G to ensure continued operation and reliability as cellular providers phase out 2G service. It has also been used to install data collection, signal detection and parking technologies.

EXTERNAL OR INTERNAL ADOPTED PLAN OR RECOMMENDATION

N/A

ADDITIONAL OPERATING IMPACTS

Annual licensing agreements will increase in cost as new sensors and monitoring systems come online.

TRAFFIC ADAPTIVE SIGNAL CONTROL

DOCUMENT SUBSECTION: Smart Mobility
 MANAGING DEPARTMENT: Department of Transportation and Environmental Services

PROJECT LOCATION: Citywide
 REPORTING AREA: Citywide

PRIMARY STRATEGIC THEME: Theme 10: Multimodal Transportation

PROJECT CATEGORY: 3
 ESTIMATE USEFUL LIFE: Varies

Traffic Adaptive Signal Control													
	A (B + M)	B	C	D	E	F	G	H	I	J	K	L	M (C:L)
	Total Budget & Financing	Through 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	Total FY 2021 - FY 2030
Expenditure Budget	7,675,900	0	0	5,266,347	2,409,553	0	0	0	0	0	0	0	7,675,900
Financing Plan													
State/Federal Grants	14,675,900	7,000,000	0	5,266,347	2,409,553	0	0	0	0	0	0	0	7,675,900
Financing Plan Total	14,675,900	7,000,000	0	5,266,347	2,409,553	0	0	0	0	0	0	0	7,675,900
Additional Operating Impact	286,500	0	0	0	30,000	31,500	33,100	34,700	36,500	38,300	40,200	42,200	286,500

CHANGES FROM PRIOR YEAR CIP

Funding plan updated to align with state grant schedule.

PROJECT DESCRIPTION & JUSTIFICATION

This project will install new control software and hardware as well as traffic sensors to monitor traffic in real-time. It also funds the design and installation of traffic adaptive signal control systems. Traffic adaptive signal control is a traffic management strategy in which traffic signal timing changes, or adapts, based on actual traffic demand. It allows traffic signals to adjust to actual traffic demand and flow rather than variables that are less effective predictors of traffic patterns, such as time of day, and continuously synchronize with each other to optimize traffic flow throughout a network to better manage traffic flow on the City's roadways.

Traffic Adaptive Signal Control will begin design in FY 2022 when funding becomes available. Construction would likely begin on the two key corridors in FY 2024.

Traffic Adaptive Signal Control is a key project in the Smart Mobility program. Traffic navigation apps have rendered traditional time of day traffic signal control obsolete. Everyday navigation apps alter traffic behavior depending on regional traffic conditions. Traffic Adaptive Control will help take the City into the future. This project will utilize many of the features installed by previous Smart Mobility projects as well as seek to integrate with navigation apps and other data sources as well as incorporate artificial intelligence.

EXTERNAL OR INTERNAL ADOPTED PLAN OR RECOMMENDATION

N/A

ADDITIONAL OPERATING IMPACTS

A software support/maintenance agreement costing approximately \$30,000/year will be needed to maintain this asset.

TRANSIT SIGNAL PRIORITY

DOCUMENT SUBSECTION: Smart Mobility
 MANAGING DEPARTMENT: Department of Transportation and Environmental Services

PROJECT LOCATION: Citywide
 REPORTING AREA: Citywide

PRIMARY STRATEGIC THEME: Themes 4 & 10

PROJECT CATEGORY: 3
 ESTIMATE USEFUL LIFE:

Transit Signal Priority													
	A (B + M)	B	C	D	E	F	G	H	I	J	K	L	M (C:L)
	Total Budget & Financing	Through 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	Total FY 2021 - FY 2030
Expenditure Budget	1,255,491	1,255,491	0	0	0	0	0	0	0	0	0	0	0
Financing Plan													
NVTA 30% Funds	60,000	60,000	0	0	0	0	0	0	0	0	0	0	0
NVTA 70% Funds	1,195,491	1,195,491	0	0	0	0	0	0	0	0	0	0	0
Financing Plan Total	1,255,491	1,255,491	0	0	0	0	0	0	0	0	0	0	0
Additional Operating Impact	0	0	0	0	0	0	0	0	0	0	0	0	0

CHANGES FROM PRIOR YEAR CIP

No changes from previous CIP.

PROJECT DESCRIPTION & JUSTIFICATION

This project will install Transit Signal Priority (TSP) on priority transit corridors throughout the City. Transit Signal Priority allows buses to request priority at intersections, thereby reducing wait time for passengers. This also allows transit vehicles to bypass congestion and offer more reliable services, making transit faster, easier and more appealing as a travel option. The existing bus fleet will be retrofitted with TSP equipment as the City upgrades traffic signals with TSP on corridors throughout the City, starting with Duke Street, Route 1 and King Street. New buses will be equipped with TSP technology.

An additional benefit of installing TSP infrastructure at traffic signals is that emergency vehicles can utilize this equipment to allow an emergency vehicle to request preemption at intersections. Technology is being installed on emergency vehicles to allow the vehicle to infrastructure communication necessary to capitalize on this equipment and provide faster emergency response times.

These corridor projects, which fall under the Smart Mobility Program, are funded through NVTA 70% funds through FY 2020. Starting in late FY 2020/early FY 2021, TSP will be installed on both Duke Street and King Street. This project will also enable first responders to use emergency vehicle preemption at these signals.

EXTERNAL OR INTERNAL ADOPTED PLAN OR RECOMMENDATION

N/A

ADDITIONAL OPERATING IMPACTS

No additional operating impacts identified at this time.