



Redevelopment of Broad Channel American Park in Queens, NY

...

Sonny Lopez, Emily Oberman, Zachary Pacenza (Team Leader)

Advisors:

Dr. Thomas Brennan, Dr. Vedrana Krstic, Sheena Lu (Industry
Advisor), Rebecca Mazzolla (Industry Advisor), Peyton Taylor (Industry
Advisor)

Overview

1. Site Overview and Problem Statement
2. Design Standards and Modern Engineering Tools
3. Realistic Constraints
4. Design Constraints
5. Alternative Designs
6. Design Selection Matrix
7. Schedule
8. Engineering Cost Estimate
9. Conclusion



Site Overview



Problem Statement

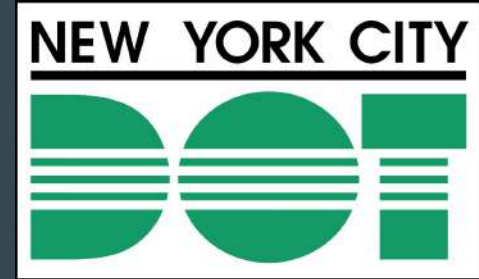
- Queens Community District 14: Fiscal Year 2026 Community District Needs
 - Address frequent flooding
 - Enhance recreation areas and green space



Design Standards and Specifications

Transportation:

- NYCDOT Standard Highway Specifications
- NYCDOT Street Design Manual



Site/Civil:

- NYC Building Code
- ASCE 24-14: Flood Resistant Design and Construction
- NYSDEC BMP Manual



Geotechnical:

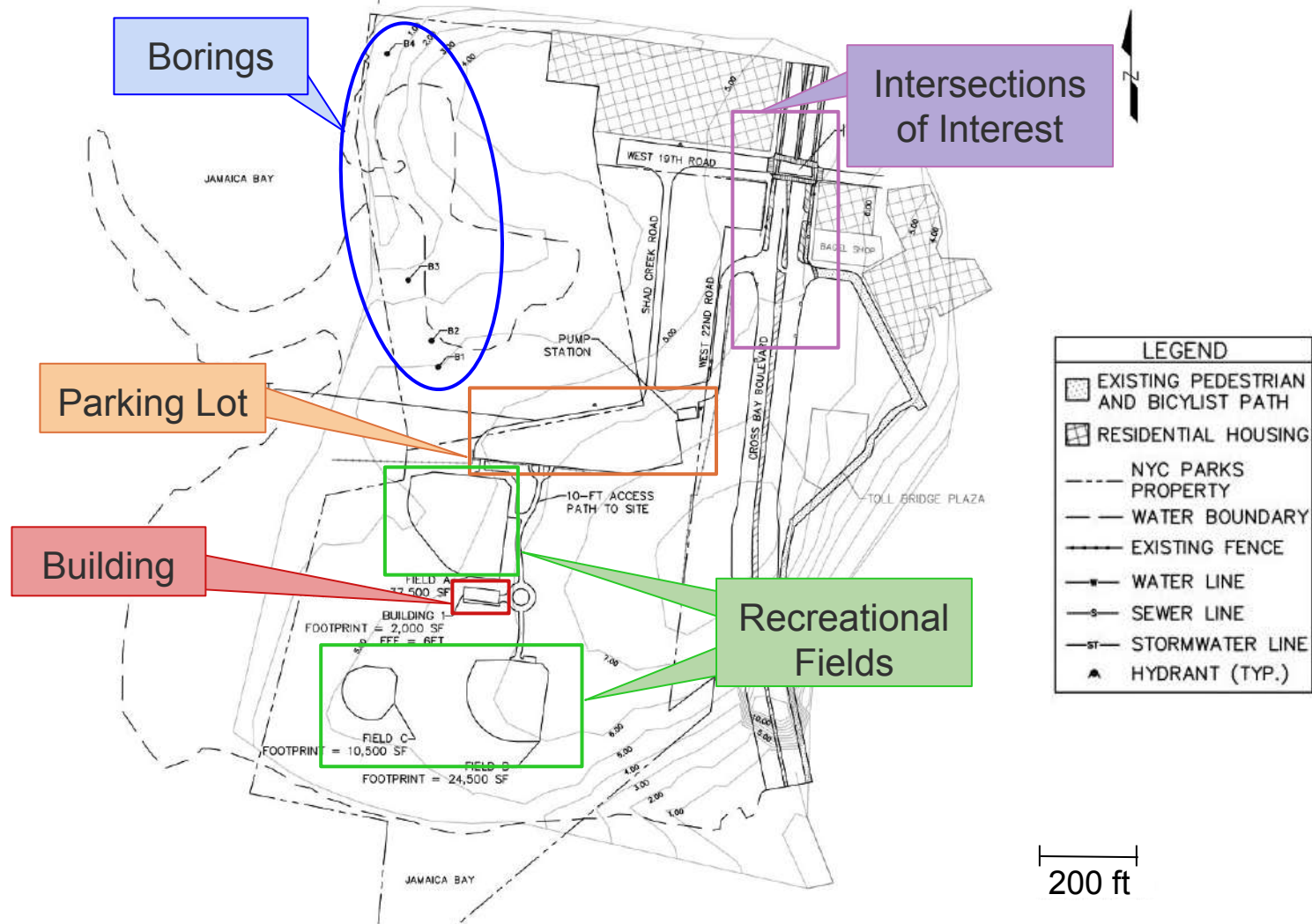
- ASTM Standard Specifications

Modern Engineering Tools

- Synchro (Transportation)
- GIS (Site/Civil)
- SPW911 (Geotechnical)
- AutoCAD (Drafting)



ArcGIS



Realistic Constraints

- Community needs
- Constructability
- Economic
- Environmental
- Health and Safety
- Sustainability
 - Envision



Transportation Design Constraints - Existing Traffic Layout

Bike Lane

W 20th Rd.

Shad Creek Rd.

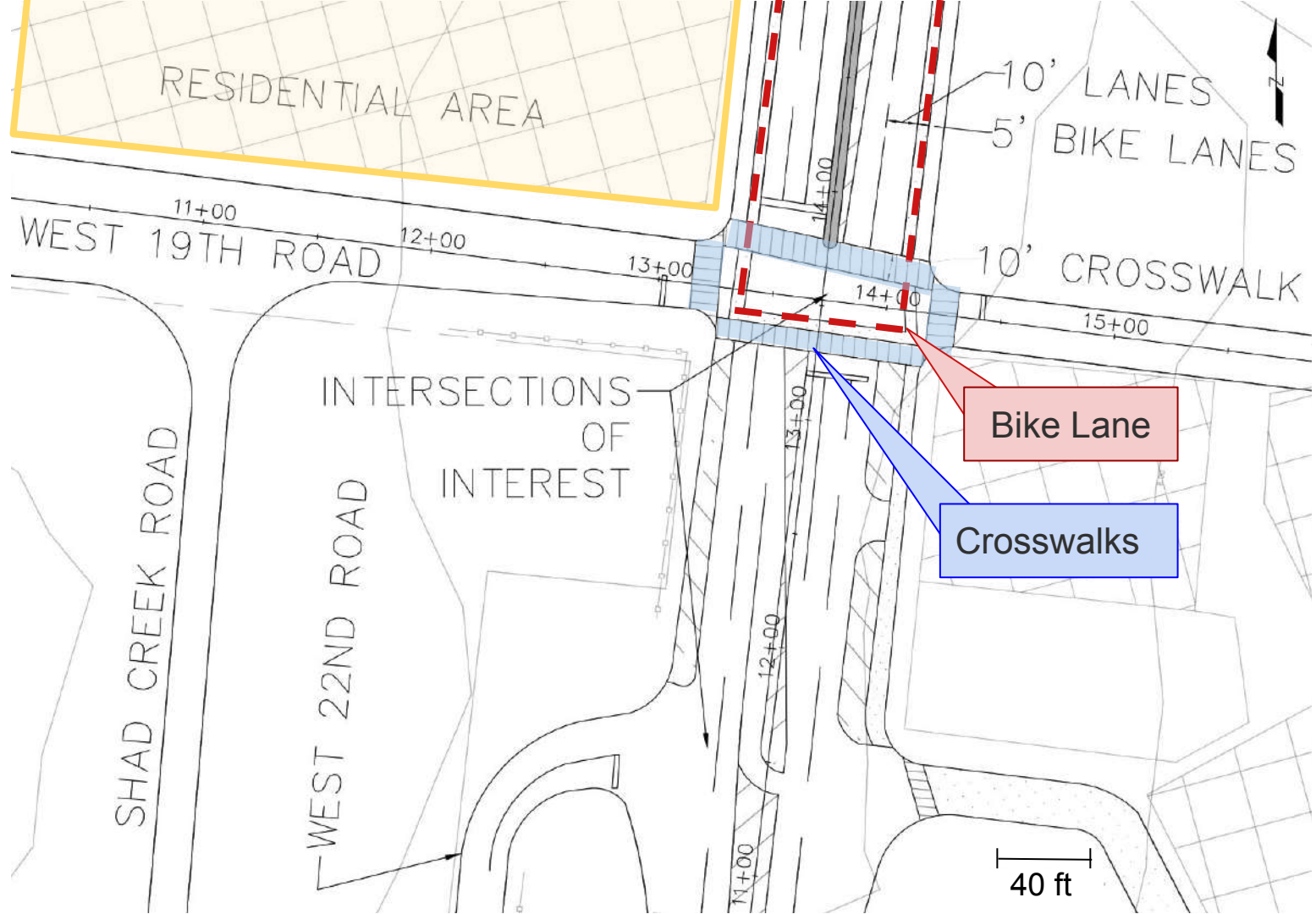
Parking Lot

W 22nd Rd.

Cross Bay Blvd.

Cross Bay Veterans Memorial Bridge

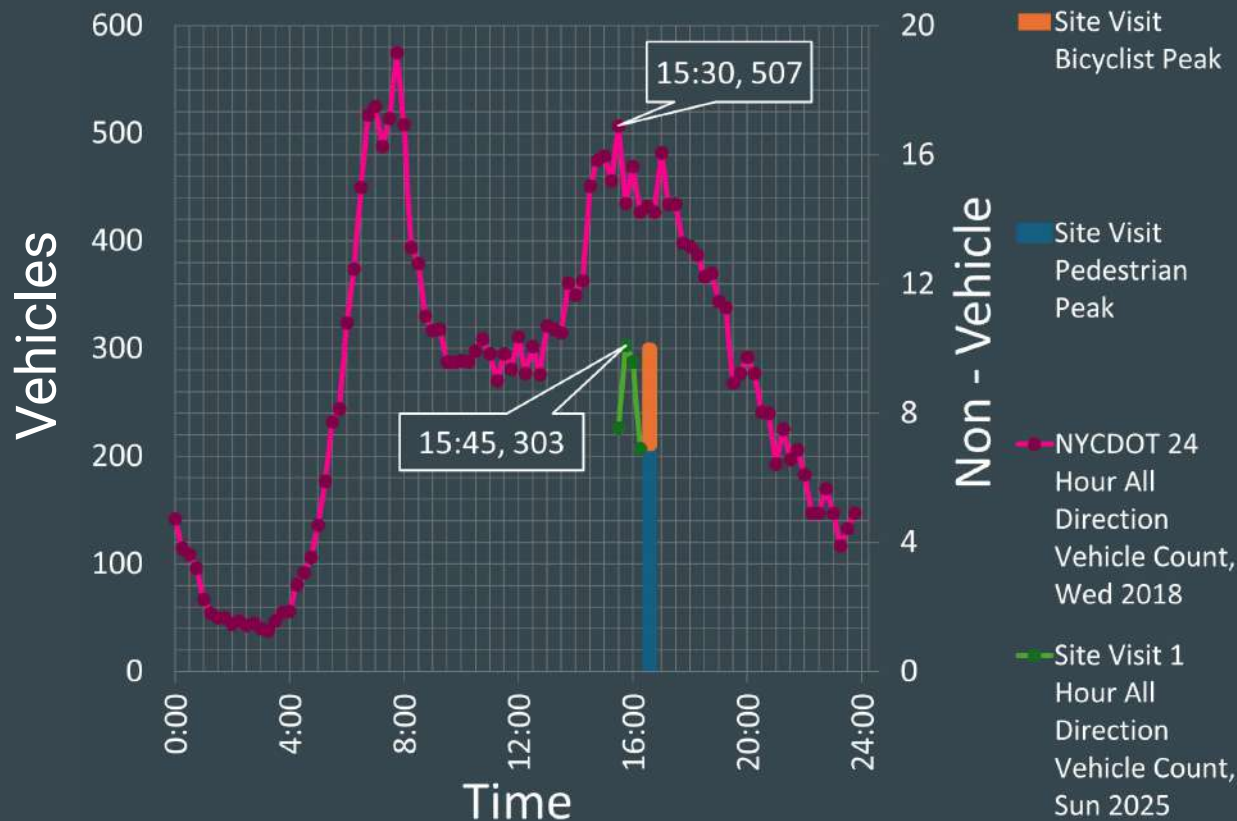


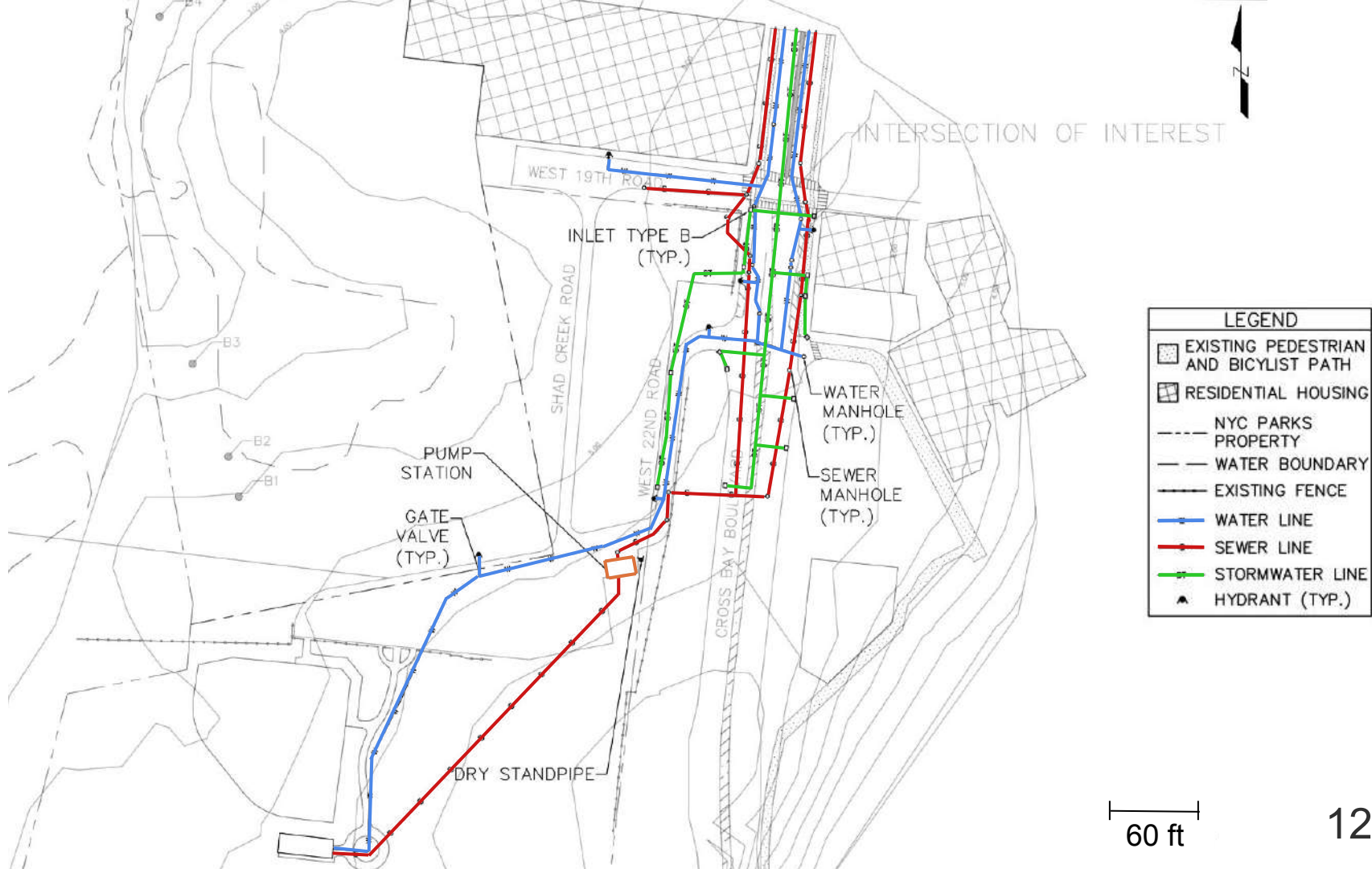


Existing Traffic Volumes



Transportation Design Constraints - Vehicle Counts at Cross Bay Blvd. : All Directions





Site/Civil Design Constraint - Wetlands Map



LEGEND	
	NYSDEC 1974 Tidal Wetlands

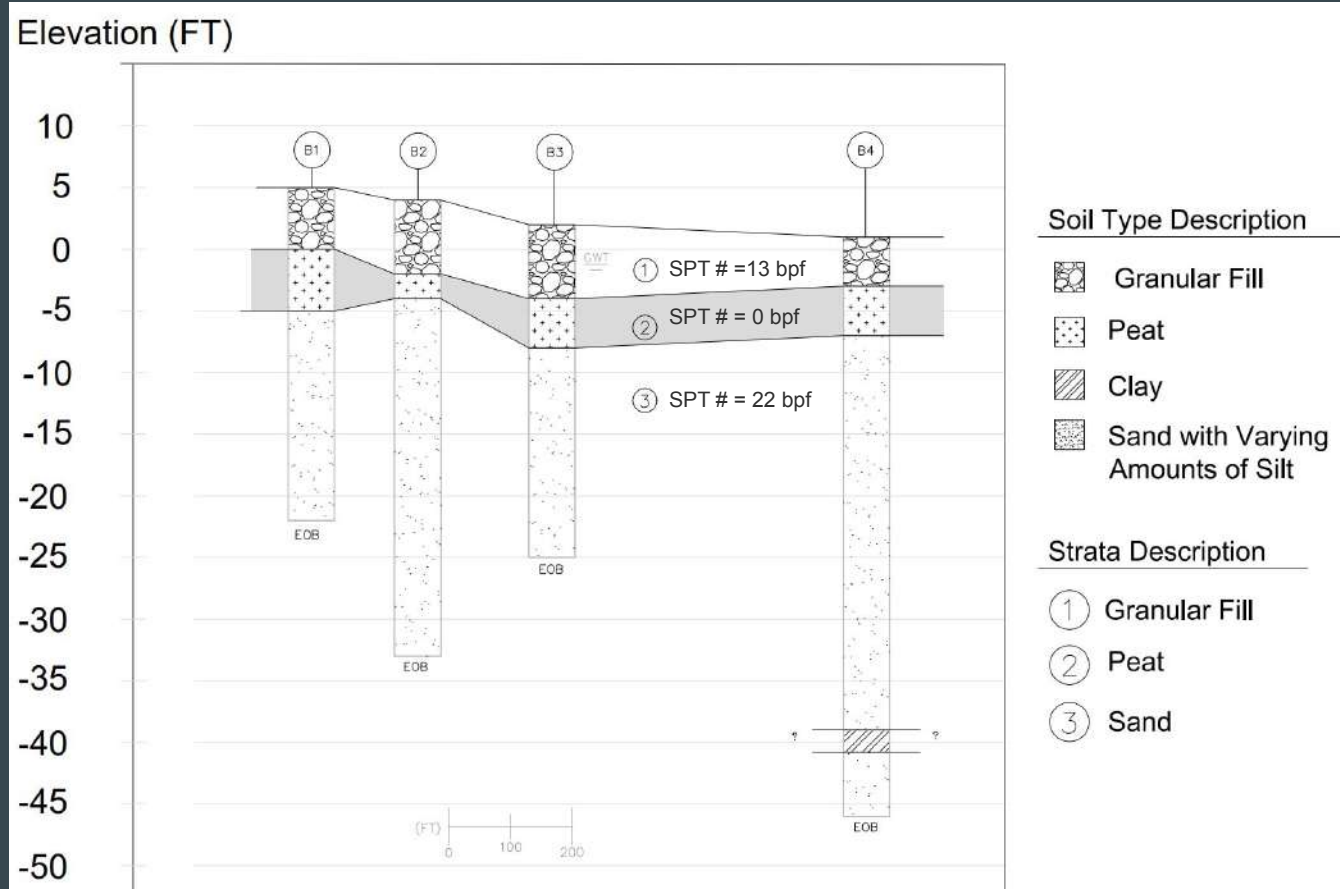
Source: NYSDEC

Site/Civil Design Constraint - FEMA Flood Map

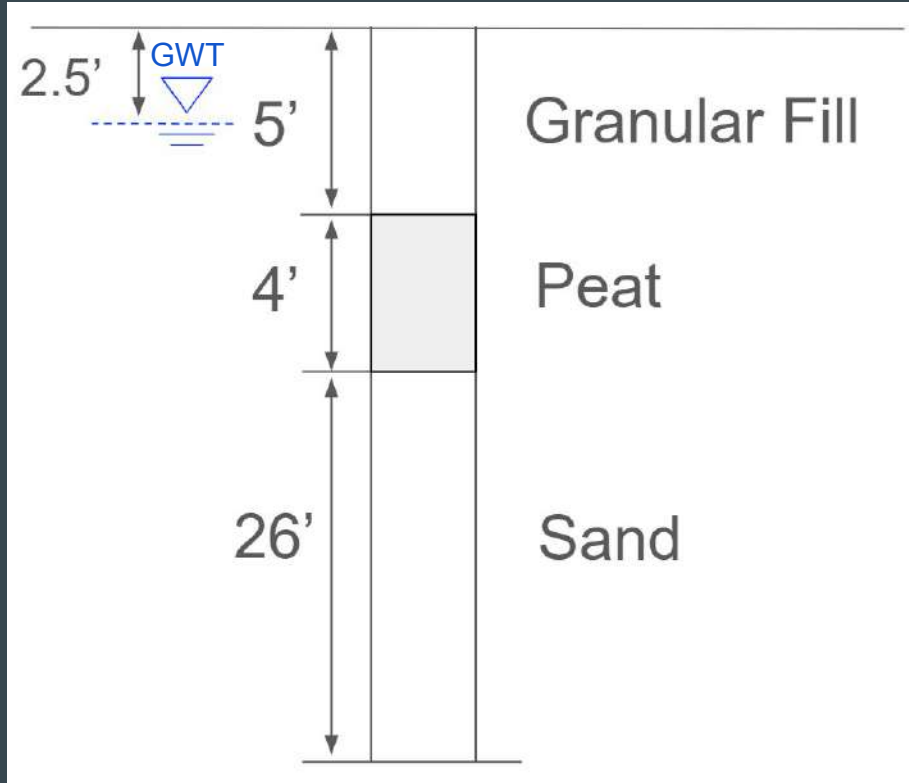


Source: FEMA (2007)

Geotechnical Design Constraint - Soil Profile



Geotechnical Design Constraint - Design Soil Profile and Properties



Design Soil Properties				
Granular Fill				
γ	115 pcf		C_R	0.0125
Φ	33°		R_R	0.0125
Peat				
γ	100 pcf		c	200 psf
C_R	0.17		C_α	0.011
R_R	0.034		c_v	0.04 ft ² /day
Sand				
γ	120 pcf		C_R	0.0154
Φ	34°		R_R	0.0154

Alternative 1

1000 ft



Alternative 2

1000 ft



Alternative 3

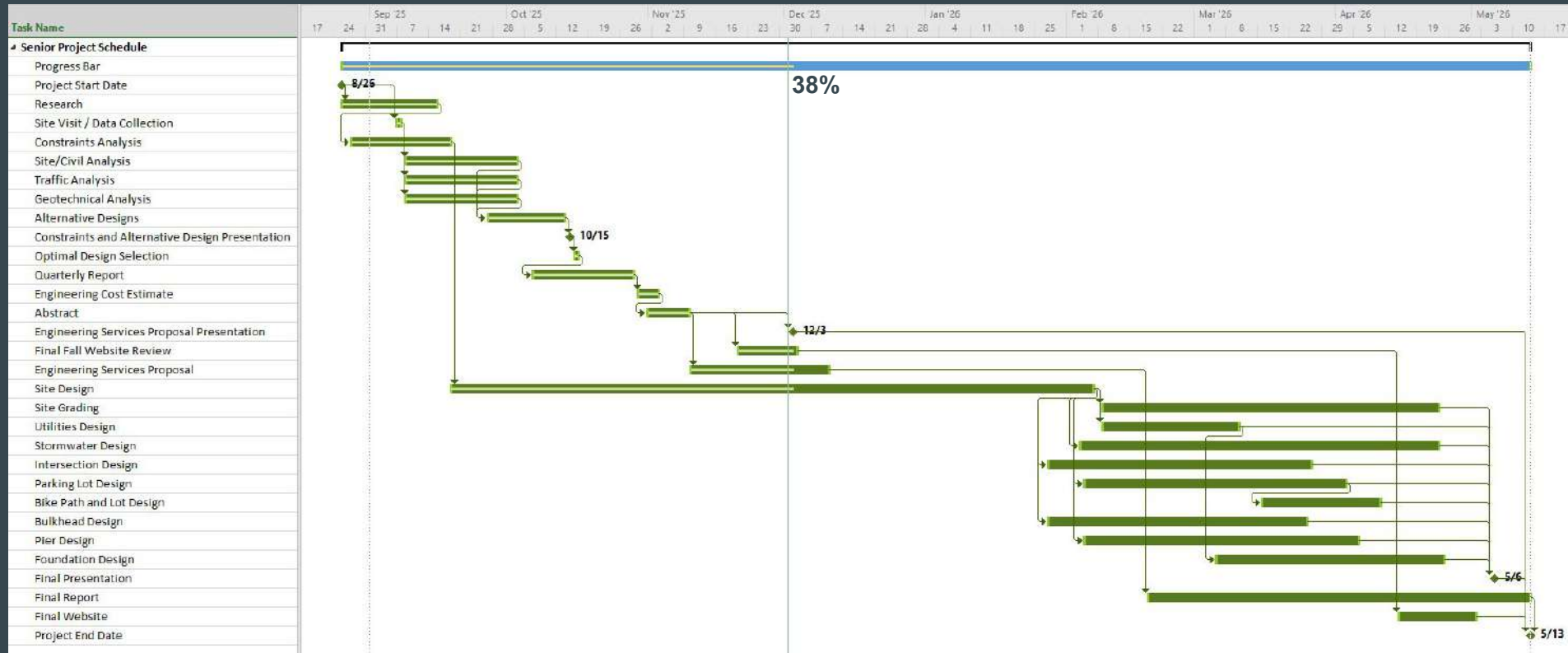
1000 ft



Design Selection Matrix

Criteria	Weight	Alternative 1		Alternative 2		Alternative 3	
		Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Space Flexibility	6	1	6	2	12	3	18
Constructability	5	3	15	1	5	2	10
Pedestrian/Cyclist Safety	4	1	4	2	8	3	12
Cost	3	3	9	1	3	2	6
Environmental	2	3	6	2	4	1	2
Site Sustainability	1	1	1	3	3	2	2
Total Score			41		35		50

Schedule



Final Engineering Cost - Fall Semester

Task	Dr. Thomas Brennan	Dr. Vedrana Krstic	Sheena Lu	Rebecca Mazzolla	Peyton Taylor	Zachary Pacenza	Emily Oberman	Sonny Lopez
	Engineering Director	Engineering Director	Consultant Advisor	Consultant Advisor	Consultant Advisor	Project Engineer	Design Engineer	Design Engineer
Fall								
WSP Team Meetings	3	3	3	3	3	3	3	3
Site Visit	0	0	0	0	0	8	8	8
Research	1	2	0	0	0	3	3	3
Proposal Presentation	0	1	0	0	0	4	4	4
Traffic Analysis	1	0	0	0	0	0	0	6
Site/Civil Analysis	0	0	0	0	0	12	0	0
Geotechnical Analysis	0	4	0	0	0	0	10	0
Alternative Designs	1	2	0	0	0	6	6	6
Constraints and Alternative Design Presentation	1	2	0	0	0	7	7	7
Design Selection	0	0	0	0	0	1	1	1
Quarterly Report	0	0	0	0	0	6	6	7
Engineering Cost Estimate and Schedule	0	0	0	0	0	1	1	1
Engineering Services Proposal	2	2	0	0	0	9	9	9
Engineering Services Proposal Presentation	2	2	0	0	0	10	10	10
Total								
Total Hours	11	18	3	3	3	70	68	65
Hourly Rate	\$95.00	\$95.00	\$100.00	\$100.00	\$100.00	\$36.00	\$33.00	\$33.00
Total Individual Rate	\$1,045.00	\$1,710.00	\$300.00	\$300.00	\$300.00	\$2,520.00	\$2,244.00	\$2,145.00
						Total Cost		\$10,564
						Overhead	250%	\$26,410
						Fixed Fee	10%	\$3,697
						Expenses		\$190
						Contingency	10%	\$1,075
						Total		\$42,000

Estimated Engineering Cost - Spring Semester

Task	Dr. Thomas Brennan	Dr. Vedrana Krstic	Sheena Lu	Rebecca Mazzolla	Peyton Taylor	Zachary Pacenza	Emily Oberman	Sonny Lopez
	Engineering Director	Engineering Director	Consultant Advisor	Consultant Advisor	Consultant Advisor	Project Engineer	Design Engineer	Design Engineer
Spring (Projected)								
WSP Team Meetings	3	3	3	3	3	3	3	3
Intersection Design	4	0	0	0	0	0	0	7
Parking Lot Design	2	0	0	0	0	0	0	8
Foundation Design	0	6	0	0	0	0	8	0
Bulkhead Design	0	5	0	0	0	0	6	0
Pier Design	0	5	0	0	0	0	7	0
Site Grading Design	3	0	0	0	0	10	0	0
Site Drainage Design	2	0	0	0	0	8	0	0
Final Report	2	4	0	0	0	10	10	10
Final Presentation	1	2	0	0	0	6	6	6
Total								
Total Hours	17	25	3	3	3	37	40	34
Hourly Rate	\$95.00	\$95.00	\$100.00	\$100.00	\$100.00	\$36.00	\$33.00	\$33.00
Total Individual Rate	\$1,615.00	\$2,375.00	\$300.00	\$300.00	\$300.00	\$1,332.00	\$1,320.00	\$1,122.00
						Total Cost		\$8,664
						Overhead	250%	\$21,660
						Fixed Fee	10%	\$3,032
						Expenses		\$190
						Contingency	10%	\$885
						Total		\$34,500

Conclusion

Site/Civil:

- Grading and stormwater management to reduce flooding
- Site utilities

Transportation:

- Redesign parking and pedestrian/cyclist path
- Redesign intersection

Geotechnical:

- Foundations, pier, and bulkhead designs



Thank you! Questions?

