Minor Project Application

District Priority #	TSM&O #1
Project Name	Statewide Traffic Signal Uninterruptible Power Supply (UPS) Installation
District	All Districts (Statewide)
Route	Various locations
Beginning Mile Post	
Length of Project	240 Working days
County	Various
Project Location	Arizona
Type of Work	Traffic Signals UPS Installs
Estimated Cost for Project Development (includes right-of-way, utilities, and environmental)	$756,500
Estimated Cost for Project Construction	$1,840,000
Design Fiscal Year	2017
Construction Fiscal Year	2019

Brief description of the project:
The TSM&O Division is requesting a project to install new uninterruptible power supply (UPS) at 80 traffic signals. The State has 570 traffic signals and over 200 are without battery backup. The project is located throughout the State and includes work in all Districts. For many years, the Regional signal maintenance units have utilized maintenance funds to install 1-2 UPS systems each year through a procurement contract. This request is being initiated due to frequent power outages due to the harsh weather and heavy lightning storms during monsoon seasons. Having UPS installed at each intersection would minimize motorist confusion at "dark" signals – increasing safety and reducing crashes, reduce unnecessary technician dispatch to remote areas, and preserve traffic progression in coordinated networks. With UPS installed at a signal, a signal would have up to 8 hours of available battery power – spanning the length of the majority of power outages. This will significantly improve mobility and reliability along the ADOT routes.

The following six items represent the factors that the selection committee will use to rate each project. Address each of the following areas as they pertain to the proposed project:

Agency Goals: How does this project align with agency goals and performance measures?
Minor projects should fall within the Modernization category and should advance ADOT's goals that are included in the Long Range Transportation Plan.
Suggested Data to be submitted:

- Specific performance measures that this project would enhance
- Average Daily Traffic
- % Truck Traffic

Installation of UPS at these signals will improve safety and maximize existing agency resources – two of the Department's strategic focus areas. UPS will reduce maintenance cost by not having to send signal technicians to signals that are several hours away when the power goes out for a short period of time. When signals lose power, usually the signal is eventually controlled by an officer causing increased delay at the intersection and longer travel times in that area. When an officer is pulled from their daily duties it affects the level of service their agency is trying to provide as well. UPS have a lifetime of 25 years and will assist in the modernization of traffic signals in the State.

Operational Improvement: How will this project improve the highway operation?
Are there other operational improvements? If so, what are they and how will this project improve them?
Topics to consider addressing in application:

- Long term benefit
- Effect on lifecycle
- Level of Service
- Occurrence frequency
- Annual maintenance costs (include Pecos documentation if applicable)
- Annual repair costs (include Pecos documentation if applicable)
- Turn back possibilities

ADOT owns over 570 traffic signals throughout the State. A traffic signal is installed only if the intersection meets federal signalization warrants – usually due to vehicle volume. Based on these higher volumes, signals are installed to mitigate delay for the travelling public and reduce right-angle crashes. When a signal is dark for a peak fifteen minutes, it could take over an hour to return to normal operation once power is restored. When UPS are installed at each signal, the traveling public would not be affected due to a power outage in a particular area. This will reduce the number of vehicle or pedestrian conflicts as pedestrian indication is also effected. From a personnel standpoint, a traffic signal tech responds each time the traveling public or local law enforcement calls about a traffic signal being dark. Typically, power would be returned to the signal before the signal tech arrives. Therefore a UPS would also save cost for the signal tech and the wear and tear on state equipment.

Safety: How will this project improve safety? When applicable, be specific with spot(s) improvements.
Arizona is within the top 10 states for lightning strikes in the United States, according to the National Weather Service. Signalized intersections have high volume of traffic and/or pedestrians. When a signal is in full operation, it allows for safe passage through an intersection. When the intersection has a UPS installed, the signal continues to operate, therefore allowing the traveling public to continue through the intersection in a safe and controlled manner. This project is proposing the installation of 80 UPS systems throughout the State and each of them has the potential to keep local enforcement and our technicians out of the roadway. When traffic is queued up from large delays which could be experienced from a signal not functioning correctly, there is increased potential for crashes.

Community Support, Collaboration and Coordination: How important is this project to the community, Transportation Board, Governor's Office, public and private organizations and agencies, etc...? How is "community" support being demonstrated? Include unsolicited" supporting documentation such as letters of support, complaints etc...
The impact to the community, public and private organizations is seen immediately at many of these locations when a signal is not functioning. Aside from the pure safety impacts of an uncontrolled intersection, "dark" signals reduce revenue to the local businesses because people cannot get to where they want to go in the timely fashion they are accustomed to. The increased delay associated with a signal not functioning has a ripple effect on the community when people arrive late due to unanticipated signal failures. The Regional signal units frequently receive complaints regarding the operation of the signals in these areas particularly during monsoon seasons.

Budget Viability: Budget adequacy for a Minor Project consideration.
Why would this investment be the best use of the requested funding?
Are other funding sources committed to this project?
Any commitment from public and private organizations and agencies to contribute to project costs?
Include evidence of funding commitments by others.
Is requested budget amount reasonable for proposed project?

This project would be an excellent use of the Minor Project funds because of the relatively low dollar amount per location and the numerous benefits associated. The funding amount requested is in line with historic projects. Other direct funding sources for this type of work are limited and typically funded through traffic signal maintenance funds.

Project Delivery Risks: Likelihood of on time delivery
Discuss challenges that may hinder a timely delivery such as:

- environmental, right-of-way, and utility clearances
- railroad
- tribal land
- BLM, Forest, etc...
- Other risks

Project Schedule: provide a high level schedule with critical milestones.

The project would have to be designed to determine the full impact but it is anticipated that the vast majority would be within ADOT's right-of-way and would not have an impact on other agencies. Both environmental and ROW involvement is anticipated to be minimal.

Project Delivery Risks: Likelihood of on time delivery

Discuss challenges that may hinder a timely delivery such as:

- environmental, right-of-way, and utility clearances
- railroad
- tribal land
- BLM, Forest, etc.,
- Other risks

Project Schedule: provide a high level schedule with critical milestones.

The project has been previously surveyed for cultural resources and eighteen archaeological sites were identified. All are potentially eligible for nomination to the National Register of Historic Places (NRHP). A review of previous cultural resource surveys addressing the proposed project area, followed by consultation with the Arizona State Historic Preservation Office, will be required. Coordination with the EPG Historic Preservation Team will be required to determine the final course of action.

Clean Water Act, Section 404/401 investigation and permitting may be required for culvert extensions. Since ground-disturbing activities will exceed 1 acre, then an Arizona Pollutant Discharge Elimination System construction general permit would be required.

The United States Fish and Wildlife Services (USFWS) list of threatened, endangered, proposed, and candidate species for Navajo County will need to be evaluated by a biologist.

The project will be using federal funding; therefore, consideration of Section 4(f) properties will be necessary.

Attach are the following documents to the application:

Map, Photographs

Estimated design and construction costs breakdown

Signatures:

2-17-16

TSMO
~~District~~ Engineer Signature Date

2/17/16

For George Wallace
Senior Project Manager Signature Date

2/17/16

Group Manager of responsible charge Signature Date

By signing, you agree you have reviewed the cost estimate and delivery year.

Signal UPS - Proposed Priority Locations

Central Region

1	SR 347	Gravel Pit Road
2	SR 347	Casa Blanca
3	SR 347	Cobblestone North
4	SR 347	Cobblestone South
5	SR 347	SR 238
6	SR 347	Fiesta
7	SR 347	Edison
8	SR 347	Hathaway
9	SR 347	Maripoca Casa Grande Highway
10	SR 347	Honeycutt
11	SR 348	Alterra
12	SR 349	Bowlin

Northern Region

1	SR 89A	Riordan
2	I-40	Butler EB ramp
3	I-40	Butler WB ramp
4	B-40	4th Street
5	US 163	N106
6	US 160	US 163
7	SR 98	Coppermine Road
8	US 160	SR 264
9	SR 260	SR 73
10	SR 264	IR 12
11	SR 73	Fatco Road
12	SR 73	IR 55
13	SR 264	IR 12/IR 112
14	US 60	SR 260
15	I-40	Navajo Boulevard
16	SR 77	Florida
17	US 180	Birch
18	US 180	Aspen
19	US 180	Columbus
20	US 180	Schultz Pass
21	B-40	Verde

Western Region

1	SR 95	Courtwright Road
2	SR 95	King
3	SR 95	Boundry Cone Road
4	SR 95	Joy Lane
5	SR 95	El Rodeo
6	SR 95	Aztec Road
7	SR 95	Camp Mohave Road
8	SR 95	The Center Loop
9	SR 95	Airport Center
10	SR 95	Retail Drive
11	SR 95	Chenoweth Drive
12	SR 95	Lake Drive
13	I-10	Riggles Avenue ramps
14	SR 95	Kuehn Street
15	B-10	US 95
16	I-8	Avenue 3E ramps
17	I-8	Fortuna Road EB ramp
18	I-8	Fortuna Road WB ramp
19	I-8	Foothills Drive EB ramp
20	I-8	Foothills Drive WB ramp
21	US 60	Mariposa
22	US 60	Vulture Mine Road

Southern Region

1	SR 77	Rudasill Road
2	SR 77	Orange Grove Road
3	SR 77	Hardy
4	SR 77	Pusch View
5	SR 77	First Avenue
6	SR 77	La Reserve
7	SR 77	Honeywell
8	SR 77	Saddlebrook Road
9	I-10	SR 287 EB ramp
10	I-10	SR 287 WB ramp
11	I-10	Sunland Gin EB ramp
12	I-10	Sunland Gin WB ramp
13	I-10	Toltec Road ramps
14	I-10	Cortaro Road ramps
15	I-10	Ina Road ramps
16	I-10	Orange Grove ramps
17	I-10	Hotel Circle ramps
18	I-10	Alvernon Way ramps
19	I-10	SR 186 ramps
20	SR 90	Village Loop Drive
21	SR 90	SR 82
22	SR 90	7th Street
23	SR 90	Coronado Drive
24	SR 90	Charleston Road
25	SR 90	SR 92

Arizona Department of Transportation

Estimated Engineering Construction Cost

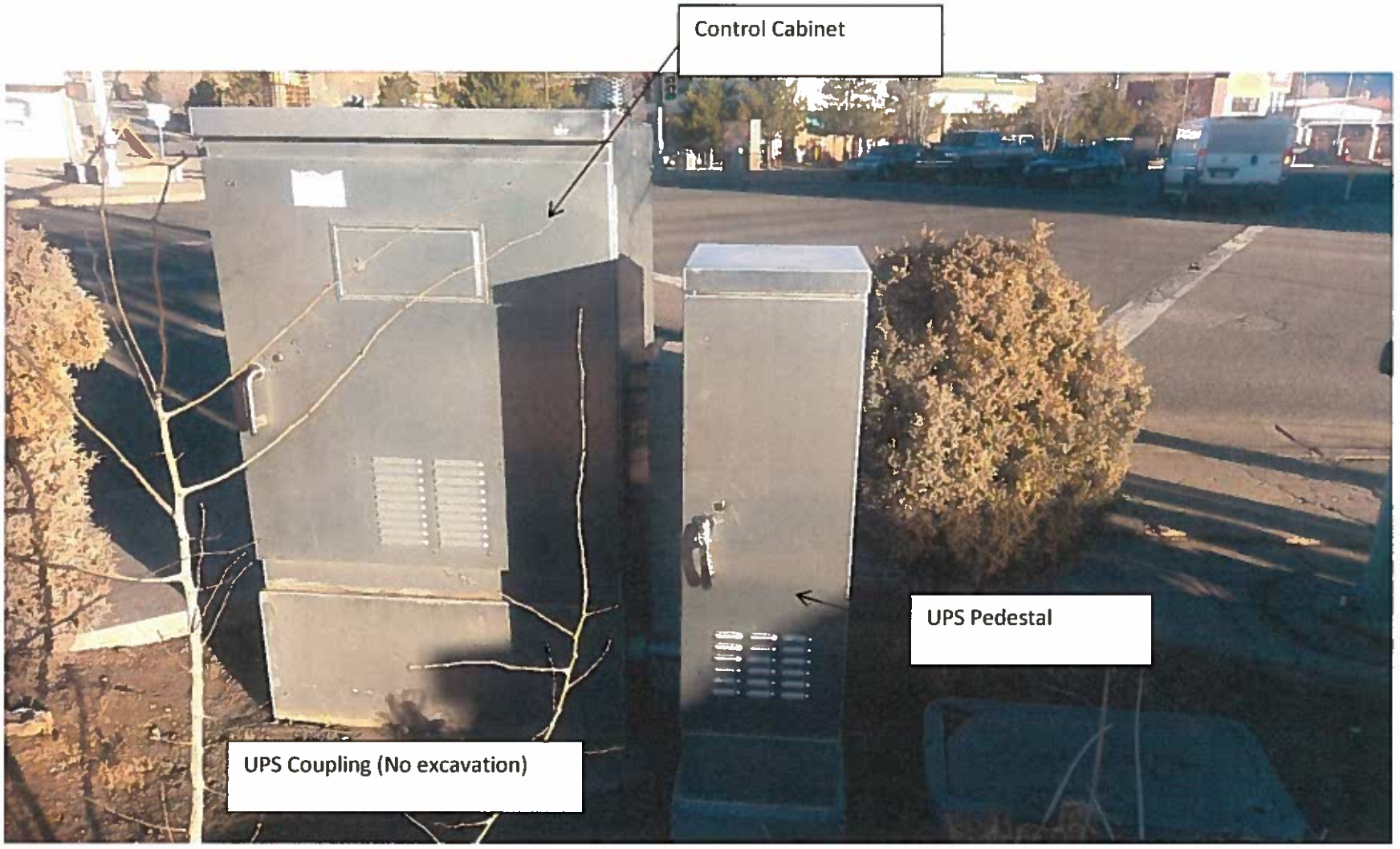
Description	Measure	Quantity	Estimated Cost	Total Cost
Portable Sign Stands	Each-Day	1920	$2.00	$3,840
Temporary Sign (Type II) (less Than 10 S.F.)	Each-Day	1920	$1.25	$2,400
Flagging Services (Local Enforcement Officer)	Hour	240	$95.00	$22,800
Pedestal (UPS Cabinet)	Each	80	$15,500.00	$1,240,000
Mobilization	L.SUM	8	$25,000.00	$200,000
			Subtotal	$1,469,040
Construction Engineering			20%	$293,808
Construction Contingency			5%	$73,452
			Subtotal	$1,836,300
Scoping - PA			10%	$146,904
Final Design			18%	$264,427
ADOT Fee for PE Review/Staff Charges			(DICE Worksheet)	$102,000
Indirect Cost Allocation (ICAP)			10.35%	$243,187
			Total	**$2,592,818**

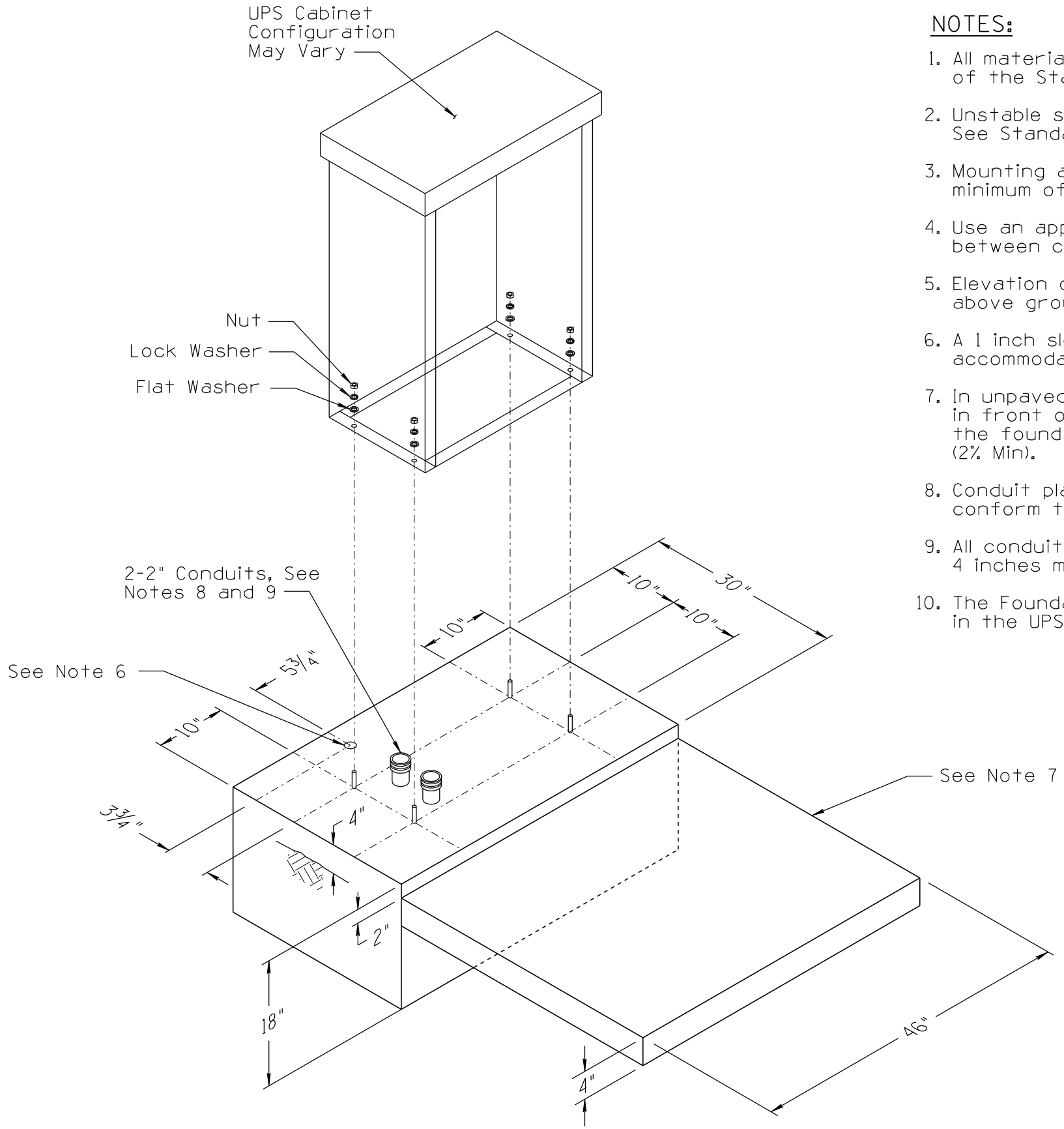
DICE WORKSHEET

SectionName	FunctionName	Rate	Hours	TotalCost
Bridge	Bridge Design	$ 60	0	$ -
Bridge	Scour	$ 60	0	$ -
Communication	Communication & Community Partnership	$ 45	20	$ 900.00
Contracts and Specs	Contracts and Specs	$ 60	260	$ 15,600.00
District	District	$ 55	60	$ 3,300.00
Engineering Consulting Section	Engineering Consulting Section	$ 40	0	$ -
Environmental Planning	Environmental Planning	$ 50	200	$ 10,000.00
Environmental Planning	Corps	$ 50	0	$ -
Joint Project Agreement	Joint Project Agreement	$ 40	0	$ -
Materials	Pavement Design	$ 50	0	$ -
Materials	Geotech Design	$ 50	0	$ -
Materials	Geotech Field Investigation	$ 50	0	$ -
Materials	Soil & Aggregate Lab	$ 50	0	$ -
Right of Way	Plans	$ 50	60	$ 3,000.00
Right of Way	Titles	$ 50	0	$ -
Right of Way	Appraisals	$ 50	0	$ -
Right of Way	Acquisition	$ 50	0	$ -
Right of Way	Relocation	$ 50	0	$ -
Right of Way	Demolition	$ 50	0	$ -
Right of Way	Property Management	$ 50	0	$ -
Right of Way	Operations/Accounting	$ 50	0	$ -
Right of Way	Project Coordination	$ 55	40	$ 2,200.00
Roadway Group	Drainage	$ 55	0	$ -
Roadway Group	Roadway Design	$ 55	0	$ -
Roadway Group	Roadside Development	$ 55	0	$ -
Roadway Group	Roadway Review	$ 70	0	$ -
Roadway Group	Pre-Design	$ 55	60	$ 3,300.00
Statewide Project Management	Project Manager	$ 55	450	$ 24,750.00
Statewide Project Management	Project Coordinator	$ 55	90	$ 4,950.00
Surveying	Photogrammetry/Mapping (PM05, PM15)	$ 45		$ -
Surveying	Location Surveys (LS50, LS70)	$ 45		$ -
Traffic	Studies & Analysis	$ 55		$ -
Traffic	Signal & Lighting	$ 55	200	$ 11,000.00
Traffic	Pavement Markings	$ 55	0	$ -
Traffic	Traffic Design	$ 55	80	$ 4,400.00
Traffic	Signing	$ 55	0	$ -
Transportation Technology Group	Transportation Technology Group	$ 55	10	$ 550.00
Urban Project Management	Project Manager	$ 60		$ -
Urban Project Management	Project Coordinator	$ 60		$ -
Utilities & Railroad	30% and Prior	$ 50	10	$ 500.00
Utilities & Railroad	Post 30%	$ 50	20	$ 1,000.00
Value Analysis	Value Analysis	$ 65		$ -
	SUBTOTAL		1560	$ 85,450.00
	Lesser of 7.5% or $50,000			$ 6,408.75
	ICAP			$ 9,544.12
	STAFF GRAND TOTAL			**$ 102,000.00**

DICE UPS PROJECT

Typical UPS Pedestal Installation (SR 89A @ Riordan – Flagstaff)





NOTES:

1. All materials and construction shall conform to the requirements of the Standard Specifications.
2. Unstable soil and/or steep slopes may require deeper foundations. See Standard Specifications or project Special Provisions.
3. Mounting anchor bolt studs shall project above the foundation a minimum of 2 inches.
4. Use an approved silicone sealer (RTV type), grey in color or clear between cabinet and foundation.
5. Elevation of cabinet foundation shall be a minimum of 4 inches above ground line.
6. A 1 inch sleeve shall be placed at the depicted location to accommodate a ground rod.
7. In unpaved areas, a raised PCC pad 36" x 4" x 46" shall be placed in front of the cabinet, and the pad shall be set 2 inches below the foundation elevation. Slope pad away from cabinet to drain (2% Min).
8. Conduit placement and grounding configuration shall be verified to conform to the specific requirements of the UPS cabinet manufacturer.
9. All conduits shall project above the foundation 2 inches minimum to 4 inches maximum. Conduits shall be capped.
10. The Foundation Bolt pattern shall be as depicted. The mounting holes in the UPS cabinet shall fit the foundation bolt pattern.

NOT TO SCALE

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	2010 EDITION	C. COLE	03/10
2	ADDED NOTE NO. 10.	L. LOPEZ	03/15

DESIGN APPROVED **SIGNATURE**	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION TRAFFIC SIGNALS AND LIGHTING STANDARD DRAWINGS	REVISION 03/15
APPROVED FOR DISTRIBUTION **ON FILE**	TRAFFIC SIGNAL UPS CABINET FOUNDATION DETAIL	DRAWING NO. T.S. 2-7 SHEET NO. 1 OF 1

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