BYU ENGINEERING
Civil & Construction Engineering

CAPSTONE

Wasatch Mountain State Park West Bench Trail

Project ID: CEEn_CPST_017

By

Ascension Engineers

Jared Fuerst

Jared Murri

Bryson Passey

Tasha Jackson

A Capstone Project Final Report

Submitted to

Steve Gerrick

Wasatch Mountain State Park

Department of Civil and Construction Engineering

Brigham Young University

April 04, 2022

Executive Summary

PROJECT TITLE: WASATCH MOUNTAIN STATE PAR WEST BENCH TRAIL
PROJECT ID: CEEn_CPST_017
PROJECT SPONSOR: Wasatch Mountain State Park
TEAM NAME: Ascension Engineers

The purpose of this project was to identify and design a route for construction of a 12-foot wide natural surface trail for fire prevention egress/ingress and non-motorized public use. The trail is to reach from the Main Wasatch Mountain State Park Visitor Center Snowmobile Trail to the Soldier Hollow Complex arriving at the Cascade Springs Trail Head. Deliverables from this project provide necessary information to allow for applications to funding opportunities such as grants and Utah State Purchasing Guidelines for biding requirements. Design considers drainage, code requirements for recreational trails, land ownership, cost of construction, environmental preservation, and visual deterrents.

Table of Contents

Table of Figures

Table of Tables

Introduction

The purpose of this project is to propose a trail alignment for the for the Wasatch Mountain State Park West Bench Trail (hereafter referred to as the Project). The proposed alignment will begin at the Main Wasatch Mountain State Park Visitor Center Snowmobile Trail and end at the Cascade Springs Trail Head. This trail will serve as a potential Fire Prevention Egress and Ingress and as a non-motorized recreational trail. The proposed alignment will consider existing trail locations, water drainage, property boundaries, and landscaping.

The Project will be completed using available GIS data from Utah State and Wasatch County databases to determine viable trail alignments. After several alternative alignments are determined in preliminary design, topographic information along the proposed alignments may be supplemented as necessary using a drone survey, weather and schedule permitting. GIS and CAD software will then be used to develop the final deliverables for the Project.

Progress was reviewed at the 30%, 60%, and 90% milestones to seek client approval. A list of tasks to be completed to reach each milestone is shown below. Tasks listed below a milestone are to be accomplished before the milestone review with the client. The primary purpose of each review is listed next to the milestone.

- 30% Milestone – Determine preliminary alignment alternatives using Google Earth and ArcGIS
  - Create shape files for existing site conditions including:
    - Existing elevation data
    - Existing trails
    - Property boundaries
  - Determine possible trail alignment alternatives based on:
    - Applicable codes and Wasatch State Park requirements
    - Fire ingress and egress requirements
    - General slope of terrain
    - Potential connections to existing trails
    - Property lines
  - Create rough cost estimates for alternative alignments
  - Send markups of preliminary alignments to client for feedback
- 60% Milestone – Upload top alignment into AutoCAD
  - Analyze trail and adjust alignment as needed based on:
    - Cross slopes
    - Perpendicular slopes
    - Drainage
    - Cut/fill balancing
  - Refine construction cost estimates for the top alignment
- 90% Milestone – Review final recommendations with client and address any final concerns
  - Produce proposed trail map and construction drawings

- Write final proposal narrative

Specific milestone points were altered as needed based on client responsiveness and technical factors on the project timeline.

Assumptions & Limitations

Assumptions:

- Initial trail layouts were acceptable for a 12-foot-wide natural surface trail easily used and accessed in emergency efforts of fire prevention as well as for year-round access to public recreation, event, and tourism use.
- Federal Offroad Trail Guidelines are the standard to determine trail dimensions and features
- All mountain surfaces are able to be cut out (no hard rock that cannot be passed with a trail)
- Maximum straightaway grade = 25% for short bursts
- Minimum 50-ft centerline turn radius

Limitations:

- Drone Surveying/Modeling constraints:
  - Weather prevented us from accessing the desired locations in the State Park
  - Drone equipment limitations prevented us from being able to survey such a large area. Problems such as signal loss and inadequate battery life
  - 3D Modeling issues such as not being able to model the area once snow fell, and resolution variances with the varying terrain.
  - Due to the lack of drone surveying, our team had to use lower resolution elevation data that was collected from the State of Utah.
- Software issues:
  - Large data sets produced long load times and operational issues on our computers.
  - Data had to be manipulated across different software platforms which could have caused data decimation
- Personnel Issues:
  - General lack of experience in the subject area. The creation of a trail alignment mainly involved transportation related skills and no one in our team has a transportation background. This resulted in a lot of learning about techniques, codes, and software to accomplish this task.

Progress Narrative

The 30% milestone tasks were initiated shortly after the SOW was submitted and approved. Each team member selected responsibilities for investigating trail codes, potential trail paths on Google Earth, and creation of shape files from ArcGIS. Slope optimization programs were run to determine the most efficient path between the selected start and end points. It was determined to use two trail segments on the two ends of the trail path as the middle section had many existing trails that would serve effectively for this project given the property line bottleneck.

Shape files and preliminary trail alignments were initially imported to AutoCAD the week of January 24th. This initiated progress on the 60% stage. Many technical issues were encountered during this stage which slowed anticipated progress. Due to the size of the files being analyzed, a large amount of computational power was needed. Computers frequently crashed when running data and sometimes had issues saving. Coordinate systems of the imported shape files were frequently erratic. Many hours were spent debugging and running data during attempts to import all needed data into AutoCad models.

Final trail alignment recommendations were established by the first week of April, initializing the 90% stage of the project. Due to previous technical issues and limited time, it was determined that obtaining drone survey of the trail alignment was not feasible and, even if obtained, would provide limited benefits as 10-meter data on the area is already available through the state. Final checks were performed, and deliverables were created. All items were loaded onto a USB drive to leave with the client.

Design, Analysis & Results

Slope Analysis on ArcGIS

Data Inputs for AcrGIS

10 meter USGS DEM Elevation Data from Utah GIS Database
https://gis.utah.gov/data/elevation-and-terrain/
Land Ownership Data for Wasatch Mountain State Park Boundaries from Utah GIS Database
https://gis.utah.gov/data/cadastre/land-ownership/
Utah State Park Trails for Existing Wasatch Mountain State Park Trails
https://gis.utah.gov/data/recreation/trails/

Geoprocessing Tools used in ArcGis

Calculate Slope – Calculates the slope between elevation data points and results in a slope map.

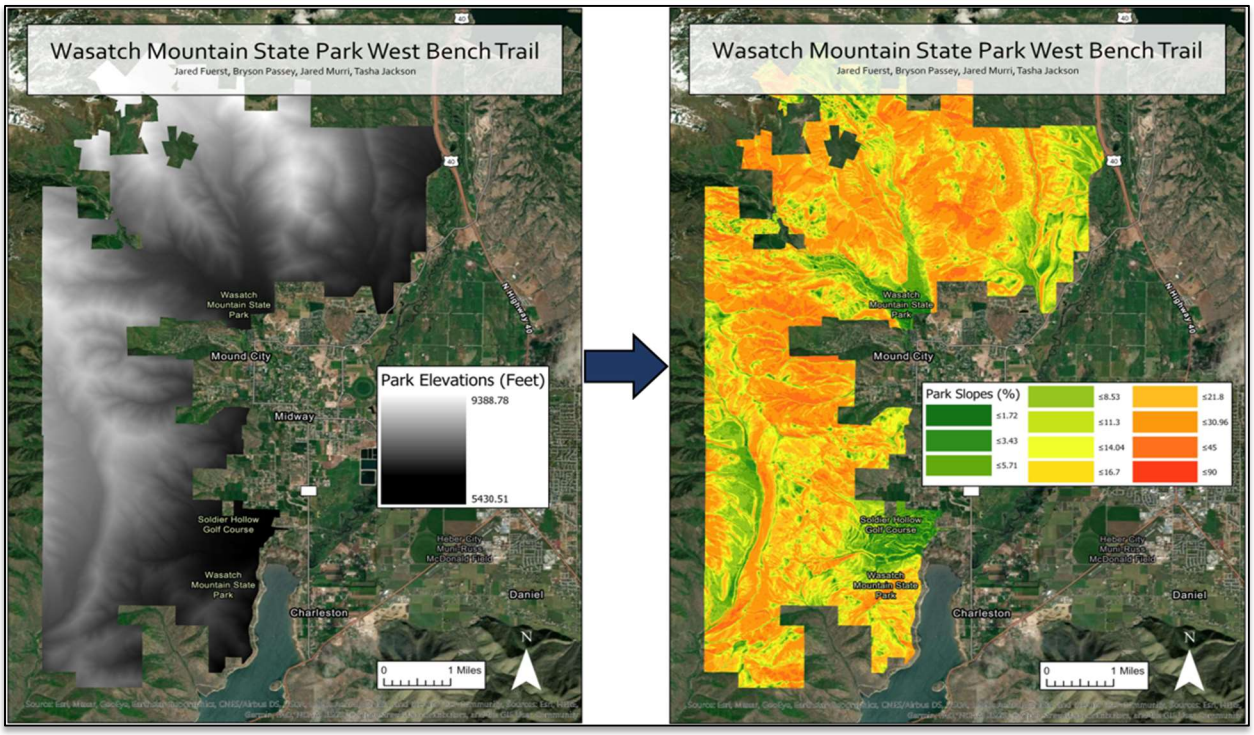


Figure 1 - Park Elevations and Slopes Maps in ArcGIS Software

Least Cost Path – Determines a Least Cost Path from weighted criteria. For this project, we used the slope raster to create a cost raster. The cost raster weighs how much it costs to go to a certain location based off the slope. We also created a directional raster which creates a map at every data point, so the Least Cost Path tool knows which adjacent data point has the lowest slope.

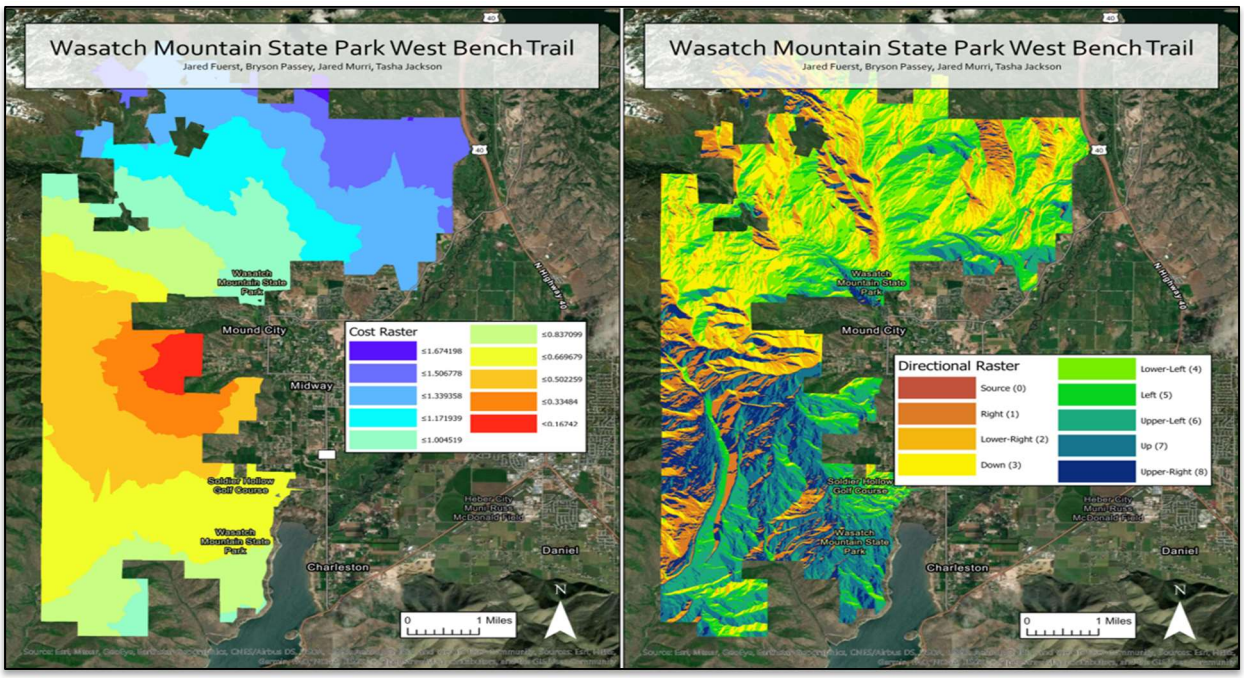


Figure 2 - Cost Raster and Directional Raster in ArcGIS Software

Trail Alignment on Civil 3D

After the initial slope analysis was performed using the GIS software, we prepared a more detailed analysis and model of the proposed trails using Civil 3D. The purpose of this analysis was to refine the path for the proposed trail alignments, measure the lengths and running slopes, and estimate cut and fill volumes for the proposed trail. This information was critical in determining the best routes for the trail.

The first step in the CAD analysis was to import surface data and proposed trail locations from the initial GIS analysis. We created a model of the surface elevations based on data found on the Utah GIS Database. After creating a model of the surface, we imported the proposed trail alignments that we created in the GIS software, along with a map of existing trails in the park and the park boundaries.

Once the proposed trail locations were added to the CAD file, we could then create alignments in CAD to find optimum paths for the trails in the proposed areas. Creating these alignments enabled us to create a profile of the existing ground surface and determine the running slopes for the trail centerlines. Our target slopes for the majority of the trail were a 10-15 percent running slope and a maximum slope of 25 percent for no more than 10 percent of the length of each proposed trail. We manually adjusted the alignment locations to follow surface contours and maintain a running slope within these parameters. See Figure 4 below with one such example slope/elevation profile used for this analysis.

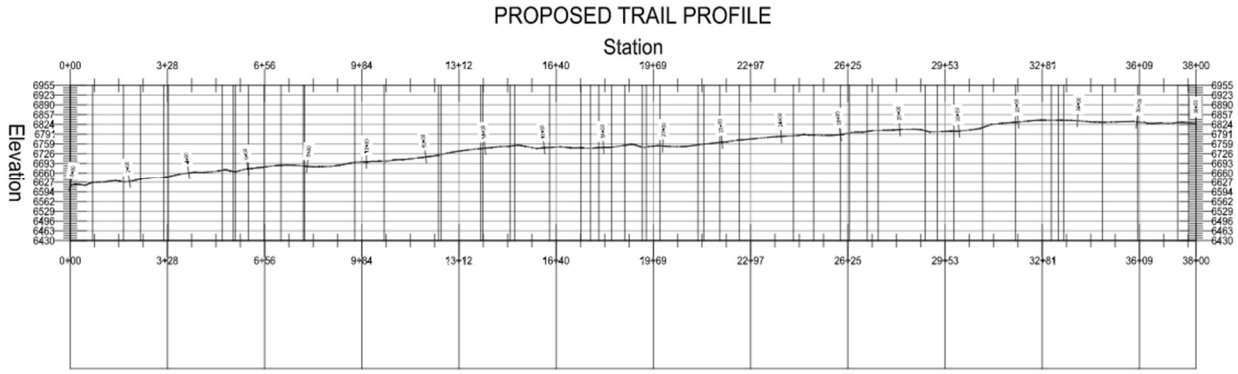


Figure 3 - Example Trail Profile in AutoCAD Software

After running initial alignments for the two possible trail locations, we discovered that designing switchbacks with adequate turn radii for emergency vehicles was impractical. To avoid the need for switchbacks, we moved the north end of the trail farther uphill and followed the contour lines to maintain reasonable running slopes for the length of the trail. This is why the final proposed alignment looks significantly different than either of the two initial alignments from GIS software.

Creating an assembly to model a typical trail section was the next step in the analysis. This assembly could then be used to model the trail corridor and calculate the cut and fill quantities. Because this analysis is for a concept level trail design, we chose to model the trail with no cross slope to simplify the model. The steepest cut slopes shown in this corridor are 1H:1V slopes, and the steepest fill slopes shown are 2H:1V slopes. See Figure 5 for an example trail section showing AutoCAD-produced cut and fill regions.

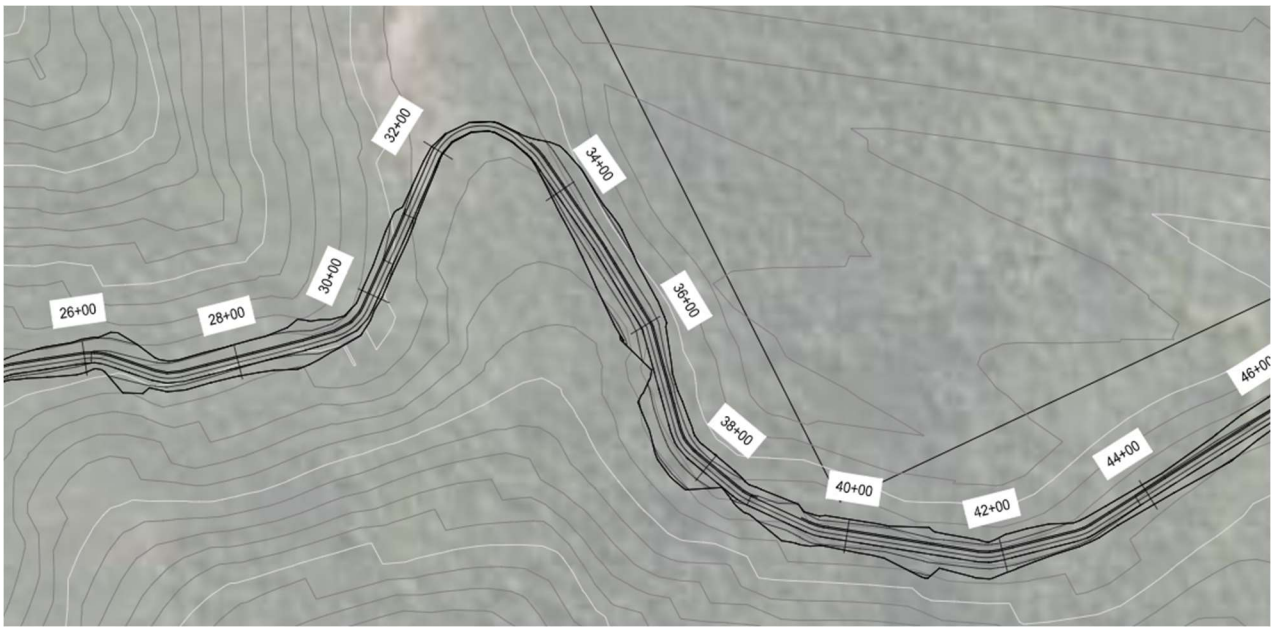


Figure 4 - Example Corridor Plan View with Cut and Fill Sections in AutoCAD Software

The CAD analysis allowed us to refine our recommendation for the trail location. From this analysis, we gathered data that could be used to perform an economic analysis of the trail.

Results

Below is the proposed natural-surface trail running along the Eastern property boundary. The 12-ft wide trail is suitably located to serve as a firebreak as well as emergency access. Although we initially planned on presenting 2 options, the impracticality of drivable switchbacks necessitated the proposal of single option. Locations are also marked where culverts would be useful. Complete maps are included in Appendix A.

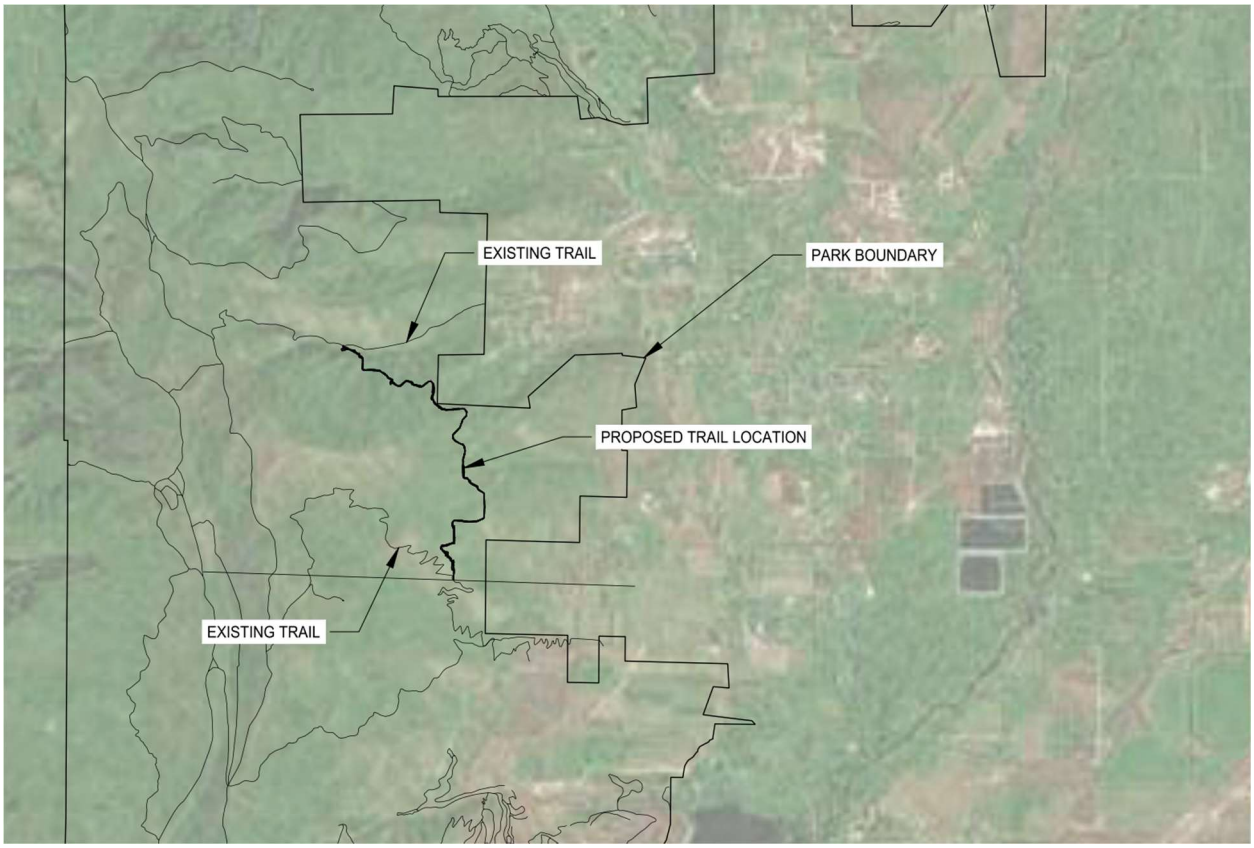


Figure 5 - Snippet from Final Results Map in AutoCAD

Economic Analysis of Trail

Trail Details

Primary Proposed Trail

- Length
  - 11,540 ft (2.2 mi)
- Cut & Fill Quantities

  - Cut: 19,888 Cubic Yards
  - Fill: 21,797 Cubic Yards
  - Net: 1909 Cubic Yards Fill
- Average Slope
  - 9.5%

Cost Approximations

Every trail is different and cost of construction can vary widely based on labor availability, soil types, and accessibility. Trails similar to the one proposed were researched using the Recreational Trails Program (RTP) Project Database to determine a ballpark estimate of trail construction cost. It is estimated that trail construction will cost about $250,000. Trails primarily used in this cost approximation are described below. It may be noted that the proposed trail cost estimate is significantly higher than the total cost of many trails listed below as the proposed trail is twice as wide as most ATV trails and is on very mountainous terrain. A much greater amount of labor, cut and fill, and machinery will be needed for proper construction. However, the trail data listed is

Table 1 - Related Trail Construction Costs

Record ID	Project Name	Length (miles)	Total $	Notes
19234	Cascade Springs OHV Trail Access Reroute	2.0 New	$40,000.00	Mostly flat OHV trail in Wasatch Mountain State Park. 2017
18802	Lake Canyon Trails	11.6 New	$161,260.00	ATV Trail in Manti-La Sal National Forest. Terrain type unknown. 2003
25885	Fishlake Heavy Equipment Maintenance	140 Maintenance	$125,000.00	Light Truck trail maintenance in Fishlake National Forest using trail dozers. Mostly flat terrain. 2020
1961	Upper Calico OHV Trail	5.5 Miles Maintainance and New	$52,100.00	Singletrack in San Juan National Forrest. 2002

Related Issues

The proposed trail will serve as both a firebreak and a public recreation area. As residential developments in the area are growing, the need to prepare for wildfires is increasing in importance. Among the many trails in the area, only the Cummings Parkway ridgeline trail is vehicle accessible. The creation of the proposed trail will open more of the mountain to emergency fire vehicle access. It will also serve as an important fire break close to property lines. Furthermore, the proposed trail will serve as a valuable shortcut to park personnel when responding to calls in the park. Current paths between the Wasatch Mountain Golf Course and Cascade Springs Drive requires one to drive through town using slow indirect neighborhood roads; the proposed trail addition could significantly reduce travel time given an urgent call.

If constructed, it will improve public health by extending the park recreation trail system with options for hiking and snowmobiling. As the trail is designed for emergency fire vehicle access, the trail alignment will be clear and well graded for this purpose while still taking advantage of the beautiful views along the ridgeline. It must also be considered, however, that the close proximity to property lines favored by the safety aspect of this trail also means that any recreational use will bring noise and air pollution to nearby residents.

Environmental concerns in the area include erosion and wildlife protection. Given the width and grade of the proposed fire trail, erosion concerns were addressed by identifying high-risk areas for ponding and cross-cutting runoff. Periodic dips- or changes in slope- were added to the trail alignment to minimize runoff issues. In this manner, the trail can be used to slow erosion- another benefit to the nearby residences in the case of mudslides or flooding.

The trail alignment was designed to stick close to private property lines and avoid the deeper areas of the park where wildlife is more prevalent to live. Trail construction may disturb local wildlife to a limited extent, but long-term impact should be minimal. It is recommended that the trail contractor be aware of local species habit identification to alter the trail location as needed if nests or burrows are identified along the proposed alignment.

The greatest concern with the construction of this trail is the economic feasibility. Despite the long-term importance of state parks and protected wildlands, funding for park projects is difficult to obtain and local residents are often hesitant to contribute tax funds towards trail creation. We propose that the important safety aspects of this trail will aid in obtaining funds. Wildfires have posed many scares to residential mountainous areas in recent years and the public is likely aware of the need for preventative measures in protecting their property. Efforts were made throughout the design process to create an efficient and cost-effective trail alignment. Details on trail economics were discussed earlier in this report.

Lessons Learned

This project introduced an interesting range of difficulties as team member sought to clarify project scope, model data, and determine appropriate teamwork balances. The greatest stumbling block in the project involved technical issues when attempting to analyze large data sets. Importing 10-meter data to AutoCAD frequently crashed the computer and proved unrealistic with the resources available to the team. To allow the computer to process the information the team switched to using 30-meter data. At this point, numerous issues with coordinate systems, saving, and other misc. Items prevented the team from making progress on the model until workarounds were found. As a final technical hurdle, the team realized when comparing trail alignments in AutoCad to counterparts in ArcGIS that slopes calculated by the two different programs were consistently different. The team realized that AutoCAD did not automatically convert meters from the elevation data to feet as it was supposed to when the data was imported. All these issues were eventually resolved or workarounds discovered, but significant time was taken from the project. Debugging process go faster as team members have more experience with similar issues; many of the technical issues described above could not be prevented. The lesson learned from these technical issues was to always plan extra time into the schedule for unexpected technical issues. In addition, it was impressed upon the team how important it is to always check units. Discovering the meter to feet conversion issue a few weeks sooner in the project would have saved a great deal of wasted efforts.

A second lesson learned came while the team was seeking to clarify the project scope. Original intentions were to gather drone data across the entire area of interest and use the gathered data to determine a trail alignment. As the team analyzed drone flying patterns and battery capacity, it was realized that flying the entire area of interest to get data better than what was already available online was not feasible. Drone data is more applicable for this project when taken along a calculated feasible trail alignment as a final analysis tool and a visualization for those preparing to build the trail. Communication between the project owner and subject experts should always take place as the scope of work is being developed.

During our research phase of the project, it was discovered that there was a lack of official codes and design guides for a project like this as most comparable trails are for recreational purposes. Most of the aids available are unofficial publications focusing on the aesthetics of trail design. A few recommendations were eventually discovered and the majority of design parameters have been based on those. When setting out on a project like this again, it would be beneficial to have increased contact with a park representative to give guidance on what trail guidelines are important to them.

After much trial and error, we discovered that we could effectively only run our software on a single computer, and we could not save and exit. This caused significant bottlenecks in

delegation and workflow. We found, however, that even if only one person can really make progress on the model at a time, it was still beneficial to have group work sessions to bounce ideas off each other and to progress other elements of the project.

Conclusions

Limiting running slope and providing for wide turn radius of emergency vehicles made switchbacks (and therefore trails in other locations) unfeasible. As the proposed trail ties in to existing trails, improvements of some existing trails would be necessary. Creation of a 12-ft wide trail for emergency access (with additional recreational use) is possible and an optimal location has been presented. As high-end residential construction progresses along the edge of the park, this trail and the services it makes available could be a worthwhile investment. In addition to emergency vehicles, this trail allows other park vehicles to travel quickly through the park without having to go through town.

Recommendations

In addition to optimal trail alignment locations, several factors discussed earlier in this report will need to be considered during construction. We have provided recommendations for two key elements – revegetation and drainage – in the following two subsections of this report.

Reseeding Recommendations

As the trail region is a steep hillside in a dry climate, revegetation efforts are essential in order to preserve the environment and reduce erosion. The following solutions are options recommended for this project:

- Native Erosion Control Seed Mix
    - Intermountain West Erosion Control Mix, from Nature's Seed.
        - Revegetation mix designed to establish quickly with a strong root base. Can be used for wildlife forage. Includes Mountain Brome, Slender Wheatgrass, Annual Ryegrass, Perennial Ryegrass, White Clover, and Quickguard (Sterile Triticale Hybrid).
        - $3.80/1000 ft^2
        - https://www.naturesseed.com/specialty-seed/erosion-control-blends/intermountain-west-erosion-control-mix/
    - Revegetation Gras Mix by BBB Seed.
        - Mixture of cool-season bunch grasses with extensive root systems designed for soil stabilization on disturbed sites. Includes Slender Wheatgrass, Mountain Brome, Intermediate Ryegrass, Annual Ryegrass, Crested Wheatgrass, Chewings Fescue, Sheep Fescue, Tall Fescue, and Dahurian Wildrye.
        - $20.40/1000 ft^2
        - https://bbbseed.com/product/revegetation-grass-mix/

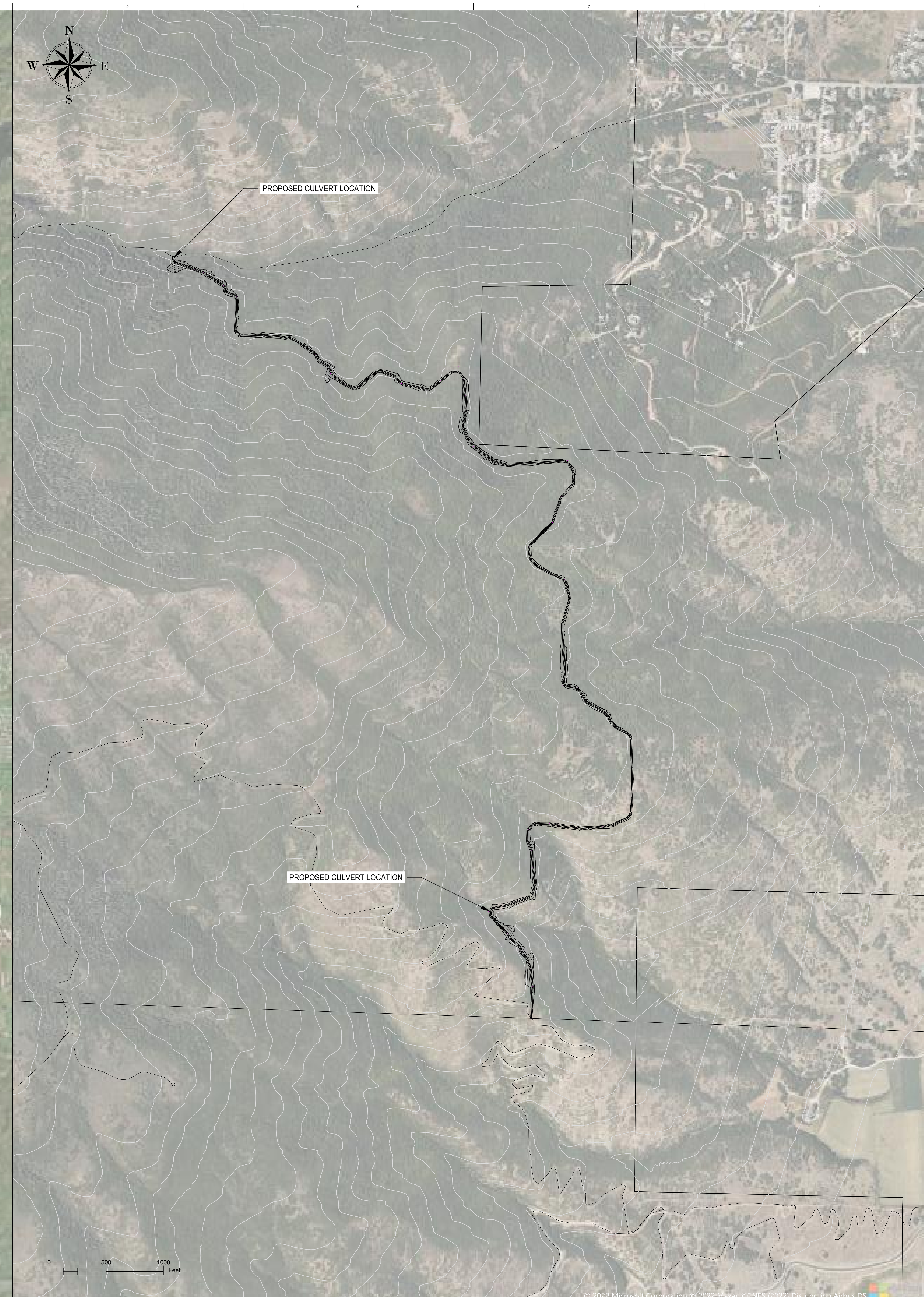
- Erosion Control Blankets
    - Premier Straw Single–Net, by American Excelsior Company (or similar)
        - For slopes of 2V:1H or flatter
        - Biodegradable and wildlife-safe
        - https://americanexcelsior.com/erosion-control/

Drainage Recommendations

With a natural surface trail, proper drainage becomes critical to prevent erosion. The proposed design includes frequent grade changes and reversals. These prevent water from sheeting down the trail uninterrupted, which causes significant erosion of the surface. Additionally, while not modeled in the corridor created, a ~2% cross slope would help to remove water from the trail surface quickly.

We also propose adding culverts at the beginning (North end) and the 104+00 mark. These are both areas where there is a significant draw. This is a natural spot for drainage, and the creation of a trail there would result in significant erosion of the trail. A culvert would allow for natural drainage to be maintained.

Appendix A - AutoCAD Plan and Profile Sheets



STAMP SPACE

Ascension

TEAM NAME AND LOGO

CLIENT NAME AND LOGO

REVISIONS

NUMBER	DESCRIPTION

PROJECT NAME: WMSP - WEST BENCH TRAIL

PROJECT NUMBER: CEEN_CPST_017

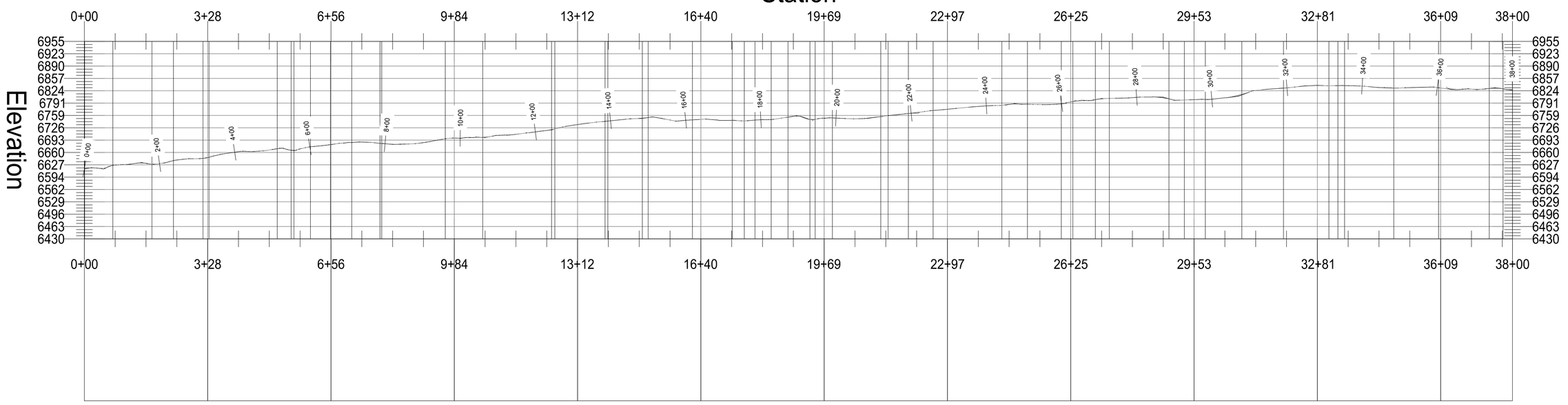
SHEET NAME: PROPOSED TRAIL LOCATION

SUBMITTAL: EXHIBIT - NOT FOR CONSTRUCTION

PLOT DATE: 2022-04-05

SHEET NO.: EX-01

PROPOSED TRAIL PROFILE



STAMP SPACE

Ascension

TEAM NAME AND LOGO

CLIENT NAME AND LOGO

REVISIONS

NUMBER	DESCRIPTION

PROJECT NAME: WMSP - WEST BENCH TRAIL

PROJECT NUMBER: CEEN_CPST_017

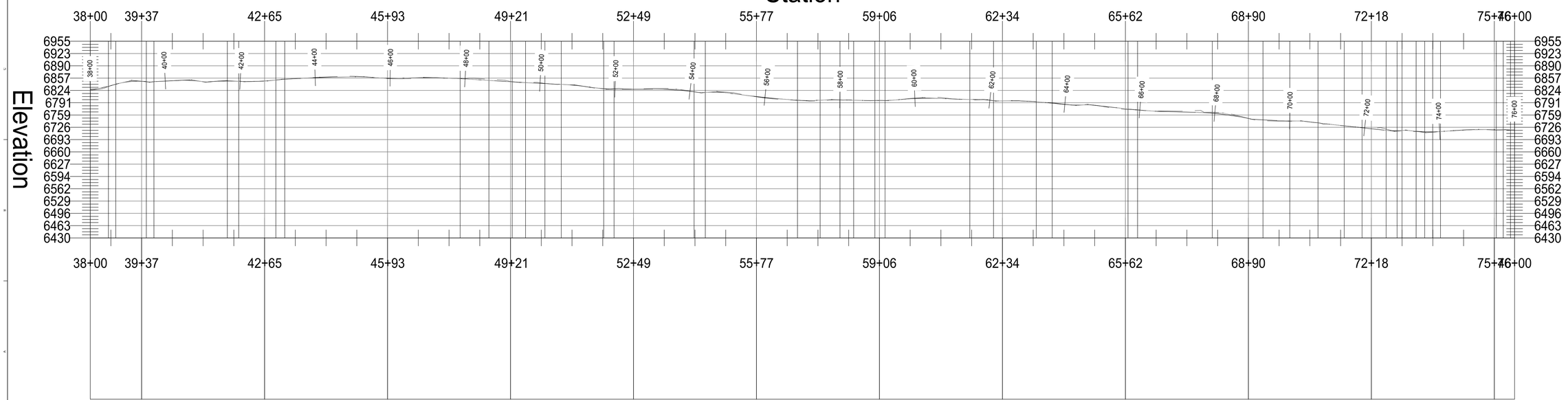
SHEET NAME: PLAN AND PROFILE

SUBMITTAL: EXHIBIT - NOT FOR CONSTRUCTION

PLOT DATE: 2022-04-05

SHEET NO.: EX-02

PROPOSED TRAIL PROFILE



STAMP SPACE

Ascension

TEAM NAME AND LOGO

CLIENT NAME AND LOGO

REVISIONS

NUMBER	DESCRIPTION

PROJECT NAME: WMSP - WEST BENCH TRAIL

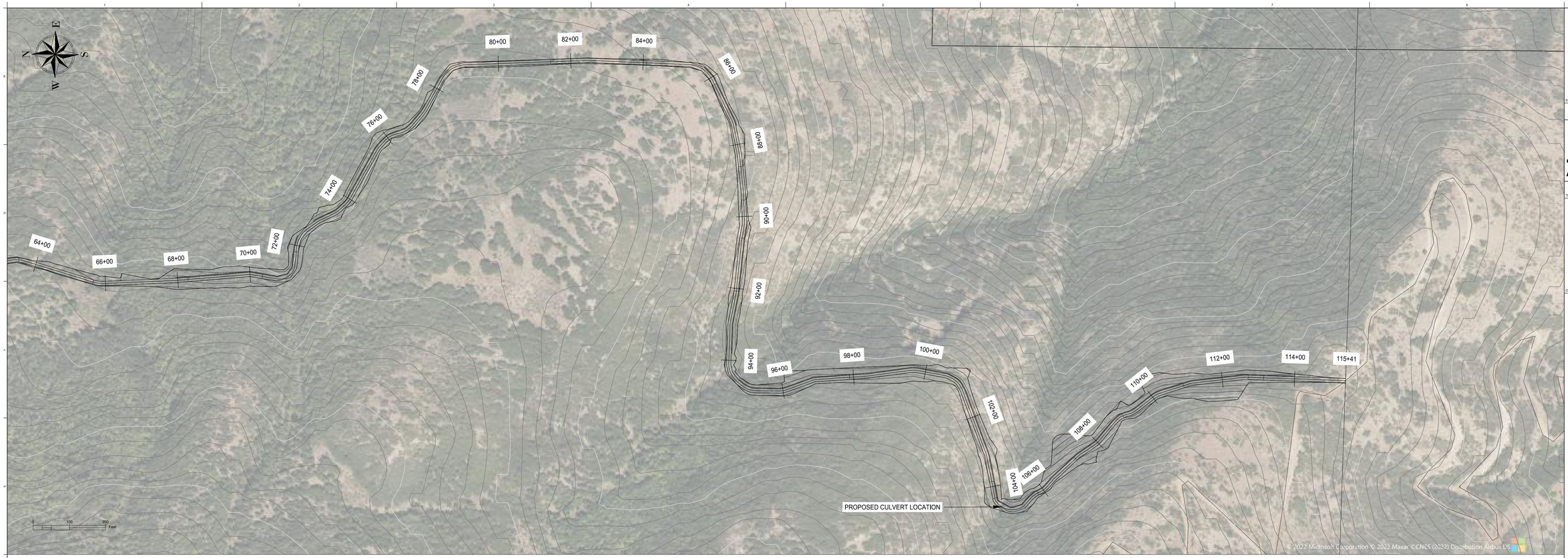
PROJECT NUMBER: CEEN_CPST_017

SHEET NAME: PLAN AND PROFILE

SUBMITTAL: EXHIBIT - NOT FOR CONSTRUCTION

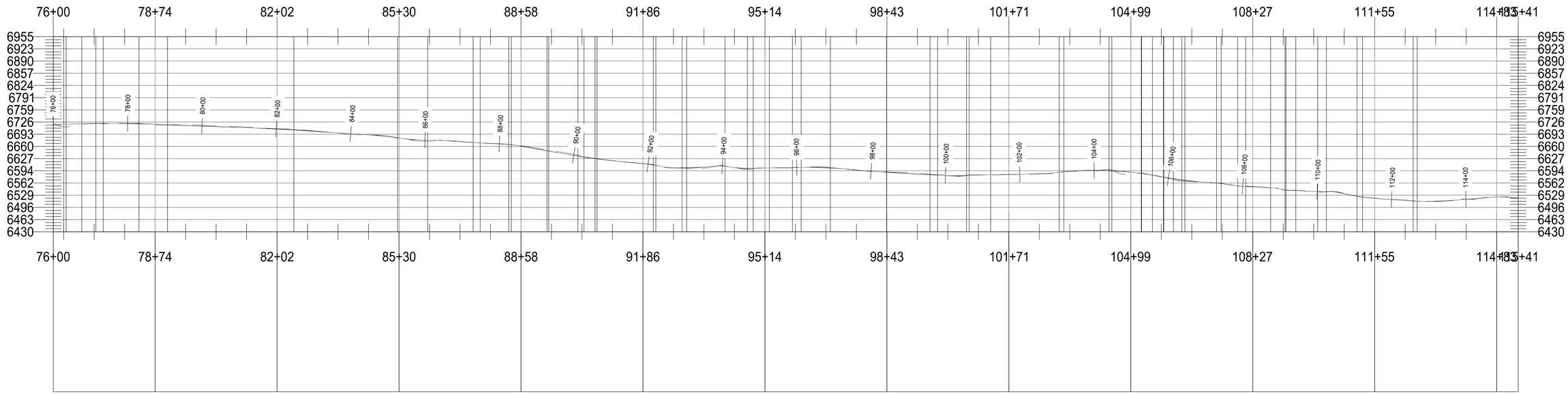
PLOT DATE: 2022-04-05

SHEET NO.: EX-03



PROPOSED TRAIL PROFILE

Station



STAMP SPACE

Ascension

TEAM NAME AND LOGO

CLIENT NAME AND LOGO

REVISIONS

NUMBER	DESCRIPTION

PROJECT NAME: WMSP - WEST BENCH TRAIL

PROJECT NUMBER: CEEN_CPST_017

SHEET NAME: PLAN AND PROFILE

SUBMITTAL: EXHIBIT - NOT FOR CONSTRUCTION

PLOT DATE: 2022-04-05

SHEET NO.: EX-04

Appendix B - Team Member Resumes

Resumes are listed in the following order:

Jared Fuerst
Jared Murri
Bryson Passey
Tasha Jackson

James "Jared" Fuerst

(937) 308-4727 · jaredfuerst2@gmail.com · 580 N 100 E Provo, Utah, 84606

EDUCATION

Brigham Young University

Bachelor of Science: Civil Engineering Graduation: April 2022

- GPA 3.49
- Member of American Society of Civil Engineers (ASCE) and Institute of Transportation Engineers (ITE)

Civil Engineering Courses

- Instruction in Revit, Civil 3D, AutoCAD, and ArcGIS
- Instruction in Excel and Software Development for CE applications

College Intramurals

Team Member and Captain

- Volleyball, Softball, Flag Football, Ultimate Frisbee, Soccer, Water Polo

RESEARCH EXPERIENCE

BYU – College of Civil Engineering – Drone Research Team January 2021-Present

Research Assistant Provo, Utah

- Helped developed 3-D models from aerial photos using the principles of Photogrammetry
- Assisted in using 3-D models to create a infrastructure monitoring system

PROFESSIONAL EXPERIENCE

City of Beavercreek Engineering Department June 2020-August 2020

Engineering Technician - Internship Beavercreek, Ohio

- Inspected over 15 city projects ranging from Road Widenings, Repavements, and Traffic Signals, to Utility Installation, Culvert Replacements, and Drainage Repair
- Regularly Issued permits for right-of-way use and water drainage
- Wrote up over 30 daily construction inspections on City contracted projects and over 150 road inspections
- Provided quotes and cost estimates for future projects worth over 5 million dollars

Brigham Young University's Museum of Art September 2019-March 2020

Carpenter Provo, Utah

- Helped design and build 3 custom exhibits at the BYU Museum of Art
- Operated numerous tools and machinery for crafting and framing various shapes and materials.

MacAir Aviation June 2015-November 2016

Lineman Xenia, OH

- Refueled, marshaled, tugged, and performed light maintenance on aircraft
- Operated the terminal desk (Greeted patrons and performed other customer support tasks such as securing guest ground transportation, lodging, and airplanes)

MILITARY EXPERIENCE

US Navy July 2020-Present

Active Duty Enlisted Sailor/Military Student United States of America

- Future Navy Civil Engineering Corp Officer after college graduation

VOLUNTEER EXPERIENCE

Self-Help Homes Jan 2019-February 2020

Laborer Provo, Utah

- Assisted 10 local families in building 10 homes to which they live in after completion

The Church of Jesus Christ of Latter-day Saints Nov 2016-Nov 2018

Full-time Volunteer Representative (Korean Speaking) Daejeon, Korea

- Responsible for finding, teaching, scheduling, interviewing and reporting on prospective new members
- Planned, organized, and taught over 20 workshops on goal setting, relationship building, and leadership skills

ACHIEVEMENTS/INTERESTS/SKILLS

- Pilot, Earned Private Pilot's License in High School (2016) - Eagle Scout (2014) - Nature Photography

JARED MURRI

331-385-5403
jared.murri@gmail.com

EDUCATION

Civil and Environmental Engineering April 2022
Brigham Young University Provo, Utah

- Intro to Transportation
- Structural Analysis
- Reinforced Concrete Design
- Foundation Engineering
- Bridge Design
- Soil Mechanics
- Advanced Steel Design
- Structural Steel Design
- Bridge Preservation

EXPERIENCE

Engineering Intern May 2021 – August 2021
Collins Engineers Midvale, Utah

- Performed ~75 routine NBI and Element Level inspections under the guidance of an NHI Bridge Inspection Team Leader
- Compiled bridge inspection reports according to UDOT guidelines using InspectX and BRM software
- Created custom deck and girder defect sheets using Blubeam Revu and Excel

Quality Control Intern April 2019 - August 2019
HHI Corporation Hill AFB, Utah

- Collaborated with a team of 9 civil engineers and construction managers on a $45 million Air Force Civil Engineer Center project
- Tracked and managed all soils and concrete testing data/reports for a 2-mile runway repair project using custom Excel spreadsheets
- Assisted the Quality Control Manager with site inspections for compliance with contract specifications
- Created 13 concrete lot submittals in Bluebeam Revu containing test data and narratives for approval by the Contracting Officer

Hazardous Waste Technician November 2017 - April 2019
BYU Risk Management and Safety Provo, UT

- Assured material collection, testing, categorization, and recycle/shipment preparation complied with OSHA, EPA, and DOT regulations
- Authored 6 new Standard Operating Procedures to ensure safe and efficient practices were carried out
- Managed, tracked, and prepared ~600 lbs. of radioactive items for disposal using Excel and BYU's Chemical Management database

SKILLS AND CERTIFICATIONS

- PADI Open Water Diver
- HAM Radio License
- Swedish Fluency
- NHI Course 130101: Introduction to Safety Inspection of In-Service Bridges

Bryson Passey

Civil Engineering Student with Structural Design Experience
(208) 530-2441 – passey.john1618@gmail.com
345 E 500 N, Apt 7, Provo UT 84606

EDUCATION

Ira A. Fulton College of Engineering Dec 2022
Bachelor of Science: Civil and Environmental Engineering, Emphasis in Structures Provo, UT

- GPA: 3.97
- Wright Broadcasting Scholarship
- Brigham Young Scholarship
- BYU ASCE Student Chapter Member

EXPERIENCE

Jones & DeMille Engineering, Inc Jan 2020 – Present
Engineering Intern (CAD/Structural) Springville, UT

- Create 3D models using Revit and Civil 3D, aiding in the drafting and design of over 70 building and site design projects
- Produce complete plan sets with Architectural, Structural, and Civil components for review and construction
- Prepare exhibits for feasibility studies, assisting clients and engineers in early design decisions
- Revise project checklists and design processes, reducing errors and increasing efficiency
- Develop and document tools to automate common tasks in project manual production, reducing document preparation time by 80% and lowering project costs

Brigham Young University Sept – Dec 2019
Teaching Assistant – Computer Aided Drafting Provo, UT

- Instructed 40+ students in principles of computer-aided design, preparing them for drafting problems encountered in the field
- Provided feedback on student submissions, similar to a QC process for plan submittals students would encounter at work
- Discovered solutions to students' technical issues in Civil 3D and Revit, showing them how to find solutions to similar issues on their own

Turner Carpentry Services Apr – Aug 2019
Light Timber Framer Bear Lake County, ID

- Assisted in the staking, concrete forming, framing, and siding of 7 custom homes
- Organized tools and supplies to improve efficiency in use of time and equipment

VOLUNTEER EXPERIENCE

The Church of Jesus Christ of Latter-Day Saints Sept 2016 – August 2018
Missionary Antananarivo, Madagascar; Mbabane, Swaziland

- Led and instructed 8 other missionaries while in serving Fort Dauphin, Madagascar
- Taught English classes in 3 cities in Madagascar, helping Malagasy citizens further their education

SKILLS, ACHIEVEMENTS, AND ABILITIES

- 2000+ hours' experience using Civil 3D and Revit
- Learned how to program in VBA; useful in automating common tasks in Microsoft Office applications
- Earned the Eagle Scout Award at age 14
- Graduated as Valedictorian of Bear Lake High School in 2016
- Became conversational in Malagasy in 4 months

Tasha Jackson

linkedin.com/in/tasha-jackson-678502193 | (801) 427-4212 | tashadianejackson@gmail.com

Summary

Self-motivated Civil Engineering Student with a passion for organization, project excellence, and interpersonal connection.

Education

BA - CIVIL ENGINEERING | BRIGHAM YOUNG UNIVERSITY

- Expected Graduation: April 2022; GPA: 3.70
- Completed advanced courses in foundation engineering, reinforced concrete, steel design, and project scheduling
- On the Dean's list for Physical and Mathematical Sciences in 2016; received academic scholarships throughout Undergrad

Experience

PROJECT DESIGN ENGINEER | HHI CORPORATION | APRIL 2019-PRESENT

- Organize and manage multi-disciplinary design engineer teams through federal bid-build processes on $1-15 million value projects; including site walks, submitting proposal questions, directing initial design, participating in regular design meetings, proposal writing, schedule creation, and bid package submission
- Participate in ongoing design meetings, write design subcontracts, perform design quality control reviews, prepare design package documentation, submit RFIs, maintain schedules, and follow up with designers to meet design milestones

PROJECT MANAGEMENT ASSISTANT | HHI CORPORATION | APRIL 2019-PRESENT

- Keep meeting minutes, submit reports, assist on-site, create and regularly update P6 schedule, monitor budget, and maintain as-builts for a $6.4-million, 3-year project installing a process air system and new specialty test stands at Hill Air Force Base.
- Traveled to the test stand manufacturer's facility in Wisconsin on 2 occasions as the HHI representative to negotiate schedule and audit the as-built configuration of the test stands
- Worked on-site as project superintendent for 3 months during the installation of a new process air system; resolved conflicts, performed quality control checks with the provided drawings, and served as a liaison with the customer
- Received several unsolicited letters of recommendation from the customer

BUSINESS MANAGEMENT INTERN | ADAPTIVE COMPUTING | APRIL 2015-SEPTEMBER 2015

- Managed software database containing information for several thousand customer companies
- Wrote and edited promotional and informational whitepaper regarding new supercomputing software

Software Experience

- Completed college courses utilizing AutoCAD, Revit, ArcGIS, and SAP200, Microsoft Project, and Excel
- Training in P6 Primavera, Bluebeam, Procore (PM & Superintendent Certification); familiarity with RMS and ProjNet

Service & Involvement

- Integral team member of the BYU Steel Bridge Competing team in weekly meetings and 2019 ASC Regional Steel Bridge Competition where the team took first place and won 6 out of 7 award titles
- Assistant Orchestra Manager for the Utah Millennial Choirs and Orchestra; help organize rehearsals, answer questions, and assured auditions ran smoothly and on time
- Secretary for the BYU American Rail Engineering and Maintenance-of-Way Association (AREMA) Student Chapter
- Spent two weeks in Belize building a school; helped teach children English, dug and poured a foundation, and worked with rebar to build structural walls
- Served as a full-time Missionary for the Church of Jesus Christ of Latter-day Saints for 18 months in Pennsylvania