



I-475 Reconstruction North Segment

Project Overview

Civil Express's goal is to enhance community connections through the improvements of deteriorating infrastructure. The I-475 Reconstruction Project delivers a revitalization of the transportation and Flint City area needs.

- Construction Engineer -
- Transportation Engineer -
- Water/Environmental Engineer -
- Structural Engineer -

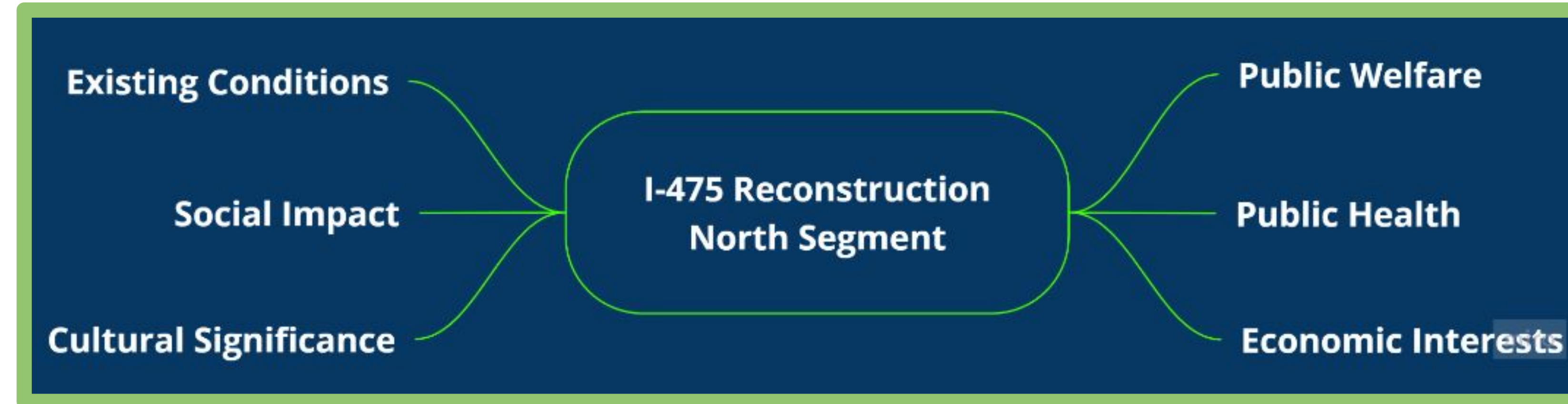
Public Health, Safety, and Welfare

- Overall Focus on the improvement of road conditions and alterations to the Dort Highway and Stewart Avenue Intersection.
- Improved Highway Conditions for vehicular use.
- The roundabout installation will decrease the delay time of the intersection, and help reduce the amount of vehicular crashes that have been previously observed involving sideswiping and turning.
- Decrease use of electric traffic signals for the roundabout will assist with use of the intersection with the high amount of power outages observed in this part of Flint.
- The park space will allow for an area of rest and connection for the bike trails to vehicular traffic.

Cultural Statement

- This project will impact the culture of Flint because it will help emphasize good social behaviors and activities.
- The development of the park space will encourage community unity and development.
- Civil Express has defined the installation of the park space as an area of encouraging citizen activity with both more space for general community events, but also as a connection point between vehicle, pedestrian, and public bus transportation avenues.

Design Criteria and Justification



Sustainability

- Civil Express will implement the 3 R's initiative: Reduce, Recycle and Reuse.
- Steel recycling consists of shredding and melting it to create new metal sheets
- Old concrete to be recycled by breaking, removing, and crushing it from existing locations.
- The Low Impact Development (LID) technology for a roundabout use in the center circle to plant vegetation and create an engineered medium.
- Extraction of trees for park with minimal demolition of surrounding trees.
- The park would also use long-lasting materials, easy-to-maintain plants and landscaping, organic mulch, and recycling bins for park patrons.

Professional Collaboration

- Industry Professionals and Faculty Advisors provided support and recommendations throughout the project deliverables. Utilization of (4) presentations to faculty and engineering professionals, (2) industry technical breakout sessions with professionals, (5) reports, (32) meetings with student team members and faculty, and (2) display board submittals encouraged further quality to engineering designs and solutions.
- (27) professionals have involved themselves in the capstone design course.
 - (24) P.E Licensed Professionals
 - (3) Non-P.E Licensed Professionals
- (8) Faculty Members for mentorship and resource management.

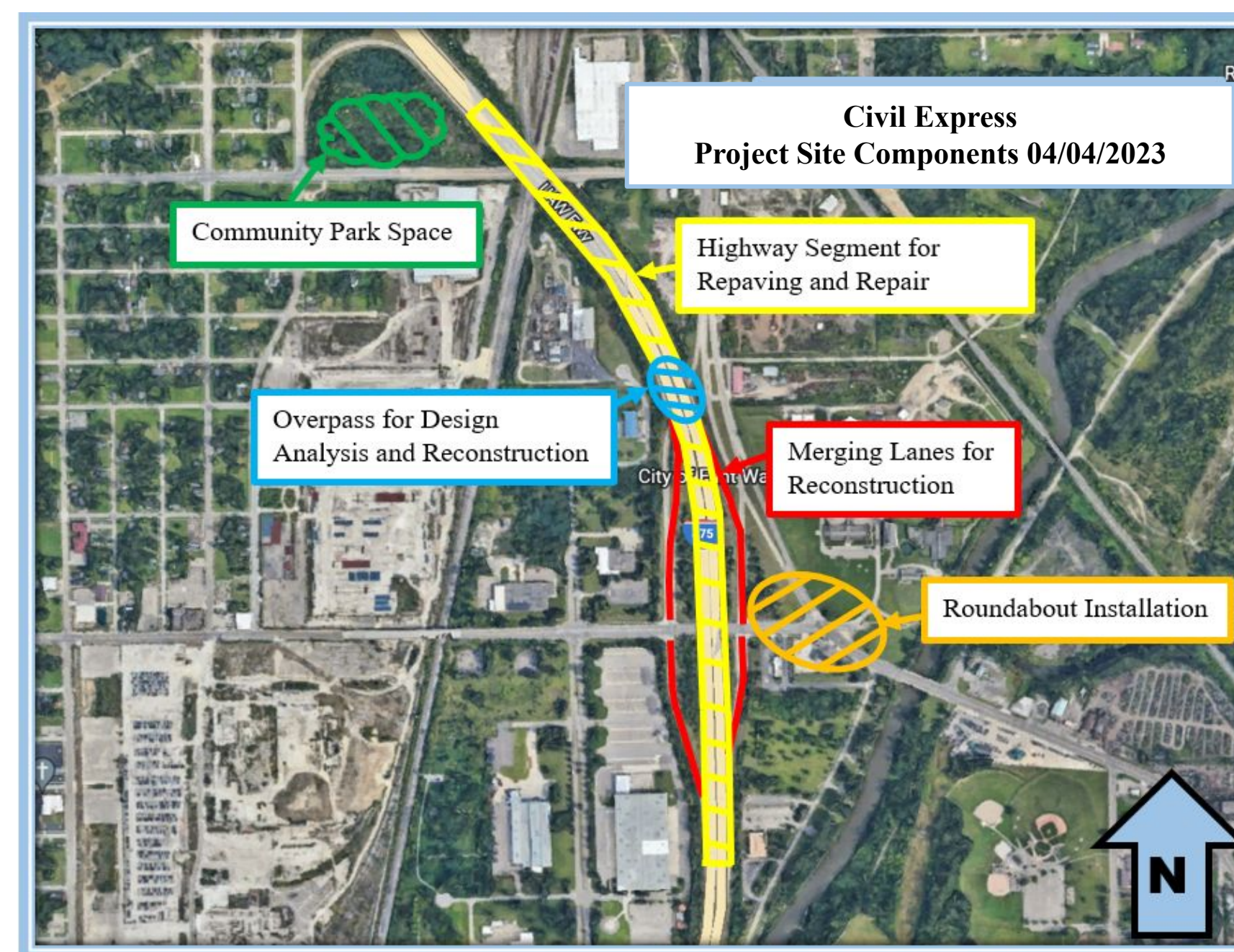
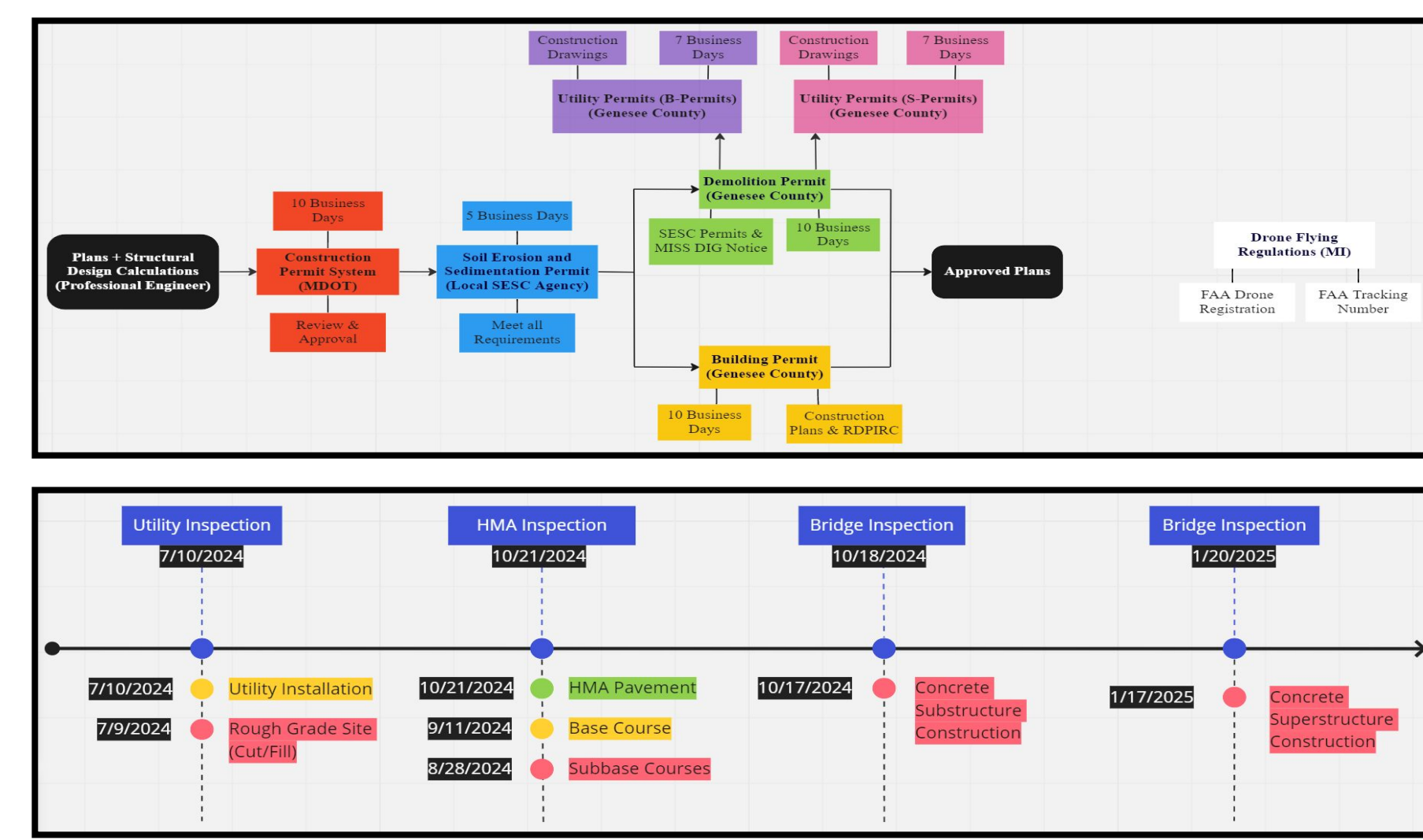
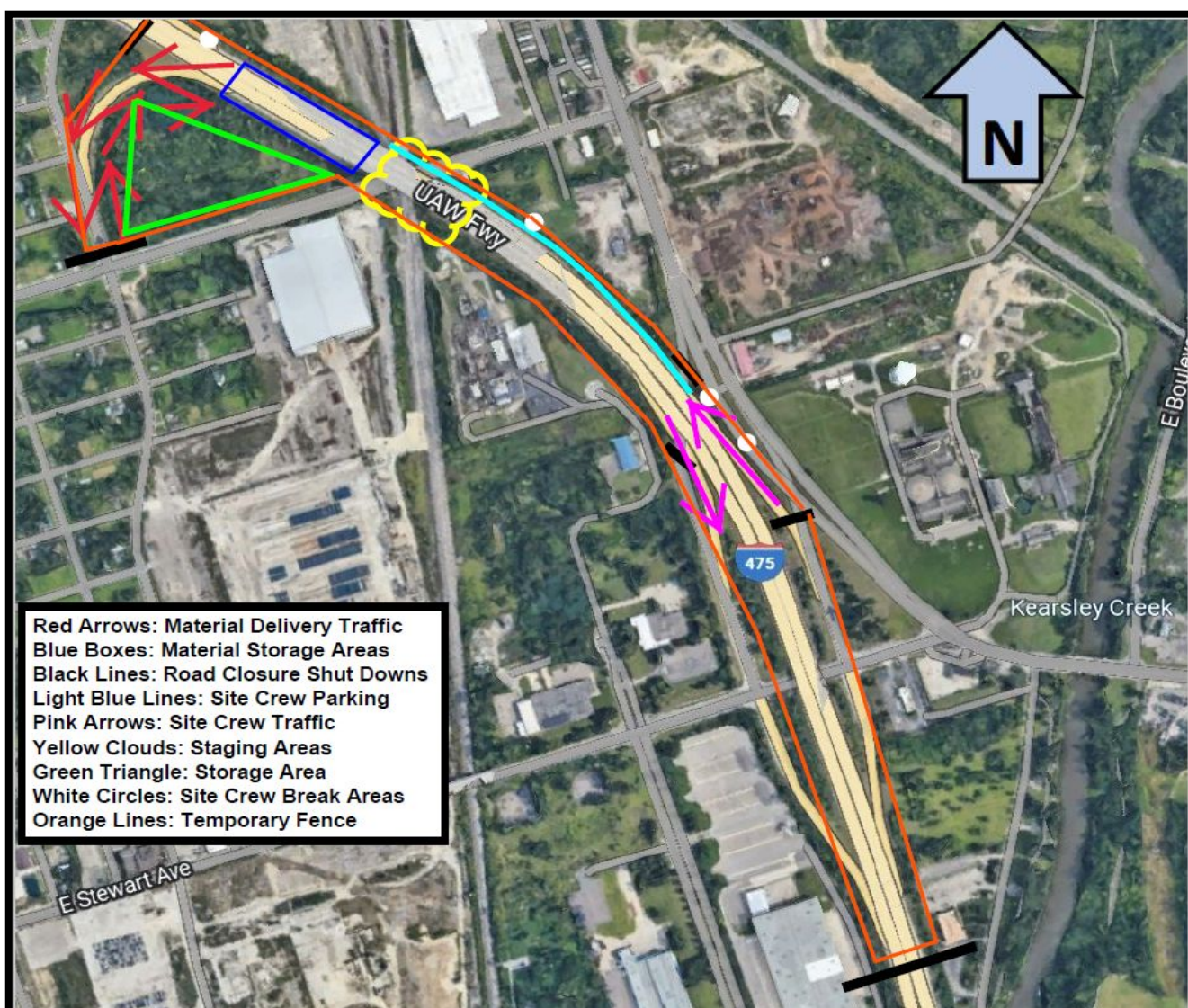
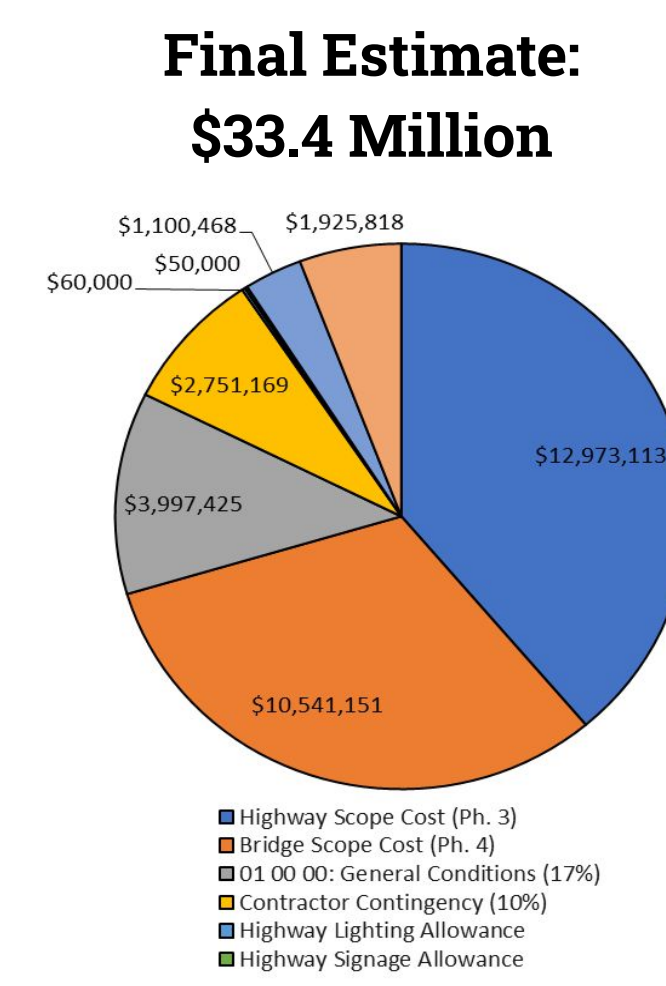
Skills Gained and Developed

- Development of soft skills in student collaboration emphasizing problem solving, professional communication, critical thinking, empathy, adaptability, and time management.
- Use and Enhancement of Project Deliverables through technical ability in:
 - Microsoft Office Applications
 - Revit
 - Mathcad 15
 - MDOT TDMS
 - Rodel
 - EPA SWMM
 - Autocad
 - StormCAD

Construction Scope of Work

- Scope Management
- Detailed Final Estimate
- Schedule Management
- Permitting & Approval Plan
- SUE Plan - Quality Level B
- Logistics Plan
- Safety Plan

Item	Description	Quantity	Unit	Price	Percentage	Parent Item
1	Final Estimate	1	Sum	\$33,340,000	100%	
2	Construction	1	Sum	\$28,500,000	85.5%	
3	Professional Fees	1	Sum	\$4,840,000	14.5%	

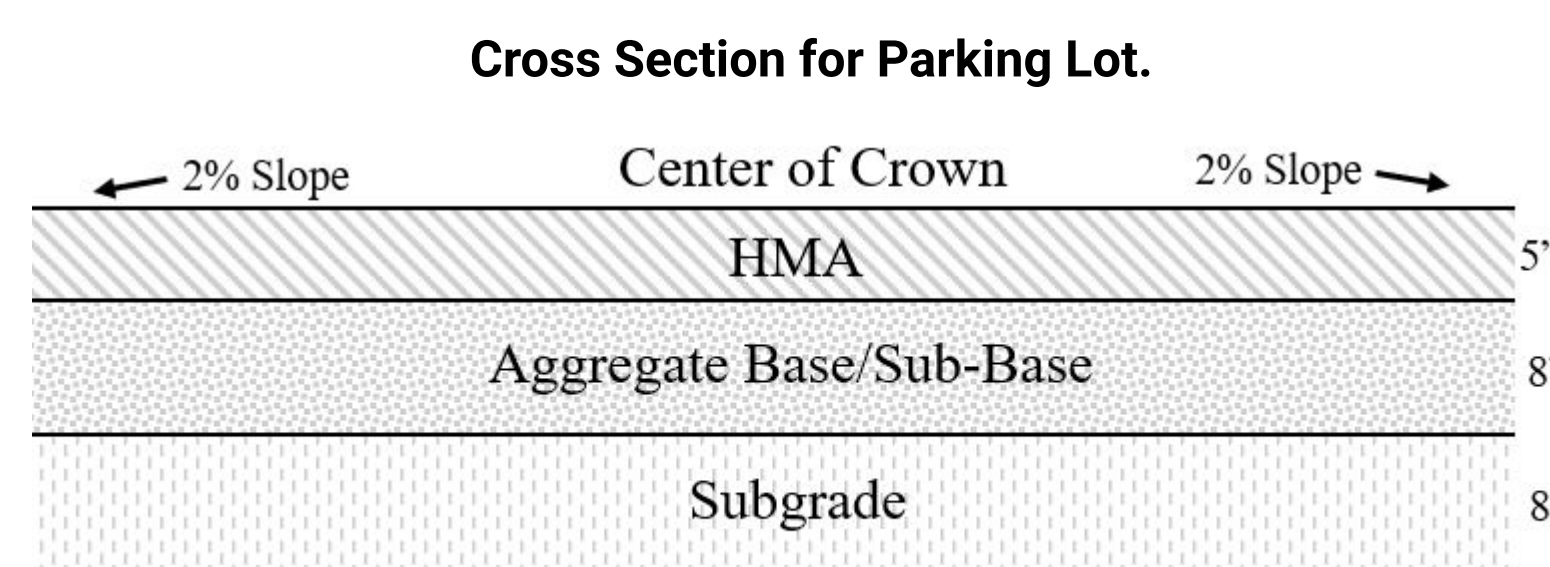


Project Components

- Roundabout Installation at Dort Highway and Stewart Avenue
- 4500' Highway Pavement Reconstruction
- Bridge Redesign for Dort Highway Overpass
- Merging On and Off Ramps for Stewart Avenue
- Community Park Installation at Pierson Road

Transportation Scope of Work

- Geometric Designs
 - Parking Lot
 - Roundabout
- Flexible Pavement Designs
 - Component Values
 - Parking Cross Section
- Sight Lighting Needs



	Exact	Approximate
HMA Layer (D1)	6.36"	7.0"
Base Layer (D2)	12.27"	14"
Subbase Layer (D3)	12.40"	14"

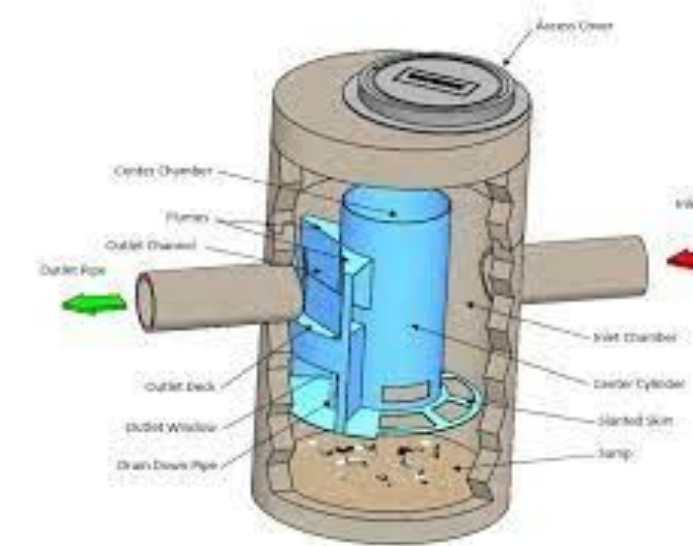
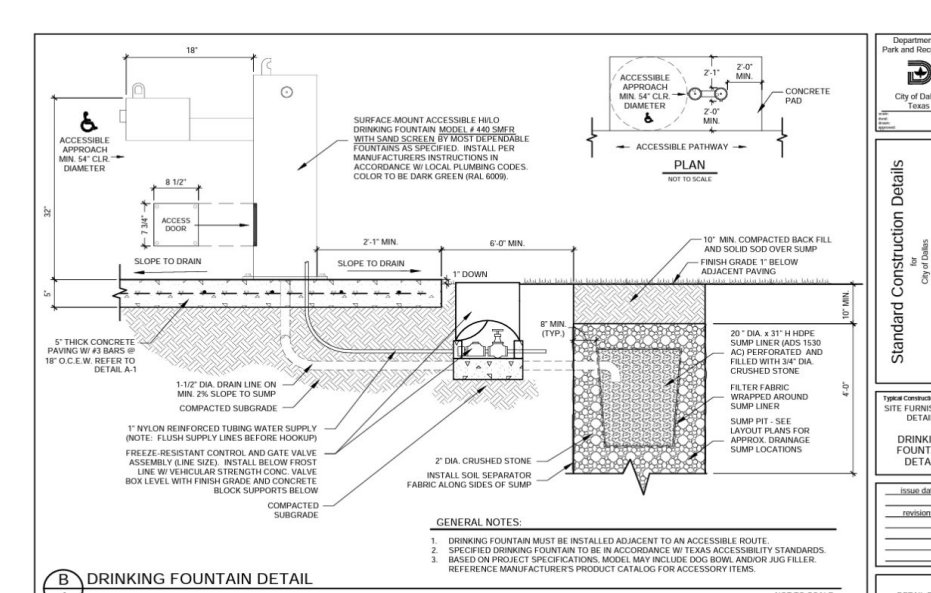
	Exact	Approximate
HMA Layer (D1)	5.68"	6"
Base Layer (D2)	11.82"	12"
Subbase Layer (D3)	12.95"	14"

	Exact	Approximate
HMA Layer (D1)	4.77"	5"
Base Layer (D2)	7.14"	8"
Subbase Layer (D3)	6.91"	8"

SKU	LEDMPALPRO140-5K-T3
Wattage	140 Watts
Delivery	16687 Lumens (119 LPW)
Power Factor	0.9
Type	V
Voltage	120-277 AC Voltage

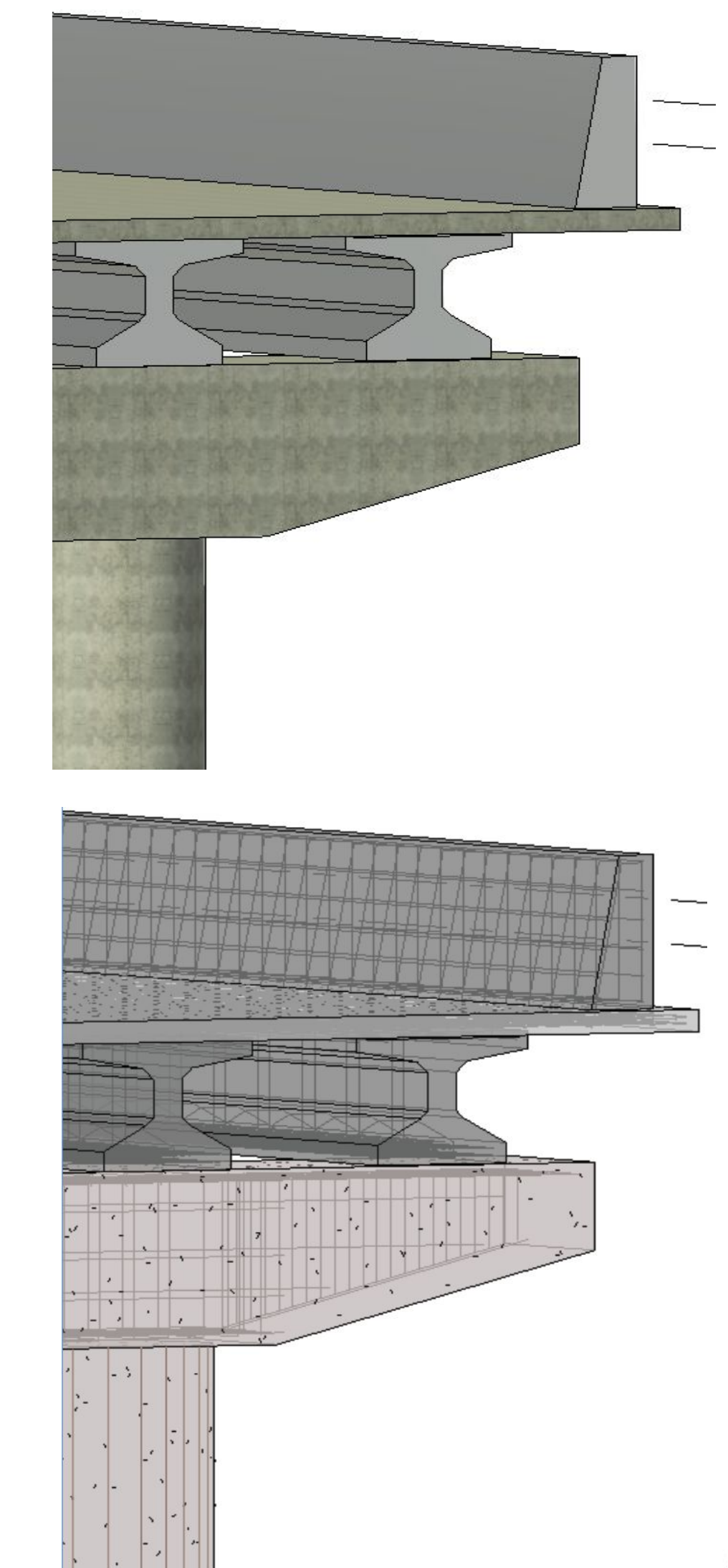
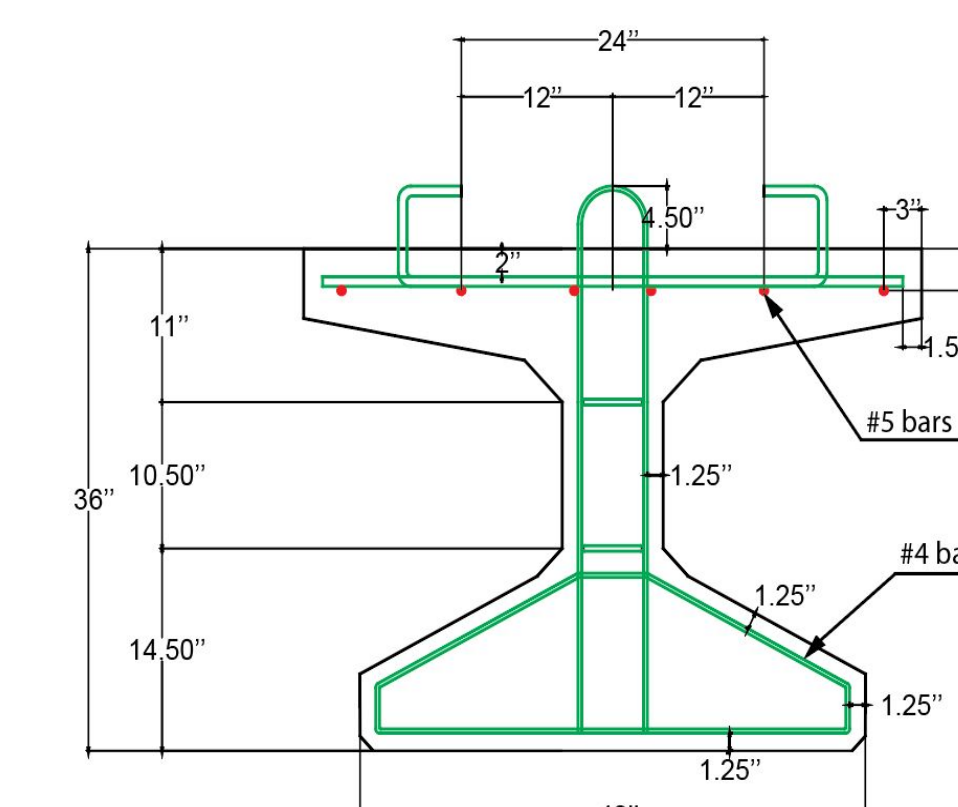
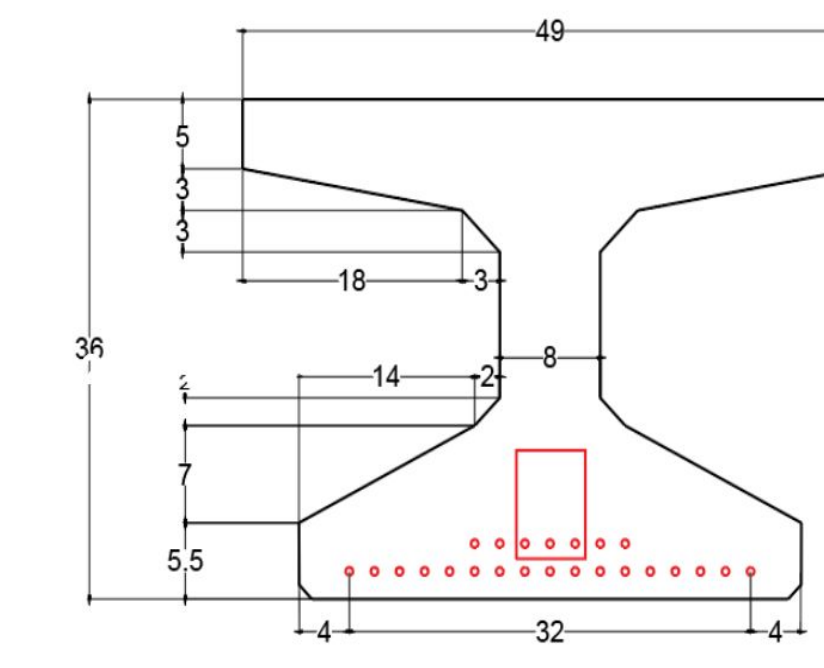
Environmental Scope of Work

- Pollution Management
 - Sedimentation Control
 - Surface Water Pollution
- Community Park Water Main Design
- Community Park Wastewater Design



Structural Scope of Work

- Load Analysis
- Superstructure
 - Live Load Distribution
 - Beam, Deck and Overhang Design
- Substructure
 - Load Distribution
 - Pier Cap, Pier Columns, Footing Design
- Minor Soil Evaluations



Water Resources Scope of Work

- Impact on Surrounding Stormwater
- Site Topography Examination
- Sewer System
 - StormCAD and EPA SWMM
- Implementation of BMPs
 - Bioretention Cells
 - Detention Pond

