

I-40/COUNTRY CLUB DRIVE ON-RAMP PROPOSAL

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CENE 476

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Project Location

- The On-Ramp is located on N Country Club Drive adjacent to Interstate 40 in Flagstaff, AZ (shown in red)

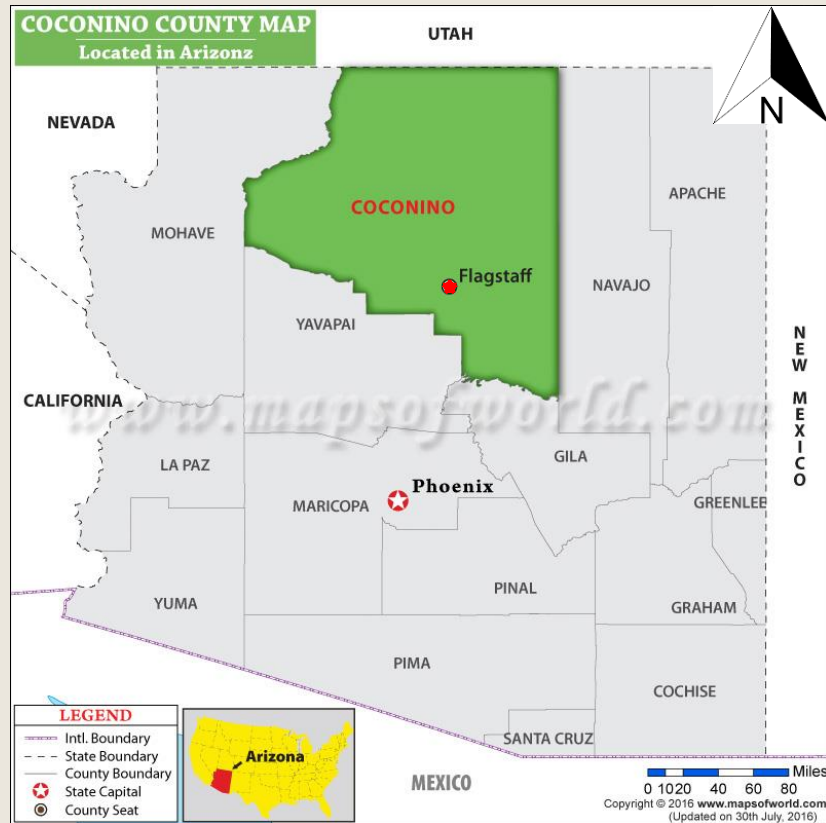


Figure 1: State of Arizona Project Location (1" = 80 miles) [1]



Figure 2: City of Flagstaff Project Location (NTS) [2]

Project Purpose

- One Southbound entrance onto I-40 westbound
- Existing detention basin on north side
- Adding an additional right turn lane to the on-ramp to increase capacity
- Expand existing on ramp from 1 to 2 lanes to reduce congestion

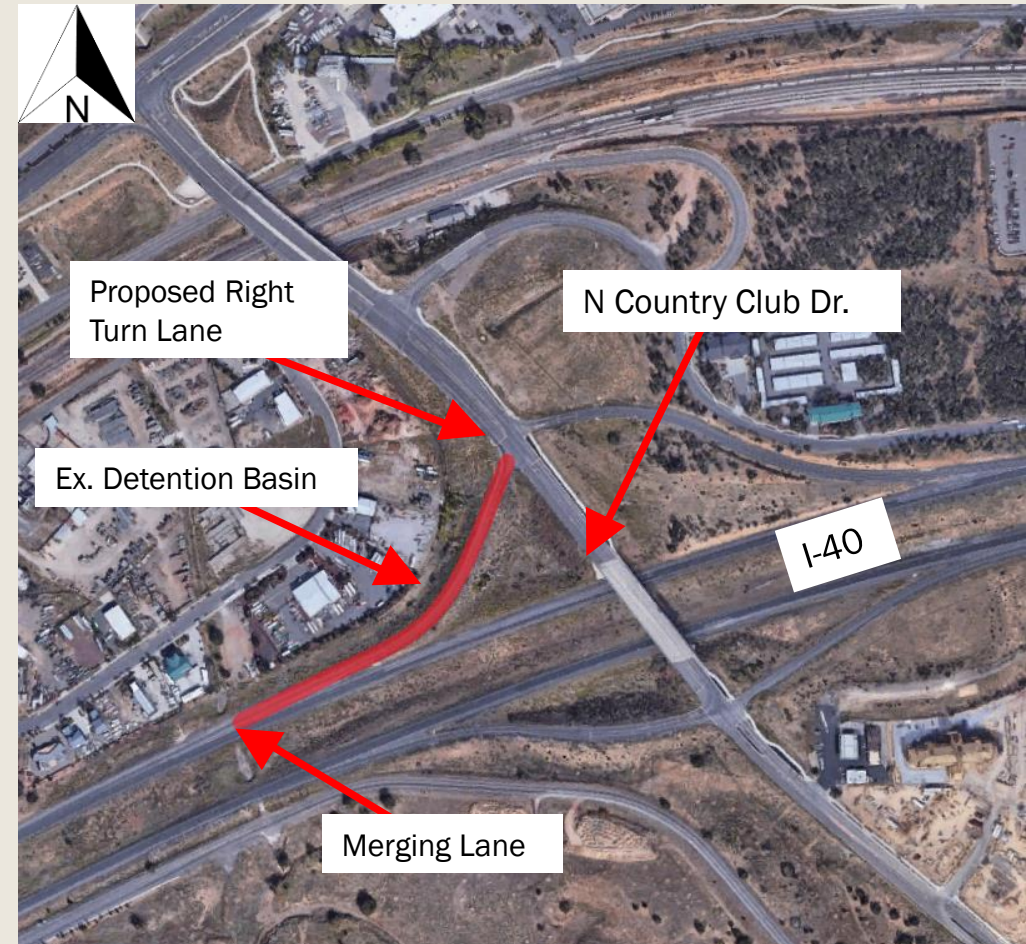


Figure 3: Zoomed in Project Location (NTS) [2]

Stakeholders

- Arizona Department of Transportation
 - *Nate Reisner, P.E., Development Engineer*
- City of Flagstaff
 - *Daily users of this facility*



Figure 4: ADOT Logo [3]

Task 1: Analyze/Review Existing Studies

- 1.1 Site Visit
- 1.2 Process Survey Data from GIS
- 1.3 Analyze Existing Drainage Studies/Obtain As-Built Information
- 1.4 Existing Runoff Calculations
- 1.5 Obtain and Analyze Geotechnical Data from ADOT
- 1.6 Input and Process Existing Geometry into Civil 3D
- 1.7 Create Existing Cross Sections
- 1.8 Create Roadway Alignments/Base Files

Task 2: Design

- 2.1 Design/Create Proposed Cross-Sections
- 2.2 Initial Design
 - 2.2.1 Intersection Design
 - 2.2.2 On-Ramp Design
- 2.3 Final Design Geometry/Cross-Sections
- 2.4 Final Drainage Design
- 2.5 Stormwater Pollution Prevention Control Plan
- 2.6 Construction Plan Set
- 2.7 Synchro Analysis and Traffic Analysis Recommendation

Task 3: Deliverables

- 3.1 30% Submittal (Includes Task 1)
- 3.2 60% Submittal (Includes Task 1 & 2)
- 3.3 90% Submittal (Includes Task 1, 2 & 4)
- 3.4 Final Design Concept Report Submittal (Includes Task 1, 2 & 4)
- 3.5 Website

Task 4: Impacts

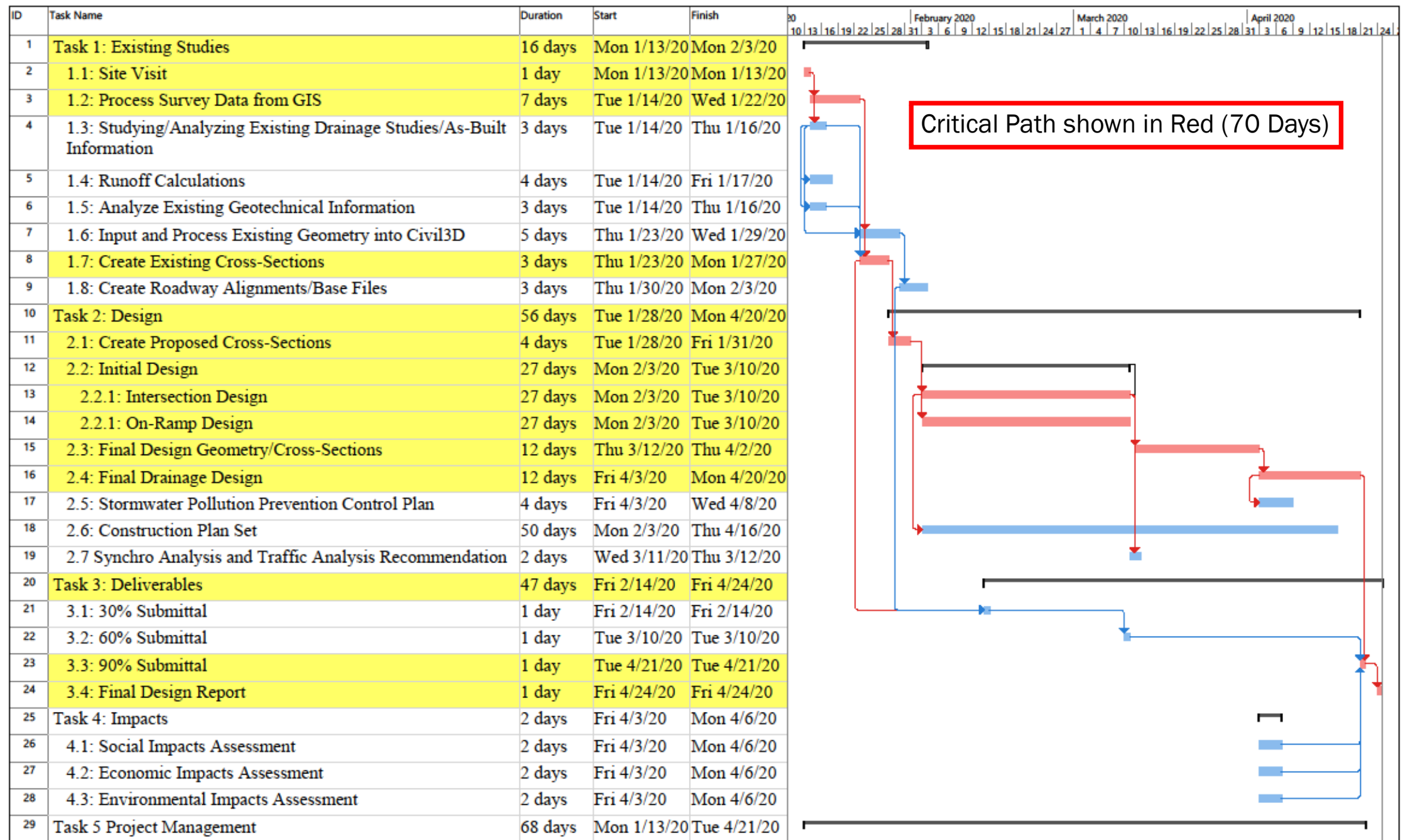
- 4.1 Economic Impacts
- 4.2 Environmental Impacts
- 4.3 Social Impacts

Task 5: Project Management

- 5.1 Grading Instructor Meetings
- 5.2 Client Meetings
- 5.3 Technical Advisor Meetings
- 5.4 Team Meetings
- 5.5 Schedule Management
- 5.6 Cost/Resource Management

Exclusions

- Full Survey
- Geotechnical Analysis
- Collection of Traffic Data
- Traffic Signal Planning
- Environmental Permits/Mitigation Measures
- Bridge Design
- New Drainage Infrastructure Design



Staffing

- **612** Total estimated hours for this project
- PE will lead Design Work
- PM will review work and ensure QA/QC

Table 1: Staffing Summary

Tasks	PM	PE	EIT	TECH	Total
Task 1: Existing Studies	6	18	40	52	116
Task 2: Design	17	38	98	74	227
Task 3: Deliverables	9	16	42	30	97
Task 4: Impacts	3	3	6	0	12
Task 5: Project Management	42	42	38	38	160
Total	77	117	224	194	612

Cost Estimate

- Total Estimated Cost of Engineering Services is **\$72,369**
- Travel Cost is Minimal, but was Included for Accuracy

Table 2: Cost Summary

1.0 Team Members	Billing Rate per Hour	Hours	Cost
PM	\$195.00	77	\$15,015
PE	\$155.00	117	\$18,135
EIT	\$110.00	224	\$24,640
TECH	\$75.00	194	\$14,550
Total			\$72,340
2.0 Travel			
8 Meetings @ 4 mi/meeting		\$0.58 mi/meeting	\$19
5 Meetings @ 2.5 mi/meeting		\$0.58 mi/meeting	\$10
Total			\$29
Total Cost of Engineering Services			\$72,369

References

- [1] “Coconino County Map” (2016). [Image] Available at: <https://www.mapsoftheworld.com> [Accessed 4 Dec. 2019].
- [2] “Google Maps”, *Google Maps*, 2019. [2019]. Available: <https://www.google.com/maps/@35.2171255,58.57948,17z> [Accessed 05- Dec- 2019].
- [3] “Arizona Department of Transportation”, *En.wikipedia.org*. 2019. [Online]. Available:https://en.wikipedia.org/wiki/Arizona_Department_of_Transportation [Accessed 05-Dec-2019]
- [4] “AASHTO-Roadside-Design-Guidelines,” American Association of State Highway and Transportation Officials, vol. 4th, 2011
- [5] “ADOT Roadway Design Guidelines,” *Arizona Department of Transportation*, May 2012

Questions?