

MONTEZUMA CASTLE NATIONAL MONUMENT

PARKING LOT REDESIGN



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Location of Montezuma Castle National Monument

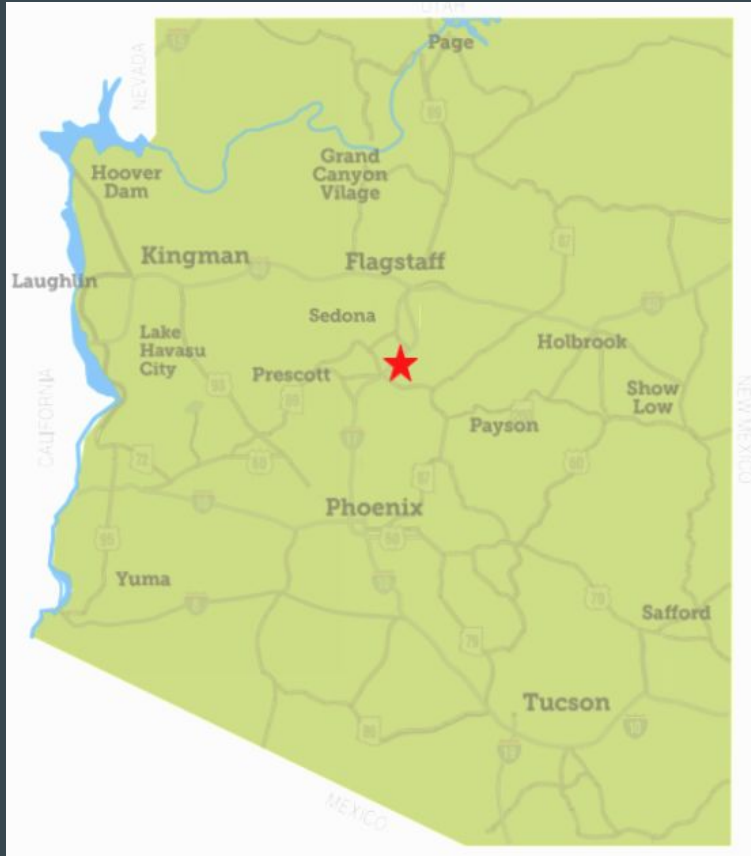


Figure 1: Location of Site Within Arizona [1]

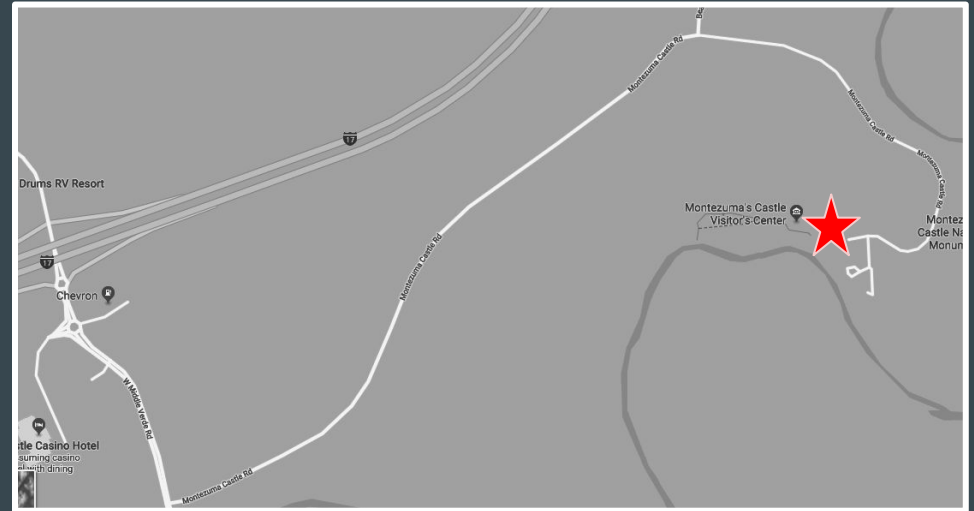


Figure 2: Vicinity Map from I-17 [1]

Site Description

- Parking Lot Characteristics:
 - 60 regular parking spaces
 - 4 ADA parking spaces
 - 4 bus/RV parking spaces
 - Large vegetation area in middle
 - Bordering sidewalks



Figure 3 & 4: Parking at Montezuma Castle [1]

Site Schematic - Existing

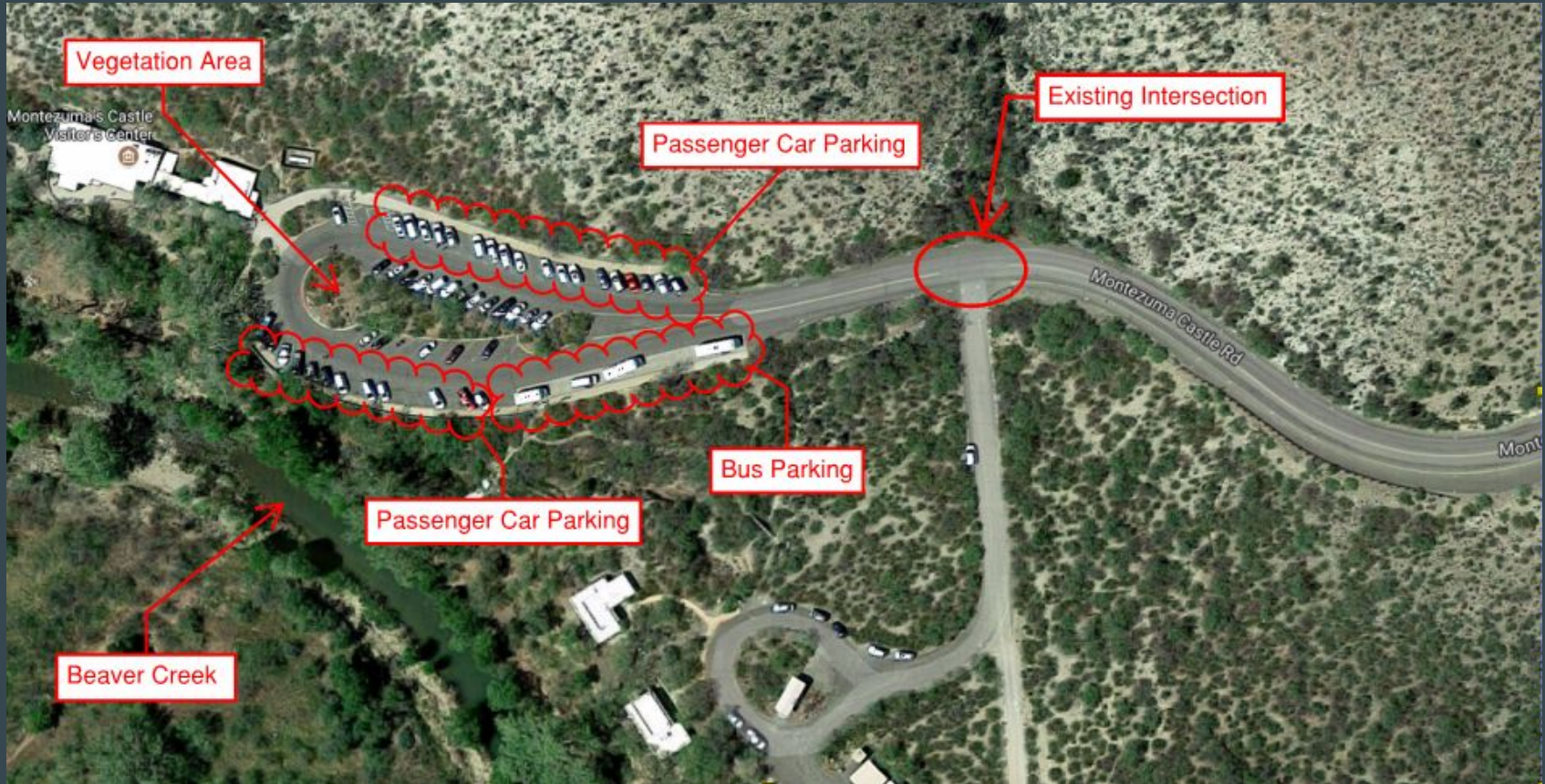


Figure 5: Site Schematic-Existing [1]

Project Background and Understanding

Site not currently optimal for visitor usage

- Pedestrian safety concerns
- Lack of parking spaces and usability
- Full parking lot turns visitors away



Figure 6: Number of Visitors of Montezuma Castle per Month [2]

Project Objectives

- Redesign the existing parking lot
 - Design a bus drop off zone
 - Design a usable and safely accessible picnic area
- Design a new bus/RV parking lot
- Promote site safety through use of sidewalks, crosswalks, control, and signage



Figure 7 & 8: Existing Parking Lot Pull Through
Photo by: Andrew McLaughlin

Site Schematic - Proposed

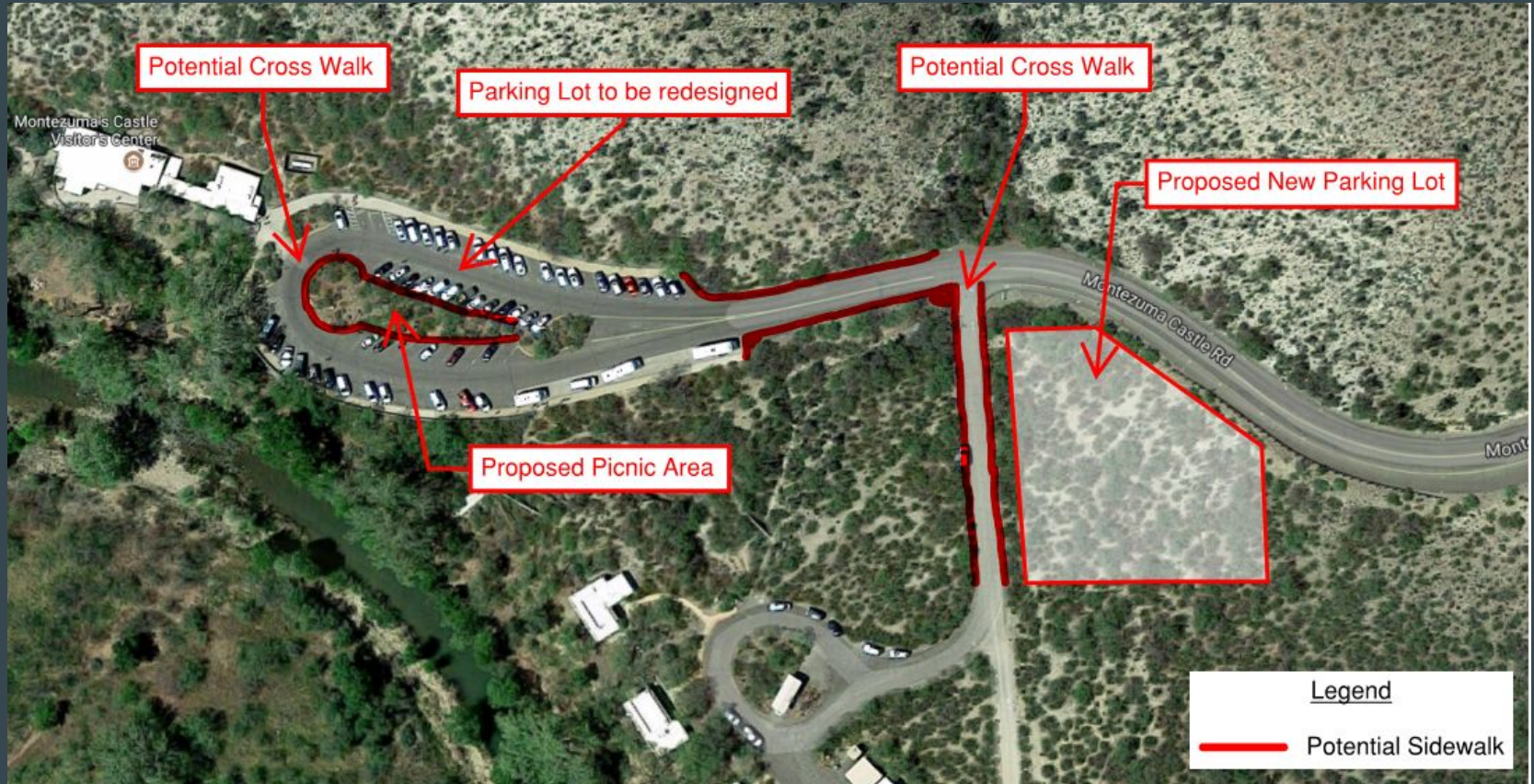


Figure 9: Site Schematic-Proposed [1]

Scope of Work

1. Site Investigation
 - a. Sitewalk
 - b. Assess current conditions
 - c. Field Survey
2. Hydrology and Hydraulics
 - a. Map existing drainage basin
 - b. Map proposed changes within basin
3. Site Plan
 - a. Developing a parking lot, sidewalks, and picnic area, and drop off zones.
 - b. Striping and Signage for existing and proposed parking lots
 - c. Grading and Drainage



Figure 10: Looking West at the Existing Parking Lot
Photo by: Andrew McLaughlin

Scope of Work

4. Traffic Analysis

- a. Evaluate: sight distances for intersections and conflict points, stopping distances, traffic movement
- b. Determine whether a controlled intersection is necessary.

5. Impact Reports

- a. Hydrology and Hydraulic
- b. Traffic Impact

6. Construction Documentation

- a. Full set of drawings for review
- b. Bid schedule for contractor pricing



Figure 11: Looking East at the Existing Parking Lot
Photo by: Andrew McLaughlin

Staff and Billing Rates

All rates include compensations, benefits, and overhead.

- **Project Engineer: \$120/Hr**
 - Provides oversight, technical expertise, and design review
- **Staff Engineer: \$100/Hr**
 - Responsible for project management and coordination along with more technical design
- **Surveyor: \$90/Hr**
 - Provides survey services and raw data to the designer
- **Engineer in Training: \$80/Hr**
 - Responsible for the majority of the design work
- **Admin: \$65/Hr**
 - Assembles deliverables and provides edits to report as required
- **Technician: \$60/Hr**
 - Completes drafting and plan preparation of design
- **Intern: \$50/Hr**
 - Completes minor design work and on-site tasks

Cost of Engineering Services

Staff (Hours)

Task	Project Engineer	Staff Engineer	Survey	EIT	Admin	Tech	Intern	Total Task
Site Investigation	4	4	35	30	2	2	4	81
Traffic Analysis	4	2	0	23	2	0	2	33
Hydrology	8	15	5	49	2	6	15	100
Site Plan	8	12	0	22	2	10	12	66
Impacts	8	7	0	20	2	5	7	49
Construction Plans	20	34	0	64	5	40	34	197
Deliverables	5	2	2	106	25	5	2	147
Project Coordination	5	5	5	132	51	5	5	208
Hours Total	62	81	47	446	91	73	81	881

<i>Billing Rate</i>	\$120	\$100	\$90	\$80	\$65	\$60	\$50
<i>Position Total</i>	\$7,440	\$8,100	\$4,230	\$35,680	\$5,915	\$4,380	\$4,050

Reimbursables	Rate (\$/Mi)	Expected	Total
Mileage*	0.65	212	\$137.80
Plan Production	To be billed per sheet as required for deliverables		

PROJECT TOTAL **\$69,933**

*Assumed two site visits. Additional costs associated with travel included in hourly rate schedule shown above

References

[1]"Montezuma Castle National Monument", Montezuma Castle National Monument, 2017. [Online]. Available: <https://www.google.com/maps/place/Montezuma+Castle+National+Monument/@34.6115755,-111.8371741,17z/data=!3m1!4b1!4m5!3m4!1s0x872daabdb1196721:0x8605dcdaba237348!8m2!3d34.6115755!4d-111.8349854>. [Accessed: 28- Nov- 2017].

[2] "Park Statistics - Montezuma Castle National Monument (U.S. National Park Service)", Nps.gov, 2017. [Online]. Available: <https://www.nps.gov/moca/learn/management/statistics.htm>. [Accessed: 28- Nov- 2017].