

Steven V. Stenger
County Executive



Daniel W. Dreisewerd, P.E., PTOE
Acting Director

Stephanie Leon Streeter, P.E.
Deputy Director

July 2, 2018

ADDENDUM NO. 1

Notice to All Persons and Firms Proposing
to Submit a Bid or Furnish Materials for
Lucas-Hunt Road (South) ARS Infrastructure
St. Louis County Project No. AR-1586
Federal Project No. STP-9901(630)

The construction contract for this project has been revised as follows:

No. 1

Revised Plan Sheet No. 1 of 37 "Title Sheet", Index of Sheets, deleted Plan Sheets 26 and 27 of 37.

No. 2

Delete Plan Sheet 26 of 37 "Kinamore Drive Intersection Details".

No. 3

Delete Plan Sheet 27 of 37 "Kinamore Drive Intersection Quantities".

No. 4

Corrected Bid Document "Itemized Bid Sheets" as follows:

Bid Item 904-52.00 "Conduit, 2'" quantity updated
Bid Item 904-54.00 "Conduit, 4'" quantity updated
Bid Item 904-85.36 "Cable, Communication, Fiber Optic, 36 Fibers (30 Single-Mode and 6 Multi-mode)" item added
Bid Item 90-88.01 "Pull Box, Single, Concrete" quantity updated
Bid Item 904-95.10 "Opening Drilled in Existing Concrete Pull Box" quantity updated
Bid Item 904-97.33 "Removal of Existing Controller Cabinet" item added

No. 5

Added description to the scope of work; revised quantities to include work description and corrected quantity on Plan Sheet No. 2 of 37 "Summary of Quantities" for the listed Item Nos. :

Bid Item 904-52.00 "Conduit, 2"" quantity updated

Bid Item 904-54.00 "Conduit, 4"" quantity updated

Bid Item 904-85.36 "Cable, Communication, Fiber Optic, 36 Fibers (30 Single-Mode and 6 Multi-mode)" item added

Bid Item 90-88.01 "Pull Box, Single, Concrete" quantity updated

Bid Item 904-95.10 "Opening Drilled in Existing Concrete Pull Box" quantity updated

Bid Item 904-97.33 "Removal of Existing Controller Cabinet" item added

No. 6

Added the following Job Special Provisions:

900.30.20 Communication Cable For Accessible Pedestrian Signal Equipment

900.30.21 Pedestrian Push Button Detector

1200.90.11 Actuated Controller Features

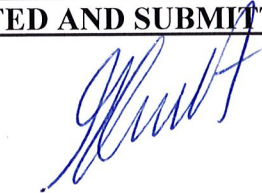
No. 7

Added the following Supplemental Document:

APS Pushbutton Programming

REVISED ITEMIZED BID SHEET NOS. 1 - 11 OF 11 ARE ATTACHED AND REFLECT THE CHANGES NOTED IN ITEM NO. 3 ABOVE. FAILURE TO SUBSTITUTE THE ITEMIZED BID SHEETS MAY RESULT IN REJECTION OF THE BID.

ATTENTION BIDDERS: THE ADDENDUM ACKNOWLEDGEMENT IN THE BID DOCUMENTS MUST BE COMPLETED AND SUBMITTED WITH ALL BID PROPOSALS.



For Joseph W. Kulesa, P.E.
Division Manager, Design

JWK/JWD/cje

Attachments: Itemized Bid Sheets, Plan Sheets 1 and 2 of 37, JSP 900.30.20, JSP 900.30.21, JSP 1200.90.11, Supplemental Document APS Push Button Programming

CONSTRUCTION PLANS FOR LUCAS AND HUNT ROAD SOUTH ARS INFRASTRUCTURE ST. LOUIS COUNTY PROJECT NO. AR-1586 FEDERAL PROJECT NO. STP-9901(630)

GENERAL LEGEND

DESCRIPTION	SYMBOL
RIGHT-OF-WAY NEW	---
RIGHT-OF-WAY EXISTING	---
PROPERTY LINE	---
UNDERGROUND UTILITY (TYPE SPECIFIED)	---
T-TELEPHONE/GTV G-GAS	---
W-WATER E-ELECTRIC	---
CONSTRUCTION LIMITS	---
TREE OR SHRUB (DESIGNATE DIA. & TYPE)	---
TREE/VEGETATION LINE	---
FENCE (DESIGNATE TYPE)	---
GUARDRAIL	---
RAILROAD	---
SIGN	---
PERMANENT DRAINAGE EASEMENT	P.D.E.
PERMANENT SIDEWALK EASEMENT	P.S.E.
TEMPORARY SLOPE AND CONSTRUCTION LICENSE	T.S.C.L.
PERMANENT TRAFFIC SIGNAL EASEMENT	P.T.S.E.
PERMANENT FOOTING EASEMENT	P.F.E.
PERMANENT ROADWAY IMPROVEMENT, MAINTENANCE AND UTILITY EASEMENT	P.R.I.M.U.E.
PERMANENT ROADWAY IMPROVEMENT, MAINTENANCE AND UTILITY SIDEWALK AND SEWER EASEMENT	P.R.I.M.U.S.S.E.
PERMANENT RETAINING WALL EASEMENT	P.R.W.E.
TO BE REMOVED	(T.B.R.)
TO BE ABANDONED	(T.B.A.)
USE IN PLACE	(U.I.P.)
TO BE REMOVED AND REPLACED	(T.B.R.&R.)
TO BE REMOVED AND REPLACED BY OTHERS	(T.B.R.&R.O.)
ADJUST TO GRADE	(A.T.G.)
ADJUST TO GRADE BY OTHERS	(A.T.G.B.O.)
TO BE ABANDONED AND FILLED	(T.B.A.&F.)

PROJECT LIMITS



INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE AND INDEX SHEET
2-4	SUMMARY OF QUANTITIES
5-7	TYPICAL SECTIONS
8	SPECIAL NOTES
9-11	PLAN SHEETS
12-15	CURB, SIDEWALK AND RAMP REPLACEMENTS
16	BUS STOP PAD DETAIL
17-28	TRAFFIC SIGNAL PLANS
29	INTERSECTION/DRAINAGE DETAILS
30	DRAINAGE NOTES
31-36	STANDARD TRAFFIC CONTROL DEVICES
37	SIDEWALK DETOUR, CROSSWALK, AND PEDESTRIAN DETOURS
---	JOINT REPAIR DETAIL (NOT NUMBERED)
---	PAVEMENT REPAIR DETAIL (NOT NUMBERED)
---	RAMP STANDARD DRAWINGS (10 SHEETS NOT NUMBERED)
---	TRAFFIC SIGNAL PLAN SHEETS 26-27 DELETED

PROJECT SPECIFIC INFORMATION

PROJECT ZIP CODE: 63136
MSD BENCHMARK: 10202

DESIGN CRITERIA

FUNCTIONAL CLASSIFICATION: ARTERIAL
DESIGN YEAR: 2017
CURRENT ADT (YEAR): 22,640 (2016)
DESIGN ADT (YEAR): 22,640 (2036)
DIRECTIONAL DISTRIBUTION (D) = N/A
TRUCK PERCENTAGE (T) = N/A
DESIGN SPEED (V) = 45 MPH
POSTED SPEED (V) = 40 MPH

LENGTH OF PROJECT

A ST. LOUIS COUNTY ROAD			
END OF PROJECT	STA.	22+30.00	
BEGINNING OF PROJECT	STA.	0+50.00	
APPARENT LENGTH		2,180	FEET
EQUATIONS AND EXCEPTIONS			
NS RAILROAD (SB BRIDGE) 17+69.79 TO 18+68.21		98.42	FEET
NS RAILROAD (NB BRIDGE) 17+67.74 TO 19+17.91		150.17	FEET
TOTAL CORRECTIONS		150.17	FEET
NET LENGTH OF PROJECT		2,029.83	FEET
STATE LENGTH		0.38	MILES
FEDERAL LENGTH		0.38	MILES

MSD CERTIFICATION

THE EXISTING SEWER LENGTHS, SIZES, FLOWLINES, DEPTHS OF STRUCTURES AND SEWERS AND LOCATIONS WITH RESPECT TO EXISTING OR PROPOSED EASEMENTS HAVE BEEN MEASURED. THE RESULTS OF THOSE MEASUREMENTS ARE SHOWN ON THIS SET OF FINAL MEASUREMENT PLANS. SINCE THE WYE LOCATIONS HAVE BEEN PLOTTED FROM INFORMATION PROVIDED BY THE SEWER CONTRACTOR OR OTHER SOURCES, I DISCLAIM ANY RESPONSIBILITY FOR THAT SPECIFIC INFORMATION.

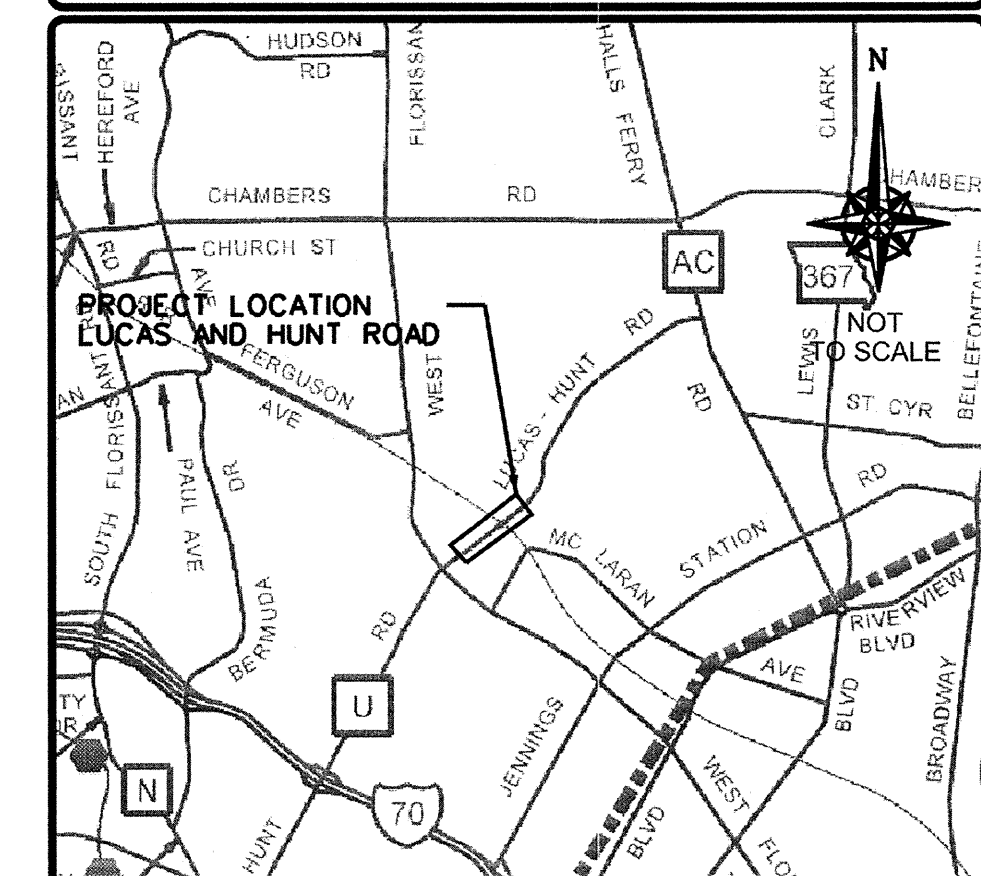
ALL PUBLIC SEWERS ARE LOCATED WITHIN DESIGNATED EXISTING OR PROPOSED EASEMENTS EXCEPT AS FOLLOWS:

SIGNED
P.E.

DATE

IT SHOULD BE UNDERSTOOD THAT THIS SIGNATURE AND SEAL APPLY ONLY TO THE AFOREMENTIONED FINAL MEASUREMENTS

LOCATOR MAP



Saint Louis COUNTY
TRANSPORTATION
PUBLIC WORKS

ST. LOUIS COUNTY, MISSOURI
DEPARTMENT OF
TRANSPORTATION/PUBLIC WORKS
DESIGN DIVISION
1050 N. LINDBERGH BLVD
ST. LOUIS, MISSOURI 63132

STANDARD SPECIFICATIONS

UNLESS OTHERWISE NOTED, ALL WORK ON THIS PROJECT SHALL BE COVERED BY THE ST. LOUIS COUNTY STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AND BY APPLICABLE ST. LOUIS COUNTY STANDARD DRAWINGS.

UTILITY NOTE

UNDERGROUND FACILITIES, STRUCTURES AND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE SURVEYS AND RECORDS; AND, THEREFORE THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. IT IS POSSIBLE THERE MAY BE OTHERS, THE EXISTENCE OF WHICH IS PRESENTLY NOT KNOWN OR SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THEIR EXISTENCE AND EXACT LOCATION AND TO AVOID THERE TO.

M.S.D. P-NUMBER: P-0031243-00

M.S.D. BASE MAP: 13G1

REVIEW ENGINEER:

APPROVAL DATE:

APPROVED:
Daniel W. Dreisewerd, P.E., PTOE
Acting Director

DATE: 4/2/18

COUNTY PROJECT NO.
AR-1586

FEDERAL PROJECT NO.
STP-9901(630)

E-W GATEWAY TIP NO.
6503Q-16

MSD:
P-0031243-00

MSD BASE MAP:
13G1

REV	DATE	BY	APP	DESCRIPTION
1	7-2-18	CJE	JWD	Remove Sheet 26 and Sheet 27

I hereby certify that the documents intended to be submitted by my seal are accurate and that I am a duly licensed Professional Engineer in the State of Missouri. I hereby disclaim any responsibility for all other drawings, reports or other documents or instruments relating to or intended to be used in connection with this engineering project or survey.

STATE OF MISSOURI
LORNE W. JACKSON
NUMBER
PE-2003014985
PROFESSIONAL ENGINEER

DATE: 4/02/2018

LOCHMUELLER GROUP
4111 N. 10TH STREET, SUITE 200
SAINT LOUIS, MISSOURI 63101
F (314) 821-3288
WWW.LOCHMUELLERGROUP.COM

LORNE W. JACKSON
PROFESSIONAL ENGINEER
LICENSE NO. 2003014985

Saint Louis COUNTY
TRANSPORTATION
PUBLIC WORKS

Daniel W. Dreisewerd, P.E., PTOE
Acting Director

LUCAS AND HUNT ROAD
SOUTH INFRASTRUCTURE

TITLE SHEET

DESIGNED: JRB

DRAWN: CJW

CHECKED: LWJ

SHEET SEQUENCE:
1 OF 37

ITEMIZED BID BID OPTION 1 OF 1

PAGE 1 OF 11

FEDERAL PROJECT NO. STP-9901(630)

COUNTY PROJECT NO. AR-1586

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
ROADWAY ITEMS					
202-20.10	Removal of Improvements	L.S.	1		
202-22.30	Removal of Rigid Pavement	S.Y.	1857		
203-10.30	Land Disturbance Permits	L.S.	1		
304-05.04	Type 5 Aggregate Base (4" Thick)	S.Y.	2278.5		
414-10.10	Crackseal, ARS Roads	MILE	3.5		
502-11.09	Concrete Pavement (9" Non-reinforced)	S.Y.	2027.6		
604-12.01	Single Curb Inlet, Untrapped	EACH	1		
604-20.20	Adjusting Basin or Inlet	EACH	3		
604-20.23	Rebuild Manhole	EACH	1		



ADDENDUM 1

ITEMIZED BID BID OPTION 1 OF 1

PAGE 2 OF 11

FEDERAL PROJECT NO. STP-9901(630)

COUNTY PROJECT NO. AR-1586

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
ROADWAY ITEMS					
604-20.30	Adjusting Manhole to Grade	EACH	3		
604-21.95	Replace Precast Inlet Top	EACH	6		
604-90.52	Replace Inlet Sill	EACH	5		
606-10.00	Removal of Guardrail	L.F.	75		
606-10.10	Guardrail, Type "A"	L.F.	75		
606-30.95	Crashworthy Guardrail Terminal	EACH	1		
608-10.90	Remove and Replace Concrete Median/Island	S.Y.	1.3		
608-50.97	Remove and Replace Paved Approach (7")	S.Y.	12.3		
609-20.11	Integral Curb (6" Height and Under)	L.F.	241		



ADDENDUM 1

**ITEMIZED BID
BID OPTION 1 OF 1**

PAGE 3 OF 11

FEDERAL PROJECT NO. STP-9901(630)

COUNTY PROJECT NO. AR-1586

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
ROADWAY ITEMS					
609-20.90	Remove and Replace Integral Curb (6" Height and Under)	L.F.	221		
612-30.10	Standard Traffic Control Devices	L.S.	1		
612-60.92	Arrow Panel, Type "B" (Noiseless), Rental	EACH	2		
613-00.00	Joint Repair - Transverse	S.Y.	268.4		
613-20.21	Joint Repair - Longitudinal, High Early Strength	S.Y.	373.1		
613-40.10	Dowel Bar Retrofit	EACH	21		
617-10.00	Concrete Median Barrier, Type "A"	L.F.	20		
619-00.00	Mobilization	L.S.	1		
627-10.00	Diamond Grinding (Concrete Pavement)	S.Y.	10121		



ADDENDUM 1

ITEMIZED BID BID OPTION 1 OF 1

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FEDERAL PROJECT NO. STP-9901(630)

COUNTY PROJECT NO. AR-1586

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
ROADWAY ITEMS					
726-13.12	12" Class III Reinforced Concrete Pipe Culvert	L.F.	5		
802-60.82	Remove and Replace Mulch (2" Depth)	S.Y.	3722		
803-20.00	Strip Sodding	S.Y.	51		
SUBTOTAL - ROADWAY ITEMS					

STRUCTURAL ITEMS					
703-20.02	Class "B" Concrete (Miscellaneous)	C.Y.	1		
710-60.00	Reinforcing Steel (Epoxy-Coated) (Grade 60)	LBS.	50		
SUBTOTAL - STRUCTURAL ITEMS					

COUNTY TRAFFIC SIGNAL ITEMS					
904-02.13	Signal Head, Type 3S	EACH	2		



ADDENDUM 1

ITEMIZED BID BID OPTION 1 OF 1

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FEDERAL PROJECT NO. STP-9901(630)

COUNTY PROJECT NO. AR-1586

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
COUNTY TRAFFIC SIGNAL ITEMS					
904-02.34	Signal Head, Type 34S	EACH	2		
904-05.43	Signal Head, Type 3B, Terminal Compartment, and Astro Bracket Mounting	EACH	5		
904-05.44	Signal Head, Type 4B, Terminal Compartment, and Astro Bracket Mounting	EACH	2		
904-05.45	Signal Head, Type 5B Cluster Assembly, Terminal Compartment, and Astro Bracket Mounting	EACH	1		
904-24.01	Signal Head, Type 1S, Pedestrian	EACH	14		
904-28.07	Post, Signal, w/Sq. Pedestal Base and Post Cap, 7' Maximum Total Height, Aluminum	EACH	7		
904-32.30	19' Pole, w/30' Mast Arm, Steel	EACH	1		
904-32.34	19' Pole, w/34' Mast Arm, Steel	EACH	1		
904-32.36	19' Pole, w/36' Mast Arm, Steel	EACH	1		



ADDENDUM 1

ITEMIZED BID BID OPTION 1 OF 1

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FEDERAL PROJECT NO. STP-9901(630)

COUNTY PROJECT NO. AR-1586

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
COUNTY TRAFFIC SIGNAL ITEMS					
904-32.42	19' Pole, w/42' Mast Arm, Steel	EACH	1		
904-43.88	Controller, Fully Actuated, (8 Phase Timer, in Aluminum Cabinet Approx. 55"H x 44"W x 26"D, Wired for 8 Phase Operation) w/Internal Fiber Optic Modem and Termination Housing, TS2, Type 2, w/Battery Backup	EACH	2		
904-49.22	Detector, Pedestrian Push Button, APS, Freezeproof	EACH	14		
904-49.35	Detector, Vehicle Induction Loop, Card Rack Mtg., 2 Channel, w/Delay and Extension Timing and Relay Outputs	EACH	13		
904-51.00	Conduit, 1"	L.F.	186		
904-51.25	Conduit, 1-1/4"	L.F.	22		
904-52.00	Conduit, 2"	L.F.	144		
904-54.00	Conduit, 4"	L.F.	456		
904-74.99	Conduit Repair (locate broken conduit, excavate, remove existing cable, repair/replace conduit, reinstall cable, backfill and restore) (Does not include sidewalk or pavement removal and replacement)	EACH	2		



ADDENDUM 1

ITEMIZED BID BID OPTION 1 OF 1

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FEDERAL PROJECT NO. STP-9901(630)

COUNTY PROJECT NO. AR-1586

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
COUNTY TRAFFIC SIGNAL ITEMS					
904-82.06	Cable, Power, #6 Gauge, 1 Conductor	L.F.	610		
904-83.05	Cable, Signal, #14 Gauge, 5 Conductor	L.F.	760		
904-83.07	Cable, Signal, #14 Gauge, 7 Conductor	L.F.	2950		
904-84.00	Wire, Stranded Ground, #6 Gauge	L.F.	200		
904-85.05	Cable, Detector Loop, #14 Gauge, 1 Conductor, w/Tube Jacket (In Conduit and Pull Boxes)	L.F.	470		
904-85.06	Cable, Detector Loop, #14 Gauge, 1 Conductor, w/Tube Jacket (In Sawed Slot)	L.F.	3230		
904-85.18	Cable, Push Button and/or Detector Loop Lead-In, #18 Gauge, 2 Conductor (Shielded)	L.F.	4990		
904-85.34	Cable, Communication, #18 Gauge, 4 Conductor (APS)	L.F.	390		
904-85.36	Cable, Communication, Fiber Optic, 36 Fibers (30 Single-Mode and 6 Multi-Mode)	L.F.	1850		

ITEMIZED BID BID OPTION 1 OF 1

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FEDERAL PROJECT NO. STP-9901(630)

COUNTY PROJECT NO. AR-1586

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
COUNTY TRAFFIC SIGNAL ITEMS					
904-88.01	Pull Box, Single, Concrete	EACH	9		
904-88.02	Pull Box, Double, Concrete	EACH	2		
904-91.00	Pad, Controller, Concrete	EACH	2		
904-91.43	Base, Type P-3, Concrete	EACH	7		
904-91.57	Base, Type B-7, Concrete	EACH	3		
904-91.59	Base, Type B-9, Concrete	EACH	1		
904-91.88	Base, Type D-8PH, Concrete	EACH	2		
904-93.10	Temporary Signal Installation	EACH	1		
904-95.10	Opening Drilled in Existing Concrete Pull Box	EACH	23		



ADDENDUM 1

ITEMIZED BID BID OPTION 1 OF 1

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FEDERAL PROJECT NO. STP-9901(630)

COUNTY PROJECT NO. AR-1586

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
COUNTY TRAFFIC SIGNAL ITEMS					
904-95.20	Removal of Concrete Single Pull Box	EACH	3		
904-95.30	Removal of Preformed Pull Box	EACH	1		
904-96.20	Removal of Concrete Base	EACH	1		
904-96.21	Removal of Concrete Controller Base	EACH	1		
904-97.20	Removal of Signal Equipment (Intersection)	EACH	1		
904-97.33	Removal of Existing Controller Cabinet	EACH	1		
904-97.42	Removal of Signal Head	EACH	6		
904-98.89	Relocation of Existing Signal Cables	L.F.	560		
SUBTOTAL - COUNTY TRAFFIC SIGNAL ITEMS					



ADDENDUM 1

ITEMIZED BID BID OPTION 1 OF 1

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FEDERAL PROJECT NO. STP-9901(630)

COUNTY PROJECT NO. AR-1586

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
PEDESTRIAN AND BICYCLE ITEMS					
201-20.11	Clearing Vegetation from the Pedestrian Access Route	L.S.	1		
412-20.00	Sidewalk Grinding	EACH	3		
608-60.04	Concrete Sidewalk (4" Thick)	S.Y.	107		
608-60.08	Concrete Sidewalk, Curb Ramp	EACH	22		
608-60.94	Remove and Replace Concrete Sidewalk (4" Thick)	S.Y.	197.1		
608-60.96	Remove and Replace Concrete Sidewalk (6" Thick)	S.Y.	2.5		
608-60.98	Truncated Domes for Curb Ramps (New Construction)	S.F.	190		
608-70.00	Concrete Steps	S.F.	5		
SUBTOTAL - PEDESTRIAN AND BICYCLE ITEMS					



ADDENDUM 1

**ITEMIZED BID
BID OPTION 1 OF 1**

PAGE 11 OF 11

FEDERAL PROJECT NO. STP-9901(630)

COUNTY PROJECT NO. AR-1586

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
PROJECT TOTAL - BID OPTION 1 OF 1					



ADDENDUM 1

**900.30.20 COMMUNICATION CABLE FOR ACCESSIBLE PEDESTRIAN
SIGNAL EQUIPMENT**

- A. This communication cable is only to be used to connect the pedestrian push button detector to the relay in the pedestrian signal indication.
- B. This type of cable shall be 300 volts and have four (4) conductors. The conductors shall be No. 18 AWG, stranded thin copper wire, with polyvinyl chloride insulation (0.017 inch thick) color and/or number coded with a nylon overcoat. The communication cable shall have a black polyvinyl chloride outer jacket (0.042 inch thick) and be plainly marked on the outside with the manufacturer's name and identification of the type of cable. This communication cable shall be rated for outdoor use. The nominal outside diameter of the cable shall be approximately 0.309 inches.
- C. Payment for this work will be made at the contract unit prices for Bid Item No. 904-85.34, Cable, Communication, #18 Gauge, 4 Conductor (APS).

900.30.21 PEDESTRIAN PUSH BUTTON DETECTOR

Section 904.4.7.1 of the St. Louis County Transportation Standard Specifications for Road and Bridge Construction is replaced as follows:

904.4.7.1 Pedestrian Push Button Detector. The pedestrian push button detector shall be able to operate as either a standard push button detector or as an accessible pedestrian signal (APS).

904.4.7.1.1 Basic Construction and Mounting The pedestrian push button detector shall be vandal resistant, pressure activated piezo type, with momentary LED, a push button locator tone, and a tactile arrow with high visual contrast. The push button shall be connected to the controller cabinet by means of a two conductor cable. The detector shall be a removable contact assembly mounted in an aluminum round case. The back of each case shall be designed for mounting to a round pole. A 1/2 inch opening for cable shall also be provided in the back of each case. Holes shall be formed in the assembly case for mounting the push button unit. The operating button shall be sturdy, secure against electrical shock to the user, and of such construction as to withstand continuous hard usage. Push buttons shall be mounted forty-two (42) inches above the paved landing with the face of the push button parallel with the associated crosswalk.

904.4.7.1.1.1 Control Module The pedestrian push button detector shall be connected to a control module located in the pedestrian head assembly by means of a four conductor cable outlined in section 904.3.2.6. The control module shall be supplied by the same manufacturer of the pedestrian push button detector to ensure compatibility. The control module shall be installed per the manufacture's recommendations.

904.4.7.1.2 Accessible Pedestrian Signal (APS) Features. Every pedestrian push button detector shall have the following specifications and features:

- 1) An accessible walk indication (a speech message or percussion tone) that runs concurrent with the pedestrian WALK signal indication shall be considered a standard feature. The accessible walk indication shall have the same duration as the pedestrian WALK signal indication except when the pedestrian signal rests in walk. If the pedestrian signal rests in walk, the accessible walk indication should be limited to the first 7 seconds of the walk interval. The accessible walk indication should be recalled by a button press during the walk interval provided that the crossing time remaining is greater than the pedestrian change interval.
- 2) A speech push button information message such as "wait" and / or "wait to cross Main Street"
- 3) All tones, messages, and alerts shall be programmed by the manufacture per the plans, specifications and construction documents before the buttons are installed.
- 4) Speech messages shall be generated by an approved speech generating program. Project site recordings of speech messages will not be permitted.

- 5) All tones, messages, and alerts shall be in an uncompressed Waveform audio file format (WAVE or more commonly known as .WAV format due to its filename extension).
- 6) Be capable of utilizing the extended push button features outlined in the MUTCD

904.4.7.1.3 Maintenance and Operational Features. The pedestrian push button shall have the following basic features.

- 1) The push button shall be designed in a way to allow the accessible walk indication to be programmed and electronically updated by means of an easily accessed and weatherproof USB Type A port. Programming and electronic updates shall have a layer of security that ensures only authorized personnel can program, update or access the audio features. The push button shall be designed to allow for bidirectional electronic transfer of all tones, messages and alerts in individual uncompressed .WAV files
- 2) The push button shall be designed in a way to allow all APS features to be turned off.
- 3) Automatic volume adjustment in response to ambient traffic sound levels.
- 4) The operating voltage shall not exceed 24 volts.
- 5) The Circuit board(s) shall be potted
- 6) The push button shall be designed in a way to facilitate the repair or replacement of components such as the speaker and circuit board with ease.

904.4.7.1.4 Pedestrian Push Button Detector Extension Assembly. A pedestrian push button detector extension assembly shall be a standard feature where an obstruction creates a horizontal side reach of more than ten (10) inches to the push button detector.

- 1) The pedestrian push button detector extension assembly shall be installed in accordance with standard detail drawing C904.20.
- 2) The pedestrian push button detector extension assembly shall be considered incidental to the cost of the pedestrian push button detector. No direct payment will be made for an extension assembly.
- 3) The pedestrian push button detector extension assembly should not exceed eight (8) inches in length.

904.4.7.1.4.1 Installation, Assembly, and Mounting.

- 1) The pedestrian push button detector extension assembly shall be banded onto the mast arm or aluminum post using a 5/8 inch by 0.30 inch stainless steel banding and stainless steel mounting hardware.

- 2) The push button case shall be attached to the extender plate weldment by means of two counter sink head bolts with flat washers, split lock washers, and hex head nuts. All bolts, washers and nuts shall be stainless steel.

904.4.7.1.5 Approval of Pedestrian Push Button Detector. In order for manufacturers' push button equipment to be approved, the following requirements must be fulfilled, unless otherwise approved by the Engineer.

- 1) The manufacturers' equipment must satisfactorily meet the specifications as described herein.
- 2) The manufacturers' equipment must have been previously tested with satisfactory results by the Saint Louis County Department of Transportation. It shall be the prerogative of the Saint Louis County Department of Transportation to determine whether a new model of previously approved equipment will be accepted without retest.
- 3) The manufacturers' equipment must meet the subjective approval of the Saint Louis County Department of Transportation concerning the following:
 - a) Appearance (suitable size of equipment and ease of installation).
 - b) User friendly (ease of programming, accessibility for monitoring).
 - c) Uniformity and Compatibility (ease of maintenance, convenient board testing and removal, state of the art board layout and design,).

1200.90.11 ACTUATED CONTROLLER UNIT FEATURES

Section 904.4.6.4 of the St. Louis County Transportation Standard Specifications for Road and Bridge Construction is replaced as follows:

904.4.6.4 Actuated Controller Unit Features. The controller unit shall be a fully actuated controller unit with a full complement of operational, programming, and diagnostics capabilities. The controller unit shall meet or exceed both NEMA TS-1 1989 and TS-2 2003 Actuated Controller Unit Standards. The controller unit shall have a LCD alphanumeric backlit display unit (8-line 40 character/line). Programming shall use English language menus. The Controller can also be utilized as a master control unit using master software. An external 10 base-T Ethernet port with configurable IP shall be built in. 8MB of flash memory shall be required to retain all timing and control parameters even during power outages.

The controller unit shall be capable of the following:

- 1) 16 vehicle phases
- 2) 16 pedestrian phases
- 3) 4 timing rings
- 4) 16 overlaps
- 5) 80 detectors
- 6) Adaptive maximum routines
- 7) Adaptive protected/permissive routines
- 8) Coordination virtual split routine
- 9) Diagnostics & status displays
- 10) Multiple reports
- 11) Peer to Peer communication
- 12) 4 phase banks that are programmable by time of day
- 13) Each phase shall have 2 Walk times and 2 Don't Walk times that can be used in conjunction with the extended press feature

904.4.6.4.1 Controller Unit Functional Standards. The following controller unit functional standards are required in addition to those specified in the latest edition and revision of NEMA Standards Publication No. TS 2 Type 2, Traffic Control Systems.

- 1) Each vehicle phase provided shall have volume-density capability.
- 2) Dual ring controller units shall have the capability of dual entry operation without the use of external logic.

904.4.6.4.2 Controller Unit Connector Pin Designations. Unless otherwise specified, all designated pins of the controller unit connectors shall be internally wired. The manufacturer shall not be allowed to internally wire the Reserved, Spare, and Test Input pins for any special use, unless otherwise approved by the Engineer.

904.4.6.4.3 Controller Unit Assembly Requirements. The actuated controller unit shall conform to the physical standards, as specified in the latest edition and revision of NEMA Standards Publication No. TS 2 Type 2, Traffic Control Systems, and to the assembly design requirements specified herein:

- 1) The controller unit shall be designed for placement on a shelf.
- 2) The front panel(s) of the controller unit shall be permanently marked to identify the fuses, indicators, switches, controls, etc., so that the operation of each shall be readily apparent.
- 3) The controller unit shall be designed utilizing microprocessor based technology.
- 4) The controller unit shall be modular by design. Modules shall be positively fastened to the frame and easily removed and replaced without the use of any special tools. An upper and lower guide or track shall be provided for each module assembly in the controller unit chassis. All modules of unlike function shall be mechanically keyed to prevent insertion into the wrong opening and subsequent damage to the controller unit.
- 5) All connectors shall be front panel mounted.
- 6) All switching functions shall be accomplished by fully solid state electronic circuitry.
- 7) Timing shall be entered by a front panel keyboard and by computer. Easy to read keys shall provide either tactile or audio feedback.
- 8) Menu driven programming shall be provided utilizing traffic engineering terminology prompts. Within a menu, each parameter shall be viewed for simple cursor control of data entries. Adding or changing data entries and instructions shall be accomplished without the use of an access code.
- 9) During a power failure, no batteries shall be required to retain memory.
- 10) A minimum 8 line by 40 character, alpha-numeric, liquid crystal display shall be provided on the front panel of the controller unit. The display shall have adjustable contrast settings providing easy to read displays under all lighting conditions. The display shall provide comprehensive visibility of program entries, operational parameters, controller units, and the status of intersection operation.
- 11) All component parts and terminals shall be readily accessible when the boards are removed from the enclosure for adjustments, testing or maintenance.
- 12) All wiring for input and output functions shall be terminated on panel terminal strips.
- 13) Controller units shall have the capability to log and display critical alarms on the unit display.

APS PUSH BUTTON PROGRAMMING

Project Name:		AR-1586	
St. Louis County Project Number:		Lucas-Hunt Road (South) ARS Infrastructure	
Federal Project Number:		STP-9901(630)	
E/W Gateway TIP Number:		6503Q-16	
Intersection Name:		Mainline Street	Cross Street
		Lucas-Hunt Road	Kinamore Drive
Location:	Arrow Direction	Tone / Voice	Voice (if needed)
1	right	Tone	
1a	right	Tone	
2	right	Tone	
3a	left	Tone	
4	right	Tone	
4a	left	Tone	

Intersection Name:		Mainline Street	Cross Street
		Lucas-Hunt Road	Hord-Huiskamp
Location:	Arrow Direction	Tone / Voice	Voice (if needed)
1	left	Tone	
1a	right	Tone	
2	left	Tone	
2a	right	Tone	
3	left	Tone	
3a	right	Tone	
4	left	Tone	
4a	left	Tone	