

PURINA RETAINING WALL PROPOSAL

High Country Engineering
CENE476, Spring 2022
Grading Instructor: Dr. Bero



High Country Engineering



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Stakeholders

Nestle Purina

City of Flagstaff

Residents and business owners of surrounding area

Project Purpose

In conjunction with previous Purina
Truck Entrance Capstone Project

Design large retaining wall with cuts
up to 25 ft

Reinforced Concrete/masonry design

Location Map

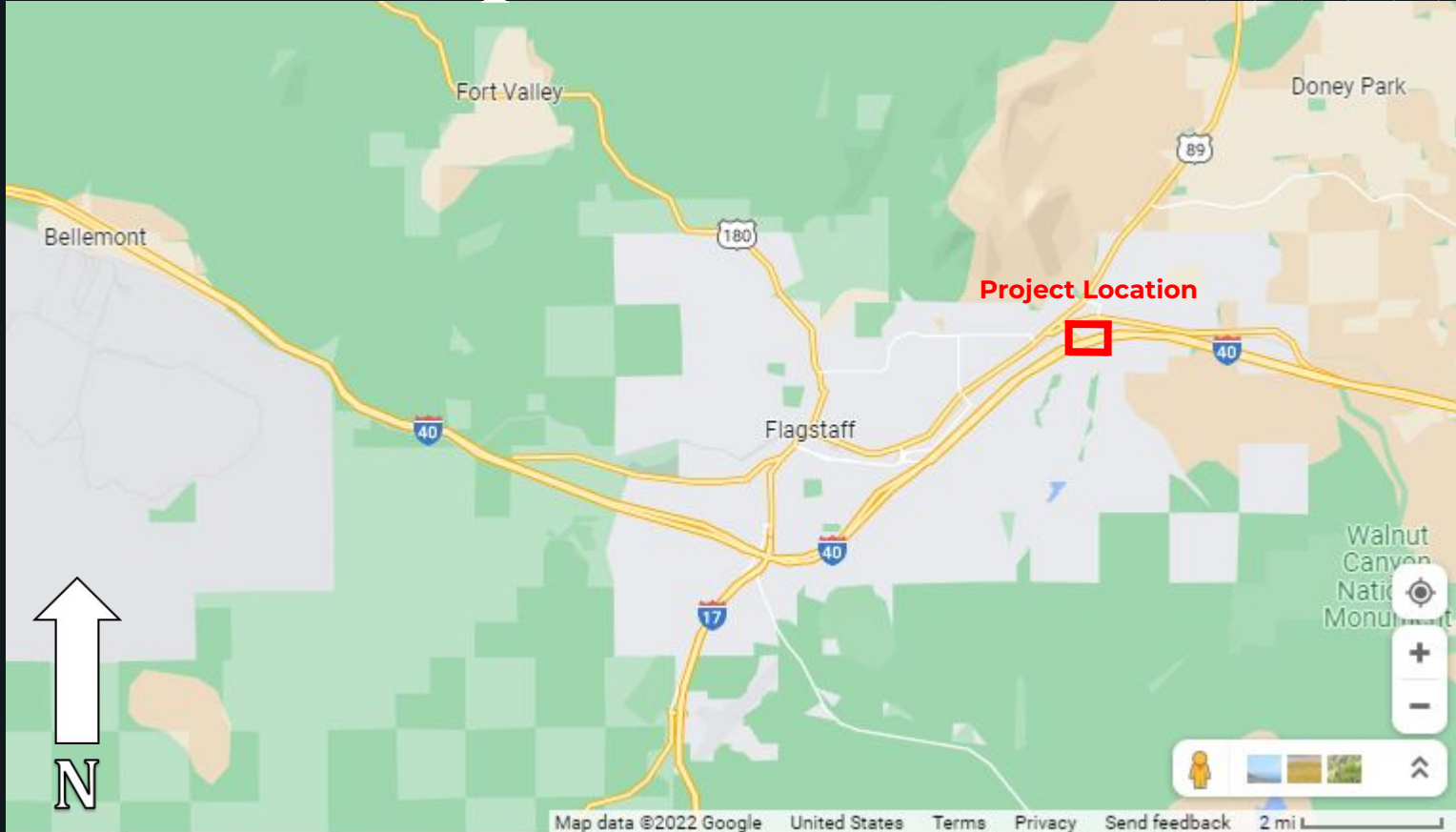


Figure 1: Location Map - Flagstaff Area

Vicinity Map



Figure 2: Vicinity Map - Nestle Purina Grounds and Retaining Wall Site

Exclusions

Will not be conducting Topographic Survey.
Will use City of Flagstaff one-foot contours
provided by Mark Lamer.

Will not be performing any geotechnical
analyses. Design for “Worst-Case Scenario”.

Scope of Services

Task 1.0 Research & Data Collection

Task 1.1: Research Relevant Codes and Standards

Task 1.2: Retaining Wall Design Research

Task 1.3: Obtain Data

Task 2.0 Create Topographic Map

Utilize Autodesk Civil 3D to identify local elevations and create a three-dimensional surface

Task 3.0 Hydrologic Data Collection

Determine watershed above the site

Maximum flow for 100 year storm event

Retaining Wall Required Drainage

Task 4.0

Design & Selection of Preferred Alternative

Task 4.1: Alternative Design Development

Task 4.2: Decision Matrix and Criteria

Task 4.3: Preferred Alternative Selection

Task 5.0

Design & Analysis

Task 5.1: Retaining Wall Design

Task 5.2: Post-Development Hydraulic and Hydrologic Analyses

Task 6.0

Plan Set Production

Create plan set using Civil 3D with following parameters:

- Site preparation and stabilization
- Retaining wall installation,
- Drainage
- Spread Footings
- Stationing
- Elevations
- Cross Sections
- Stream location

Task 7.0 Impacts Analysis

Economic

Environmental

Social

Task 8.0 Deliverables

Task 8.1:

30% Deliverables

Task 8.2:

60% Deliverables

Task 8.3:

90% Deliverables

Task 8.4:

Final Submission

Task 9.0 Project Management

Task 9.1: Meetings

Task 9.2: Schedule Management

Task 9.3: Resources Management

Schedule Gantt Chart

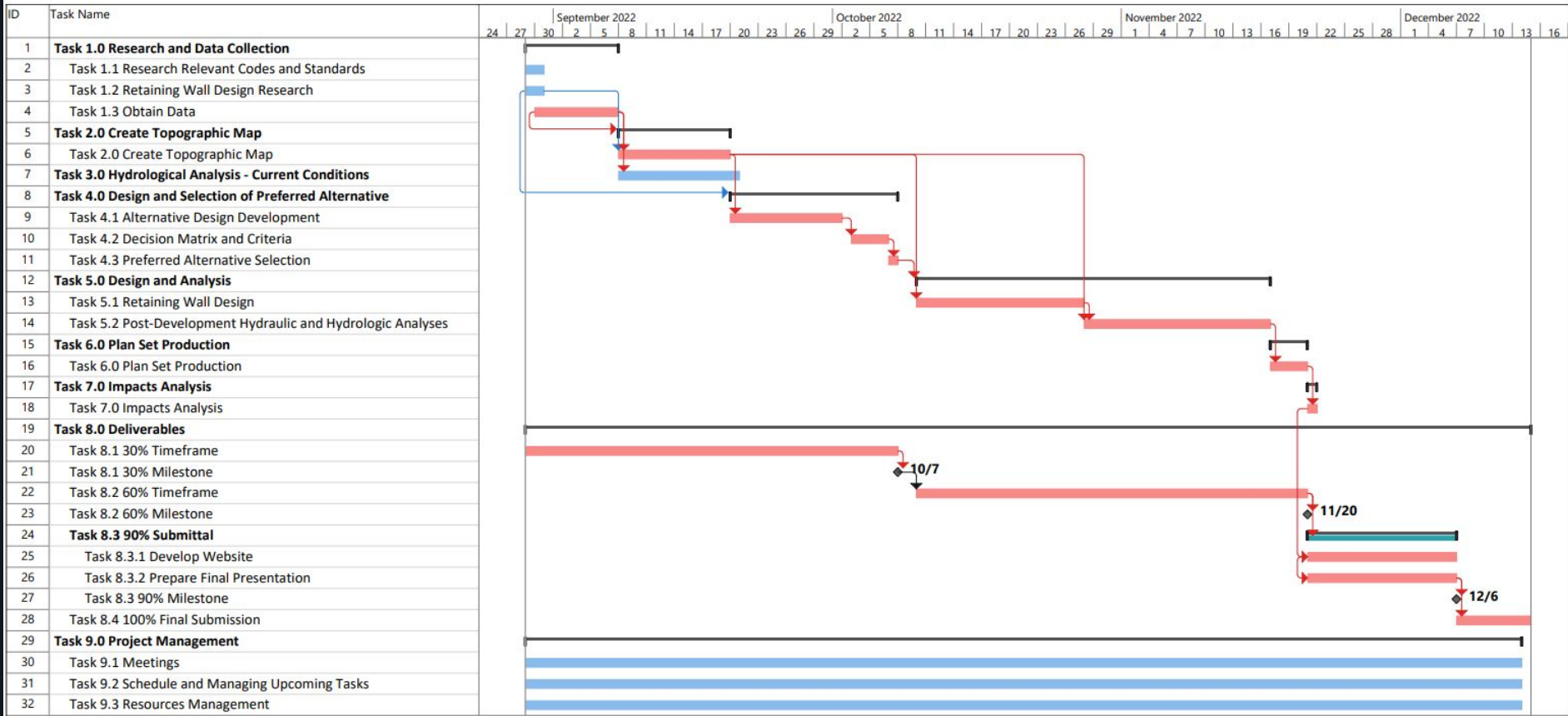


Figure 3: Gantt Chart - Start August 23, 2022, End December 14, 2022

Estimated Staffing Hours

Purina Retaining Wall Project	SENG	EIT	DFT	EI
Task 1.0 Research and Data Collection	-	-	-	-
Task 1.1: Research Relevant Codes and Standards	8	8		8
Task 1.2: Retaining Wall Design Research	8	8	8	8
Task 1.3: Obtain Data				32
Task 2.0: Create Topographic Map		4	40	
Task 3.0: Hydrologic Analysis – Current Conditions		8		32
Task 4.0: Design and Selection of Preferred Alternative	-	-	-	-
Task 4.1: Alternative Design Development		24	16	40
Task 4.2: Decision Matrix and Criteria	8	4		
Task 4.3: Preferred Alternative Selection	8			
Task 5.0: Design and Analysis	-	-	-	-
Task 5.1: Retaining Wall Design		24	64	
Task 5.2: Post-Development Hydraulic/Hydrologic Analyses		8		40
Task 6.0: Plan Set Production			32	
Task 7.0: Impacts Analysis		8		8
Task 8.0: Deliverables	-	-	-	-
Task 8.1: 30% Deliverables	4	8		16
Task 8.2: 60% Deliverables	4	2	24	16
Task 8.3: 90% Deliverables	4	2	8	8
Task 8.4: Final Submission	4	4		4
Task 9.0: Project Management	-	-	-	-
Task 9.1: Meetings	8	8	8	8
Task 9.2: Schedule Management	16			
Task 9.3: Resources Management	15			
TOTAL	85	120	200	220
CUMULATIVE TOTAL	625			

Figure 4: Staff Hours - Total 625 hours

Staffing & Estimated Costs

Cost of Services			
Position	Hourly Rate	Project Hours	Cost
Senior Engineer	\$199	85	\$16,902
Engineer in Training	\$153	120	\$18,317
Drafter	\$93	200	\$18,588
Intern	\$54	220	\$11,873
Cumulative		625	\$65,680

Figure 5: Cost of Services

References

- [1] International Building Code® 2018. International Code Council, Inc., 2018.
- [2] City of Flagstaff 2019 amendments to Flagstaff City Code, Title 4, building code. Flagstaff, Arizona: City of Flagstaff, 2011.
- [3] Nestle Purina - Flagstaff, AZ. Flagstaff, 2018.
- [4] Google Maps. [Online]. Available: <https://maps.google.com/>. [Accessed: 10-Mar-2022].
- [5] Google Earth. [Online]. Available: <https://earth.google.com/>. [Accessed: 10-Mar-2022].
- [6] J. Sandoval, K. Rhoads, E. LaTurco, and M. Ingersoll, Nestle Purina Entrance Site Design Northern Arizona University, Flagstaff, AZ, rep., 2021.

Thank you for listening!

Questions?